

6.

Regional differences

in trade

and the impact

of location

on trade patterns

Authors

Marjolijn Jaarsma

Roos Smit

International trade in goods is not merely an activity of enterprises in the Randstad. Limburg and Noord-Brabant are also quite active in trade in goods. Proximity to borders, the presence of mainports, sectoral composition and many other regional characteristics have an impact on the incidence of trading and on the trade portfolio of a region. Limburg and Noord-Brabant, Gelderland, Flevoland and Overijssel are far more likely to trade. Enterprises in Noord-Brabant, Flevoland and Overijssel also enjoy a higher than average trade value, when correcting for province and enterprise characteristics. This implies that there are specific advantages to traders in these regions of which location is one.

6.1 Introduction

When we think of international trade the Port of Rotterdam immediately comes to mind. In 2012, 441.5 million metric tonnes were loaded and unloaded in more than 7 million containers (Port of Rotterdam, 2012). Some 12 percent of Dutch imports and 18 percent of Dutch exports of goods pass through Rotterdam. Amsterdam and the Haarlemmermeer with Schiphol airport, together accounted for another 12 percent of imports and exports in 2012. Even though these cities play a crucial role in Dutch international trade, this is not the entire picture. Other regions also contribute to the Dutch international trade and, in turn, are relatively dependent on international trade for their economic growth (see chapter 7). International trade is not only beneficial for the economy as a whole, but also for individual regions and provinces since it creates employment and higher productivity (Ministry of Infrastructure and the Environment 2013; Dumont et al., 2010).

In the 2012 edition of the Internationalisation Monitor we made a start with breaking down trade information at the national level to the regional level (Braams et al., 2012). One of the main conclusions was that while most of Dutch trade value can be attributed to enterprises in the Randstad, Limburg and Noord-Brabant house relatively the most internationalised firms. In this chapter, we build on this line of research by investigating to what extent the location of a firm contributes to the degree of internationalisation of an enterprise. Some regions are highly specialised in terms of activities, while others are very complementary in terms of buyer-supplier networks and relatedness between industries (Diodato and Weterings, 2012). Such characteristics can influence the extent to which regions are active in trade but it can also determine their trade pattern. Combining this with regional differences in enterprise population and the impact of foreign firms, we

wonder to what extent the region in which an enterprise is located influences its international trade. Is the likelihood of being involved in international trade equal for all regions and can location “add” to trade value?

The outline of this chapter is as follows. Section 6.2 illustrates which data were used to investigate regional difference in trade and trading behaviour. Then section 6.3 continues by providing an overview of Dutch international trade broken down by province. The main trading partners and products traded by provinces are pitted against the general Dutch trade pattern. Regional characteristics such as sectorial specialisation or the prevalence of foreign controlled firms, and the consequences this has for the trade pattern of a region is the topic of section 6.4. In section 6.5 we combine regional and enterprise characteristics in a regression analysis in order to distil a statistical effect of location on the internationalisation of an enterprise. First we test whether location has an impact on the likelihood that an enterprise trades, while controlling for other factors. Second, we want to determine if location also influences trade value when enterprises are otherwise comparable. The chapter is wrapped up with a short summary of the main results and suggestions for further lines of research.

6.2 Data and methodology

In order to illustrate the international trade pattern of Dutch regions, datasets from several sources needed to be combined. First of all, data from the international trade in goods statistic of 2012 was matched to the General Business Register of 2012. We based our analyses and descriptive statistics on 2012 since the results are not likely to vary widely over a short period of time. These actions resulted in a dataset with information at the level of the enterprise, including their characteristics such as size and economic activity, whether or not they reported trade in 2012 and if so, the countries with which they traded and the products that were traded.

To determine the exact geographical location of the trader, this dataset of enterprises was disaggregated even further, to the level of the local business unit. In most cases, an enterprise is small and consists of one local business unit. If an enterprise is made up of more business units, these are very often located in the same province. In those cases where the business units are spread over several provinces, respective trade values were assigned according to size and sector. The analyses in this chapter are based on the level of the province, in order to avoid too much data manipulation.

Foreign control is also an enterprise characteristic with a significant impact on the likelihood of trade and its trade pattern (Jaarsma and Lemmens-Dirix, 2010). Even though only roughly 5 percent of trading enterprises are foreign controlled, they carry out approximately half of the imports and exports. We determined whether a business unit is foreign controlled further up the chain of command based on the concept of UCI. Foreign controlled enterprises are not evenly spread across the Netherlands. They are relatively often found in the Randstad area and other large cities in the Netherlands. As such, we expect to see that regions where there is a relatively large concentration of foreign controlled enterprises more trade is carried out by such firms. All these efforts resulted in a dataset comprising more than 1.7 million business units of which almost 400,000 business units belonged to enterprises with international trade in 2012. This dataset was used to make our descriptive statistics.

In order to statistically assess the impact of geographical location on internationalisation and determine whether there are regions where enterprises are more likely to trade and have large trade values, we added extra enterprise information to the dataset. We want to control for characteristics that also influence trade and/or trade size to somewhat isolate the effect of location on likelihood and size of trade. For each business unit we determined its main trading partner as well as its main product traded. This allows us to compare traders in terms of orientation with respect to country and product. Additionally, we included the number of jobs at a business unit in the analysis. This provides an additional indication of firm size (a business unit can be small but can be part of a large enterprise, which could have an impact on its degree of internationalisation). Lastly, we added turnover to the dataset.

6.3 Descriptives on international trade in goods by province

Overview of international trade in goods by province

Table 6.3.1 provides an overview of the Dutch international goods trade per province in 2012. As is to be expected, the provinces where the mainports Rotterdam and Schiphol are located have the most international commodities trade. Areas where important transport hubs and mainports are located are very important to the local economy due to their contribution to employment and to

the infrastructure that surrounds these transport routes, which attracts additional entrepreneurial activity.

With the Port of Rotterdam as its mainport, the province of Zuid-Holland is the largest trader in the Netherlands. In 2012, the import value of goods topped 95 billion euros and exports exceeded 78 billion euros. Noord-Holland is the second largest trader, with almost 57 billion euros in imports and almost 63 billion in exports. Drenthe, Friesland and Flevoland are the provinces with the lowest amount of international trade.

Table 6.3.1 also shows that there are significant differences in the incidence of trading. In some provinces establishments are more active in international trade in goods than in others. Limburg is the province with relatively the most international traders in its population of local business units, namely 40 percent in 2012. This concurs with the findings of the 2012 Internationalisation Monitor. The lowest share of traders is found in Friesland where less than one in five establishments engages in international trade in goods. Zuid-Holland and Noord-Holland both have a below average share of traders but a high trade value as some traders are very large.

6.3.1 International trade in goods per province, 2012

Province	Share of traders	Import value	Export value
	%	million euros	million euros
Drenthe	24	2,359	3,695
Flevoland	23	4,783	4,710
Friesland	19	3,122	4,254
Gelderland	26	20,597	23,026
Groningen	22	6,988	14,849
Limburg	40	22,061	23,929
Noord-Brabant	30	46,582	56,242
Noord-Holland	22	56,798	62,959
Overijssel	29	12,305	18,254
Utrecht	21	17,236	13,720
Zeeland	33	5,568	7,203
Zuid-Holland	23	95,417	78,457
Total	25	293,816	311,298

Source: Statistics Netherlands.

An important issue to keep in mind is that trade is not necessarily synonymous with value added and economic growth. The bulk of commodities enters and leaves the Netherlands at some border point, but these goods are not all destined for that region nor are they always produced there. For instance, products that are exported

via Rotterdam could very well be produced in Noord-Brabant, with value added and employees in that region. Chapter 7 digs deeper into the regional distribution of the value added due to international trade.

Trading partners

Graph 6.3.2 shows the composition of provincial trade in terms of main trading partners. Germany has been the main trading partner for the longest time. This also holds true at the provincial level. The only exceptions are Zeeland, Groningen and Noord-Holland where Belgium, Norway and the US are the most important sources of goods respectively. Imports from China are very important for Noord-Holland and Flevoland, while Belgium is very important for traders in Limburg and Noord-Brabant. Groningen is somewhat of an outlier with respect to its trade pattern. For imports it relies heavily on mineral products from Norway as is shown in graph 6.3.2. Its exports consist mainly of mineral products and natural gas, which is largely supplied to other EU countries. Almost 40 percent of its exports go to Germany.

There is less diversification in provincial exports. Across the board, Germany is the most important destination of Dutch exports, followed by Belgium, France and the UK. Remarkable is the relative importance of other countries for Friesland. Middle-eastern countries are well-represented in the exports of Friesland, especially in the exports of food and live animals.

Products traded

Figure 6.3.2 also shows the composition of provincial imports and exports in terms of products (on SITC 1-digit level). The full definition of the SITC categories can be found in the glossary at the end of this publication. In general, machinery and transport equipment (SITC 7), mineral fuels (3) and chemicals (5) are the most important products traded by the Netherlands. This is also the case for most provinces. However, some provinces diverge significantly from this pattern. As mentioned, the imports and exports of Groningen mainly comprise mineral fuels (3), namely 60 percent of imports and 74 percent of exports. For Zuid-Holland, mineral fuels (3) are also relatively important. The presence of large storage units for fuel, oil and derivatives makes it possible for Zuid-Holland to trade large amounts of these products.

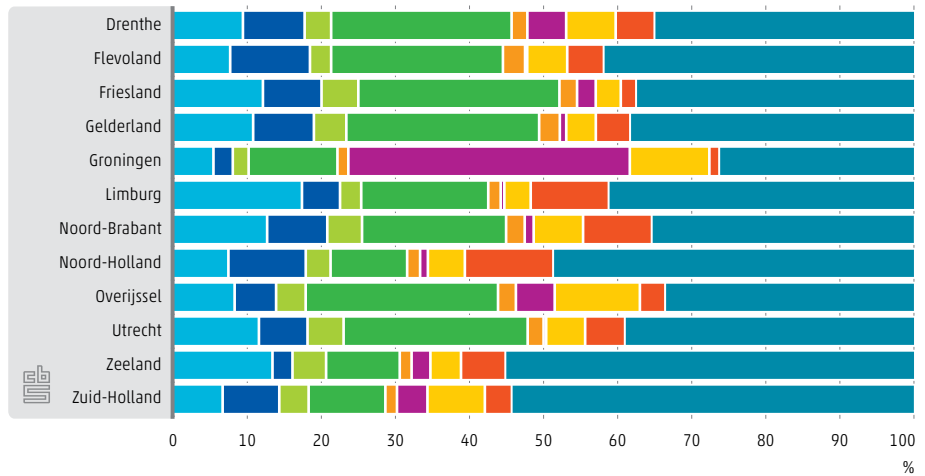
Chemical products (5) are important to the trade portfolio of Limburg, Overijssel and Zeeland. In these provinces, the chemical sector plays an important role in the local economy (as shown in 6.4.2) and as such this obviously also shows in the

international trade of these provinces. The exports of the three Northern provinces, Groningen, Friesland and Drenthe as well as Gelderland and Zeeland consist for a relatively large amount of food and live animals (0).

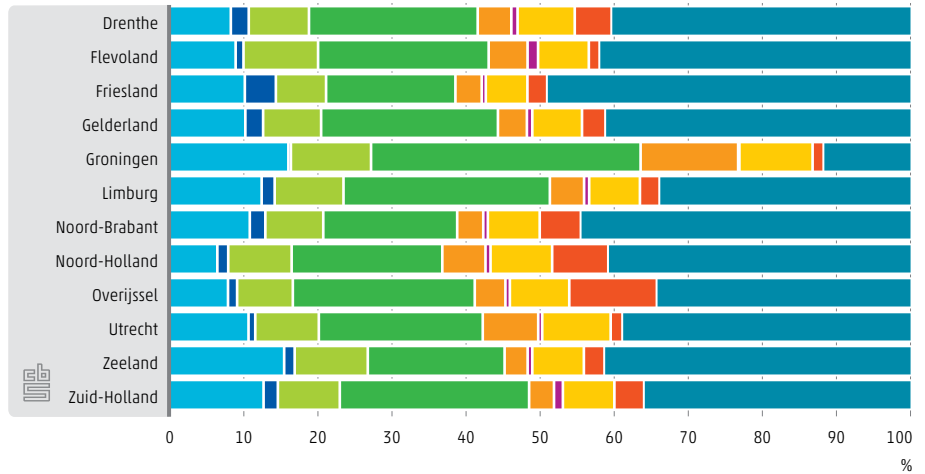
Summing up, figure 6.3.2 shows that trade partners and product portfolio vary between provinces due to specific specialisations and the presence of resources.

6.3.2 Composition of trade by partner country and SITC, 2012

Imports per partner country



Exports per partner country

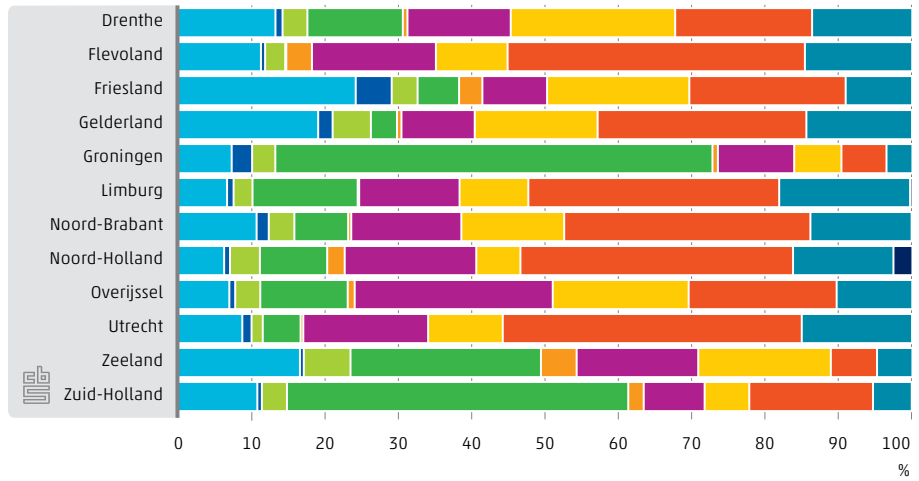


Legend: Belgium (light blue), China (dark blue), France (light green), Germany (green), Italy (orange), Norway (purple), UK (yellow), US (red), Other (dark blue).

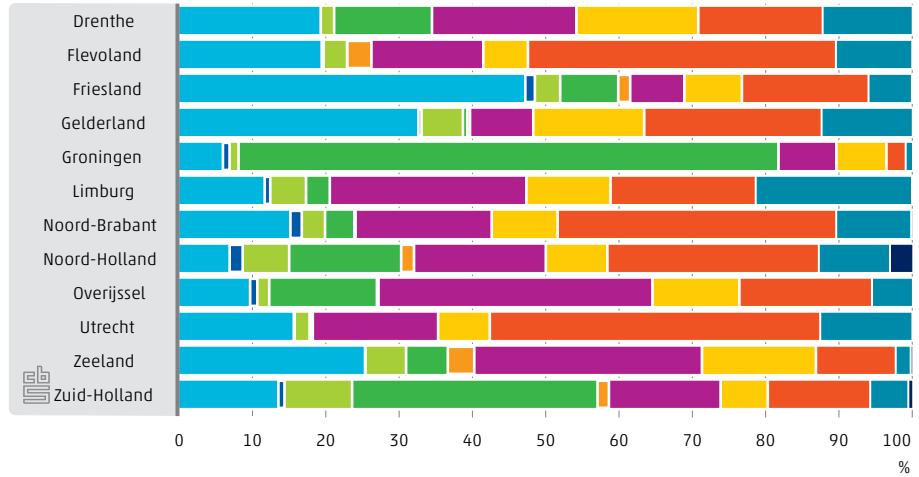
Source: Statistics Netherlands.

6.3.2 Composition of trade by partner country and SITC, 2012

Imports per SITC



Exports per SITC



Source: Statistics Netherlands.

6.4 Characteristics of regions and their impact on trade patterns

The previous section provided an overview of the international trade pattern of Dutch provinces. In this section the characteristics of the trading enterprise, such as its size and locus of control, as well as its economic activity, which is also related to its location, are taken into account when illustrating trade flows.

Enterprise size

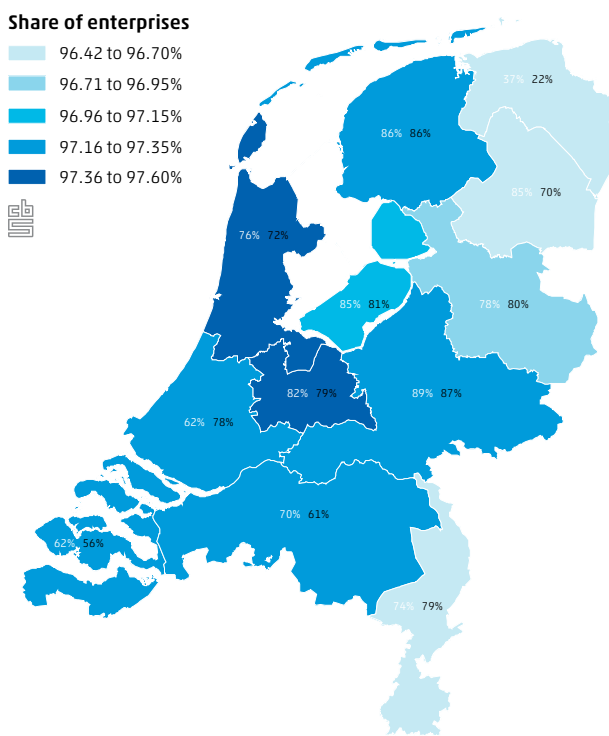
Graph 6.4.1 shows the concentration of Dutch trade by size of the local business unit. Size is measured in terms of employees. When a business unit has fewer than 250 employees it is characterised as a small or medium sized enterprise (SME). The province's colour in graph 6.4.1 shows to what extent business units with trade are SMEs or large. The darker the colour of the province, the larger the share of traders that are small or medium-sized. With respect to trade *value*, the two numbers in each province represent the share of a province's import value and export value that is carried out by SMEs. The black numbers shows the share of the province's export value that is carried out by small or medium-sized local business units. The white figures do so for imports.

International traders in Groningen, Drenthe and Limburg are relatively often large in terms of employees. Additionally, in Groningen the bulk of trade is carried out by large enterprises, only 37 percent of imports and 22 percent of exports are carried out by SMEs. This makes Groningen the province where large traders are most abundant (3.5 percent) and where they are responsible for the largest share of trade. Despite the relatively high share of large business units in the trader population, SMEs in Limburg and Drenthe carry out the bulk of trade in these provinces.

In Utrecht and Noord-Holland the role of small or medium sized enterprises in trade is relatively important. These provinces have the largest share of SMEs in their trader population. In addition, between 72 and 82 percent of trade is by business units employing fewer than 250 employees.

In Gelderland, Friesland, Zuid-Holland, Zeeland and Noord-Brabant the role of SMEs is also quite large, both in numbers as in trade value. In Zeeland, however, the share of trade carried out by SME business units is relatively low, which implies that the majority of traders are SMEs, but that a few very large business units dominate trade value.

6.4.1 Share of SME enterprises, imports and exports by SMEs, 2012



White numbers depict import value share by SME.
Black numbers depict export value share by SME.

Sector of activity

Another characteristic of the business unit that can vary is the sector in which it is active. Since economic activity is intertwined with the region in which the enterprise is active, it is difficult to separate the regional effect from the sector effect merely by showing a descriptive picture. For instance, manufacturing is a relatively important activity for enterprises in the Northern regions, Noord-Brabant and Limburg, while Noord-Holland, Utrecht and Zuid-Holland are relatively specialised in services (Diodato and Weterings, 2012). In section 6.5 we will tackle this issue by entering both variables into the analysis.

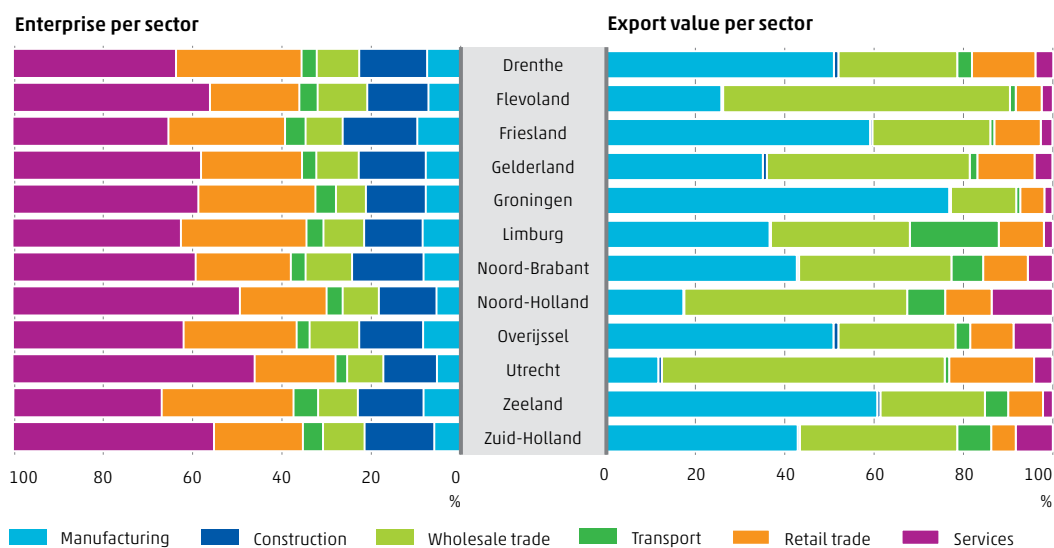
The left side of graph 6.4.2 shows the sectoral composition of provinces in the Netherlands while the right side shows the export value that can be attributed to these sectors for 2012. Most business units in the Netherlands are active in retail or services. Services are especially well represented in Utrecht, Noord-Holland and Zuid-Holland. However, these sectors play only a minor role in international

trade in goods. For instance, Utrecht has the largest share of service units, over 54 percent of local units are service units, but the most international trade value is generated by wholesale traders. Utrecht also has the lowest share of manufacturing, construction, transport and retail trade units of all provinces.

As the right side of 6.4.2 shows, the bulk of exports is carried out by business units active in manufacturing (especially in Groningen, Zeeland and Friesland) and wholesale (Noord-Holland, Utrecht and Flevoland). In terms of absolute numbers, these sectors may seem relatively small, but the export value they generate makes them very important.

Logistics plays a relatively large role in the exports of Limburg. In the Northern provinces and Zeeland the manufacturing industry exports relatively a large amount, while the west often exports via wholesale. The manufacturing industry of Noord-Brabant is also relatively active in exporting. This is related to the location of the high-tech cluster/top sector in this region.

6.4.2 Sectoral composition and exports per province, 2012

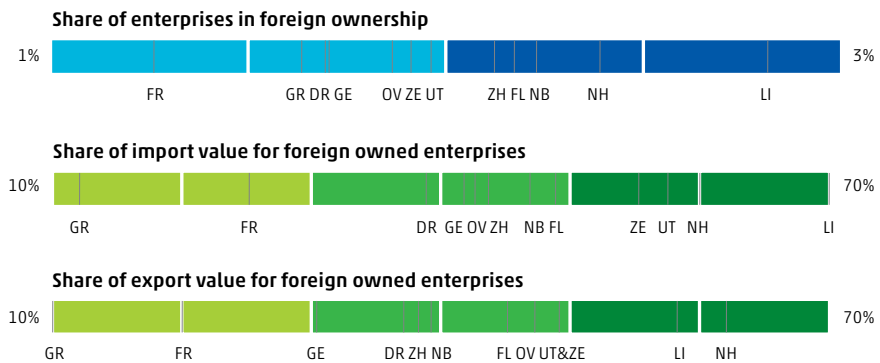


Locus of control

In the Netherlands roughly 50 percent of commodities imports and exports can be attributed to foreign controlled enterprises (see also chapter 13). Graph 6.4.3 shows how the share of imports and exports by foreign controlled firms

varies per province as well as how abundant foreign traders are. In the 2012 Internationalisation Monitor (Braams et al., 2012) we already found that Limburg has the highest concentration of foreign controlled business units. This is reaffirmed as graph 6.4.3 shows that the share of foreign owned business units is highest in Limburg (almost 3 percent) As such it is not surprising that the role of foreign controlled firms in the trade of Limburg is relatively high. Friesland and Groningen have the lowest share of foreign controlled enterprises. In terms of import value, foreign controlled firms are responsible for 70 percent of imports in Limburg, while in Groningen and Friesland this share is respectively 12 and 25 percent. Groningen and Friesland also have the lowest share of exports by foreign controlled enterprises, but Noord-Holland surpasses Limburg with 62 versus 58 percent.

6.4.3 Trade by ownership per province, 2012



70% of goods imports in Limburg are by foreign controlled enterprises

6.5 The impact of the region on trade

The previous paragraphs illustrated the regional differences in Dutch international trade in terms of partner country and product. We also described the impact of structural and regional characteristics such as sector, enterprise size and presence of foreign enterprises on trade patterns. From these paragraphs clear patterns emerge with respect to specialisation and idiosyncrasies of provinces and regions, i.e. natural gas dominates trade in Groningen, relatively much trade by manufacturing enterprises in the North, relatively much trade by services in the middle and western part of the country, the highest absolute trade value in the west, foreign controlled enterprises important in the trade of Limburg and Noord-Holland. Now we want to isolate the effect of location on the propensity of trade and trade size. When otherwise similar enterprises are located in different parts of the Netherlands, does this have an impact on likelihood of trading and trade value? Formulated differently, is an enterprise in the North less likely to engage in trade than an enterprise in the South of the Netherlands when both enterprises are otherwise comparable? Are there regions in which otherwise similar enterprises are more likely to trade than others? And if so, does it also contribute to the size of its trade flow? Obviously, we have to take into account the heterogeneity between provinces that we observed in the previous paragraphs.

Impact of the region on the probability of trade

First we tackle the question whether, all else being equal, establishments in some regions are more likely to export or import than establishments in other regions. In order to answer this question, we ran a logistic regression in which the occurrence of exports (imports) was the dependent variable. The independent variables were the sector of economic activity, size of the enterprise to which the local business unit belongs, foreign control, turnover and number of jobs at the business unit and lastly the province in which the business unit is located.

Graph 6.5.1 shows the results of this logistic regression. All independent variables are extremely significant and the Nagelkerke R^2 in our model is high for exports and imports, respectively 39 and 38 percent. Provinces in which the probability of trading is above average are depicted darker than those where the likelihood is below average. As it turns out, the province in which a business unit is located definitely contributes to the probability that it engages in trade. All else being equal, firms in the southern and eastern provinces are more likely to export than enterprises in the northern or western provinces. This corroborates the results of the previous Internationalisation Monitor (Braams et al., 2012), namely that

Turnover was not included in this analysis as it correlates highly with import and export values. Additionally the type of trader (import only, export only or two-way trader) was included as well as main trading country and product. These variables all control for the type of trader that an enterprise is and therefore could not be used in the logistic regression, as these will predict trade perfectly.

The results of these ANCOVA analyses are shown in graph 6.5.2 and table 6.5.3.

If being located in a certain province causes the export (import) value to be above average after controlling for size, sector, foreign control, etc. the province is depicted darker. Again, location matters and apparently there are regional advantages for traders. These could be all sorts of advantages, ranging from proximity to borders or mainports, agglomeration or cluster advantages, benefiting from a knowledgeable workforce or (foreign) knowledge workers. Such an analysis would be interesting to conduct in the future.

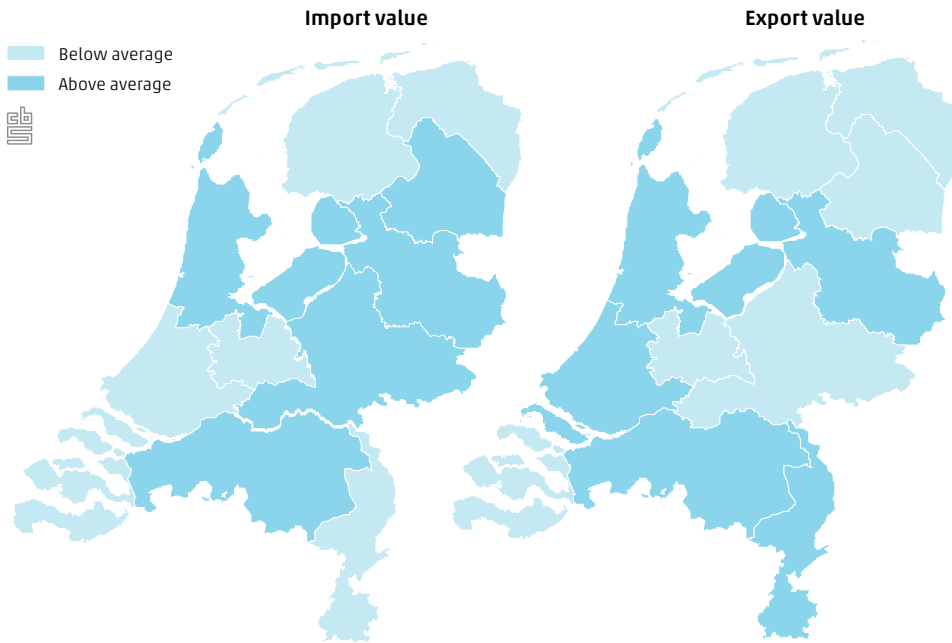
In Groningen, Friesland, Zeeland and Utrecht the import and export value is lower than for the average firm with similar characteristics in other provinces.

In Noord-Holland, Noord-Brabant, Overijssel and Flevoland the trade value of firms is above average. Interestingly Limburg, relatively the most internationally oriented province, has the lowest corrected import value. This may be due to the fact that importing is a more incidental activity for establishments in Limburg than exporting. One could argue that due to the shape and location of Limburg, incidental importing i.e. buying supplies from foreign neighbouring enterprises is more common than for establishments in other provinces.

As table 6.3.1 showed, Zuid-Holland is by far the largest trader, followed by Noord-Holland and Noord-Brabant. However, the results of the ANCOVA show that Zuid-Holland isn't the province with the highest average import value. After correcting for trader and enterprise characteristics, the average import value is below average. This apparent paradox can be explained by the fact that imports in Zuid-Holland are dominated by a relatively small group of very specialised traders creating the bulk of imports, the great majority still being small traders. Similar enterprises in Gelderland and Overijssel, importing the same products from the same countries, have a larger average import value than firms in Zuid-Holland. It may be that the barriers of international trade are more difficult to overcome in these provinces, and that only larger and more productive enterprises can pass them.

For Friesland one might expect the average trade value to increase as we have controlled for foreign ownership (smallest share in Friesland) and trade status. Nonetheless Friesland remains the province where the export value is the lowest and the import value is the second lowest.

6.5.2 Is the import or export value above or below average after correction? (2012)



6.5.3 F-values and significance from the ANCOVA model on import and export value

	Import value	Export value
Corrected Model	1,483***	1,664***
intercept	32,497***	28,418***
province	3**	6***
sector	2,527***	840***
size class	1,912***	3,333***
UCI	1,351***	347***
type of trader	7,266***	428***
main country	919***	1,334***
main product	171***	87***
employees	10,621***	9,787***
R ²	0.455	0.531

The asterisks ***, ** and * indicate significance at the 1, 5 and 10 percent level.

Evaluating the model in 6.5.3 some things are noteworthy. First the R² of both models are high, as the model explains 53 percent of the variation of export value between enterprises and over 45 percent of the variation in import value. In this study we assume that the variation left after correction is due to other, unobserved,

regional characteristics e.g. cultural customs, language skills of the population, or the presence of a cluster. An agglomeration or cluster of enterprises provides urbanisation and location benefits to the enterprises in the cluster, making them more productive and innovative than other enterprises. Examples of such benefits are e.g. proximity to buyers and suppliers, the presence of universities or research facilities but also the more densely populated cities and towns (Raspe et al., 2012). In this case location has more influence on the import than on the export value as the F-value is larger.

Province has a significant influence on the trade value, but it certainly doesn't explain most of the variation in trade values. The variable explaining most in this model is the number of employees, which indicates the size of the business unit. For imports international embedding by means of a foreign parent company is a more important explanatory variable than for export value. This is understandable as enterprises that merely import quite often resemble non-traders (Jaarsma and Lemmens-Dirix, 2010) and are very dissimilar from two-way traders and foreign controlled enterprises.

6.6 Conclusion

The previous paragraphs have shown that there are substantial differences between provinces with respect to main trading partner, main trading product, distribution of size, sector of activity and locus of control. Even after taking these differences into account, the location of a business unit most certainly has an influence on its likelihood to trade and its value of international trade.

For the likelihood the regression yields similar results as the share of enterprises that import or export per province: adjusting for several characteristics doesn't change the general picture. Most local business units are international traders in the south-east of the country and particularly in Limburg. The lowest share of international traders is found in the north-west. Enterprises in Friesland have the lowest odds of being a trader, they are 2.5 times less likely to be active in international trade as are enterprises in Limburg.

In terms of value, differences arise after correcting for several characteristics. Zuid-Holland is by far the largest trader, followed by Noord-Holland and Noord-Brabant. However, looking at the results of the ANCOVA Zuid-Holland isn't the province with the highest average import value. After correction, the average import value in Zuid-Holland is below average meaning that similar enterprises in Gelderland,

Noord-Brabant or Overijssel, have a larger average import value than firms in Zuid-Holland. This apparent paradox can be explained by the fact that imports in Zuid-Holland are dominated by a relatively small group of highly specialised traders creating the bulk of imports.

Interestingly the lowest average (corrected) import value is found for Limburg. We suspect this is partly due to the large number of local business units in Limburg that are involved in international trade in commodities (40 percent) and the location of Limburg. The threshold to trade in Limburg is low as neighbouring countries are close by and so more enterprises will import only small amounts from Belgium or Germany, explaining the low average corrected import value. For exports this is not the case, as apparently more enterprises have specialised in exporting their products abroad than enterprises that only benefit from incidental exports.

Another odd duck is Groningen. International trade in Groningen is mainly done by large enterprises, 63 percent of imports and 78 percent of exports. Groningen mainly trades in natural gas with imports coming from Norway and exports largely going to Germany. After correction, Groningen has a below average incidence of international traders, import value and export value. But the least successful province in terms of international trade in commodities is Friesland. Although the absolute trade value of Friesland is larger than that of Drenthe and even though Groningen has a smaller share of exports done by foreign controlled enterprises, Friesland surpasses both after correction.

Noord-Brabant, Overijssel and Flevoland are the three provinces that score above average in all three analyses. Their likelihood of trading as well as the average trade value is above average when correcting for regional and enterprise characteristics. This implies that there are specific benefits to traders in these provinces, one of which is their location.

In general looking at the influence of location after correcting for trade and enterprise characteristics has provided new insights in the patterns of trade and trade value. The absolute trade value of a province is not necessarily a good predictor for the average trade value of an individual enterprise. Enterprises in provinces with a high absolute trade value (e.g. Zuid-Holland) are not necessarily the enterprises with the highest average trade value. Neither is the absolute number of traders indicative of a high likelihood of trading. In Noord-Holland there are many international traders, but the likelihood of trading is lower than in e.g. in Limburg.