

Internationalisation Monitor
2010

Explanation of symbols

.	= data not available
*	= provisional figure
**	= revised provisional figure
x	= publication prohibited (confidential figure)
–	= nil or less than half of unit concerned
–	= (between two figures) inclusive
0 (0.0)	= less than half of unit concerned
blank	= not applicable
2008–2009	= 2008 to 2009 inclusive
2008/2009	= average of 2008 up to and including 2009
2008/'09	= crop year, financial year, school year etc. beginning in 2008 and ending in 2009
1998/'99-2008/'09	= crop year, financial year, etc. 1998/'99 to 2008/'09 inclusive

Due to rounding, some totals may not correspond with the sum of the separate figures.

Publisher
Statistics Netherlands
Henri Faasdreef 312
2492 JP The Hague

Prepress
Statistics Netherlands
Grafimedia

Cover
TelDesign, Rotterdam

Information
Telephone +31 88 570 70 70
Telefax +31 70 337 59 94
Via contact form:
www.cbs.nl/information

Where to order
E-mail: verkoop@cbs.nl
Telefax +31 45 570 62 68

Internet
www.cbs.nl

Price: € 49.70 (excluding postage)

ISBN: 978-90-357-1506-6

Print run: 400 copies

© Statistics Netherlands, The Hague/Heerlen, 2010.
Reproduction is permitted. 'Statistics Netherlands' must be quoted as source.

Foreword

The process of economic globalisation is characterised by increasing international trade and foreign direct investments, reflecting the activities of Dutch multinational enterprises in the economy of the Netherlands. The size and impact of these economic cross-border activities have important consequences for many policy areas of national governments and international institutions. The recent economic downturn further illustrates the importance of international trade for the Dutch economy.

Policymakers and the general public are interested in the effects of international trade on employment, economic growth and sustainability. To help quantify these effects, this third edition of the Internationalisation Monitor, published by Statistics Netherlands, presents a range of connected and consistent statistics on international trade. In four descriptive chapters on trends and 24 annotated tables, the Internationalisation Monitor analyses developments in the area of international trade of goods, international trade of services, international direct investments, and international R&D and innovation. Thus Statistics Netherlands aims to contribute to a balanced and factual discussion on the position of the Dutch economy from an international perspective.

International trade is the focus of four in-depth articles that highlight the importance of exports and imports for the Netherlands, and analyse the characteristics of companies involved in the international flow of goods and services. Although companies engaged in either exports or imports of goods or services account for only a small number of overall Dutch enterprises, they generate approximately 80 percent of the turnover and two-thirds of the value added of the Dutch economy. Both exporting and importing companies are on average larger, more productive and more innovative than companies not involved in international trade. Lastly, firms engaged in international trade also pay higher wages: 7 and 5 percent higher for importers and exporters respectively. Although part of this wage premium is a reflection of their economic success, it is largely explained by a different workforce composition than companies operating only within the Netherlands.

Future editions of the Internationalisation Monitor will cover more themes and indicators, based on scientific research and close cooperation with policymakers, research institutes and universities. For more information visit the 'Globalisation' dossier on our website (www.cbs.nl).

Director General of Statistics

G. van der Veen

Heerlen/The Hague, October 2010

Table of Contents

Introduction: the Internationalisation Monitor 2010	9
1.1 Introduction	9
1.2 Measuring internationalisation: statistical innovation	10
1.3 Results	11
1.3.1 Trends	11
1.3.2 Traders – an in-depth analysis	12
1.4 Structure of the publication	13
1.5 Further developments	14
A1 Trends in international trade in goods	17
1.1 Introduction	17
1.2 Composition of Dutch trade	18
1.2.1 Partner countries	18
1.2.2 Products	20
1.2.3 Comparative advantages and disadvantages (Balassa index)	21
1.2.4 The Netherlands' role in global trade	22
1.3 The current financial and economic crisis	24
1.3.1 Introduction	24
1.3.2 Decline in imports and exports of goods	26
1.4 Conclusion	28
References	30
Annex I	31
Balassa index (Revealed Comparative Advantage):	31
A2 Trends in international trade in services	33
2.1 Introduction	33
2.2 Developments in Dutch international trade in services	33
2.3 Composition of Dutch international trade in services	35
2.4 The largest import and export services markets for the Netherlands	37
2.5 Comparative advantages: the Balassa index	39
2.6 The Netherlands as services partner for other countries	40
2.7 Summary and conclusions	43
References	43
A3 Trends in international direct investment	45
3.1 Introduction	45
3.2 Trends in the Netherlands	46
3.2.1 Flows and stocks	46
3.2.2 Trends on sectoral level	47
3.2.3 Trends on country level	48

3.3	Foreign Affiliate Trade Statistics (FATS)	50
3.4	The Netherlands in an international perspective	51
3.4.1	Trends: stocks	52
3.4.2	Trends on sectoral level	54
3.4.3	Trends on country level	54
3.5	Conclusions and further research	55
	References	55
A4	Trends in international R&D and innovation in the Netherlands	57
4.1	Introduction	57
4.1.1	Innovation: definition	58
4.2	Innovation input	59
4.3	Innovation output	62
4.4	Dutch innovation over time and in an international perspective: benchmarking patent indicators	66
4.4.1	Future technologies	68
4.5	Summary and conclusion	70
	References	72
B1	International traders in goods and services – differences and similarities	73
1.1	Introduction	73
1.2	Methodology and datasets	74
1.2.1	International trade in goods statistics (2002–2008)	74
1.2.2	Services traders (2006–2008)	75
1.2.3	Combining the datasets (2006–2008)	76
1.3	Population characteristics	77
1.3.1	Population count	77
1.3.2	Differences in terms of size class	77
1.3.3	Differences in terms of economic activity	79
1.3.4	Foreign controlled traders versus Dutch controlled traders	81
1.4	Conclusion	82
	References	83
B2	A closer look at Dutch goods and services traders	85
2.1	Introduction	85
2.2	Theory and background	86
2.3	Methodology and composition of datasets	86
2.4	Results	88
2.4.1	Contribution of specific traders to Dutch turnover and value added	88
2.4.2	Differences in turnover and labour productivity	89
2.4.3	The probability of exporting and importing	92
2.4.4	The probability of being an exporter expounded for several factors	94

2.5	Conclusions	97
	References	98
B3	In-depth analyses: international trade and R&D	101
3.1	Introduction	101
	3.1.1 Trade and knowledge	102
	3.1.2 Structure of this chapter	102
3.2	Literature review on international trade and knowledge	103
	3.2.1 Self-selection effects and productivity	103
	3.2.2 Innovation diffusion	104
3.3	Data and methodology	105
3.4	Trade and knowledge	106
	3.4.1 International trade in high-tech goods	106
	3.4.2 Key economic indicators for aggregations on technology and knowledge intensity	108
3.5	Innovators and high-tech exporters: their characteristics	110
	3.5.1 Innovators	110
	3.5.2 Exporters of high-tech goods	112
3.6	Summary and conclusion	114
	References	115
B4	Wage and employee differences between trading and non-trading firms in the Netherlands	117
4.1	Introduction	117
4.2	Theory and background	118
4.3	Data and methodology	120
4.4	Results	121
4.5	Regression results	126
4.6	Discussion and conclusion	127
	References	128
C1	International trade in goods by enterprises	131
	Introduction	131
	Changing methodology	131
1.1	Distinguishing international trade in goods between Dutch and foreign controlled enterprises in the Netherlands	134
1.2	International trade in goods organised by size class	136
1.3	International trade in goods by industry	138
1.4	International goods traders in the Netherlands	140

C2 International trade in services by enterprises	143
Introduction	143
2.1 Overview of international trade in services by origin of the parent enterprise	144
2.2 International trade in services organised by size class	146
2.3 International trade in services by industry	148
2.4 International services traders in the Netherlands	150
C3 Foreign Direct Investments	153
Introduction	153
3.1 Foreign direct investment: stocks and flows	154
3.2 Foreign direct investment: by economic sector	156
3.3 Foreign direct investment: by country	158
3.4 Share of the Netherlands in worldwide FDI	162
C4 Internationalisation of research and development (R&D)	165
Introduction	165
Classification	165
4.1 R&D expenditures of foreign controlled enterprises in the Dutch business sector	166
4.2 Technological innovation profile	168
4.3 Cooperation profile of innovators	170
4.4 Gross domestic expenditure on research and development (GERD)	172
C5 International traffic and transport flows	175
Introduction	175
5.1 International air passenger transport	178
5.2 International air freight and mail transport	180
5.3 Internationalisation of goods transport flow by modality and by nationality of the transporters	182
5.4 International sea container flow by origin and destination	186
C6 Internationalisation and employment	190
Introduction	190
6.1 Employment in foreign and Dutch controlled enterprises	192
6.2 Labour turnover rate at foreign and Dutch controlled enterprises	194
6.3a Share of high and low-paid employees in foreign and Dutch controlled enterprises	196
6.3b Share of high and low-paid employees in foreign and Dutch controlled enterprises, by industry and size class	198
6.4 Labour force composition in foreign and Dutch controlled enterprises	200
Contributors to the Internationalisation Monitor 2010	203

Introduction: the Internationalisation Monitor 2010

Fabienne Fortanier

1.1 Introduction

Globalisation has become a popular and much discussed topic over the past two decades. International developments have major implications particularly for a small and open economy like the Netherlands. The recent financial and economic crisis illustrates the role the international economy plays for the Netherlands. Global trade fell by 12.5 percent in 2009 – due to a collapse in demand, the drying up of trade finance, and the integrated nature of global supply chains (OECD, 2010) – which was mirrored by an even greater decrease in Dutch exports and imports. This collapse of international trade explains two-thirds of the decline in Dutch GDP in 2009 (SN, 2010a). At the same time, the positive economic growth rates that were recorded for the first half of 2010 are also largely driven by resurging exports (SN, 2010b).

Since international trade, but also international investments and other dimensions of globalisation play a vital role in the Dutch economy, it is not surprising that policymakers and the public-at-large ask questions about the determinants of globalisation and its effects in terms of employment, economic growth, sustainability and developments over time. To help answer these questions, Statistics Netherlands (SN) aims to develop and present coherent data and statistics, with clear descriptions and annotations of the trends and impacts of globalisation.

To achieve this ambition, Statistics Netherlands has over the past few years initiated a series of projects to match existing datasets in order to construct and publish new and relevant data on globalisation. The first results were published in *Key Figures Internationalisation* (2007) and the *Internationalisation Monitor* (2008 and 2009). These publications – and this 2010 edition of the *Internationalisation Monitor* – serve a threefold goal:

- firstly, they monitor trends and developments in international trade and international investment, and enterprise activities, bearing in mind the relationship between these developments and the economic role and position of the Netherlands in Europe and in the world;
- secondly, they analyse the consequences of these trends and developments for economic growth, wealth, the labour market and innovation;
- finally, they contribute to a well-balanced and factual discussion on internationalisation and the position of Dutch and foreign controlled enterprises in this discussion.

In this introduction, we present the structure of this edition of the Internationalisation Monitor 2010 and highlight the main findings. We start with the statistical challenges and innovations necessary to capture a widespread and complex phenomenon such as globalisation. In the subsequent sections we summarise the main trends and conclusions formulated throughout this publication.

1.2 Measuring internationalisation: statistical innovation

Measuring the process of globalisation accurately and consistently is an enormous challenge for statistical authorities. Existing statistical concepts and frameworks – for instance, various macroeconomic indicators, systems of national accounts, and balance of payments principles – become increasingly difficult to construct. In addition, the ever-expanding activities of enterprises (and persons) abroad are inherently difficult to observe by statistical agencies, which are often restricted to a national mandate and locality. It is also a major challenge to embody the many dimensions and effects of globalisation such that it justifies the intrinsic and methodological subtleties of the individual indicators as well as the interconnectedness of the dimensions.

In multidimensional and complex discussions, statistical agencies have an obligation and a responsibility to prevent, based on their data and analyses, partial or incorrect conclusions being drawn. A thorough knowledge of the main concepts and subjects of debate within the theme are necessary to identify which indicators and figures are most significant in political and policy debate. Additionally, to ensure the correct interpretation of the data and figures, it is very important to explain clearly which data are used to construct the statistics and indicators and to illustrate the trends within a context, while the limitations of the data and the methods used, are explicitly described. These considerations have materialised in the Internationalisation Monitor 2010, where several descriptive and analytical papers are combined with a large number of annotated tables on various globalisation indicators.

Each year, the Internationalisation Monitor presents a wide variety of new statistics on the nature and consequences of the internationalisation of the Dutch economy. One of the key sources for these new statistics is the integration of micro-data from various sources (surveys and registers) available at Statistics Netherlands. Many of the innovations made in previous editions can now be found as ‘regular’ output in part C of this publication.

This edition also includes a series of analytical papers on international trade and the characteristics of firms that are responsible for exports and imports. By expanding the dataset that links the General Business Register to International

Trade data with information on various economic, employment and innovation indicators, we build a coherent picture of the similarities and differences across exporters, importers and two-way traders (i.e., enterprises engaged in both export and import) on various dimensions.

1.3 Results

This section focuses on the main results of the articles and annotated tables in the *Internationalisation Monitor 2010*. Firstly, we describe the trends in internationalisation by focusing in particular on the developments in international trade in goods and services, foreign direct investment, and technology. Secondly, we summarise the results of the focused papers analysing the key themes of this publication: international trade and the characteristics of the enterprises responsible for Dutch imports and exports.

1.3.1 Trends

From 2002 to the recent economic crisis, international trade in goods has increased on average by 10 percent each year (see chapter A1). Although a significant part of Dutch trade remains with the European Union, the share of imports originating from EU countries has decreased since 1996, from 64 percent to 55 percent in 2009. The main reason behind this development is the surge in imports from China. The share of exports to the European Union has also decreased since 1996, to roughly 75 percent in 2009. Nearly half the goods exported to the European Union in 2009 consisted of re-exports.

The economic crisis resulted in a strong decline in Dutch exports of almost 22 percent in 2009, and goods imports decreased even more strongly. The first quarter of 2010 marked an upturn in trade, more so for exports than for imports, driven by a strong recovery in China and other developing Asian countries.

In addition to goods, services are also important in international trade, and have a similar geographic composition (see chapter A2). The services sector has long been considered as non-tradable, but since the mid 1990s, services exports account for approximately 20 percent of total exports. Approximately half the value of services trade is done by foreign controlled enterprises.

The role of foreign enterprises is also apparent in the statistics on foreign direct investment (FDI) and the activities of foreign affiliates in the Netherlands (see chapter A3). As a general trend, the share of foreign controlled enterprises in the private Dutch sector is on the increase. In 2008, these enterprises generated more than a fifth of the added value, one-sixth of employment and nearly a third of

turnover in the private sector. However, like other international economic relations, Dutch inward and outward FDI was strongly affected by the economic crisis. Incoming and outgoing direct investment flows even turned negative in several quarters of 2008 and 2009, and stocks of inward and outward Dutch FDI decreased for the first time in many years. A very substantial part of these dynamics can however be explained by the activities surrounding one single firm: the acquisition of ABN AMRO by Santander, Fortis and the Royal Bank of Scotland, and the subsequent purchase of Fortis by the Dutch government.

As a final dimension of the analysis of internationalisation trends, we note that Dutch innovative performance is relatively internationally oriented, given the share of R&D investments by foreign controlled enterprises (30 percent in 2008), and the prominence of trading firms among investors in R&D (see chapter A4). This is partly caused by size effects: a small number of large enterprises are responsible for the majority of R&D, and also trading enterprises and foreign controlled enterprises are often larger than their counterparts that are not internationally active. Since 2002 total R&D investments in the Dutch business sector increased by 16 percent (2008), while the share of enterprises with R&D activities decreased by one percent. Corrected for inflation the R&D investments in 2008 are on par with those in 2002. The resulting innovations from R&D investments are often reflected in patents. Although Dutch patent applications have stagnated since 2002 and even declined since 2004, there is a relatively high focus on the future technology patent classes which might present opportunities for future productivity and welfare growth.

1.3.2 *Traders – an in-depth analysis*

The volume of international trade in goods and services is often used as a measure of openness and integration of economies with the rest of the world. However, the drivers of these macro-economic developments are the enterprises that pursue international sales (or purchases) in order to expand their market. Hence, an understanding of the characteristics of these firms helps us to get a better grasp of trends in international trade.

Results for the Netherlands confirm the international stylised facts for exporters of goods, in that they are generally larger, more profitable, and pay higher wages. But we know far less about the characteristics of importers and two-way traders of goods, and about traders in services. Chapter B1 presents new datasets on international traders in goods and services in order to describe the main similarities and differences between these various types of international traders in terms of economic activity, enterprise size, ownership, productivity (B2), R&D and innovation (B3), and wages and employment characteristics (B4):

We find that traders in goods and services are larger (in terms of employee numbers) than enterprises that traded in either goods or services alone. Exporters and importers of services are somewhat larger than traders in goods, but smaller than enterprises that engaged in both the trade of goods and services. As a result of their larger size, in 2008, exporters of goods and/or services generated almost 80 percent of total Dutch turnover and two-thirds of total value added. These shares were even higher for importers of goods and/or services. Traders in goods were mostly found in wholesale and retail trade sectors, whereas traders in services are generally active in real estate, rental and business activities.

Exporters and importers are more productive and more innovative than firms that do not engage in either exports or imports. In addition, foreign controlled exporters and importers were also significantly more productive, innovative, and larger than their Dutch controlled counterparts. In 2008, almost 30 percent of the exporters of goods and services were foreign controlled, and 34 percent of importers. Particularly firms that export high-tech goods can be characterised as (very) large in size, and are relatively often foreign controlled and have their own R&D activities.

Finally, we established that exporters, importers and two-way traders pay significantly higher wages than non-trading firms. This is partly a reflection of higher levels of productivity of trading firms (necessary to counteract the costs of doing business overseas), but partly also a reflection of the differences in the composition of the workforce of exporters and importers. For example, exporters and two-way traders employ relatively highly-educated employees, and fewer women. Similarly, differences in other firm characteristics influence the wage differential between trading and non-trading firms. For example, enterprises engaged in exports or imports are much more likely to be foreign controlled, and it has been established that foreign subsidiaries pay higher wages e.g. to forestall labour turnover (cf. the Internationalisation Monitor 2009). Yet, even controlling for those differences, we established wage premiums of 7 percent and 5 percent for importers and exporters (including two-way traders) respectively, although the results were not extremely significant, suggesting that the wage premium is wholly caused by differences in the composition of the workforce.

1.4 *Structure of the publication*

The current format of the Internationalisation Monitor 2010 improves upon the setup we developed in previous years. It now includes an entirely new section (A) with chapters on trends, in addition to the focused analytical section (B) on international trade and international traders, and the annotated tables (C). The publication is the result of close cooperation with different researchers in Statistics

Netherlands, and as such reflects the variety of statistics available in our organisation's portfolio.

Section A describes and monitors trends in several key areas of international economic activity. Chapter A1 focuses on trade in goods, chapter A2 on trade in services, chapter A3 on foreign direct investment, and chapter A4 on international technology and R&D. All chapters describe the main developments and trends up to the latest possible moment (generally 2008 or 2009), highlighting geographic and sectoral patterns. In addition, each chapter also benchmarks Dutch developments against several other countries, including neighbours like Germany and countries that share the Dutch nature of a small, open economy, like Sweden.

Section B then presents a set of 4 papers that all focus on a selected topic. This year's topic is international traders: the characteristics of enterprises engaged in exports, imports or both. Chapter B1 first explores how trade in goods and in services are related. Subsequent chapters report on the differences across the various types of trade with respect to their economic characteristics such as productivity and turnover) (B2), innovation activities (B3) and employment characteristics (B4). Each chapter reports breakdowns by sectors (manufacturing, wholesale trade, services), size class and by locus of control (foreign versus domestic).

Finally, section C presents a set of annotated tables that will be regularly updated. Some of these tables can already be found on Statline, others are in the process of being made available through that channel. The tables are closely linked to the topics in section A, and involve trade in goods, trade in services, foreign direct investment, R&D, transport and employment.

1.5 Further developments

While publication of the Internationalisation Monitor 2010 presents yet another step in publishing more detailed and more coherent data on globalisation and its consequences for the Netherlands, additional research remains necessary. Many topics that are central to the debate on globalisation and internationalisation have not yet been addressed. Examples include international outsourcing, regional distribution of wealth and welfare, international migration, entrepreneurship and entrepreneurial behaviour. As we move from static comparison to analyses of dynamics and changes over time, the need for (international) enterprise demography also becomes increasingly apparent.

This Internationalisation Monitor 2010 is the third in a series of similar publications that are planned for the coming years, which will further describe the extent of

internationalisation of the Dutch economy and the consequences of that international orientation for enterprises and individuals.

Statistics Netherlands has already embarked on several new projects on the above-mentioned topics, or will start to do so in the near future. Many of these involve matching existing micro-level datasets and involve collaboration with strategic partners including e.g. the Ministry of Economic Affairs, the Dutch Central Bank (DNB), the Dutch Bureau for Economic Policy Analysis (CPB), EIM Business and Policy Research (SMEs and Entrepreneurship), universities, and Eurostat. This allows for the pooling of expertise and knowledge, and guarantees broad dissemination of the research findings.

References

- OECD (2010). *Trade, policy and the economic crisis*, Paris.
- Statistics Netherlands (2009). *Internationalisation Monitor 2009*, The Hague/Heerlen.
- Statistics Netherlands (2010a). *De Nederlandse Economie 2009*, The Hague/Heerlen.
- Statistics Netherlands (2010b). *De Nederlandse Economie per kwartaal*, The Hague/Heerlen.

A1 Trends in international trade in goods

Marjolijn Jaarsma

1.1 Introduction

International trade is vitally important to the Dutch economy. The Netherlands has been a trading nation for centuries, with its prosperity depending to a large degree on free and profitable international relations with other countries. Where, at the end of the 19th century, many small economies started to specialise in particular economic activities, often in line with their comparative advantage, the Netherlands did not confine itself to any specific activity. Instead, the country transformed into a diversified and multi-faceted economy with a strong focus on international trade and associated services (Van Zanden, 1997). Owing to its geographic location, the Netherlands is perfectly positioned as a gateway to Europe for goods from throughout the world. Moreover, the creation and integration of the European Union, the Single European Market and the introduction of the euro have also contributed to the already increasing number of international transactions and trade flows, and provided the foundation for the economic growth of the previous decades.

Graph A1.1 illustrates the role of international trade on the development of Dutch GDP in the past twenty years. The share of total exports or imports in GDP is a frequently used indicator of trade intensity, as it shows the extent to which the economy depends on foreign sales and purchases. In 1990, Dutch exports of goods equalled 46 percent of Dutch GDP. By 2008, this share had increased to almost 62 percent of GDP, while imports of goods amounted to almost 55 percent of GDP. The net contribution of trade to GDP, the trade balance, has also risen during the past 20 years, from almost 4 percent of GDP to over 7 percent in 2008.

The Dutch economy has not been spared from the impact of the current worldwide financial crisis. Trade figures showed unprecedented declines that have not been seen in recent decades and at the moment the national economy is only slowly recovering. The primary developments and trends in Dutch trade and the impact of the crisis on Dutch trade are the main topics of this chapter. Section 1.2 starts with an overview of the structure of Dutch trade in terms of partner countries, goods and relative comparative advantages as measured by the Balassa index. This section also analyses the Dutch trading position in an internationally comparative perspective. Section 1.3 examines the impact of the economic crisis on Dutch economic growth and trade so far, compared with a benchmark of other countries. The chapter concludes with a short summary in section 1.4.

A1.1 Trade in goods as share of GDP



Source: Statistics Netherlands, StatLine, National Accounts.

1.2 Composition of Dutch trade

1.2.1 Partner countries

Table A1.1 shows how Dutch trade in goods with its main partner countries has developed since the mid-90s. The total import value almost doubled between 1996 and 2009, increasing from 140 billion to 274 billion euros. A significant part of Dutch trade was with the European Union, which is not only explained by geographical and historical factors, but also by increased European integration. Nevertheless, the share of imports originating from EU countries has decreased since 1996, from 64 percent to 55 percent in 2009. The import value of goods from non-EU countries was almost 2.5 times greater in 2009 than in 1996. The main reason behind this development is the surge in imports from China. In 1996, imports from China constituted about 1 percent of Dutch imports, which increased to roughly 8 percent in 2009 and the first quarter of 2010. However, a significant part of this trade consists of re-exports, implying that the goods are ultimately destined for other EU countries. In the observed period, imports from the Czech Republic, Hungary, Poland and the Russian Federation also increased relatively strongly.

The total export value was also twice as high in 2009 compared with 1996, increasing from 154 billion to 309 billion euros. The bulk of Dutch exports went to the European Union, although this share decreased somewhat since 1996, to roughly 75 percent in 2009 and the first quarter of 2010. Around 48 percent of the goods exported to the European Union in 2009 consisted of re-exports, illustrating

the role of the Netherlands as a gateway to Europe. At almost 66 percent, the share of re-exports was highest for goods going to the Czech Republic in 2009. Alternatively, approximately a third of exports going to non-EU countries consisted of re-exports.

Table A1.1
International trade in goods by partner country

	Import value				Export value				Re-exports
	1996	2008	2009	2010Q1*	1996	2008	2009	2010Q1*	2009*
	<i>million euro</i>								<i>%</i>
Total	139,913	335,921	274,020	77,116	153,752	370,480	309,359	87,459	44.0
EU	89,616	185,125	151,824	42,020	121,773	282,730	231,337	65,900	47.9
Non-EU	50,297	150,796	122,196	35,096	31,979	87,750	78,022	21,559	32.7
Argentina	547	1,561	1,518	306	191	273	291	223	.
Austria	1,198	2,007	1,636	427	2,342	4,871	4,102	1,149	50.1
Belgium (incl Luxembourg up to 1999)	15,905	33,896	27,452	7,538	21,218	42,967	34,619	10,181	40.9
Brazil	1,316	4,854	3,893	827	607	1,231	1,109	445	34.1
Bulgaria	.	219	187	47	.	554	413	112	.
Canada	711	1,540	1,110	319	483	1,725	1,391	288	39.9
China	1,965	25,000	21,948	6,360	592	3,852	4,589	1,250	33.9
Cyprus	.	82	83	24	.	369	324	90	.
Czech Republic	297	3,701	3,761	1,119	568	4,481	3,818	1,135	65.6
Denmark	1,643	3,529	2,975	630	2,591	5,061	4,076	1,135	45.0
Estonia	.	154	346	110	.	357	264	66	.
Finland	1,287	3,606	2,640	826	1,254	3,686	2,888	889	53.1
France	9,934	16,884	13,591	3,638	16,491	32,375	27,484	7,874	47.1
Germany	31,805	64,622	52,537	13,941	43,800	90,618	75,225	21,423	48.4
Greece	229	432	389	101	1,292	3,018	2,571	646	48.1
Hong Kong	1,735	1,754	1,800	462	898	1,091	1,151	297	45.1
Hungary	377	2,004	1,845	571	410	2,725	2,108	556	54.9
Ireland	1,591	3,534	3,154	822	1,048	3,318	2,600	650	40.8
Italy	5,407	7,962	6,322	1,762	8,550	19,608	16,007	4,637	48.9
Japan	4,932	9,492	7,251	2,108	1,682	2,945	2,381	672	22.6
Latvia	.	202	152	23	.	427	230	63	.
Lithuania	.	281	312	138	.	611	449	117	.
Luxembourg (as of 2000)	.	1,200	716	163	.	1,198	959	273	.
Malta	.	16	40	55	.	178	247	54	.
Poland	763	3,938	3,595	1,119	1,225	7,261	5,948	1,692	55.0
Portugal	960	1,304	1,088	301	1,147	2,460	2,413	664	49.4
Romania	.	912	957	200	n a	1,732	1,298	342	45.2
Russian Federation	1,293	13,036	9,628	3,134	1,388	6,559	4,419	1,161	41.6
Slovakia	.	1,182	1,118	249	.	1,068	890	258	.
Slovenia	.	274	228	60	.	650	528	146	.
Spain	2,806	5,988	4,799	1,569	4,233	12,730	10,512	3,068	56.2
Sweden	3,545	5,737	3,992	1,076	3,407	6,463	5,185	1,552	52.1
Turkey	606	1,642	1,367	382	1,119	3,850	3,482	1,001	45.0
United Kingdom	13,306	21,224	17,648	5,438	14,400	33,586	25,879	7,044	47.0
United States	11,283	27,042	22,995	5,820	5,299	16,472	13,928	3,620	26.9
Rest of world	24,471	65,108	50,948	15,450	17,516	50,111	45,583	12,688	.

Source: Statistics Netherlands, StatLine, International trade in goods (extracted: 13-8-2010).

The above illustrates that the Netherlands continues to be a country actively engaged in trade with Europe and the rest of the world. The increasing share of imports originating from outside the EU 15, while export trade with the internal market is maintained, implies that globalisation has resulted in the Netherlands enjoying a special position in integrated global value chains.

1.2.2 Products

Table A1.2 shows the pattern of goods imported, exported and re-exported between 1996 and the first quarter of 2010. In 1996, the total value of imported goods amounted to 140 billion euros. By 2008, imports were 2.4 times higher, amounting to 336 billion euros. The worldwide economic crisis affected Dutch trade as of the third quarter of 2008, causing trade values to drop significantly. As such, in 2009 the import value had decreased by 62 billion euros compared with 2008.

Table A1.2
Imports, exports and re-exports of commodities by SITC classification

	Imports				Exports				Re-exports ¹⁾		
	1996	2008	2009	2010-Q1*	1996	2008	2009	2010-Q1*	2008	2009	2010-Q1*
	<i>billion euro</i>								<i>% of exports</i>		
Total	140	336	274	77	154	370	309	87	42	44	44
Food and live animals	14	27	26	7	24	42	40	11	25	25	26
Beverages and tobacco	2	3	3	1	4	6	6	1	13	12	11
Crude materials, inedible ex. fuels	6	14	10	3	8	18	15	5	31	27	32
Mineral fuels, lubricants, related materials	11	61	43	14	11	57	38	12	18	24	25
Animal and vegetable oils, fats and waxes	1	3	2	1	1	4	3	1	27	20	21
Chemicals and related products	17	48	44	12	25	66	59	17	36	43	40
Manufactured goods classified by materials	21	39	28	8	19	35	27	8	38	37	39
Machinery and transport equipment	48	102	83	23	44	107	88	25	62	64	62
Miscellaneous manufactured articles	19	37	34	9	16	33	31	8	68	69	69
Commodities not classified elsewhere	0	1	1	0	0	2	2	0	7	21	49

Source: Statistics Netherlands, StatLine, International Trade in Goods (extracted: 13-8-2010).

¹⁾ No figures for 1996 available.

At 102 billion euros, imports of machinery and transport equipment formed the bulk of Dutch imports in 2008, followed by chemicals and mineral fuels. Combined, these three categories constituted 63 percent of Dutch imports in 2008. Remarkably, this share remained fairly stable in 2009 and in the first quarter of 2010, indicating that the impact the crisis had on trade in the various types of goods was fairly uniform.

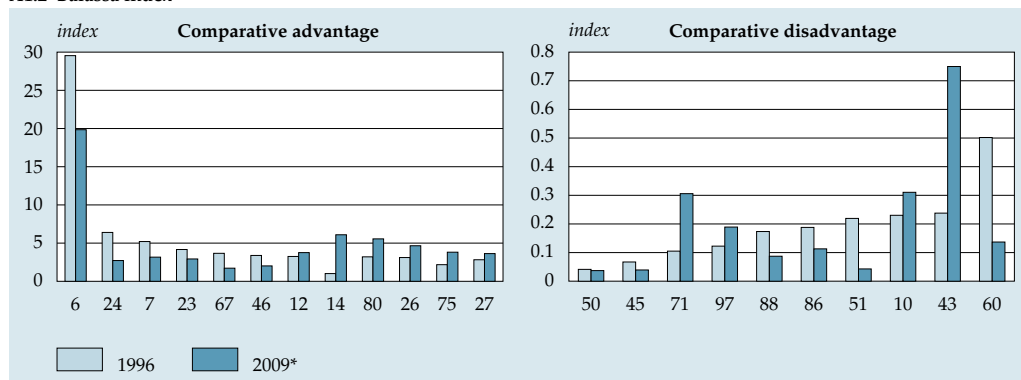
The composition of Dutch exports is quite similar to that of imports. Due to the recession, the total export value also decreased by roughly 61 billion euros between 2008 and 2009. The main export products from the Netherlands were machinery and transport equipment, chemicals and related products and mineral fuels. The share of re-exports was high in the observed period, mainly in miscellaneous manufactured articles and in machinery and transport equipment, varying between 62 and almost 70 percent. Exported beverages and tobacco were mainly produced domestically, while mineral fuels and chemical products displayed increasing shares of re-exports since 2008.

1.2.3 *Comparative advantages and disadvantages (Balassa index)*

As the figures in Graph A1.2 show, the Netherlands traditionally has a very strong comparative advantage in the export of live trees and other plants, such as bulbs, roots and cut flowers compared with the EU 14 (Balassa index, see Annex I), although by 2009 this comparative advantage had decreased somewhat. Other products in which the Netherlands had a comparative advantage in both years were, for instance, tobacco, edible vegetables, and residues and waste from the food industry. Compared with the EU 14, the Netherlands is relatively specialised in the export of flowers and plants and in goods originating from the agro-food sector. Products in which the comparative advantage has increased compared with 1996 are oil seeds, (oleaginous) fruits, grains and seeds, vegetable plaiting material as well as crude materials and articles thereof, such as tin and ore.

In 2009 there were four commodity chapters in which the Netherlands had developed a comparative advantage compared with the EU 14, i.e. where it had a disadvantage in 1995. These were wood, pulp, or other fibrous cellulosic material, waste and scrap paper or paperboard (HS47), electrical machinery and equipment (HS85), musical instruments and parts thereof (HS92) and nuclear reactors, boilers, machinery and mechanical appliances (HS84). There were eight commodity chapters in which the Netherlands lost its comparative advantage to the EU 14 between 1996 and 2009. However, in most cases the index remains close to 1 in 2009, indicating that there was no strong disadvantage relative to the EU 14. In sum, it can be concluded that the Netherlands has managed to maintain its competitive edge in goods where the comparative advantage was the greatest in 1996. However, the commodity chapters for which the Netherlands had a comparative advantage in 2009 showed an even greater advantage in 1996.

A1.2 Balassa index¹⁾



Source: Easy Comext, EU27 Trade Since 1995 by HS2-HS4 (includes quasi-transit trade).

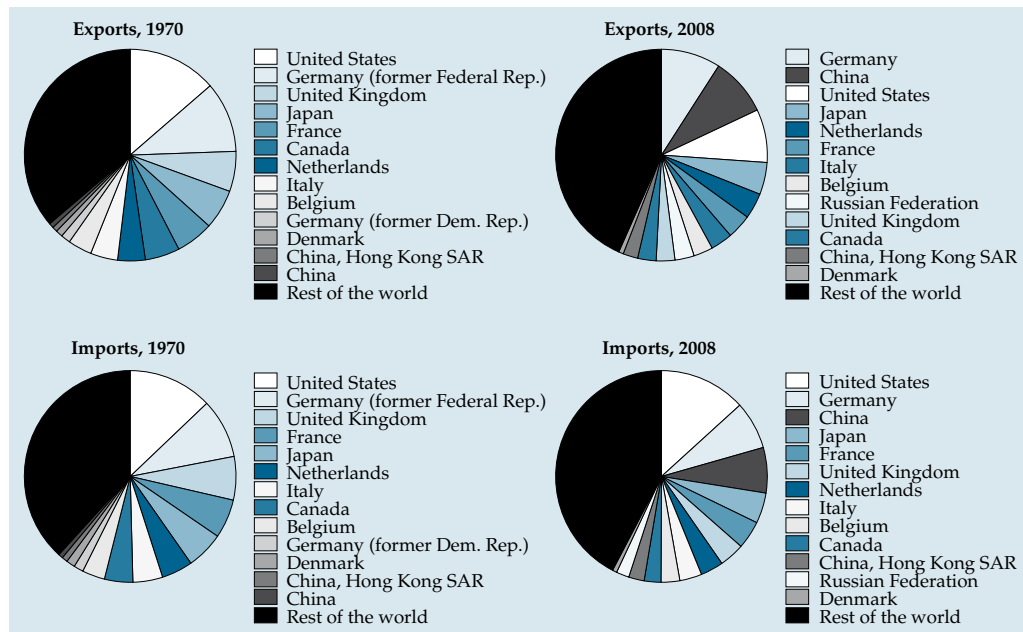
¹⁾ Full description of commodity chapters in Annex I.

1.2.4 The Netherlands' role in global trade

Even a small country like the Netherlands can play an important role in global trade. Graph A1.3 shows that in 1970, the Netherlands was the sixth largest importer in the world, accounting for approximately 5 percent of total world imports. While this share had fallen to 3 percent by 2008, it remains only a slightly smaller share than countries such as France or the UK. The largest importer in the observed period, the United States, imported approximately 13 percent of all traded goods worldwide. In 2008, Germany was still the second largest importer in the world, with 7 percent of total imports. Worthy of note is the rise of China as a trading nation, accounting for almost 7 percent of world imports in 2008, compared with 1 percent in 1970.

In 1970, the Netherlands accounted for roughly 4 percent of world exports and this share has remained stable throughout the past four decades. As a result, the Netherlands has gone from being the seventh largest exporter to being the fifth in 2008. Germany has taken over the role of the United States as the largest exporter worldwide, only just ahead of China in 2008. In 2008, Germany, China and the United States combined exported a little over 25 percent of all commodities in the world. Compared with 1970, developing Asian countries and south American countries currently account for an increasingly large share in world exports.

A1.3 Share of Dutch trade in world trade



Source: UNCTAD, Handbook of Statistics Online (extracted 6-8-2010).

Countries for which the Netherlands was a relatively important trading partner in 2008 are shown in Table A1.3. The Netherlands plays the most important role for neighbouring countries. In 2008, Belgium exported approximately 12 percent of its total exports to the Netherlands and imported almost a fifth of its imports from the Netherlands. The Netherlands is also an important partner country in terms of imports and exports for Germany, the United Kingdom, Luxembourg, and Denmark.

Remarkable are also the relatively large shares of Icelandic and Norwegian exports going to the Netherlands. In 2008, roughly 34 percent of Icelandic exports went to the Netherlands. Almost 85 percent of these exports consisted of aluminium and related articles. Roughly 10 percent of Norway's exports went to the Netherlands in 2008, which consisted of approximately 75 percent mineral fuels, mineral oils and products of their distillation.

Table A1.3
The role of the Netherlands in trade of selected countries, 2008

	Share of exports going to the Netherlands	Share of imports coming from the Netherlands
	%	
Belgium	12	19
Germany	6	8
United Kingdom	8	7
Denmark	4	7
Luxembourg	6	6
Iceland	34	6
Sweden	5	6
Italy	2	5
Ireland	4	5
Greece	2	5
Switzerland	3	5
Hungary	3	5
Portugal	3	4
Finland	5	4
Norway	10	4
France	4	4
Spain	3	4
Poland	4	3
Czech Republic	4	3
Austria	2	3
Turkey	2	2
Mexico	1	1
Slovak Republic	3	1
United States	3	1
Australia	2	1
New Zealand	1	1
Korea	2	1
Canada	1	1
Japan	3	1

Source: OECD Olisnet (extracted: 6-8-2010).

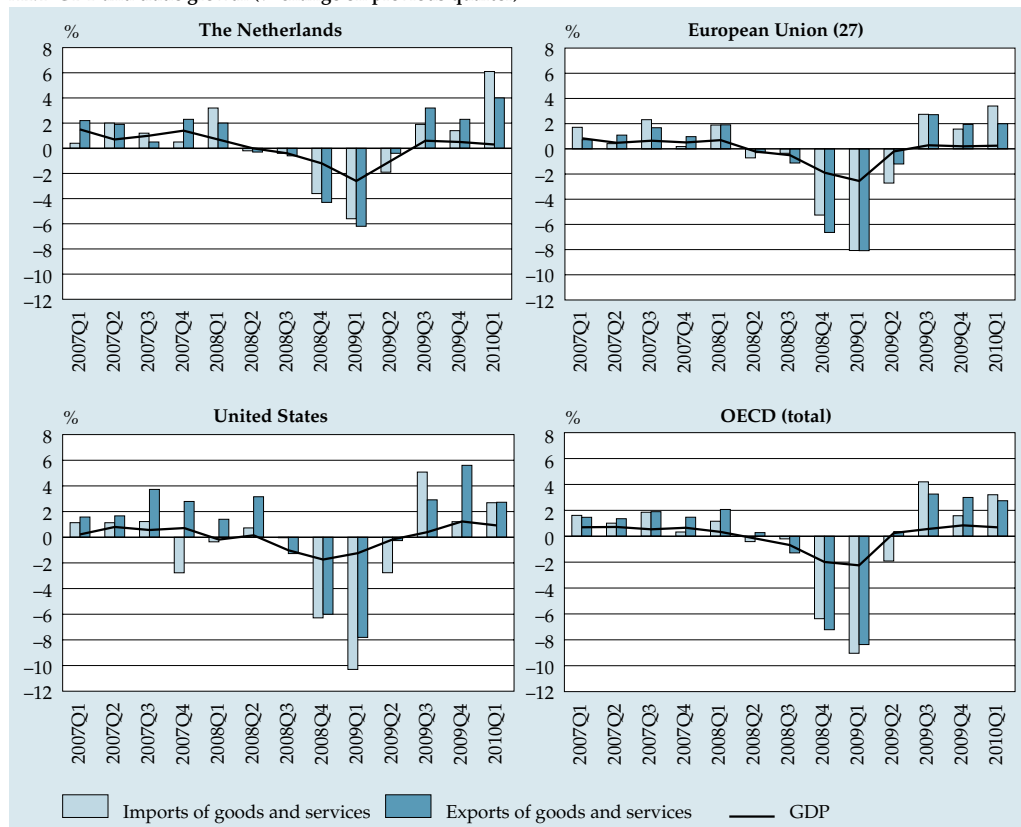
1.3 The current financial and economic crisis

1.3.1 Introduction

It took some time before the worldwide financial crisis, which began on the American housing market in August 2007, took its toll on the economy at large (WTO, 2009). The collapse of several Wall Street institutions and the subsequent major government bailouts of national banks late 2008 and early 2009 intensified the financial downturn and marked a sharp drop in economic growth and international trade throughout developed and developing countries. A significant reduction in consumer and business confidence, fuelled by the credit crunch and the reluctance of the financial sector to release financial resources, caused a strong decline in demand which, combined with declining inflation pressures, led to a

significant slowdown in global production. Through the mechanism of global supply chains and integrated financial and capital markets, virtually no country or market was spared.

A1.4 GDP and trade growth (% change on previous quarter)



Source: OECD OIisnet; Quarterly National Accounts.

Graph A1.4 shows that for most economies, the second quarter of 2008 marked the start of the recession as a result of the economic crisis. The Dutch economy did not grow in this quarter and contracted substantially in the ensuing four quarters. Huge negative growth rates were also recorded for import and export volumes in many countries and this trend continued well into 2009. Most countries hit rock bottom in the first quarter of 2009 in terms of import and export decline. OECD countries in general had already realised positive export and economic growth in the second quarter of 2009, while European countries and the United States slowly recovered as of the third quarter. The first quarter of 2010 shows minimal positive economic growth rates, whereas imports and exports are already growing at a faster pace.

1.3.2 Decline in imports and exports of goods

Across the board, the decline in trade volume in 2009 is unprecedented in recent economic history. The merchandise exports of the Netherlands decreased by almost 22 percent in 2009, while goods imports decreased even more strongly. The international trade in goods in neighbouring countries such as Belgium, Denmark, Germany and the United Kingdom declined in the same order of magnitude. Italy and Sweden were hit somewhat harder by the economic crisis than other EU countries and experienced negative growth rates in their international trade of almost 30 percent. The European Union as a whole saw its imports of goods decline faster than its exports, namely by 25 percent in 2009.

The Russian Federation experienced the strongest decline in trade of the countries in Table 1. The country's exports of goods decreased by almost 36 percent compared with 2008, and imports only slightly less so. The international trade in goods from China and Hong Kong seem to be less affected by the economic downturn, since their trade in goods shrank the least compared with other major traders. China's imports decreased by some 11 percent in 2009, while its exports decreased by almost 16 percent compared with 2008. The United States also experienced a comparatively modest decline in exports in 2009. The devaluation of the dollar against the euro may possibly have been beneficial for US exports, while the credit crunch and job losses had a negative impact on domestic demand leading to a decline in imports, as was the case in other countries.

Table A1.4
Export and import growth

	Export				Import			
	2007	2008	2009	2010Q1	2007	2008	2009	2010Q1
	<i>% change on one year previously</i>							
Argentina	19.8	25.5	-20.5	10.8	30.9	28.4	-32.5	33.1
Belgium	17.5	9.8	-21.8	21.4	17.2	13.4	-24.7	19.1
Brazil	16.6	23.2	-22.7	25.8	32.1	44.0	-26.7	36.2
China	25.7	17.4	-16.0	28.7	20.7	18.5	-11.2	64.7
Denmark	11.4	13.2	-19.8	10.4	14.7	12.2	-24.9	-1.1
EU 27	16.3	11.1	-22.6	17.8	16.0	12.6	-25.0	15.8
France	11.4	11.7	-21.5	14.1	14.5	15.6	-21.9	13.0
Germany	19.2	9.6	-22.2	16.8	16.4	12.3	-20.9	12.4
Hong Kong	8.8	5.3	-12.2	25.8	10.0	5.6	-10.6	34.2
Italy	19.9	8.9	-25.5	13.0	15.6	10.0	-26.8	17.4
Japan	10.4	9.5	-25.7	48.4	7.4	22.6	-27.6	22.7
Netherlands	18.9	15.8	-21.9	21.5	18.3	17.9	-23.3	20.0
Russian Federation	16.8	33.1	-35.7	61.1	36.0	30.6	-34.3	18.7
Sweden	14.3	8.8	-28.6	22.4	19.6	10.7	-29.0	26.6
Turkey	25.4	23.1	-22.6	6.3	21.8	18.8	-30.2	33.3
United Kingdom	-1.9	4.9	-23.4	22.0	3.8	1.9	-24.1	19.0
United States	11.9	12.1	-18.0	20.5	5.3	7.4	-26.0	20.5

Source: Easy Comext, Eurostat (extracted: 18-8-2010); WTO statistics; Monthly Merchandise Trade.

A different way of presenting the effect the crisis had on trade is to measure its impact and depth simultaneously (Bergeijk, 2009). Graph A1.5 shows, for a selection of countries, the depth and duration of the reduction in imports and exports due to the present economic crisis. Trade decline is measured in percentages from peak (i.e. the quarter in which trade was at its highest point) to trough (i.e. the quarter in which trade value was at its lowest point). Duration is measured as the number of quarters in which imports (exports) decreased compared with the previous quarter.

The contraction of trade (in percentages) was smaller for European countries than for the selected non-EU countries such as Russia, Argentina, Brazil and Japan. Graph 5 shows that Denmark's exports decreased by 21 percent, measured from peak to trough. Even a trading country like the Netherlands, for which international trade in goods is an important pillar of economic growth, was not as strongly affected as some Latin-American or Asian countries. For example, by the first quarter of 2009, Russian exports of goods had dropped by almost 60 percent compared with the third quarter of 2008 (which was the last quarter with positive export growth). Even the country that is credited for the current upturn in world trade, China, has seen its exports decrease by 40 percent over two quarters.

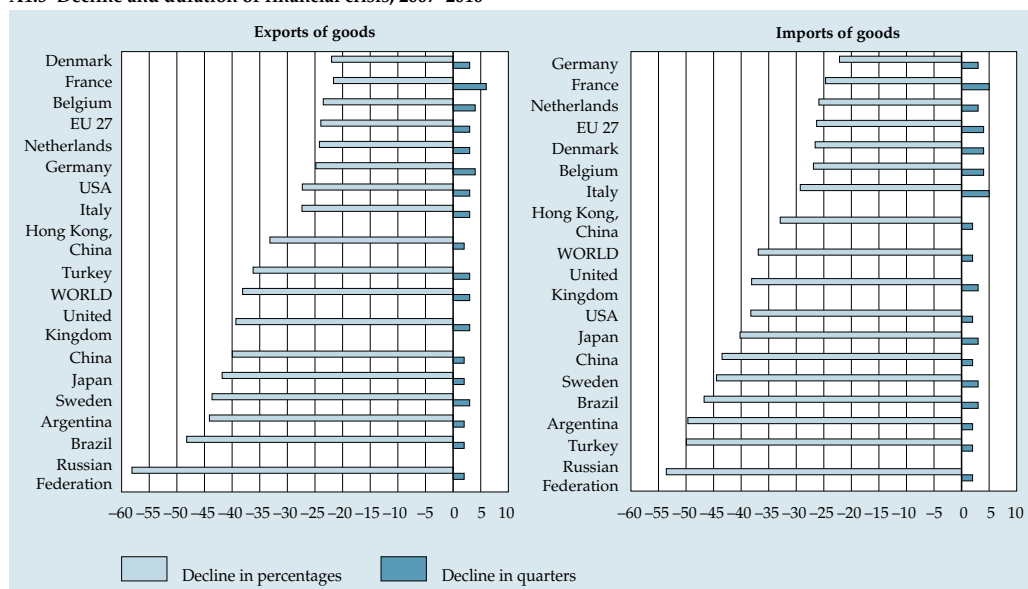
Although it may be too early to say, in terms of duration, the European countries seemed to take longer to recover than other countries, particularly in terms of imports. World imports declined for two consecutive quarters while the EU 27 reported four quarters of negative import growth. Of the selected countries, France reported the most quarters with negative growth: five in terms of imports and six quarters for exports.

The economic crisis hit some countries sooner than others, although this did not necessarily mean that these countries were also the first to recover. For instance, in Belgium, Denmark, France, Sweden and Italy, the third quarter of 2008 already yielded negative growth rates for imports and exports, where the Netherlands still managed to have positive growth. In addition, Italy and France took a relatively long time to recover from this drop. World imports and exports decreased by more than 35 percent from peak to trough, although exports took longer to recover (three quarters compared with two quarters for imports).

Country or region-specific economic crises and credit crunches affect export patterns differently from import volumes (Van Bergeijk, 2009). Export-led growth strategies or protectionist measures implemented by the government during a crisis can actually cause exports to decline less or even grow during or shortly after a crisis. Importers on the other hand, might suffer from a lack of funding, currency devaluation, loss of trust and decreased domestic demand. As such, the impact of a 'normal' crisis is most visible and unambiguous in import statistics (Van Bergeijk,

2009). However, van Bergeijk argues that since countries are part of global production chains and mainly trade intermediate goods, government policies to stimulate exports might not be effective in a global crisis like the present one. As such, exports should also be hit hard by a global crisis, which is the general picture that emerges from Table 4 and Graph 5.

A1.5 Decline and duration of financial crisis, 2007–2010



Source: Easy Comext (Eurostat; extracted 28-7-2010) and WTO Monthly Merchandise Exports (extracted 17-8-2010).

However, Table 4 also shows that exports are recovering more strongly than import demand in the first quarter of 2010. In fact, for the Netherlands, export was the main driving force behind the economic growth of 0.1 and 2.1 percent in the first two quarters of 2010 respectively (CBS a/b, 2010). A strong recovery in China and other developing Asian countries is an important reason behind this strong export performance in the Netherlands and other exporting countries such as Germany.

1.4 Conclusion

International trade in goods has always been an important driver of economic growth in the Netherlands. The country's geographic location and ongoing European economic integration has made the Netherlands a major player in global trade. The bulk of Dutch trade is still with other European countries, even though this share has declined somewhat compared with the mid-90s. Nearly half of all goods exported to the European Union currently consist of re-exports.

Trade in machinery and transport equipment formed the bulk of Dutch trade in 2008, followed by chemicals and mineral fuels. The same picture emerged for 2009 and the first quarter of 2010, indicating that the economic crisis impacted trade in the various types of goods fairly uniformly. These are however not the commodities in which the Netherlands had the greatest comparative advantage compared with other European countries in 2009. Compared with the EU 14, the Netherlands is particularly specialised in the export of live trees, and plants, such as bulbs, roots and cut flowers, and products from the agro-food industry. These comparative advantages were already present in the mid-90s, although sometimes more pronounced than in 2009.

The Netherlands was the sixth largest importer in the world in 1970. By 2008, this share had decreased to 3 percent, but was only slightly less than countries such as France and the United Kingdom. In terms of exports, the Netherlands went from being the seventh largest exporter in 1970 to fifth in 2008. The Netherlands remains an important trading partner particularly for neighbouring countries such as Belgium and Germany.

For many countries, including the Netherlands, the worldwide financial and economic crisis has had a detrimental impact on economic growth and international trade. The Dutch economy did not grow in the second quarter of 2008 and contracted in the subsequent four quarters. Dutch exports of goods decreased by almost 22 percent in 2009, while imports decreased even more strongly. Comparable negative growth rates were recorded by neighbouring EU countries. The impact of the crisis was even greater outside the EU.

The contraction of trade (in percentages) was smaller for European countries than for non-EU countries such as Russia, Argentina, Brazil and Japan, but it seemed to take the EU longer to recover. Even though the contraction of international trade in the Netherlands was substantial, the decline was below average compared with other countries. World imports and exports decreased by almost 40 percent, where exports declined during three quarters and imports during two quarters.

Crises in individual countries affect exports and imports in a different way (Van Bergeijk, 2009). Empirical evidence shows that the impact of a 'normal' crisis is most visible and unambiguous in import statistics (Van Bergeijk, 2009). A global crisis like the current one puts both imports and exports under severe pressure. At the moment exports seem to be recovering more strongly than import demand in several European countries. The first quarter of 2010 shows cautious positive economic growth rates, whereas imports and exports are already growing at a faster pace. The tentative economic growth in the Netherlands in the first two quarters of 2010 is largely due to export growth, stimulated by Chinese demand (CBS a/b, 2010).

References

- Bergeijk, P. van (2009). Expected extent and potential duration of the world import crunch. *KYKLOS*, Vol. 62, No. 4 (pp. 479–487).
- CBS a (2010). Economie groeit met 2,1 procent. Persbericht: <http://www.cbs.nl/nl-NL/menu/themas/macro-economie/publicaties/artikelen/archief/2010/2010-052-pb.htm>. Statistics Netherlands.
- CBS b (2010). Minimale groei van de economie. Persbericht: <http://www.cbs.nl/nl-NL/menu/themas/macro-economie/publicaties/artikelen/archief/2010/2010-036-pb.htm>. Statistics Netherlands.
- Ramaekers, P. and T. de Wit (2010). Helft Nederlandse goederenexport naar Duitsland is van eigen makelij. *Webmagazine* : <http://www.cbs.nl/nl-NL/menu/themas/internationale-handel/publicaties/artikelen/archief/2010/2010-3142-wm.htm>. Statistics Netherlands.
- WTO (2009). *World trade report 2009. Trade policy commitments and contingency measures*. Geneva, Switzerland.
- Zanden, J.L. van (1997). *Een klein land in de 20^e eeuw. Economische geschiedenis van Nederland 1914–1995* (1st ed.) [A small country in the 20th century. Dutch economic history 1914–1995]. Zeist, the Netherlands: Het Spectrum.

Annex I

Balassa index (Revealed Comparative Advantage):

The Balassa index measures a country's degree of specialisation in a certain sector or commodity relative to another group of countries. In this chapter, the Balassa index is calculated as follows:

$$\frac{X_{NL}^i / X_{NI}^{tot}}{X_{EU14}^i / X_{EU14}^{tot}}$$

where X represents the exports of the Netherlands (NL) and the EU 14 respectively (the EU 15 excluding the Netherlands) of commodities in chapter i and for all commodities (*tot*).

If the Balassa index exceeds 1, then the Netherlands has a comparative advantage in the exports of product i compared with the EU 14. If the index is less than 1, the country has a comparative disadvantage.

Table Annex A1.1
Commodity chapters with largest comparative advantages/disadvantages (Balassa index)

Commodity	Description
6	Live trees and other plants; bulbs, roots and the like; cut flowers and ornamental foliage
24	Tobacco and manufactured tobacco substitutes
7	Edible vegetables and certain roots and tubers
23	Residues and waste from the food industries; prepared animal fodder
67	Prepared feathers and down and articles made of feathers or of down; artificial flowers; articles of human hair
46	Manufactures of straw, of esparto or of other plaiting materials; basketware and wickerwork
12	Oil seeds and oleaginous fruits; miscellaneous grains, seeds and fruit; industrial or medicinal plants; straw and fodder
14	Vegetable plaiting materials; vegetable products not elsewhere specified or included
80	Tin and articles thereof
26	Ores, slag and ash
75	Nickel and articles thereof
27	Mineral fuels, mineral oils and products of their distillation; bituminous substances; mineral waxes
50	Silk
45	Cork and articles of cork
71	Natural or cultured pearls, precious or semi-precious stones, precious metals, metals clad with precious metal and articles thereof; imitation jewellery; coin
97	Works of art, collectors' pieces and antiques
88	Aircraft, spacecraft and parts thereof
86	Railway or tramway locomotives, rolling-stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signalling equipment of all kinds
51	Wool, fine or coarse animal hair; horsehair yarn and woven fabric
10	Cereals
43	Furskins and artificial fur; manufactures thereof
60	Knitted or crocheted fabrics

A2 Trends in international trade in services

Chantal Lemmens-Dirix

2.1 Introduction

Services are the intangible equivalent of economic goods because their form and composition are difficult to describe and their transfer and exchange are difficult to measure. Services often require that they are 'consumed' at or near the place and at or near the time of their production. Furthermore, they are usually customised to meet client needs (Lennon, 2008; Doh and Pearce, 2003). Services are in most economies the largest contributor to economic growth and employment (Hufbauer and Warren, 1999). While the increasing economic importance of services has not gone unnoticed, services have not, until recently, figured as prominently in the literature on international trade. For a long time, the services sector was considered as the non-tradable sector of economy. However, globalisation has affected all facets of the world economy, including services. This chapter provides more information about recent trends in the international trade in services in the Netherlands and in an international perspective.

This chapter is organised as follows. Section 2.2 highlights the main developments in Dutch international trade in services. The breakdown of the Dutch international trade in services by services category, and by country of origin and destination can be found in sections 2.3 and 2.4 respectively. The export specialisation of the Netherlands, as measured with the Balassa Index, is presented in section 2.5. Section 2.6 examines the market share in services trade of the Netherlands in several foreign markets. Finally, section 2.7 contains a summary and conclusions.

2.2 Developments in Dutch international trade in services

Over the last three decades, services (see definitions in Box A2.1) have grown from around 58 percent of GDP to almost 75 percent in higher income countries, such as the Netherlands (Francois and Hoekman, 2009). This growing importance of trade in services is the result of advances in information and communication technologies which are increasingly enabling cross-border 'disembodied' trade in services. Furthermore, an increase in the production of intermediate services (i.e. outsourcing) is also one of the driving forces behind this trend (Lennon, 2008; Francois and Hoekman, 2009).

Box A2.1 International trade in services: definition

International trade in services covers all services transactions between a country (i.e. its residents) and foreign countries or international organisations (i.e. the non-residents of that country) during a given period. The services are classified as follows: transportation, travel, communication services, construction services, insurance services, financial services, computer and information services, royalties and licence fees, other business services, personal, cultural, and recreational services and government services not included elsewhere.

Statistics Netherlands (SN) uses the business survey to collect data for a large portion of the international trade in services. Data, for instance, on government services and travel are obtained by other data collection methods.

Table A2.1 shows the overall Dutch imports and exports of international trade in services as a share of total international trade (goods and services) for five successive years. In 2008, the value of imported services was 19 percent higher than in 2004. For the same period, it was observed that the export of services increased by almost 26 percent.

Dutch services exports accounted for approximately 20 percent of total exports, see also Table A2.1. This percentage has been comparatively stable from the mid 1990s onwards (see WTO, 1998). The relative growth of services trade vis-à-vis trade in goods happened before that period (increasing from 7 percent of total exports in 1987).

Table A2.1
Dutch imports and exports of international trade in services as a share of total international trade (goods and services)

	Imports			Exports		
	international trade	international trade in services	% of total imports	international trade	international trade in services	% of total exports
	<i>million euro</i>			<i>million euro</i>		
2004	292,344	64,097	22	323,922	68,262	21
2005	317,779	67,934	21	355,298	73,998	21
2006	354,569	69,199	20	395,973	77,020	19
2007	378,542	71,721	19	425,836	81,534	19
2008	412,391	76,470	19	456,415	85,935	19

Source: CBS, International Trade in Services Statistics.

The share of services exports in total exports appears relatively low, considering that the share of services in GDP is about 75 percent. However, there are several reasons why services are relatively less frequently traded across borders than

goods. Many services must be consumed at the point of production. Only a limited number of services can be shipped or transferred via internet or telephone. Firms that export services are not only confronted with language barriers but also with a broad range of national regulatory barriers, such as special licences, labour legislation etc. which make it more difficult to trade in services. Furthermore, their form and composition are difficult to describe and their transfer and exchange are difficult to measure compared with goods (Kox, Lejour & Verweij, 2009).

2.3 *Composition of Dutch international trade in services*

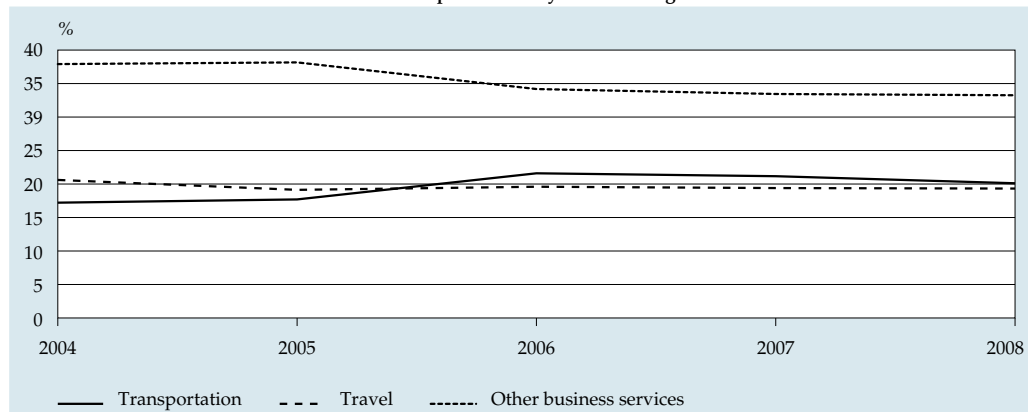
Although total international trade in services increased during the period 2004–2008, the composition of the Dutch international trade in services remained markedly constant in this period. The ‘Other business services’ category is by far the largest group in Dutch imports as well as exports, see also Tables A2.2A and A2.2B. This group is extremely diverse and includes among others merchanting, operational leasing services, advertising, market research and public opinion polling, research and development, architectural engineering and other technical services. The share of trade in these ‘other business services’ in total Dutch services trade declined slightly, see also Graphs A2.2A and A2.2B. Given the role of the Netherlands as a distribution country for the EU hinterland it is not surprising that ‘transportation’ was the second largest service in the observed period for both imports and exports. The share of ‘royalties and licence fees’ in total services had grown remarkably since 2005 and was therefore the third most important service in Dutch exports from 2007 onwards. Because of this growth, ‘travel’ services were pushed to fourth place in exports in 2008. For imports on the other hand, ‘travel’ remained the third most important service during the whole period. This implies that Dutch travel expenditures abroad are 20 percent of the total Dutch services imports.

Table A2.2A
Trends in total Dutch import values by the three largest services in 2008

	2004	2005	2006	2007	2008
	<i>million euro</i>				
Total	64,097	67,934	69,199	71,721	76,470
<i>Largest services in 2008</i>					
Other business services	24,298	25,924	23,654	23,985	25,429
Transportation	11,035	12,025	14,948	15,182	15,382
Travel	13,211	12,996	13,560	13,912	14,777

Source: CBS, International Trade in Services Statistics.

A2.2A Trends in relative distribution of Dutch import values by the three largest services in 2008



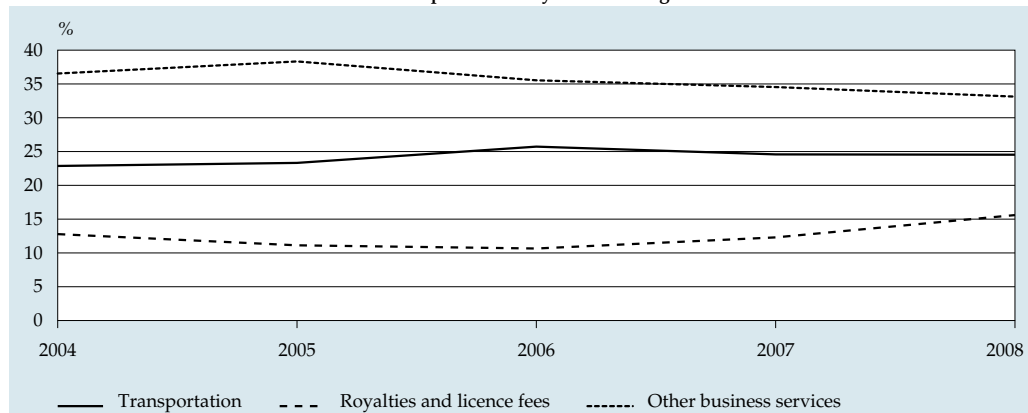
Source: CBS, International Trade in Services Statistics.

Table A2.2B
Trends in total Dutch export values by the three largest services in 2008

	2004	2005	2006	2007	2008
<i>million euro</i>					
Total	68,262	73,998	77,020	81,534	85,935
<i>Largest services in 2008</i>					
Other business services	24,945	28,364	27,372	28,163	28,467
Transportation	15,610	17,257	19,815	20,040	21,081
Royalties and licence fees	8,727	8,234	8,207	10,029	13,405

Source: CBS, International Trade in Services Statistics.

A2.2B Trends in relative distribution of Dutch export values by the three largest services in 2008



Source: CBS, International Trade in Services Statistics.

2.4 The largest import and export services markets for the Netherlands

The Netherlands mainly trades in services with adjacent countries. This is not surprising given that services often require suppliers and consumers to be physically located at or near the same place in order to fulfil the transaction. The large market size of the United States made it the most important trading partner outside Europe.

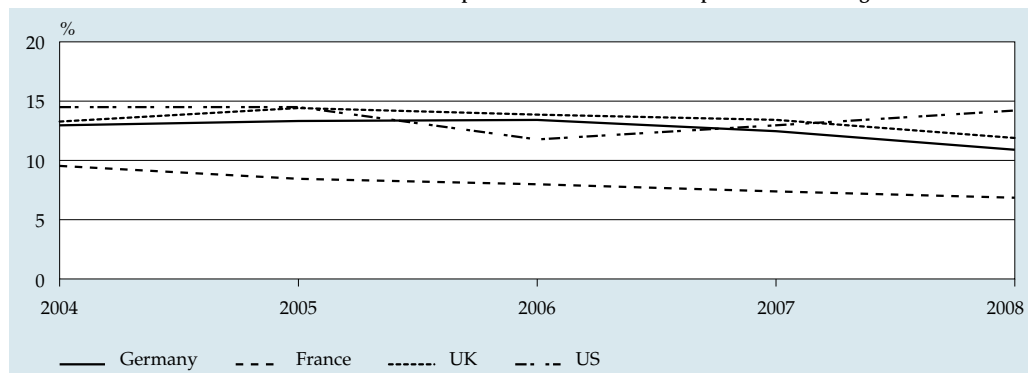
In 2008, the United States was, at nearly 11 billion euros, the most important source of Dutch import of services, closely followed by the European trading partners United Kingdom, Germany and France. However, in 2006 and 2007, the share of Dutch imports from the United States decreased significantly, mostly due to reductions in cross-border 'royalties and licence fees' and 'other business services', see also Graph A2.3A. The decrease in total imports from France in the period 2004–2008 was mainly due to reduced imports of 'other business services'.

Table A2.3A
Trends in total Dutch import values of all services imported from the largest markets in 2008

	2004	2005	2006	2007	2008
<i>million euro</i>					
Total	64,097	67,934	69,199	71,721	76,470
<i>Largest markets in 2008</i>					
United States	9,291	9,849	8,145	9,296	10,865
United Kingdom	8,510	9,794	9,592	9,625	9,094
Germany	8,306	9,052	9,283	8,940	8,334
France	6,112	5,739	5,527	5,296	5,240

Source: CBS, International Trade in Services Statistics.

A2.3A Trends in relative distribution of the Dutch import values of all services imported from the largest markets in 2008



Source: CBS, International Trade in Services Statistics.

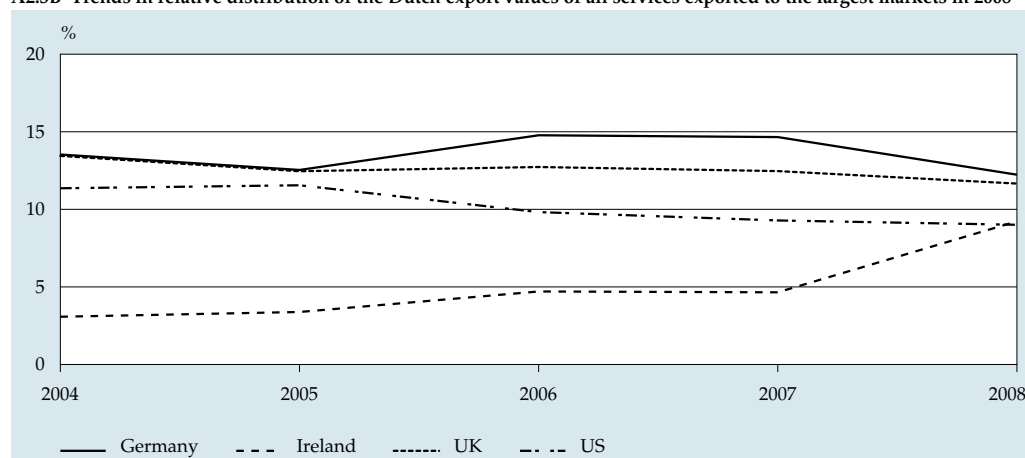
On the other hand, Germany was the most important export destination for the Netherlands at 10.5 billion euros in 2008. The importing trading partners United Kingdom and the United States were also in the top four. Between 2007 and 2008 the share of Dutch imports from Germany decreased by 2.5 percentage points, mostly due to reductions in 'other business services', see also Graph A2.3B.

Table A2.3B
Trends in total Dutch export values of all services exported to the largest markets in 2008

	2004	2005	2006	2007	2008
<i>million euro</i>					
Total	68,262	73,998	77,020	81,534	85,935
<i>Largest markets in 2008</i>					
Germany	9,238	9,278	11,379	11,951	10,512
United Kingdom	9,177	9,217	9,803	10,163	10,020
Ireland	2,100	2,504	3,624	3,793	7,929
United States	7,753	8,547	7,565	7,569	7,738

Source: CBS, International Trade in Services Statistics.

A2.3B Trends in relative distribution of the Dutch export values of all services exported to the largest markets in 2008



Source: CBS, International Trade in Services Statistics.

In addition to developed countries, emerging markets are becoming increasingly more important in Dutch services trade. Table A2.4 shows the share of the Dutch import and export values from and to four main emerging markets – the BRIC countries (Brazil, Russia, India and China) – for the period 2004–2008.

The table shows that total Dutch imports of services from BRIC countries increased by 238 percent between 2004 and 2008. The share of the Dutch imports value from BRIC countries amounted to 2.1 percent in 2004 and 5.8 percent in 2008. Similar results were found for exports. The overall Dutch export value to BRIC countries was 167 percent higher in 2008 than in 2004, whereas the share of the Dutch export value to BRIC countries rose from 3 percent in 2004 to 6.3 percent in 2008.

Table A2.4
Total Dutch import and export values for total services from and to BRIC countries

	2004	2005	2006	2007	2008
<i>million euro</i>					
Total Dutch import	64,097	67,934	69,199	71,721	76,470
of which BRIC countries	1,320	1,681	2,693	2,982	4,469
share of BRIC (%)	2.1	2.5	3.9	4.2	5.8
Total Dutch export	68,262	73,998	77,020	81,534	85,935
of which BRIC countries	2,044	2,934	3,217	4,061	5,454
share of BRIC (%)	3.0	4.0	4.2	5.0	6.3

Source: CBS, International Trade in Services Statistics.

2.5 Comparative advantages: the Balassa index

The Balassa index has been extensively used in the international trade literature to measure export specialisation. This index compares the actual export structure of a country relative to the export structure of a set of reference countries. If a country has a relatively large share (i.e. relative to the benchmark group of countries) of a particular service in its export package, it is considered to specialize in that service. The EU 26 (i.e., EU 27 excluding the Netherlands) was used as a benchmark group in this chapter.

Box A2.5 The Balassa index

The Balassa index (Revealed Comparative Advantage) is calculated as follows:

$$\frac{(X_{NL}^i / X_{NL}^{tot})}{(X_{EU26}^i / X_{EU26}^{tot})}$$

Where X represents the exports of, respectively, the Netherlands (NL) or the EU 26 to all countries in services category (i) or in all services categories combined (total).

If the Balassa index for a given services category is greater than 1 then the Netherlands has a comparative advantage and is thus relatively specialized in the export of these services compared with the EU 26. If the index is lower than 1, the Netherlands has a comparative disadvantage.

Table A2.5 shows the Revealed Comparative Advantages (RCA) of the Netherlands for seven of the eleven services categories in 2008.

Table A2.5
The Balassa index: comparison of the Netherlands and EU 26, 2008

	RCA with respect to the EU 26	Total Dutch exports to all countries
		<i>million euro</i>
Other business services	1.2	28,467
Transportation	1.1	21,081
Travel	0.5	9,072
Computer and information services	0.9	4,569
Communications services	1.4	3,074
Construction services	1.0	2,210
Personal, cultural, and recreational services	0.6	514

Source: Eurostat.

The Balassa index demonstrated that, compared with the EU 26, the Netherlands had a comparative advantage in the two largest export sectors of the Dutch economy, namely 'other business services' and 'transportation'. Furthermore, the Netherlands was strongly specialized in the relatively small 'communication services' sector. However, with regard to 'travel', 'computer and information services' and 'personal, cultural, and recreational services', the Netherlands had a comparative disadvantage compared with the EU 26 in 2008.

2.6 *The Netherlands as services partner for other countries*

Table A2.6A gives an overview of the Dutch share in services imports for several important European benchmark countries. The total import of services increased between 2004 and 2008 for all these countries. As regards the import values from

the Netherlands, only the United Kingdom showed a slight decrease from 4.8 billion euros to 4.3 billion euros in 2008.

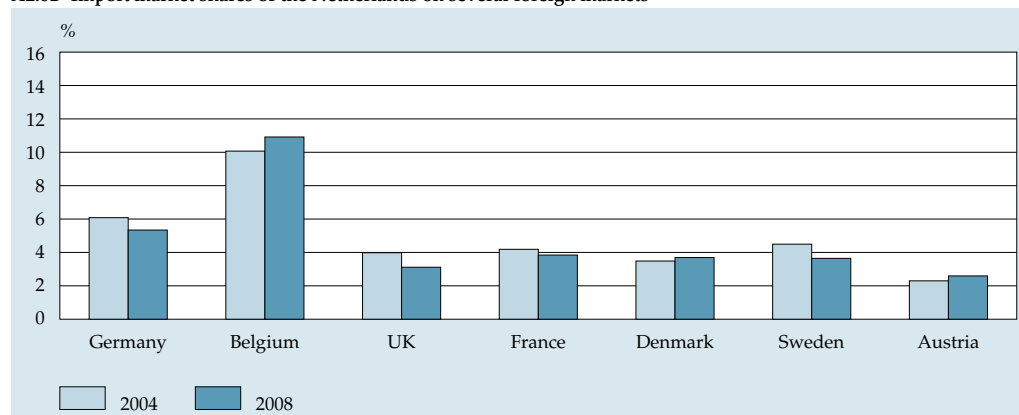
Of all these benchmark countries, Germany, at 193.5 billion euros, imported the most in 2008, of which 10.3 billion euros came from the Netherlands. However, as Graph A2.6A shows, the Dutch market share of the total import for Germany declined between 2004 and 2008 by 0.8 percentage point. For the United Kingdom, France and Sweden also a decrease was found for the Dutch share in the total imports of these countries. On the other hand, an increase in the Dutch market share of total imports was observed for three countries, of which Belgium was the most important with an increase of 1 percentage point between 2004 and 2008.

Table A2.6A
Total import values of all services from the Netherlands and the world for several European countries

Country	Import from	2004	2008
<i>million euro</i>			
Germany	World	157,405	193,549
	The Netherlands	9,575	10,336
Belgium	World	39,475	56,058
	The Netherlands	3,975	6,119
United Kingdom	World	120,658	137,962
	The Netherlands	4,804	4,296
France	World	79,171	97,199
	The Netherlands	3,315	3,736
Denmark	World	26,757	42,545
	The Netherlands	932	1,572
Sweden	World	26,617	37,367
	The Netherlands	1,196	1,362
Austria	World	22,542	29,129
	The Netherlands	518	755

Source: Eurostat.

A2.6B Import market shares of the Netherlands on several foreign markets



Source: Eurostat.

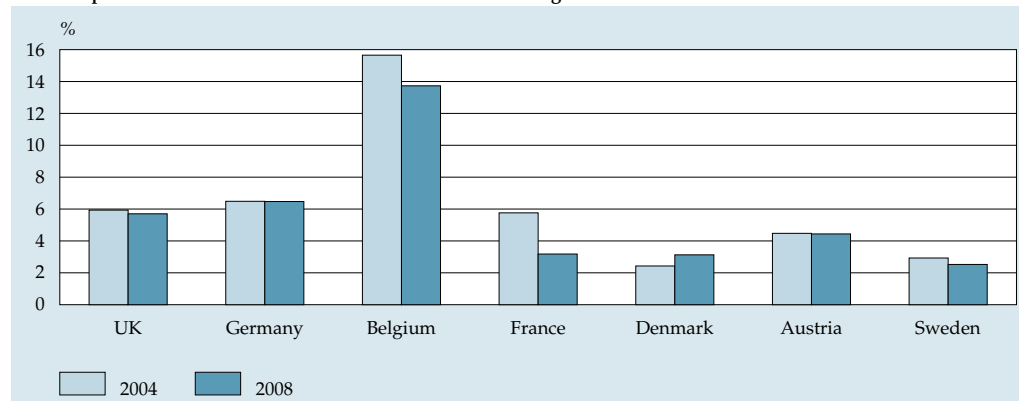
A similar analysis can be made for exports, see also Table A2.6B. The United Kingdom was the most important exporter among the selected countries, 196.2 billion euros in 2008. As Graph A2.6B demonstrates, the Dutch export share in total export of the United Kingdom was almost 6 percent. As with imports, the largest Dutch market share was observed in Belgium. Almost 16 percent of the total export value of Belgium was destined for the Netherlands in 2004, although this share decreased between 2004 and 2008 by almost 2 percentage points.

Table A2.6B
Total export values of all services to the Netherlands and the world for several European countries

Country	Import from	2004	2008
<i>million euro</i>			
United Kingdom	World	159,106	196,157
	The Netherlands	9,441	11,185
Germany	World	117,725	167,985
	The Netherlands	7,636	10,873
Belgium	World	42,396	58,878
	The Netherlands	6,636	8,084
France	World	92,422	111,657
	The Netherlands	5,325	3,549
Denmark	World	29,424	49,390
	The Netherlands	715	1,545
Austria	World	30,516	42,304
	The Netherlands	1,366	1,878
Sweden	World	31,336	49,643
	The Netherlands	918	1,254

Source: Eurostat.

A2.6B Export market shares of the Netherlands on several foreign markets



Source: Eurostat.

2.7 *Summary and conclusions*

The aim of this chapter was to provide more information about recent trends in the international trade in services in the Netherlands and in an international perspective. It was shown that the Dutch import and export values of total services increased substantially during the period 2004–2008. Despite this increase, the export share of services in total Dutch export remained approximately 20 percent. The literature indicates that this percentage has been quite stable since 1997. The composition of the Dutch international trade in services has been markedly constant during the period 2004–2008. The ‘other business services’ and ‘transportation’ services categories were the largest services groups in Dutch imports as well as exports.

The Balassa Index demonstrated that the Netherlands has a comparative advantage in ‘other business services’ and ‘transportation’, which are also the two largest export sectors in the Dutch economy. The Netherlands mainly trades with adjacent countries such as Germany and the United Kingdom. In addition, Dutch import from and export to the upcoming BRIC countries increased significantly from 2004 to 2008. As a consequence, it can be concluded that the BRIC countries are becoming increasingly more important for the Dutch economy. Finally, it was observed that for Belgium, the Netherlands is the most important importing as well as exporting country.

References

- Doh, J. and Pearce, J. II. (2003). ‘Revising our understanding and expectations of the international trade in services’. *Journal of Transnational Management Development*, 9(1): 59–78.
- Francois, J. and Hoekman, B. (2009). ‘Services trade and policy’. Working paper No. 0903, Johannes Kepler University of Linz, Linz-Auhof.
- Hufbauer, G. and Warren, T. (1999). ‘The globalisation of services: What has happened? What are the implications?’. Working Paper No. 99–12, Institute for International Economics, Washington.
- Kox, H., Lejour, A. and Verweij, G. (2009). ‘Regulatory barriers in business and transport services trade’. Paper prepared for the First Meeting of Globalisation Investment and Services Trade, June, Milan.
- Lennon, C. (2008). ‘Trade in services and trade in goods: Differences and complementarities’. Working Paper No. 52, Paris School of Economics, Paris.

World Trade Organisation (1998). 'Annual Report'. Volume 2, Statistical Appendix, Geneva.

A3 Trends in international direct investment

Oscar Lemmers

3.1 Introduction

The Netherlands is an attractive country for foreign enterprises interested in investing abroad. Almost a third of Dutch private sector turnover is generated by foreign controlled enterprises, which indicates the importance of inward foreign direct investment (FDI) for the Dutch economy. Similarly, Dutch enterprises have substantial investments abroad. As a result, the Netherlands always ranks highly in the UNCTAD Performance Indices for inward and outward FDI. For example, in the 2009 UN World Investment Report there were as many as six Dutch companies in the top 100 of non-financial Trans National Companies, including Shell, Philips Electronics, and AkzoNobel.

However, the economic crisis has affected FDI flows just as it has affected other international economic relations such as foreign trade, international R&D, and cross-border transport. Incoming and outgoing direct investment flows to and from the Netherlands turned negative in several quarters of 2008 and 2009. The stocks of inward and outward Dutch FDI decreased for the first time in many years. In particular, the Dutch government's acquisition of the Dutch part of Fortis in October 2008 had a considerable direct effect on Dutch FDI. This takeover led to a decrease in the incoming investment position from Belgium and "provides a strong safeguard for all those involved in these institutions (Fortis, editor) and for the stability of the Dutch financial system" (Dutch Ministry of Finance, 2008).

This chapter explores the recent trends in international direct investments in and from the Netherlands. Section 3.2 focuses on trends during the crisis, such as the decrease in FDI stocks, which is followed by a review of a number of ongoing trends such as the shift from services to manufacturing. The section concludes with a discussion on the possible channels through which the economic crisis affects FDI. In section 3.3 we focus on inward and outward Foreign Affiliate Trade Statistics (inward and outward FATS). These statistics describe the activities of foreign controlled enterprises that reside in the Netherlands and the activities of Dutch controlled enterprises in foreign countries, respectively. Subsequently, Dutch FDI is put into an international perspective in section 3.4. The chapter ends with a number of conclusions and suggestions for further research.

Box A3.1 Definitions and methodology

The leading authority on FDI in the Netherlands is De Nederlandsche Bank (DNB). It collects, compiles and publishes the data about incoming and outgoing FDI as part of the Balance of Payments according to the IMF Balance of Payments Manual (IMF, 1993). DNB divides FDI into two categories: manufacturing (sectors A through F in NACE Rev. 2, which includes mining, quarrying and the metal industry) and services (sectors G through S, excluding O, which includes trade, transport and the financial sector). DNB publications have been used for references to enterprises in this chapter where the source is not specified.

Special Purpose Entities (SPEs). According to De Nederlandsche Bank, SPEs, sometimes called special financial institutions (SFIs), are Dutch-based subsidiaries of foreign parent companies that “function as financial turntables for foreign components of the group to which they belong. (...) With its favourable tax climate and infrastructure, the Netherlands has always been a popular domicile for SPEs.” (DNB 2008–9, p. 195 and p. 7, respectively). De Nederlandsche Bank does not include SPEs in detailed FDI statistics, but it does publish the Balance of Payments including the SPEs (as well as a version excluding the SPEs). Van den Dool (2008) already pointed out that in 2007 the Dutch figures excluding SPEs came out 72 percent lower than the figures that included SPEs.

For more definitions and methodology see the introduction to C3.

3.2 Trends in the Netherlands

3.2.1 Flows and stocks

Table A3.1
Distribution of Dutch FDI in manufacturing and services (stocks)

	2003	2004	2005	2006	2007	2008
	%					
Inward FDI						
Manufacturing	38.8	45.1	39.3	39.0	37.1	42.1
Services	61.2	54.9	60.7	61.0	62.9	57.9
Outward FDI						
Manufacturing	39.4	41.5	43.6	42.1	43.5	49.6
Services	60.6	58.5	56.4	57.9	56.5	50.4

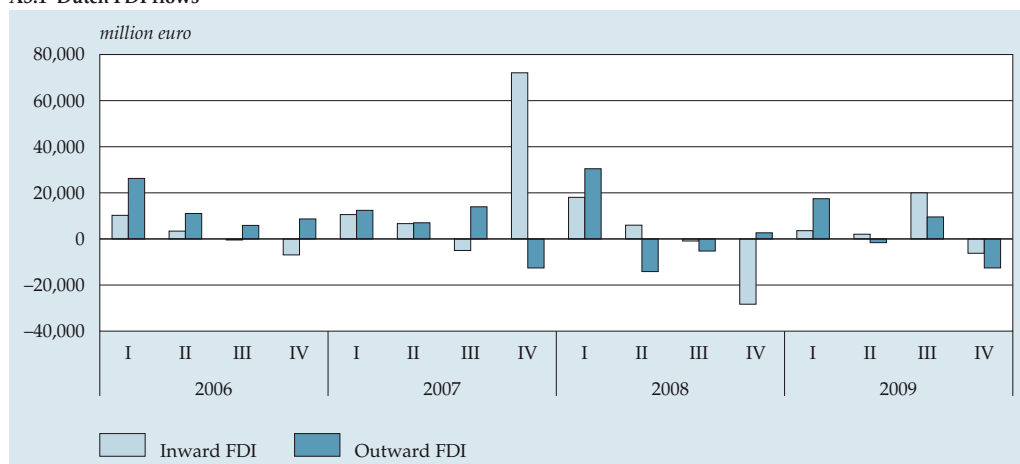
Source: De Nederlandsche Bank, calculated by Statistics Netherlands.

Outward FDI flows were generally positive before the crisis, but turned negative during the crisis. There were several quarters in which Dutch enterprises withdrew funds from their foreign subsidiary enterprises or even sold them. Inward FDI flows were also affected. Although there was a sharp increase in the fourth quarter of 2007, it was largely due to the purchase of ABN AMRO by Santander, Fortis and the Royal Bank of Scotland. On the other hand, there was a substantial decrease in inward FDI flows in the fourth quarter of 2008 because the Dutch government bought the Dutch part of Fortis.

The stocks of inward and outward direct investments also decreased. In 2008 (and in 2009) stocks of inward FDI decreased for the first time since De Nederlandsche Bank started to record them in 1984. Again, it should be noted that a large part of the decrease in 2008 was caused by the Dutch government acquiring the Dutch part of the Belgian company Fortis, which caused a substantial decrease in incoming investments from Belgium. Stocks of outward FDI also decreased in 2008; the last time this has happened was in 1986.

3.2.2 Trends on sectoral level

A3.1 Dutch FDI flows



Source: De Nederlandsche Bank.

On a sectoral level, the share of manufacturing in both inward and outward FDI increased during the period 2003–2008, whereas the share of services decreased. More specifically, in the services sector the share of both inward and outward direct investments decreased in the trade, and in the radio, TV and communication equipment sectors. In the manufacturing sector the share of inward direct investments in food products increased during the period 2003–2008, as a result of, among other things, the acquisition of Numico by Danone in 2007 (DNB, 2008–3).

Furthermore, the increase in outward direct investments in the refined petroleum and other treatments sector can be partially explained by the restructuring of Shell in 2005. More detailed information about the distribution of Dutch FDI to and from sectors can be found in Table C3.2 “Foreign direct investment: by economic sector”.

3.2.3 Trends on country level

Table A3.2
Share of top three countries inward Dutch FDI (stocks)

	2003	2004	2005	2006	2007	2008
	%					
United States	20.5	19.7	19.1	18.9	18.2	20.0
United Kingdom	16.7	16.6	13.9	13.6	15.9	19.0
Luxembourg	6.0	7.4	8.9	9.2	10.3	11.2

Source: De Nederlandsche Bank, calculated by Statistics Netherlands.

On a country level the largest share of Dutch inward FDI is from the United States, even though there was a decline in the period 1999–2003 (not shown in table). Another large investor is the United Kingdom, whose share in inward Dutch FDI fluctuated considerably in 2005 (because of the restructuring of Shell) and 2007–2008 (because the Royal Bank of Scotland bought part of ABN AMRO). Another noteworthy trend shown in Table A3.2 is that inward FDI from Luxembourg is increasing rapidly.

Table A3.3
Share of top three countries outward Dutch FDI (stocks)

	2003	2004	2005	2006	2007	2008
	%					
United Kingdom	13.2	14.1	18.2	15.1	14.5	13.2
United States	17.1	16.2	16.1	13.2	9.4	10.6
Belgium	8.7	8.1	7.0	10.0	11.5	10.3

Source: De Nederlandsche Bank, calculated by Statistics Netherlands.

With regard to outward FDI stocks there are also several trends worth mentioning. First of all, there is a relative decline in Dutch FDI in the United States. In 1999 this consisted of about one quarter of total Dutch FDI, but it steadily decreased to about one tenth by 2008. This can be explained to some extent by the depreciation of the US dollar against the euro. Even if investments in the United States had retained their value in dollars, their value in euros would have declined. The United

Kingdom is now the largest recipient of Dutch FDI. Another noticeable trend, not shown in Table A3.3, is the rise of direct investments in Luxembourg.

The share of European stocks in both inward and outward direct investments has increased. The shares of emerging markets, such as Brazil, Russia, India and China, remained modest and most Dutch direct investments are still related to OECD countries (around 90 percent). More detailed information about the distribution of Dutch FDI to and from countries can be found in Table C3.3, "Foreign direct investment: by country".

The trends in flows of inward and outward FDI are similar, even though the flows fluctuate far more. They also show that investments from the Dutch Antilles and Aruba have risen since 2006, although it is possible that the ultimate origin of this flow might be from somewhere else.

Box A3.2 summarises the effects of the crisis and possible implications for FDI.

Box A3.2 Transmission channels of the crisis

- A lower supply of capital combined with increasing costs of capital has discouraged investment. Banks lost confidence following the collapse of Lehman Brothers in September 2008. Although attempts were made to improve capital buffers, banks became reluctant to enter into loan agreements and raised the interest rates on loans (World Investment Report 2009). In order to preserve liquidity and credit, parent companies withdrew funds from their foreign subsidiaries. For FDI, these disinvestments are recorded as negative flows.
- The declining stock exchange both discouraged and encouraged investments. Financing investments through the decreasing stock market was no longer feasible, but on the other hand, this did create opportunities for enterprises or countries that still had funds available for investments. They could buy stocks at a far lower price than in the past.
- Reduced demand diminished the propensity of enterprises to invest in further expansion. According to Koo (2009), the current recession is a balance sheet recession. After the decline of the real estate markets and the stock markets: "businesses and individuals are saddled with excess liabilities and are forced to pay down debts by curbing consumption and investment. The last thing they are interested in is increasing their borrowings." (Koo, 2009).
- According to the United Nations, foreign investments in several countries are discouraged by their local governments, as "some protectionist tendencies have emerged, as some countries have begun to discriminate against foreign investors and/or products in a "hidden" way using gaps in international regulations" (World Investment Report 2009, p. 31).

3.3 Foreign Affiliate Trade Statistics (FATS)

The foreign affiliate trade statistics (FATS) present detailed data on foreign affiliates, e.g. on performance characteristics such as employment levels, turnover and value added. In principle, FATS data cover a sub-set of the entities involved in FDI. Unfortunately, the same information is not yet available for all enterprises that engage in FDI. It must be taken into account that the methodologies applied to current FDI and FATS are not completely consistent, which we further explain at the end of this section.

Table A3.4 displays the inward foreign affiliate trade statistics (inward FATS), which describe the activities of majority foreign controlled enterprises resident in the compiling country (here: the Netherlands). Control is defined as the ability to determine the general policy of an enterprise by choosing appropriate directors, if necessary (FATS regulation, article 2, 2007).

Table A3.4
Share of foreign controlled enterprises in total private Dutch sector

	2001	2002	2003	2004	2005	2006 ¹⁾	2007	2008 ¹⁾
	%							
Number of enterprises	0.7	0.8	0.7	0.7	1.2	1.1	1.0	1.0
Number of employees	11.9	13.5	13.4	14.7	14.6	15.5	14.9	15.8
Turnover	23.7	25.1	25.3	27.1	26.7	29.9	29.4	31.4
Added value	17.5	20.5	19.2	20.9	20.5	23.4	22.3	24.4
Gross investment	16.9	19.2	15.4	17.6	17.8	20.0	20.6	21.8

Source: Statistics Netherlands, Inward FATS.

¹⁾ Between 2005 and 2006, 2007 and 2008, there are breaks in the time series due to different definitions.

Even though the numbers fluctuate from year to year as a result of mergers, sales and acquisitions, the general trend is an increase in the share of foreign controlled enterprises in the private Dutch sector. In 2008, these enterprises generated a quarter of the added value of the private sector, or 12 percent of GDP.

Therefore, a lot is known about foreign controlled enterprises in the Netherlands. Unfortunately, it is not yet possible to make a single table that includes all enterprises engaged in Dutch inward FDI. Therefore Statistics Netherlands has started a project to determine, for larger and smaller enterprises, whether they have investments abroad or not, and to subsequently match that information to other business and performance characteristics.

Table A3.5 displays the outward FATS, which describe the activities of Dutch controlled enterprises resident in a foreign country. The outward FATS is a new statistic, and this is the first time that Statistics Netherlands has published its results. Statistics Netherlands only collects information on activities outside the European Union. In time, using the mirror statistics of the inward FATS collected by other member states, information on activities inside the European Union will also become available.

Table A3.5
Activities of Dutch controlled enterprises outside the European Union

	2008
Enterprises	6,067
Employees	667,353
Turnover (<i>billion euro</i>)	295

Source: Statistics Netherlands, Outward FATS .

An important difference between FATS and FDI statistics is that FATS use the concept of ultimate controlling institute (UCI), whereas FDI uses the concept of direct investor. For example, suppose a Dutch enterprise owns, and controls, a German enterprise, which in turn owns, and controls, an Austrian enterprise. Then the UCI of the Austrian enterprise is Dutch, but the direct investor in Austria is German. Furthermore, there are also other methodological differences, as can be seen in a comparison of the IMF Balance of Payments Manual and the FATS Regulation.

3.4 *The Netherlands in an international perspective*

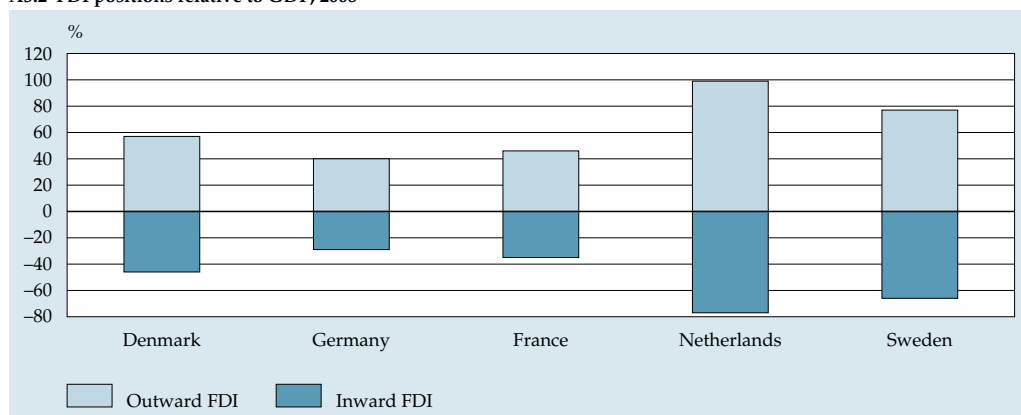
In this section we place Dutch FDI in an international perspective by comparing it with several European countries: Denmark, Germany, France and Sweden. Unfortunately there was not sufficient data for Belgium, so Belgium was omitted from this comparison.

Compared with other countries, the Netherlands has relatively more FDI when adjusting for the size of the economy. This adjustment is made by dividing the stocks of inward, or outward, direct investments by a country's GDP. The Netherlands also always occupies a high position in the annual United Nations FDI country rankings. These rankings consist of an inward FDI Performance Index, an inward FDI Potential Index and an outward FDI Performance Index, see e.g. World Investment Report 2008.

Why is the Netherlands so attractive for foreign investments? According to a survey among top executives of American companies in the Netherlands, they are highly satisfied with the Dutch investment climate, including knowledge of foreign languages, clear and stable policies, legislation and administration, quality of life, the level of local labour skills, telecommunications infrastructure, transport and technical infrastructure (AmCham, 2010). The OECD also notes that compared with other countries, the Netherlands creates very few barriers for FDI. Of 48 economies, including the members of the OECD and large economies, the Netherlands scored the lowest on the OECD FDI Restrictiveness Index, together with Luxembourg (Kalinova et al., 2010).

Graph A3.2 shows outward FDI relative to GDP and inward FDI relative to GDP. Their difference is net assets relative to GDP. The Netherlands has far more inward and outward FDI than the other countries. This indicates that foreign enterprises see good investment opportunities in the Netherlands, and that Dutch enterprises might be more inclined to invest abroad than their foreign counterparts.

A3.2 FDI positions relative to GDP, 2008



Source: Eurostat (GDP) and OECD (FDI), calculated by Statistics Netherlands.

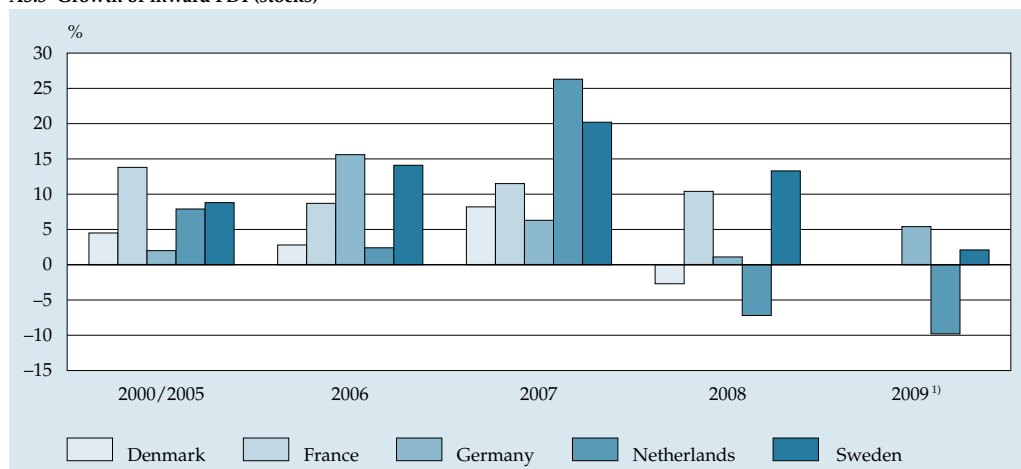
3.4.1 Trends: stocks

It seems that the crisis has had more negative effects on Dutch FDI than on that of other countries. The graph below shows that growth of Dutch inward FDI (stocks) still fared well compared with those of Denmark, France, Germany and Sweden during the period 2000–2005. In 2006 it grew considerably less than in other countries, and a large part of the big boost of Dutch inward FDI in 2007 was explained by the takeover of ABN AMRO. During the next two years inward FDI in the Netherlands decreased, while it continued to grow in other countries.

However, it must be taken into account that a large part of the decrease in 2008 was the result of the Dutch State acquiring the Dutch part of Fortis.

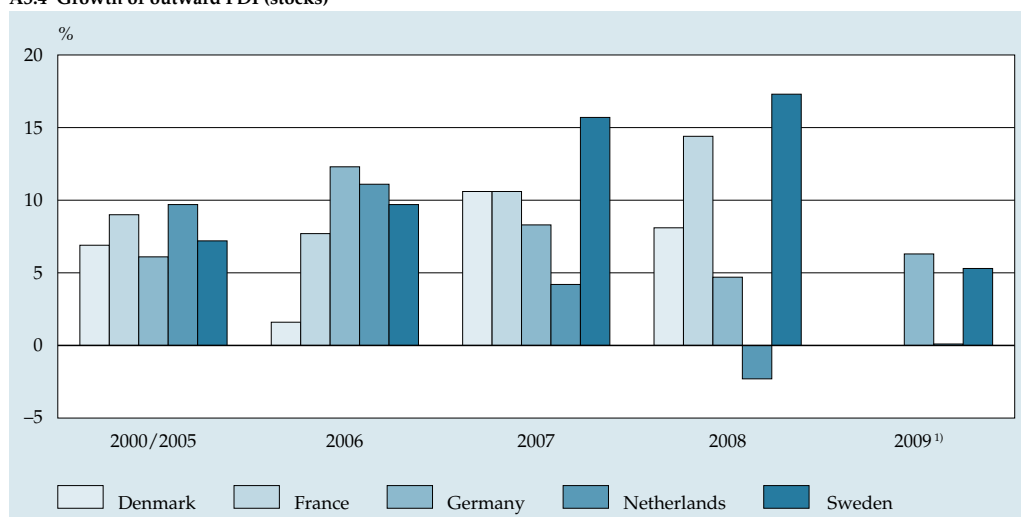
Note that the findings in this section are restricted to FDI stocks, as the flows are highly volatile and on a detailed level they are often heavily influenced by a large single transaction.

A3.3 Growth of inward FDI (stocks)



Source: OECD, calculated by Statistics Netherlands.
¹⁾ 2009 data for Denmark and France not yet available.

A3.4 Growth of outward FDI (stocks)



Source: OECD, calculated by Statistics Netherlands.
¹⁾ 2009 data for Denmark and France not yet available.

A similar pattern can be discerned in outward FDI. For the Netherlands, outward FDI grew at the same pace as for other countries during the period 2000–2006. But it grew far less in the subsequent three years. In 2008 outward Dutch FDI even decreased, whereas outward FDI continued to grow in the other countries under investigation.

3.4.2 Trends on sectoral level

The general trend in Europe on a sectoral level seems to be that there is an increasing concentration of investments in the service sector. However, Table A3.2 shows that in the Netherlands the shares of manufacturing increased. Furthermore, in the EU 15 with a ratio of 3:1, the share of services is far larger than that of manufacturing, whereas this ratio in the Netherlands is around 1:1. This is surprising because the general view is that the Netherlands is a services economy. The answer is found in the “business and management consultancy activities including those of holding companies” sector. Whereas this sector is small in the Netherlands, it is very large in other countries. For example, in France it accounts for two thirds of incoming FDI. The most plausible explanation is that other countries include financial holdings (such as SPEs) in their statistics, whereas the Netherlands does not do so for detailed statistics, as noted in Box A3.1. It is obvious that this has consequences for other international comparisons as well. We have opted not to take this into account for the time being.

The Netherlands has traditionally had a relatively large share in “refined petroleum products and other treatments”, for both inward and outward FDI. This is a very capital intensive sector. Recently, inward FDI rose for gas extraction, food products and computer activities compared with other countries.

3.4.3 Trends on country level

Just as in the Netherlands, the share of the OECD in inward direct investments did not change much during the period 2000–2008 for the countries under investigation. However, there was some variation in the level of the share of the OECD among countries: from 90 percent in Denmark and the Netherlands, up to 97–98 percent in Germany. Another similarity between the Netherlands and the benchmark countries was the decrease in US incoming direct investments, whereas the share of incoming direct investments from the EU 15 showed a general increase. As was to be expected, the share of neighbouring countries in total FDI was relatively high for every country.

The share of the OECD in outward direct investments was just below 90 percent for the Netherlands and the benchmark countries in 2008. It remained constant for France, Germany and the Netherlands, while it dropped for Denmark and Sweden

by 5 and 3 percent respectively, during the period 2000–2008. Just as in the Netherlands, the share of direct investments from the other countries in the United States decreased sharply, whereas the share of investments in the EU 15 rose. This phenomenon is only partially explained by the considerable depreciation of the dollar against the euro during the period 2000–2008. Apparently, it became more interesting for European enterprises to invest in Europe instead of in the United States. In general, those investments went to countries that joined the European Union before 2004, and the share for the newer EU countries remained constant. Only for Germany did the share of investments in the new EU countries rise quickly. New investments in other emerging markets, such as the BRIC countries, were also most prominent in Germany.

3.5 *Conclusions and further research*

The sustained increase in FDI stocks in and by the Netherlands came to a halt during the crisis. For the first time in many years, stocks of inward and outward FDI decreased. A prominent trend observed in the Netherlands and in similar European countries is that enterprises have started to invest more in Europe than in the United States. Consequently, the share of incoming European direct investments is also on the increase, whereas that of the United States is decreasing. Surprisingly, there seems to be a trend in the Netherlands in favour of incoming direct investments in manufacturing, whereas it is exactly the opposite in other countries. However, it is possible that this difference is an artefact caused by a different treatment of Special Purpose Entities.

There is only limited information about enterprises that engage in FDI. The inward FATS and outward FATS yield detailed information such as turnover, number of employees, number of enterprises, but the population they describe is different from the population in the FDI statistics. Therefore Statistics Netherlands started a project in order to determine, for both larger and smaller enterprises, whether they have investments abroad or not. It will subsequently match that information to other business and performance characteristics.

References

- AmCham (2010). The attractiveness of the Netherlands as a location for foreign investment. The American Chamber of Commerce in the Netherlands.
- DNB (2008–3). Selected Recent Developments. *Statistical Bulletin March 2008*, De Nederlandsche Bank.

DNB (2008–9). *Statistical Bulletin September 2008*, De Nederlandsche Bank.

Dutch Ministry of Finance (2008, 3 October). Press release Ministry of Finance on Fortis.

FATS Regulation (2007). Regulation (EC) No 716/2007 of the European Parliament and of the Council of 20 June 2007 on Community statistics on the structure and activity of foreign affiliates, *Official Journal of the European Union*, 29th June 2007.

IMF Balance of Payments Manual (1993), fifth edition, International Monetary Fund.

Kalinova, B., Palerm A. and S. Thomsen. OECD's FDI Restrictiveness Index: 2010 Update. *OECD Working Papers on International Investment*, No. 2010/3.

Koo, R.C. (2003). *Balance Sheet Recession: Japan's Struggle with Uncharted Economics and its Global Implications*. John Wiley & Sons (Asia) Pte Ltd: Singapore.

Van den Dool, G. (2008) Can foreign direct investment statistics be made more useful? *Statistical Bulletin December 2008*, De Nederlandsche Bank.

World Investment Report 2008, *Transnational Corporations and the Infrastructure Challenge*, United Nations 2008.

World Investment Report 2009, *Transnational Corporations, Agricultural Production and Development*, United Nations 2009.

A4 Trends in international R&D and innovation in the Netherlands

René Bongard

4.1 Introduction

“If we fail to act now, our prosperity growth will come to a standstill”

(Michael Porter, 2001, Innovation Lecture Dutch Ministry of Economic Affairs).

According to Porter, the Netherlands needs to shift from an approach based on low cost and efficiency to one based on innovation and dynamism in order to further increase productivity and welfare (Porter, 2001). Policymakers have also recognised the importance of innovation, and have placed the item high on their agendas. On EU level, the Lisbon agenda has set targets for EU member states to invest in innovation in order to foster economic growth. On a national level, key actors from business, politics, science and education are working together on the Knowledge and Innovation Agenda 2011–2020 in the Knowledge and Innovation Agenda coalition (KIA-coalition), which was known as the Dutch Innovation Platform until April 2010. The new Knowledge and Innovation Agenda 2011 – 2020 has been formulated in response to the European Commission’s communication entitled “Europe 2020 – a strategy for smart, sustainable and inclusive growth”. Its goal for the Netherlands is for the country to be among the top five countries with the strongest competitiveness.

However, Dutch advances towards achieving the Lisbon goals have not been convincing. Furthermore, neither has the Dutch ambition to be among the five most competitive countries been reached. The ranking is based on the Global Competitiveness Indicator compiled by the World Economic Forum (2010). Currently ranked number 10 (April 2010), the Netherlands particularly falls short on innovation compared with the number one Switzerland. Stimulating innovation in the Netherlands is currently recognised as a key factor for maintaining competitiveness. In May 2010 the Conference Board published the results of research on the Dutch innovation agenda which they had conducted for the Dutch Innovation Platform and concluded that “continued investment in intangibles is a key part of keeping the growth of the Dutch economy on track. A destruction or slowdown in creation of intangible capital would hamper the ability to keep economic growth at sustainable rates” (Conference Board, 2010). In another publication by the Innovation Platform, the authors recommend that the Netherlands attract more international enterprises and increase trade, expressing their concern about the pressure on Dutch competitiveness as a consequence of

globalisation, an ageing society, energy transition, the economic recession and the shift of economic power towards Asia (Dutch Innovation Platform, 2010).

This chapter of the Internationalisation Monitor examines innovation activities in the different industry branches of the Dutch business sector over time and in an international perspective. Foreign controlled enterprises are compared with Dutch controlled enterprises, exporters with non-exporters and importers with non-importers. Using a micro-level approach, we are able to provide new insights into the interrelation between innovativeness and the globalising economy. The Community Innovation Survey (CIS) is the main data source for the first two parts of this chapter. The outcomes are weighted to the population of all enterprises in the Netherlands with more than 10 employees.

4.1.1 Innovation: definition

In order to analyse the variety of innovation activities in the Netherlands we first have to make a distinction between invention and innovation. An invention is the discovery of an idea that is new to the world. An invention is often regarded as a new or improved technology. However, a new method of processing or a new way of organising something is also an invention. An innovation is a successfully implemented invention in practice, which means that it has to add value. In economic terms an invention is an innovation if it yields higher value for customers or producers. Many scholars in the field of economics regard innovation as the main source of productivity growth for developed countries and therefore as the motor behind welfare growth (Porter, 2001; Hall, 2009).

Some inventions are spontaneous discoveries made when people make their work more efficient and come up with new ideas. Other inventions result from research and development (R&D) specifically focused on coming up with something new. Universities, government organisations and enterprises have dedicated R&D activities whose remit is to improve existing technologies and discover completely new technologies. R&D investment increases the odds of inventions being discovered. Many inventions are unsuccessful, but the ones that are successful yield added value to an enterprise, industry, customer or society as a whole. R&D investment is important for innovation.

To describe the trend in R&D and innovation from an international perspective this chapter is divided into three main parts. After the introduction (4.1), the first part (4.2) provides indicators on innovation input (R&D expenditures and enterprises active in R&D) for several stratifications such as industry branch, international trade profile (i.e. exporter / non-exporter, importer / non-importer), locus of control (i.e. whether the important decisions for the enterprise are taken abroad or in the Netherlands) and size class. International trade and locus of control are

indicators for globalisation. The breakdown for these indicators is the result of matching data from different statistical fields on enterprise level. The methodological section in chapter B3 goes into the micro data matching in more detail. In the following section (4.3) a similar overview is given for innovation output. Since patent applications can also be used as indicators for innovativeness, Dutch patenting activities are compared with other European economies over time in section 4.4.

4.2 Innovation input

In order to assess how the Netherlands performs on innovation input, Table A4.1a shows the percentage of enterprises with more than 10 employees that claim to have R&D activities and investments in in-house R&D activities for 2002, 2004, 2006 and 2008. International trade and locus of control stratifications add the international perspective to these figures.

Table A4.1a
Innovation input: R&D activities and R&D expenditures in the Dutch business sector

	2002		2004		2006		2008	
	<i>% of enterprises</i>	<i>million euro</i>	<i>% of enterprises</i>	<i>million euro</i>	<i>% of enterprises</i>	<i>million euro</i>	<i>% of enterprises</i>	<i>million euro</i>
Total	7	4,543	7	5,071	5	5,480	6	5,263
<i>International trade profile</i>								
Non-importer	3	275	2	320	2	401	2	247
Importer	13	4,268	13	4,751	10	5,079	10	5,016
Non-exporter	3	376	3	446	3	624	2	450
Exporter	14	4,167	15	4,625	11	4,856	12	4,813
<i>Origin of the parent company</i>								
Dutch controlled	6	3,322	6	3,791	4	4,124	5	3,546
Foreign controlled	19	1,221	16	1,281	15	1,357	17	1,717
<i>Size class</i>								
Small (10–49 employees)	5	422	5	431	4	421	4	390
Medium (50–249 employees)	16	830	15	934	13	992	13	862
Large (250 or more employees)	29	3,291	30	3,707	26	4,068	25	4,012

Source: Statistics Netherlands.

In 2008, 4 percent of small enterprises had R&D activities. Medium-sized enterprises were more often active in R&D (13 percent). It appears that larger enterprises tend to invest more often in R&D, as a quarter of the large enterprises had R&D activities in 2008. The large enterprises are responsible for 76 percent of total R&D investments in the Dutch business sector. This is in line with results published in the 2009 edition of the Internationalisation Monitor (Statistics Netherlands) and with the in-depth analysis in chapter B3 of this 2010 edition. In 2002 relatively more enterprises had R&D activities than in 2008: the percentage of R&D enterprises declined for all size classes. Total expenditure on R&D in the Dutch business sector increased by roughly 700 million euros, or 16 percent, in the period 2002–2008. However, correcting for annual price level increases (inflation) in the Dutch economy, one can state that R&D investments in 2008 are on a par with those in 2002. The increase in R&D expenditures came to an end in 2006. There is even a decline of 200 million euros between 2006 and 2008 which may be the result of the economic stagnation that started in that period, as uncertainty about future economic growth can lead to cautious investment behaviour by enterprises.

Furthermore, it appears that Dutch controlled enterprises are relatively less active in R&D compared with foreign controlled enterprises: in 2008, 5 percent of Dutch enterprises invested in R&D, while 17 percent of foreign controlled enterprises had R&D activities. However, it must be taken into account that the distribution of Dutch and foreign controlled enterprises over the size classes is not equal. By far most Dutch enterprises are classified as small, whereas foreign controlled enterprises are underrepresented in this small size class. Foreign controlled enterprises in the Netherlands are, on average, larger than Dutch controlled enterprises in terms of employee numbers. Large enterprises invest relatively more often in R&D and on average the amounts invested are higher. On the other hand, chapter B3 provides in-depth analyses of the relationship between company size and R&D activities and establishes that when controlling for other factors, foreign controlled enterprises are still more innovative than Dutch controlled enterprises (see also the 2009 edition of the Internationalisation Monitor).

In 2008, foreign controlled enterprises were responsible for one third of R&D expenditures in the Dutch business sector. This is a considerable increase compared with the period 2002–2006 when foreign controlled enterprises were responsible for a quarter of R&D expenditure. However, this is the result of just a few acquisitions of large Dutch controlled firms by foreign controlled firms. The majority of R&D expenditures is incurred by a limited number of very large enterprises. International enterprises decide to exploit R&D activities in the Netherlands by setting up new R&D facilities or by taking over existing Dutch R&D activities through mergers and acquisitions. However, the reasons why foreign enterprises acquire Dutch R&D activities remain uncertain. Will they continue to invest in R&D in the Netherlands and increase R&D expenditures? Or

will they capture the knowledge and decrease or even stop investments in Dutch R&D? For example, in July 2010 a large pharmaceutical enterprise in the Netherlands announced its intention to close its R&D department and move it abroad. One year earlier the former Dutch enterprise had been acquired by a foreign controlled multinational.

Importers and exporters generally have more R&D activities than non-trading firms. In 2008, just 2 percent of the non-importing enterprises are involved in R&D activities, while 10 percent of the importing enterprises have R&D activities. Two percent of the non-exporting enterprises are also active in R&D, while 12 percent of the exporting enterprises invest in R&D. Size is also obviously significant here. Enterprises involved in international trade are larger than enterprises that do not trade internationally. Regression analyses in chapter B3 show that the effect of size class does not fully explain the differences between traders and non-traders. Note that an enterprise is defined as an international trader if it trades internationally, or at least one of the enterprises in the same enterprise group does.

Table A4.1b contains the same indicators as Table A4.1a, but now broken down by industry branch. Since enterprises in the manufacturing branch spend the majority of total R&D expenditures in the Dutch business sector, a further breakdown into manufacturing classes is provided. 17 percent of the enterprises in the manufacturing branch have R&D activities in 2008, spending a total of 3.8 billion euros on R&D activities. A closer examination of the manufacturing sector reveals that the following three manufacturing sectors turn out to be the most R&D intensive:

- Electrical and optical equipment
- Chemicals, chemical products and man-made fibres
- Machinery and equipment

Enterprises in these fields are responsible for over 80 percent of R&D expenditures in the Dutch manufacturing sector and for almost 60 percent of the total R&D expenditures in the Dutch business sector. Later in this chapter we see that this is in line with Dutch patent applications in related technology fields.

Table A4.1b
Innovation input: R&D activities and R&D expenditures in the Dutch business sector

	2002		2004		2006		2008	
	<i>% of enterprises</i>	<i>million euro</i>	<i>% of enterprises</i>	<i>million euro</i>	<i>% of enterprises</i>	<i>million euro</i>	<i>% of enterprises</i>	<i>million euro</i>
Total	7	4,543	7	5,071	5	5,480	6	5,263
<i>Industry branch</i>								
Agriculture, hunting and forestry	2	53	6	12	3	1	3	27
Mining and quarrying	10	64	9	31	3	183	4	35
Electricity, gas and water supply	25	16	21	5	14	16	12	15
Manufacturing	20	3,454	18	3,898	16	4,094	17	3,758
Of which								
food products, beverages and tobacco	13	256	13	215	11	172	13	152
textiles and textile products	12	14	16	34	17	20	15	19
leather and leather products	14	1	16	10	9	3	15	2
wood and wood products	5	6	11	9	4	9	5	7
pulp, paper and paper products; publishing and printing	8	40	8	98	8	68	6	65
coke, refined petroleum products and nuclear fuel	38	10	30	10	39	9	39	26
chemicals, chemical products and man-made fibres	56	843	42	1,165	38	683	45	974
rubber and plastic products	25	45	29	90	20	75	33	64
other non-metallic mineral products	11	34	14	62	11	27	23	32
basic metals and fabricated metal products	17	161	12	97	10	89	10	137
machinery and equipment n.e.c.	34	466	32	918	26	697	25	879
electrical and optical equipment	37	1,414	30	793	35	1,986	31	1,221
transport equipment	22	141	23	369	18	220	12	154
manufacturing n.e.c.	11	24	8	28	8	38	7	24
Construction	1	28	2	24	1	29	1	47
Wholesale and retail trade	3	201	3	93	2	169	3	113
Hotels and restaurants	0	3	0	2	0	1	0	1
Transport, storage and communication	2	27	2	18	1	53	1	25
Financial intermediation	5	41	5	56	6	33	3	140
Real estate, renting and business activities	9	641	9	925	7	895	7	1,056
Other community, social and personal service activities	3	16	3	7	3	6	2	45

Source: Statistics Netherlands.

4.3 Innovation output

In addition to the indicators on R&D input, this section provides indicators on innovation output. We know from section 4.2 how much enterprises invest in R&D, but we do not know how much they earn from innovation. Scholars found evidence

that private returns to R&D are strongly positive, while social returns as a result of knowledge spillovers are even higher (Hall, 2009). However, there is as yet no substantial quantitative evidence to bear this out. Therefore other variables are used to measure innovation output. First, the percentage of enterprises that have introduced an innovation – also distinguishing between product innovations and process innovations – says something about innovativeness. Second, the share of enterprises that applied for a patent in the period under investigation (2004–2008) can also be used as an indicator of innovation. The same stratifications as in the section on innovation input are used: industrial branch, international trade profile, locus of control, and size class.

Table A4.2a
Innovation output: innovating enterprises and patent applications

	2004				2008			
	Innovation	Product innovation	Process innovation	Patent application	Innovation	Product innovation	Process innovation	Patent application
	<i>% of enterprises</i>							
Total	25	17	17	3	25	17	15	3
<i>International trade profile</i>								
Non-importer	18	11	13	1	17	11	11	1
Importer	35	25	23	6	33	23	21	6
Non-exporter	18	11	13	1	17	11	11	1
Exporter	38	28	25	7	36	26	22	7
<i>Origin of the parent company</i>								
Dutch controlled	23	15	16	3	23	15	15	3
Foreign controlled	46	35	31	9	48	37	27	9
<i>Size class</i>								
Small (10–49 employees)	22	12	14	2	21	14	13	2
Medium (50–249 employees)	38	26	26	7	37	26	25	6
Large (250 and more employees)	59	38	46	14	54	41	39	14

Source: Statistics Netherlands.

There are only marginal differences between 2004 and 2008, indicating that differences in innovation output over time are small. In 2008 almost a quarter of the enterprises introduced an innovation and just 3 percent applied for a patent. Although the difference is slight, there are more product innovations than process innovations.

Importers and exporters are roughly twice as likely to be innovators compared with non-importers and non-exporters respectively. This applies to both product innovations and process innovations. Enterprises active in international trade apply for more patents than non-traders. Again, the fact that traders are larger than non-traders is the main reason for this observation. However, controlling for size class and other structural business factors, international traders still seem to be more innovative. The same applies to the difference in innovativeness between Dutch controlled enterprises and foreign controlled enterprises (see chapter B3). The size class breakdown clearly shows that larger enterprises introduce innovations more often. One in five small enterprises introduced an innovation in 2008, whereas more than half the large enterprises were innovative in the same year. The difference between small and large enterprises is a factor seven for patent applications, which may indicate that small enterprises encounter relatively more barriers when applying for a patent than large enterprises do. These barriers could be because applying for a patent is costly and time consuming. The need for patenting could also be less urgent for small enterprises since in geographical terms they are usually active on smaller markets.

Table A4.2b shows the innovation output indicators by industry branch with an additional breakdown for the manufacturing branch. The *construction* and the *hotels and restaurants* sectors are the least innovative sectors, which may be because of the high number of small enterprises in these branches. Note that there are relatively few, but very large enterprises active in the *Electricity, gas and water supply* and *Mining and quarrying* branches. This is partly the reason for the high percentage of innovative enterprises to be found here. The manufacturing branch has high innovation output rates. Two in five manufacturing firms introduced an innovation in 2008 and almost 10 percent applied for a patent. The breakdown for the manufacturing sector reveals that chemical enterprises are the most innovative. More than 70 percent of the manufacturing enterprises in the *chemicals, chemical products and man-made fibres* and *rubber and plastic products* branches introduced an innovation in 2008. These sectors also score the highest for patent applications with a share of 19 percent. In the *machinery and equipment* sector and in the *electrical and optical equipment* sector relatively many enterprises also applied for patents. While in most sectors there is more product innovation, some sectors show higher shares for process innovation. In particular, innovation in the *wood and wood products* sector and in the *coke, refined petroleum products and nuclear fuel* sector seems to be more process oriented than product oriented. These sectors mainly produce low-tech and standardised output which implies that increasing labour productivity and profit requires more process innovation than product innovation.

Table A4.2b
Innovation output: innovating enterprises and patent applications

	2004				2008			
	Inno- vation	Product inno- vation	Process inno- vation	Patent appli- cation	Inno- vation	Product inno- vation	Process inno- vation	Patent appli- cation
	<i>% of enterprises</i>							
Total	25	17	17	3	25	17	15	3
<i>Industry branch</i>								
Agriculture, hunting and forestry	29	17	22	3	26	18	16	5
Mining and quarrying	35	23	24	21	37	27	21	2
Electricity, gas and water supply	51	23	41	6	51	24	33	14
Manufacturing	42	29	29	9	42	30	28	9
of which								
Food products, beverages and tobacco	36	25	28	3	38	29	26	2
Textiles and textile products	39	27	31	10	48	30	35	9
Leather and leather products	19	17	12	0	27	19	14	9
Wood and wood products	34	24	22	7	38	16	28	2
Pulp, paper and paper products; publishing and printing	37	23	30	3	31	20	21	3
Coke, refined petroleum products and nuclear fuel	56	35	33	0	54	28	44	0
Chemicals, chemical products and man-made fibres	66	49	45	24	70	57	39	19
Rubber and plastic products	53	38	35	17	71	53	48	19
Other non-metallic mineral products	32	21	26	10	55	39	35	10
Basic metals and fabricated metal products	36	23	26	4	34	21	27	6
Machinery and equipment n.e.c.	54	41	33	19	46	35	25	17
Electrical and optical equipment	55	47	33	13	57	41	37	16
Transport equipment	41	29	29	12	37	26	21	10
Manufacturing n.e.c.	30	20	19	4	30	21	20	7
Construction	11	6	8	1	12	8	9	1
Wholesale and retail trade	21	14	12	2	22	14	13	3
Hotels and restaurants	12	7	8	1	10	6	7	0
Transport, storage and communication	18	10	14	1	21	12	15	0
Financial intermediation	29	19	21	0	29	20	17	0
Real estate, renting and business activities	31	21	20	3	26	19	15	3
Other community, social and personal service activities	25	13	17	1	20	14	12	1

Source: Statistics Netherlands.

Note that some industry branches pay less attention to R&D and innovation, but still increase productivity by introducing innovative products or processes developed by suppliers in other branches. The construction industry is known to be less innovative than many other industries. However, innovations in, for

example, the chemical industry can finally lead to improved construction materials used in the construction industry. Therefore, innovation in one branch also leads to productivity gains in other branches and innovation diffuses through trade in value chains.

4.4 Dutch innovation over time and in an international perspective: benchmarking patent indicators

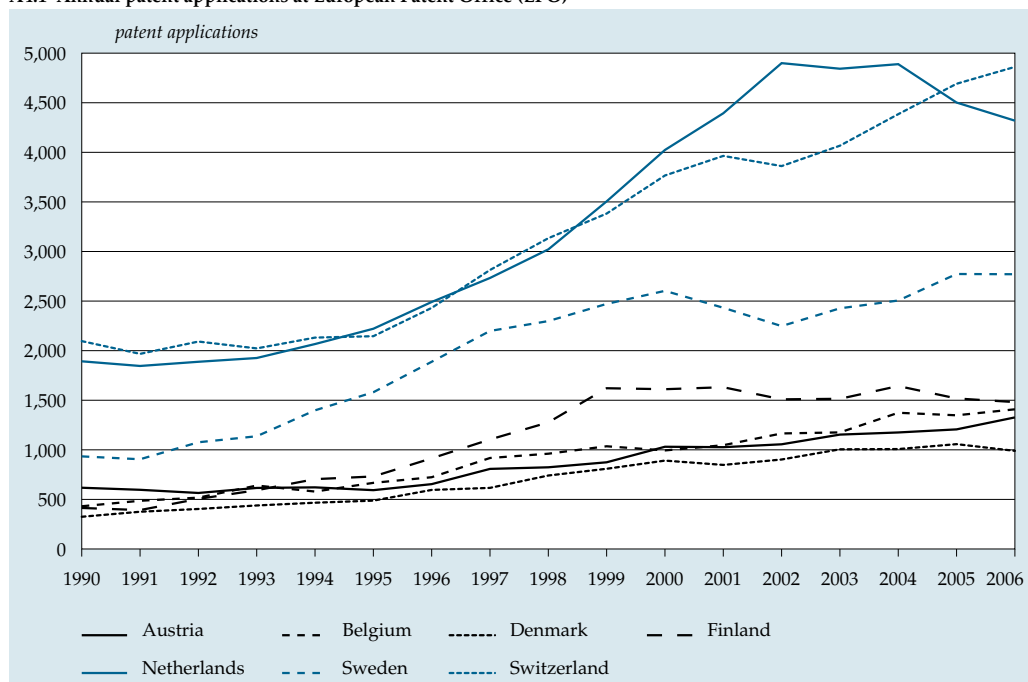
Patents are intellectual property rights that offer legal protection for the results of R&D investments. They are granted if the invention is new and industrially applicable. This justifies the assumption that patents can be used as indicators of inventions that may add value when implemented. In addition, the advantage of patent indicators is that the underlying data sources are publicly available for a long time. A disadvantage of using patents as an indicator of innovation is that patents can also be used for strategic reasons. Enterprises may apply for patents in order to force competitors to invent around the patented invention, without the proper incentive to exploit the patented technology (Granstrand, 2000).

To compare the Dutch innovation output with that of similar European countries, Graph A4.1 shows the number of annual patent applications at the European Patent Office (EPO) for the selected countries. The correlation between a country's population, industry size and number of patent applications has to be taken into account. The Netherlands has the largest economy in terms of GDP of the benchmark countries and therefore one may expect the number of annual patent applications to be higher than in a smaller economy. However, the graph shows that the annual number of Dutch patent applications was more or less the same as the number of Swiss patent applications in the period 1990–1998. From 1998 through 2004 the Netherlands led in the number of annual patent applications, but since 2004 a sudden decline in Dutch patent applications is visible (mainly in the *Electricity* class, see Table A4.1), while Swiss applications continue to increase. The other benchmark countries show a more stable number of annual patent applications. A reason for the Swiss increase in patent applications may be strategic patenting which is popular in the pharmaceutical branch (OECD, 2008, p.68), and the Swiss pharmaceutical industry is much larger than the Dutch pharmaceutical industry.

International cooperation in R&D activities leads to cross-border knowledge flows and fosters innovation diffusion. The number of joint patent applications between domestic and foreign inventors is indicative of international cooperation in innovation. Belgium and Switzerland are the leading benchmark countries in international cooperation in R&D. Geographical and linguistic reasons may explain this to a certain extent. In 2004, 18 percent of all Dutch patents (with more than one

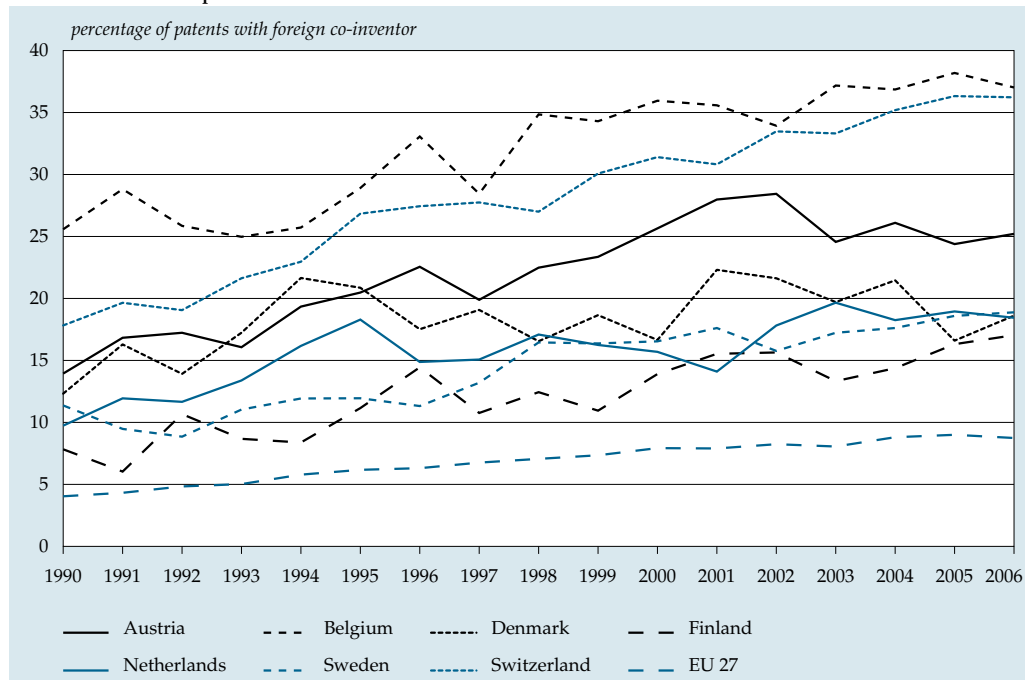
inventor) were applied for by at least one Dutch and one foreign inventor. This international co-invention rate is 9 percent for the whole European Union. In line with increasing globalisation of the world economy, the Netherlands and all benchmark countries in the available time series show an upward trend in joint patent applications. Enterprises tend to exploit their activities increasingly more often across borders in order to gain access to new markets and production factors e.g. mineral resources, cheap labour. Access to knowledge and R&D is another important motive for economic actors to cross borders. This stimulates innovation diffusion and increases knowledge spillover effects.

A4.1 Annual patent applications at European Patent Office (EPO)



Source: European Patent Office (EPO).

A4.2 International cooperation in invention



Source: European Patent Office (EPO).

4.4.1 Future technologies

In the current economic climate with declining and even negative economic growth in some parts of the world, a strong innovative motor is needed to foster recovery. Investments in future technologies, for example in the field of renewable energy, offer opportunities for economies to recover and generate added value. Taking into account the dwindling stock of fossil fuels, attention for alternative energy sources can be expected. This offers opportunities for new technologies in the fields of, among others, energy saving and renewable energy. Table A4.1 and Table A4.2 contain figures on selected technology domains, further referred to as future technology patent classes. These classes are identified by the OECD and by the United States Patent and Trademark Office (USPTO), the European Patent Office (EPO) and the Japan Patent Office (JPO).

Table A4.3 presents figures for Dutch patent applications for seven of the future technology patent classes and the eight main International Patent Classes (IPCs). In 2006 almost 48 percent of Dutch patent applications were in a future technology class, of which ICT is by far the most important followed by *biotechnology*. *Human necessities, physics, electricity and chemistry / metallurgy* are the most important

International Patent Classes for the Netherlands. It is interesting to see the decline in the *electricity* field and the rise in the field of *physics*.

Table A4.3
Dutch patent portfolio

	1994	2000	2006	
	% of Dutch patent applications			abs.
Patent applications / International Patent Classes (IPC)	100	100	100	4,319
Human Necessities	18.8	13.0	20.2	871
Performing Operations; Transporting	14.6	11.9	11.8	511
Chemistry; Metallurgy	16.4	15.2	16.1	694
Textiles; Paper	1.2	1.2	1.2	50
Fixed Constructions	3.5	3.3	3.9	168
Mechanical Engineering; Lighting; Heating; Weapons; Blasting	5.4	4.3	5.0	214
Physics	16.5	23.2	23.3	1,006
Electricity	23.7	27.9	18.6	804
Future technology patent classes	43.3	55.8	47.9	2,070
Biotechnology	4.5	6.0	6.3	271
ICT	35.3	46.4	36.4	1,571
Nanotechnology	0.5	0.5	1.5	64
Pollution abatement and waste management	1.7	1.2	1.6	70
Renewable energy	.	0.4	0.3	13
Electric and hybrid vehicles	.	0.0	0.0	2
Energy efficiency in buildings and lighting	1.2	1.2	1.8	79

Source: European Patent Office (EPO).

Table A4.4 places the Dutch patent portfolio in a European perspective by benchmarking it with comparable European economies. By dividing a country's relative share of patent applications in a certain patent class by the relative share of all its EPO patent applications, the focus on a particular patent class in the country can be deduced. Values higher than one indicate an above average focus on the patent class and the underlying technology field. For example, in 2006 we see that the Netherlands has a high focus on nanotechnology. The Netherlands has a very high focus on *energy efficiency in buildings and lighting*, while the Dutch focus on mechanical engineering is below the European average. The benchmark countries Finland, Sweden and Switzerland have, just as the Netherlands, a relative high focus on future technology classes. Switzerland, Belgium and Denmark focus more on *biotechnology*, while Finland and Sweden have a relatively high share of *ICT* patent applications. Finland, Belgium, Austria and Denmark have higher shares in the fields of *pollution abatement and waste management*. The 27 EU member states

have, on average, a relatively low share of patents in the future technology classes. The Netherlands therefore performs well compared with the average EU member state, and also quite well compared with the selected benchmark countries.

Table A4.4
Dutch patent portfolio in a European perspective

	The Netherlands			Benchmark countries in 2006						
	1994	2000	2006	Austria	Belgium	Denmark	Finland	Sweden	Switzerland	EU 27 in 2006
<i>% of EPO patents</i>										
Patent applications / International Patent Classes (IPC)	3.2	3.5	3.5	1.1	1.1	0.8	1.2	2.2	3.9	43.0
Human Necessities	3.9	2.9	3.9	1.2	1.4	1.4	0.5	2.1	6.4	40.4
Performing Operations; Transporting	2.5	2.5	2.5	1.5	1.1	0.6	0.9	2.1	4.4	53.9
Chemistry; Metallurgy	2.9	3.5	4.3	0.8	2.1	1.0	0.9	1.2	4.5	40.5
Textiles; Paper	2.0	2.7	2.9	1.8	5.1	0.3	2.8	1.6	4.9	58.1
Fixed Constructions	3.4	4.2	4.6	3.9	1.6	1.6	1.5	2.6	3.6	69.6
Mechanical Engineering; Lighting; Heating; Weapons; Blasting	2.1	1.9	1.8	1.2	0.9	1.1	0.6	2.2	2.4	54.2
Physics	3.0	4.2	4.4	0.5	0.7	0.5	1.3	1.7	3.5	34.7
Electricity	4.4	4.8	3.2	0.7	0.5	0.4	2.3	3.6	2.0	35.5
Future technology patent classes	3.4	4.0	3.9	0.7	0.8	0.7	1.6	2.6	2.6	35.4
Biotechnology	2.3	2.8	4.3	1.1	2.1	1.9	0.5	1.5	4.2	36.6
ICT	3.6	4.3	3.7	0.5	0.6	0.4	1.9	2.9	2.3	33.7
Nanotechnology	3.1	2.2	6.8	0.8	1.7	0.4	1.0	1.2	3.2	39.3
Pollution abatement and waste management	2.1	2.3	3.4	1.5	1.4	1.3	1.4	1.6	3.3	52.7
Renewable energy	.	6.4	1.8	1.2	0.1	6.0	1.2	0.8	1.2	57.2
Electric and hybrid vehicles	.	0.7	0.5	1.0	.	.	.	1.0	0.9	33.5
Energy efficiency in buildings and lighting	9.5	9.3	14.6	2.0	0.9	1.3	0.7	0.9	2.0	56.9

Source: European Patent Office (EPO).

4.5 Summary and conclusion

This chapter places data on Dutch innovation activities in an international perspective and compares them over time. Breakdowns in several dimensions - industrial branch, international trade profile, locus of control and size class - provide an insight into R&D investment and innovation activities by different types of enterprises in the Netherlands.

The results showed that a relatively small number of large enterprises are responsible for the majority of Dutch R&D investments. Furthermore, exporters and importers are more often active in R&D and invest more in R&D than enterprises that do not trade internationally. This observation is partly caused by the size effect, since trading enterprises are, on average, larger (in terms of employee numbers) than non-trading enterprises. The same can be said for the higher R&D activity of foreign controlled enterprises compared with domestic-controlled enterprises. Chapter B3 examines these findings in more detail.

In general, since 2002 total R&D investments in the Dutch business sector increased by 16 percent (2008), while the share of enterprises with R&D activities decreased by 1 percent. Enterprises in the manufacturing industry invest most in R&D, particularly in the fields of chemistry, machinery and electricity and optics. However, enterprises in these branches are often suppliers for other, less innovative, branches and therefore they lead to productivity growth in other branches as a result of selling innovative products to their customers.

The conclusions on innovation output are more or less the same as the conclusions on innovation input. Large enterprises tend to be more innovative and apply for more patents. Foreign controlled enterprises and exporters and importers are also more innovative than Dutch controlled enterprises and non-exporters and non-importers respectively. The manufacturing sector is the most innovative sector because technology is more important in this sector than in others.

The annual increase in the number patent applications came to an end in 2002 in the Netherlands and has declined since 2004, while annual figures for patent applications in most benchmark countries continue to increase. Enterprises in the Netherlands apply for relatively many patents in future technology classes, while the average focus of the 27 EU member states on these classes lags behind. Dutch R&D seems to be highly focused on nanotechnology and on energy efficiency in buildings and lighting.

To conclude, we find that Dutch innovative performance is relatively internationally oriented, since the share of R&D investments by foreign controlled enterprises is 30 percent in 2008. Patent indicators also show that the Netherlands performs reasonably well compared with the benchmark countries. There is a relatively high focus on the future technology patent classes that offer opportunities for future productivity and welfare growth. The fact that Dutch patent applications have stagnated since 2002 and have even declined since 2004 is not a positive sign, since patent applications indicate innovativeness and therefore future productivity growth.

Chapter B3 discusses the topics covered here in more detail. New breakdowns and variables are presented and regression analyses show relations between innovation and several essential variables. Chapter C4 gives an overview of some key tables on innovation that have been published in earlier editions of this Internationalisation Monitor.

References

Dutch Innovation Platform (2010). 'Netherlands 2020: back in the top 5 – The economical agenda: innovative, international, involving'. Workgroup on Competitiveness, The Hague

European Patent Office (2008). 'Worldwide Statistical Database.' edition April 2008.

Granstrand, O. (2000). *'The economics and management of intellectual property: towards intellectual capitalism'*. Edward Elgar Publishing, Northampton.

Hall, B.H., Mairesse, J., Mohnen, P. (2009). 'Measuring the Returns to R&D'. Chapter for the *Handbook of the Economics of Innovation*.

Knowledge & Innovation Agenda coalition (2010). 'Dutch Knowledge & Innovation Agenda 2011–2020', The Hague.

Organisation for Economic Co-operation and Development (OECD) (2008). 'Pharmaceutical pricing policies in a global market'. *OECD Health Policy Studies*, Paris.

Porter, M. E. (2001). 'Innovation lecture 2001', The Hague.

Statistics Netherlands (2009). *Internationalisation Monitor 2009*, The Hague/Heerlen

The Conference Board (2010). *Intangible Capital in the Netherlands and its applications for future growth*. Working paper, New York.

World Economic Forum (2009). *The Global Competitiveness Report 2009–2010*. Geneva.

B1 International traders in goods and services – differences and similarities

Marjolijn Jaarsma and Chantal Lemmens-Dirix

1.1 Introduction

The volume of international trade in goods and services is often used as a simple measure of openness and integration with the rest of the world. However, the drivers of these macro-economic developments are the enterprises that pursue international sales in order to expand their market (Mayer and Ottaviano, 2007). As is well documented in academic literature (Bernard and Jensen, 2007; Wagner, 2005; Breinlich and Criscuolo, 2008) and briefly discussed in the previous edition of the Internationalisation Monitor (CBS, 2009), firms that engage in international trade differ from businesses that operate only on the domestic market. Traders are in general bigger, more profitable, pay higher wages and are more capital and skill-intensive than non-traders. However, international traders are by no means a homogeneous group. Most studies find that only a fraction of traders account for a large share of the total trade flows and have the highest number of trading partners (Bernard and Jensen, 2007; Mayer and Ottaviano, 2007). These traders are most often the largest and most productive enterprises. Smaller firms often have a lower trade incidence and a different trade pattern. Firms that import and/or export goods also differ from enterprises that only trade in services, in the sense that their product portfolio requires different inputs and that services are inherently more difficult to trade cross-border (e.g. buying a service might require the physical presence of the service provider) (Doh and Pearce, 2003).

Despite the growing importance of international trade in services, not much is known about the characteristics and performance of the firms engaged in this kind of trade since detailed data on a micro-level are lacking. On the contrary, there are many studies on international trade in goods using firm-level data to describe the specific firm features. However, better knowledge of the characteristics of traders in services and a more profound link with traders in goods, are important contributions to the understanding of firms engaged in international transactions. As such the aim of this article is to present new datasets on international traders in goods and services in order to describe the main similarities and differences between these various types of international traders in terms of economic activity, enterprise size, and ownership.

The next section provides relevant background information about the international trade in goods and services statistics and the composition of the datasets.

Subsequently, differences in structure, economic activity and ownership between the various types of traders are examined in section 3. The last section presents the main conclusions of this chapter.

The datasets presented here are used in chapter B2 to study the differences in two key economic variables – turnover and labour productivity – between international traders in services and/or goods and their non-exporting or non-importing counterparts. The relationship between international trade and the level of research and development is investigated in chapter B3. In addition, chapter B4 examines whether there are differences in employment between traders and non-traders. The studies carried out in these two chapters only include data on traders in goods.

1.2 *Methodology and datasets*

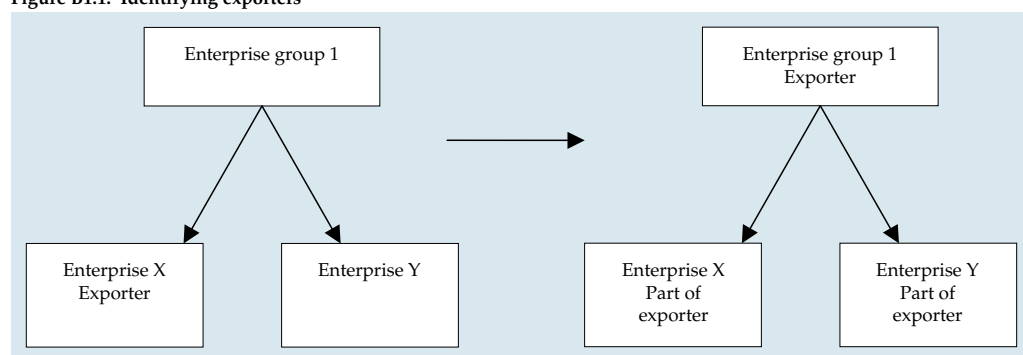
1.2.1 *International trade in goods statistics (2002–2008)*

New developments in the general business register in 2008 made it possible to match a substantial portion of the population of international traders in goods to enterprise (groups) in the general business register. The results of this matching exercise were satisfying: approximately 80 percent of the total export value of goods in 2008 could be attributed to enterprises in the business register, as could 84 percent of imports. Using the same linked dataset for the 2007 trade figures resulted in a match of 76 and 81 percent of the total export and import values respectively¹⁾. However, these matching algorithms were not applicable to earlier years. Therefore, determining which enterprises were involved in international goods trade in 2002–2006 was done based on CBS-source information and (old) VAT information. As such, two separate methods of matching trade flows to enterprises were implemented, where the first-mentioned method was superior to the method implemented for 2002–2006. Combined, these efforts resulted in an enterprise dataset for 2002–2008, in which all enterprises were characterised as to whether or not they were an importer, exporter or two-way trader i.e. involved in both imports and exports. The information on traders in goods for 2002–2006 was used in chapters B3, B4 and C1.

The decision of an entrepreneur to start trading internationally is not taken lightly. Strategic decisions involve a certain degree of risk and will most likely be made at the top of an organisation. In order to avoid focusing on just a segment of an entire organisation, and to avoid mismatches due to the peculiarities in the different surveys of Statistics Netherlands (SN), the focus was not on whether a single *enterprise* is a trader or not but on the *enterprise group* in the Netherlands. Therefore, the classification of exporters and non-exporters was made at enterprise group level. For instance, Figure B1.1 shows that enterprise ‘X’ is part of enterprise group

'1' and reports exports of goods to SN. Logically, since enterprise 'X' belongs to enterprise group '1', the group as a whole is active in exporting, even though the actual goods might be produced or delivered by 'X'. Since enterprise group '1' as a whole engages in the export of goods, both enterprise 'X' and enterprise 'Y' are **part of** an exporter of goods, and will be treated as such in the analysis. The same rationale is applied to importers of goods. When an enterprise group was involved in importing and exporting, all enterprises belonging to this group were characterised as **part of** a two-way trade in goods. In most instances however, the enterprise group is the equivalent of the enterprise, implying that there is only one unit of activity.

Figure B1.1: Identifying exporters



1.2.2 Services traders (2006–2008)

International trade in services covers all services transactions between a country (i.e. its residents) and foreign countries or international organisations (i.e. the non-residents of that country). For a large part of the international trade in services, SN uses the business survey to collect the international services data. Data, for instance, on government services and travel are obtained by different data collection methods. Data on enterprises acquired with these other methods are not available for the analyses presented in this chapter.

The business survey is according to the *size value* of the international trade in services, based on two groups:

1. Group A, containing enterprises with a significant share in the total size value of the international trade in services. These enterprises (n = 350) are integrally observed on enterprise group level.
2. Group B, containing enterprises with a less significant share in the total size value of the international trade in services. These enterprises are questioned

based on a sample survey of approximately 5 000 companies at enterprise level. The enterprises in the survey originated from a larger gross sample frame containing approximately 90 000 enterprises of the general business register. This gross sample frame is reduced by removing enterprises whose size value of the international trade in services is expected to be limited. This leaves a net sample frame of nearly 45 000 enterprises of which the 5 000 enterprises were sampled.

To identify the exporting services traders, the same system was used as for the traders in goods:

1. If an enterprise group in group A responded to the business survey with an export value $\neq 0$, all enterprises belonging to this enterprise group received the code 'part of exporter of services' (see also Figure B1.1).
2. The enterprises belonging to the remaining enterprise groups in group A were defined as 'part of exporter of services unknown'.
3. If an enterprise in group B responded to the business survey with an export value $\neq 0$, the enterprise and all other enterprises belonging to the same enterprise group were defined as 'part of exporter of services'.
4. All other enterprises in group B that were not defined earlier, including all other enterprises belonging to the same enterprise group, were defined as 'part of exporter of services unknown'.
5. Enterprises in the gross sample frame that were not sampled and not defined earlier, including all other enterprises belonging to the same enterprise group, were also defined as 'part of exporter unknown'.
6. All remaining enterprises in the general business register, which were not defined elsewhere, were given the code 'no part of exporter of services'.

The same procedure was applied for the importers of services. When an enterprise group was involved in importing and exporting, all enterprises belonging to this group were characterised as part of a two-way trade in services.

1.2.3 *Combining the datasets (2006–2008)*

Combining the datasets of traders in goods and services for 2006 through 2008 made it possible to classify Dutch enterprises as an exporter (of goods, services or both) and/or an importer (of goods, services or both). It was impossible to depict enterprises in the gross sample frame of the services dataset as an exporter or importer. These enterprises were therefore excluded from the subsequent analyses. Furthermore, enterprises with no employees were also left out of the analyses. In the final combined dataset, the nationality of the ultimate controlling institutional unit (UCI) for each enterprise was determined. The UCI is defined as the institutional unit, proceeding up an enterprise's chain of control, which is not controlled by another institutional unit. 'Foreign controlled' means that the resident

country of the UCI is a country other than the Netherlands. Enterprises were marked as Dutch controlled if it was not known whether they were foreign controlled or not.

1.3 Population characteristics

1.3.1 Population count

Table B1.1 shows the composition of the dataset in 2008, in terms of the share of firms engaged in imports, exports, or both, for either goods or services. Most enterprises in 2008 (84.2 percent) did not engage in international trade. Almost 5 percent of Dutch enterprises were (part of) enterprises that only imported goods. Enterprises that exported and imported goods, but for which it was uncertain whether they also traded in services, comprised 3.1 percent of all enterprises. Two-way traders in both goods and services represented only 0.3 percent of the 2008 dataset.

Table B1.1
Dataset and trade indication, 2008*¹⁾

		7	8	9	10	11	12
		Yes	Yes	Yes	No	No	No
		Yes	No	?	Yes	No	?
		<i>Goods importer</i>		<i>Services importer</i>			
		<i>Goods exporter</i>		<i>Services exporter</i>			
1	Yes	Yes	Yes	–	0.0	0.0	–
2	Yes	No	–	–	0.0	1.1	–
3	Yes	?	–	–	–	–	0.4
4	No	Yes	–	–	0.0	0.0	–
5	No	No	–	–	0.0	84.2	–
6	No	?	–	–	–	–	2.9

¹⁾ n = 1,175,181. Dashes indicate combinations that did not occur in the 2008 dataset.

The focus in the remainder of this article is on those enterprises for which it was possible to determine whether they traded in goods and/or services or not. As such, the enterprises in rows 3 and 6, and columns 9 and 12 were not included in the following tables (7.3 percent of the dataset).

1.3.2 Differences in terms of size class

Table B1.2 shows the distribution of exporting enterprises in terms of size, defined as SME and Large enterprises. A small or medium-sized enterprise (SME) is an

enterprise that employs fewer than 250 people. A large enterprise is an enterprise with 250 or more employees.

The exporting firms in the investigated population were classified in four subgroups: firms that exported goods and services, firms that only exported goods, firms that only exported services, and firms that did not export. The group of exporters contained relatively more large enterprises than non-exporters. Furthermore, exporters of only services involved more large enterprises (6.8 percent in 2008) than exporters of only goods which consisted for 0.6 percent of large enterprises. Firms that exported goods and services included, at 14.6 percent in 2008, even more large enterprises. During the period 2006–2008, a slight decrease was seen in the relative distribution of large enterprises in all three exporting subgroups which means that the small and medium-sized enterprises became more important in their share of the export population.

Table B1.2
Exporting enterprise population by size class

	Exporter (goods and services)			Exporter (goods only)			Exporter (services only)			No exports		
	2006*	2007*	2008*	2006*	2007*	2008*	2006*	2007*	2008*	2006*	2007*	2008*
	%											
SME	83.7	85.7	85.4	98.8	99.3	99.4	90.4	90.8	93.2	99.7	99.9	99.9
Large enterprise	16.3	14.3	14.6	1.2	0.7	0.6	9.6	9.2	6.8	0.3	0.1	0.1
Total	100	100	100	100	100	100	100	100	100	100	100	100

The results for importing firms are presented in Table B1.3. The outcomes for importing enterprises were in concordance with the exporting results. In 2008, only 0.1 percent of the non-importing enterprises were large enterprises, whereas 0.3–15.6 percent of the importing firms, depending on the subgroup, were large enterprises. In addition, firms that only imported goods contained more small and medium-sized enterprises compared with the enterprises that only imported services. In 2008, 99.7 percent of firms that only imported goods were small or medium-sized enterprises in contrast to 92.1 percent of the firms that imported services. Just like the exporting firms, the ‘firms that imported goods and services’ subgroup was the group with the highest percentage of large enterprises. For the importing enterprises, a slight reduction was also seen in the relative distribution of large enterprises in all three subgroups.

Table B1.3
Importing enterprise population by size class

	Importer (goods and services)			Importer (goods only)			Importer (services only)			No imports		
	2006*	2007*	2008*	2006*	2007*	2008*	2006*	2007*	2008*	2006*	2007*	2008*
	%											
SME	83.0	84.4	84.4	99.1	99.6	99.7	89.8	89.6	92.1	99.7	99.9	99.9
Large enterprise	17.0	15.6	15.6	0.9	0.4	0.3	10.2	10.4	7.9	0.3	0.1	0.1
Total	100	100	100	100	100	100	100	100	100	100	100	100

1.3.3 Differences in terms of economic activity

Tables B1.4 and B1.5 show the economic activities of the various types of traders in 2006 and 2008. Almost 30 percent of exporters of goods and services were active in real estate, renting and business activities in 2008. About 20 percent were active in manufacturing and almost 19 percent could be classified as wholesalers and retailers. These percentages did not vary much between 2006 and 2008.

In 2008, approximately 44 percent of exporters (goods only) were wholesale or retail enterprises. Table 4 in chapter C1 (in this Internationalisation Monitor 2010) shows that of all wholesale enterprises in 2008, some 47 percent reported exports of goods (of retailers and repair enterprises almost 9 percent exported). So not only were most goods exporters wholesalers or retailers, a large portion of these enterprises were also active in exporting.

Exporters of services were mostly active in real estate, renting and business activities. In 2008, almost 40 percent of services exporters were active in this sector. In terms of the total number of enterprises active in this sector, they form only a small portion, namely 2 percent (see Table 4, chapter C2).

Non-exporting enterprises were abundantly active in the real estate, renting and business activities sectors. Non-exporters were relatively well represented in the public sector and in the hotels and restaurants sector, compared with exporting enterprises in both years.

Table B1.4
Exporting enterprises by economic activity

	Exporter (goods and services)		Exporter (goods only)		Exporter (services only)		No exports	
	2006*	2008*	2006*	2008*	2006*	2008*	2006*	2008*
	%							
<i>Economic activity (NACE Rev.1.1)</i>								
Agriculture, hunting, forestry, fishing, mining and quarrying	1.2	1.5	5.5	7.6	0.7	1.0	7.4	6.5
Manufacturing	21.0	19.0	15.7	15.0	2.3	1.4	4.3	3.9
Electricity, gas, water supply and construction	5.8	7.4	4.2	3.9	2.7	2.7	10.4	11.6
Wholesale and retail trade, repair	18.7	18.9	45.3	44.0	6.1	6.1	18.3	16.4
Hotels and restaurants	0.5	0.4	0.6	0.4	0.1	0.2	5.2	4.6
Transport, storage and communication	14.2	14.6	2.7	2.4	24.4	27.1	3.1	2.9
Financial intermediation	6.1	4.1	3.2	3.7	10.7	15.2	7.6	8.2
Real estate, renting and business activities	29.8	29.7	18.4	18.4	44.3	39.2	25.1	27.1
Public administration, education, health, social work and other services	2.8	4.4	4.6	4.6	8.7	7.1	18.5	18.7
Total	100	100	100	100	100	100	100	100

The distribution of importing enterprises across industries did not differ much from that of exporters. In 2008, almost 27 percent of importers of goods and services were active in real estate, renting and business activities. Approximately 21 percent of importers of goods and services were manufacturing enterprises, and a similar percentage were active in wholesale, retail trade and repairs.

More than half of all goods importers were wholesale and retail enterprises, while the share of importing manufacturers remained relatively modest in 2006 and 2008. Even though 'only' 10 percent of goods importers were characterised as manufacturers, Table 4 in chapter C1 shows that in 2008 almost 40 percent of all manufacturing enterprises reported imports.

Services importers were mainly found in the following sectors: real estate, renting and business activities, and in transport, storage and communication. Almost 28 percent of services importers were active in transport, storage and communication in 2008, even though 'only' 6 percent of all enterprises active in this sector reported services imports (see Table 4 in chapter C2). Compared with 2006, importers of services were less active in manufacturing industries, energy and construction.

Table B1.5
Importing enterprises by economic activity

	Importer (goods and services)		Importer (goods only)		Importer (services only)		No imports	
	2006*	2008*	2006*	2008*	2006*	2008*	2006*	2008*
	%							
<i>Economic activity (NACE Rev.1.1)</i>								
Agriculture, hunting, forestry, fishing, mining and quarrying	1.5	1.7	2.7	4.8	0.5	1.1	7.7	6.6
Manufacturing	21.2	20.4	10.3	10.2	3.1	1.1	4.3	3.8
Electricity, gas, water supply and, construction	5.0	5.9	6.3	6.6	4.0	2.4	10.5	11.7
Wholesale and retail trade, repair	19.7	20.9	53.7	52.2	4.2	4.1	16.8	14.5
Hotels and restaurants	0.3	0.3	2.9	2.6	0.1	0.4	5.2	4.6
Transport, storage and communication	12.4	13.0	1.5	1.4	27.5	27.8	3.2	3.0
Financial intermediation	6.8	5.0	2.5	3.0	13.2	19.3	7.8	8.5
Real estate, renting and business activities	28.2	26.6	13.0	12.6	39.0	35.2	25.7	28.0
Public administration, education, health, social work and other services	4.9	6.2	7.2	6.6	8.5	8.6	18.9	19.2
Total	100	100	100	100	100	100	100	100

1.3.4 Foreign controlled traders versus Dutch controlled traders

Tables B1.6 and B1.7 give an insight into the ownership structure of the various types of trading enterprises. It turns out that enterprises that import and export both services and goods were most likely to be foreign controlled. Almost 30 percent of all exporters of goods and services were ultimately controlled by a foreign entity, compared with a third of importers. This share had only slightly increased since 2006. Mayer and Ottaviano (2007) found that exporters in Belgium, the UK, Italy and Hungary were also more likely to be foreign owned than non-exporters, although no distinction was made between exporters of goods or services. In addition, Breinlich and Criscuolo (2008) found that services traders were more likely to be foreign owned compared with non-traders. The Dutch data confirmed this picture.

Enterprises that exported and imported only goods were least likely to be foreign owned. The share of foreign controlled traders increased for exporters and importers of services compared with 2006. Enterprises that only traded in goods as well as non-traders were, in most cases, Dutch owned.

Table B1.6
Foreign controlled versus Dutch controlled exporters

	Exporter (goods and services)		Exporter (goods only)		Exporter (services only)		No exports	
	2006*	2008*	2006*	2008*	2006*	2008*	2006*	2008*
	%							
Dutch controlled	71.7	70.5	97.9	98.2	83.0	79.7	99.9	99.9
Foreign controlled	28.3	29.5	2.1	1.8	17.0	20.3	0.1	0.1
Total	100	100	100	100	100	100	100	100

Table B1.7
Foreign controlled versus Dutch controlled importers

	Importer (goods and services)		Importer goods duties only)		Importer (services only)		No imports	
	2006*	2008*	2006*	2008*	2006*	2008*	2006*	2008*
	%							
Dutch controlled	67.9	66.4	99.3	99.2	88.6	85.0	99.9	99.9
Foreign controlled	32.1	33.6	0.7	0.8	11.4	15.0	0.1	0.1
Total	100	100	100	100	100	100	100	100

1.4 Conclusion

Many studies on international trade focus on industries or enterprises that trade in goods and highlight their strengths and importance for economic growth, compared with non-traders. Clearly, excluding firms that trade in services means that a significant and interesting portion of cross-border transactions is omitted. Therefore, this chapter attempted to provide an insight into *all* enterprises that were engaged in trade, using several descriptive tables which showed structural and organisational differences and similarities between the various types of traders.

Traders in goods and services were larger than enterprises that traded in either goods or services. Interestingly, in the period 2006–2008, the share of large

enterprises decreased in favour of SMEs. Exporters and importers of services were somewhat larger than traders in goods, but still relatively smaller than enterprises that engaged in both types of trade.

Most traders in goods and services were involved in real estate, renting and business activities, manufacturing and wholesale, retail and repairs sectors. Almost 70 percent of importers as well as exporters of goods and services were active in these industries in 2008. Traders in goods were often found in wholesale and retail trade, while traders in services were mostly active in real estate, renting and business activities.

Foreign control was mainly a characteristic of the largest traders that imported and exported both goods and services. In 2008, almost 30 percent of exporters of goods and services were foreign owned, compared with nearly 34 percent of importers of goods and services. Traders in goods were the least likely to be foreign controlled. The non-exporters and non-importers were more likely to be domestically owned compared with 2006.

This chapter focused on differences in firm characteristics of international trade in goods and services enterprises. The following chapter presents broader research with emphasis on the differences between international traders in services and/or goods and their non-exporting or non-importing counterparts in terms of performance (measured as turnover and labour productivity).

References

- Bernard, A., Jensen, J., Redding, S. and Schott, P. (2007). 'Firms in international trade'. *Journal of Economic Perspectives*, 21(3): 105–130.
- Breinlich, H. and Criscuolo, C. (2008). 'Service traders in the UK'. CEP Discussion Paper No. 901, Centre for Economic Performance, LSE, London.
- CBS (2009). *Internationalisation Monitor 2009*. Statistics Netherlands.
- Doh, J. and Pearce, J. II. (2003). 'Revising our understanding and expectations of the international trade in services'. *Journal of Transnational Management Development*, 9(1): 59–78.
- Lennon, C. (2008). 'Trade in services and trade in goods: Differences and complementarities'. Working Paper No. 52, Paris School of Economics, Paris.

Mayer, T. and Ottaviano, G. (2007). 'The happy few: the internationalisation of European firms. New facts based on firm-level evidence'. Bruegel Blueprint Series, Volume 3, Brussels.

Melitz, M. (2003). 'The impact of trade on intra-industry reallocations and aggregate industry productivity'. *Econometrica* 71(6): 1695–1725.

Muûls, M. and Pisu, M. (2007). 'Imports and exports at the level of the firm: Evidence for Belgium'. Working Paper Research No. 114, National Bank of Belgium, Brussels.

Smeets, R., Creusen, H., Lejour, A. and Kox, H. (2010). 'Export margins and export barriers. Uncovering market entry costs of exporters in the Netherlands'. CPB Discussion Paper No. 208, The Hague.

Wagner J. (2005). 'Exports and productivity: A survey of the evidence from firm level data'. Working Paper Series in Economics No. 4, University of Lüneburg, Lüneburg.

Notes in the text:

¹⁾ See introduction to C1 for the reasons why a certain international trade flow cannot be matched to an enterprise.

B2 A closer look at Dutch goods and services traders

Marjolijn Jaarsma and Chantal Lemmens-Dirix

2.1 Introduction

Enterprises engaged in international trade activities are different from enterprises that operate only on the domestic market. This can be concluded from a wide range of studies that have shown that exporters are larger, pay higher wages and are more productive than non-exporters (Bernard and Jensen, 1999; Bernard et al., 2007; Mayer and Ottaviano, 2007; Wagner, 2005). Yet most of these studies concentrated on exporters of goods. This paper aims to contribute to the current literature by exploring whether similar results can also be established for importers and traders in services.

Chapter B1 describes the main similarities and differences between these types of international traders in terms of economic activity, enterprise size, and ownership, based on three newly prepared datasets. A main conclusion was that Dutch exporters and importers were larger in terms of number of employees and were more likely to be part of a foreign controlled organisation compared with non-exporters and non-importers respectively.

The emphasis in this chapter is on the differences between international traders in services and/or goods and their non-exporting or non-importing counterparts in terms of turnover and labour productivity. We also analysed whether there were differences in the labour productivity and turnover of domestic versus foreign controlled traders. Finally, several regression analyses were conducted to explore whether the likelihood of exporting or importing is associated with the labour productivity of a company, when controlling for enterprise size, economic activity and foreign ownership.

This chapter is organised as follows. First, we briefly discuss some of the relevant literature on firm heterogeneity in exports. Subsequently, section 3 describes the datasets and estimation methodology. The results are presented in section 4, while the main conclusions are reported in section 5.

2.2 *Theory and background*

There is overwhelming, empirical evidence in the existing academic literature that exporters are different from non-exporters. Exporters are generally found to be more productive than non-exporters even when controlled for time, industry, location or size (Bernard and Jensen, 1999; Wagner, 2005; Smeets et al., 2010). The differences between exporters and non-exporters are generally explained by the self-selection hypothesis which presumes that the most productive firms self select into export markets since they are capable of overcoming the costs involved in exporting. Exporting, and also importing to a certain degree, requires additional effort and investment in order to set up a distribution channel or to ship goods abroad. As such, there are fixed and variable costs associated with internationalisation, which only firms that exceed a certain threshold value of productivity are able to overcome (Melitz, 2003; Smeets et al., 2010). The most common approach to test this theory is to look at differences in average levels of productivity and differences in productivity growth rates (Wagner, 2005).

The learning-by-doing hypothesis extends this argument by also accounting for the (productivity) consequences of exporting, namely whether exporting in itself has a positive effect on productivity growth (Bernard and Jensen, 1999; Schank et al., 2008). The general idea is that exporters learn from different environments and their foreign competitors and thereby increase their productivity. However, there is little evidence for this hypothesis. One explanation for this might be that learning-by-doing studies mainly focus on developed countries. Enterprises in poor countries may have much more to learn from trading and their trading partners than firms in more developed countries (Blalock and Gertler, 2004). Another explanation might be that exporters are not a homogeneous group of enterprises, implying that learning-by-doing effects may only occur for certain firms and not for all. This is supported by empirical studies that demonstrate that productivity and performance vary widely within the group of exporting enterprises. Furthermore, imports and exports appear to be concentrated in the largest (employment and value added) and most productive firms (Muûls and Pisu, 2007).

2.3 *Methodology and composition of datasets*

The linked datasets presented in chapter B1 also form the backbone of the research described in this chapter. Unfortunately, these datasets are not yet suitable for longitudinal studies on self-selection or learning-by-doing theories. Therefore the analyses were restricted to determining the differences in productivity and turnover between three types of exporters and non-exporters. The same analyses were conducted for importers and non-importers. Whether or not an enterprise is

foreign controlled or Dutch controlled might also influence its productivity; hence this variable was explicitly included in the analysis. Furthermore, the association between labour productivity and the probability of being an exporter or importer was examined.

In order to investigate these research questions the data files needed to be extended. Therefore, several variables from the Structural Business Statistics (SBS) for 2006–2008 were linked to the final datasets at the micro level, using the unique enterprise identifier as key variable. The variables included were turnover and value added. Labour productivity was constructed by dividing the value added by the number of employees (fte). Information on the ultimate controlling institutional unit (UCI) was used to determine whether an enterprise was foreign or Dutch controlled. Since the SBS are survey statistics, all enterprises in the SBS received a weight factor to estimate the population values. Only enterprises with a weight factor > 0 were included in the final datasets. Furthermore, outliers (1% of the upper limit) from the SBS variables were removed and the normality of their distributions was checked using histograms. Since these variables were not normally distributed, transformation was applied by natural log to optimise the data distribution towards normal.

F-tests (ANOVA) were conducted to investigate whether there were statistical differences between the average labour productivity and turnover across various types of exporters and non-exporters. Independent t-tests were used to study the differences between Dutch and foreign controlled exporters. Both methods were also used for the various types of importers and non-importers. Pooling the three observed years in one large file resulted in a dataset of around 130 000 observations. Logistic regression analyses were performed on the pooled dataset to test whether there was a positive association between labour productivity and the likelihood of exporting or importing, taking into account firm-specific characteristics such as size, economic activity and ownership. Year dummies were included to correct for time effects. Finally, differences in the effects of ownership, size and industry on the likelihood of exporting were illustrated graphically. To create these graphs regression models were used with the binary variable 'exporter' as dependent variable and labour productivity as the independent variable. The variables 'ownership', 'size class' and 'industry' were included separately to quantify their marginal effect on the probability of being an exporter for various levels of labour productivity.

2.4 Results

2.4.1 Contribution of specific traders to Dutch turnover and value added

The following two tables are descriptive tables that show the economic contribution of each type of trader, as well as non-traders, to the Dutch economy. Since it is unknown for a sub-set of the sample whether or not they (also) export services (as explained in chapter B1), a separate category for these enterprises was created. The same subdivision was made for importers in 2006–2008.

Table B2.1 shows that in the observed period, roughly 27 percent of the total amount of Dutch turnover and value added was generated by exporters of both goods and services. Approximately 35 percent of Dutch turnover and a quarter of value added were produced by enterprises that exported goods, but for which it was uncertain whether they also exported services. Exporters of only goods generated an increasing share in total turnover and value added, while the contribution of only services exporters remained relatively constant between 2006 and 2008. Interestingly, non-exporters produced a fairly large share of value added, compared with their share of turnover.

Table B2.1
Distribution of Dutch turnover and value added over exporters versus non-exporters

	Turnover			Value added		
	2006*	2007*	2008*	2006*	2007*	2008*
	%					
Exporters (goods and services)	27	27	27	27	27	27
Exporters (goods, maybe services)	35	35	36	25	25	26
Exporters (goods only)	7	7	11	7	6	10
Exporters (services only)	4	4	3	4	4	3
No goods exports, maybe services	9	12	9	12	14	10
Non-exporters	18	16	14	26	24	24
Total	100	100	100	100	100	100

In Table B2.2, total Dutch turnover and value added were distributed over the various types of importers and non-importing enterprises. The bulk of turnover and value added, 73 and 63 percent respectively in 2008, was generated by enterprises that imported goods and perhaps services. Enterprises that only imported services represented about 1 percent of Dutch turnover and value added,

which was slightly less than exporters of services. Importers of only goods increased their share in total turnover and value added between 2006 and 2008. Non-importers had a larger share in total value added than in turnover in the observed period, even if enterprises for which it was uncertain whether they imported services (but no goods) were included.

Table B2.2
Distribution of Dutch turnover and value added over importers versus non-importers

	Turnover			Value added		
	2006*	2007*	2008*	2006*	2007*	2008*
	%					
Importers (goods and services)	32	31	34	31	31	34
Importers (goods, maybe services)	37	39	39	29	29	29
Importers (goods only)	6	7	9	7	7	8
Importers (services only)	1	1	1	2	2	1
No goods imports, maybe services	6	8	5	8	10	7
Non-importers	17	14	12	23	21	21
Total	100	100	100	100	100	100

2.4.2 Differences in turnover and labour productivity

i. Exporters and importers versus non-exporters and non-importers

Table B2.3 shows the average labour productivity and turnover value of various types of exporters and non-exporters in 2008. The results for the importers and non-importers are presented in Table B2.4. Every type of exporter and importer appeared to be larger in terms of turnover and more productive than non-exporters and non-importers respectively. This is in concordance with studies observed in the literature, which showed that goods traders were larger in terms of turnover and were more productive than non-traders (Bernard and Jensen, 1999; Mayer and Ottaviano, 2007). Furthermore, other studies found that firms engaged in trade in services also had a higher turnover and were more productive than non-traders (Hijzen et al., 2006; Breinlich and Criscuolo, 2008; Vogel, 2009). The results showed that, in general, enterprises involved in both goods and services had the highest average labour productivity and turnover, followed by firms that only traded in services. Enterprises that only traded in goods had the lowest average labour productivity and turnover.

Table B2.3
Average labour productivity and turnover of exporters versus non-exporters, 2008*

	Exporters	T-test (compared with non-exporters)	F-value (ANOVA)
<i>1,000 euro</i>			
Labour productivity			
Exporters (goods and services)	89.1	41.1***	3,369***
Exporters (goods only)	58.0	33.5***	
Exporters (services only)	96.5	26.8***	
Non-exporters	49.8		
Turnover			
Exporters (goods and services)	32,951	147.6***	34,600***
Exporters (goods only)	2,988	122.3***	
Exporters (services only)	14,340	71.8***	
Non-exporters	452		

*** p < 0.01; ** p < 0.05; * p < 0.10

Table B2.4
Average labour productivity and turnover of importers versus non-importers, 2008*

	Importers	T-test (compared with non-importers)	F-value (ANOVA)
<i>1,000 euro</i>			
Labour productivity			
Exporters (goods and services)	94.8	46.3***	3,181***
Exporters (goods only)	50.3	13.2***	
Exporters (services only)	84.5	16.5***	
Non-importers	50.2		
Turnover			
Exporters (goods and services)	37,000	167.6***	37,739***
Exporters (goods only)	1,800	150.1***	
Exporters (services only)	16,308	53.5***	
Non-importers	411		

*** p < 0.01; ** p < 0.05; * p < 0.10

ii. Foreign controlled enterprises versus Dutch controlled enterprises

Tables B2.5 and B2.6 present the role of ownership on average labour productivity and turnover of exporters and importers in 2008. Table B2.5 shows that, in general, foreign controlled exporters were significantly more productive and had a higher

average turnover value than Dutch controlled exporters. Differences between foreign controlled and Dutch controlled exporters were most pronounced when the enterprise only exported goods. The average turnover of foreign controlled exporters of both goods and services was almost twice as high; and their labour productivity was, on average, ten thousand euros higher than that of Dutch controlled firms.

Table B2.5
Average labour productivity and turnover of foreign controlled versus Dutch controlled exporters, 2008*

	Dutch controlled	Foreign controlled	Independent t-test
<i>1,000 euro</i>			
Labour productivity			
Exporters (goods and services)	86.7	95.0	6.0***
Exporters (goods only)	56.2	115.9	22.7***
Exporters (services only)	97.8	91.2	-1.6
Turnover			
Exporters (goods and services)	27,769	46,518	12.8***
Exporters (goods only)	2,239	30,229	43.0***
Exporters (services only)	11,151	27,637	6.4***

*** p < 0.01; ** p < 0.05; * p < 0.10

Table B2.6 shows whether there were significant differences in labour productivity and turnover between the various types of foreign controlled and Dutch controlled importers. As was seen with respect to exporters, foreign controlled importers were also larger in terms of turnover and more productive than Dutch owned importers. For services traders, no significant results were found for labour productivity.

Foreign controlled enterprises that imported only goods had a far higher average level of labour productivity in 2008 than Dutch importers of only goods. This might be explained by the fact that there were only very few foreign controlled importers of only goods, which may have very specific trading activities in the Netherlands (e.g. distribution). Their average turnover was also substantially higher than that of Dutch controlled importers of only goods.

Dutch controlled services importers were somewhat more productive than foreign controlled importers, although not significantly so. Their average turnover was only half that of foreign controlled importers, indicating that Dutch controlled importers of services were, in general, smaller enterprises.

Table B2.6
Average labour productivity and turnover of foreign controlled versus Dutch controlled importers, 2008*

	Dutch controlled	Foreign controlled	Independent t-test
	<i>1,000 euro</i>		
Labour productivity			
Importers (goods and services)	94.2	95.9	4.2***
Importers (goods only)	49.4	106.9	23.2***
Importers (services only)	85.3	79.6	-0.9
Turnover			
Importers (goods and services)	31,733	47,445	11.7***
Importers (goods only)	1,583	16,780	35.9***
Importers (services only)	14,589	27,159	2.6**

*** p < 0.01; ** p < 0.05; * p < 0.10

2.4.3 *The probability of exporting and importing*

The results of the logistic regression analyses are presented in Tables B2.7 and B2.8. All models in Table B2.7 represented a multivariate regression model with the binary export variable as the dependent variable, and labour productivity (ln), foreign control, industry, size class and year as independents. A significant positive association was found between labour productivity and the likelihood of exporting. Additionally, foreign ownership was also positively associated with the chance of being an exporter. Models 2–6 also included a variety of interaction effects between labour productivity and foreign control, industry and size class respectively. Model 5 included all interaction terms simultaneously. But since the interaction term size class*ln labour productivity was not significant, this term was excluded from model 6. This last model showed that if ln labour productivity was increased by one unit the likelihood of being an exporter was nearly twice as high. For instance, if an enterprise was able to increase its labour productivity from e.g. 33 thousand euros to 89 thousand euros¹⁾, the regression model predicts that its chance of being an exporter almost double. However, the results for the interaction effects indicate that this effect differs across firms from different industries, and by foreign ownership. These regression results are in line with existing research (Bernard and Jensen, 2001; Bernard and Wagner, 1998).

Table B 2. 7
Probability of exporting, pooled dataset 2006*-2008*

	1	2	3	4	5	6
Constant	-6.30*** (0.00)	-6.33*** (0.00)	-6.08*** (0.00)	-6.33*** (0.00)	-6.10*** (0.00)	-6.12*** (0.00)
Ln labour productivity	0.69*** (2.00)	0.70*** (2.01)	0.63*** (1.88)	0.70*** (2.01)	0.64*** (1.90)	0.64*** (1.90)
Foreign controlled	3.18*** (24.05)	6.20*** (491.53)	3.20*** (24.43)	3.18*** (24.03)	6.17*** (477.75)	6.16*** (475.15)
Industry fixed effects	***	***	***	***	***	***
Size class fixed effects	***	***	***	***	***	***
Time fixed effects	***	***	***	***	***	***
Interaction effects						
foreign controlled * ln labour productivity	n.i.	***	n.i.	n.i.	***	***
industry * labour productivity	n.i.	n.i.	***	n.i.	***	***
size class * ln labour productivity	n.i.	n.i.	n.i.	***	n.s.	n.i.
n	129,310	129,310	129,310	129,310	129,310	129,310
Chi-square	189,347	189,567	196,392	189,385	196,608	196,605
R ² (Nägelkerke)	0.329	0.330	0.340	0.329	0.341	0.341

n.i. = not included; n.s. = not significant; *** p < 0.01; ** p < 0.05; * p < 0.10

Table B2.8 displays the results for the likelihood of being an importer. The first multivariate regression model showed a significant positive association between labour productivity and the probability of being an importer. Increasing the ln labour productivity by one unit raised the chance of being an importer by nearly 68 percent. In the following models the interaction terms were introduced which led to the definite model in which all terms were included. All variables included in the final regression model were statistically significant and positively associated with the likelihood of being an importer. However, the effect of labour productivity on the likelihood of importing again depends on ownership, industry and size class.

Table B2.8
Probability of importing, pooled dataset 2006*–2008*

	1	2	3	4	5
Constant	–4.94*** (0.01)	–4.95*** (0.01)	–4.89*** (0.01)	–4.95*** (0.01)	–4.88*** (0.01)
Ln labour productivity	0.52*** (1.68)	0.52*** (1.68)	0.50*** (1.66)	0.52*** (1.68)	0.50*** (1.65)
Foreign controlled	3.65*** (38.4)	5.94*** (379.73)	3.68*** (39.68)	3.65*** (38.38)	5.56*** (260.11)
Industry fixed effects	***	***	***	***	***
Size class fixed effects	***	***	***	***	***
Time fixed effects	***	***	***	***	***
Interaction effects					
foreign controlled * ln labour productivity	n.i.	***	n.i.	n.i.	***
industry * labour productivity	n.i.	n.i.	***	n.i.	***
size class * ln labour productivity	n.i.	n.i.	n.i.	n.s.	***
n	133,063	133,063	133,063	133,063	133,063
Chi-square	216,497	216,591	221,070	216,498	221,154
R ² (Nagelkerke)	0.328	0.328	0.334	0.328	0.334

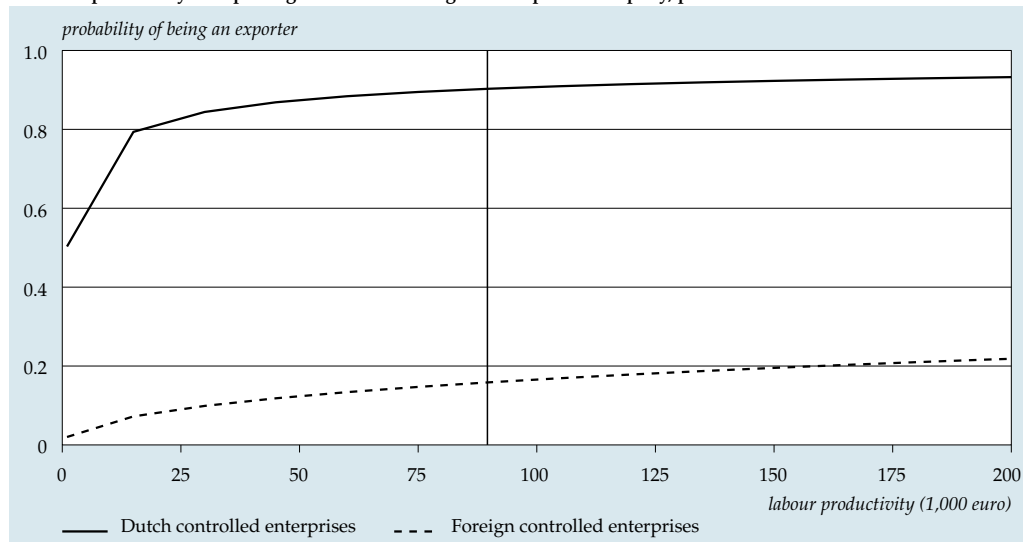
n.i. = not included; n.s. = not significant; *** p < 0.01; ** p < 0.05; * p < 0.10

2.4.4 The probability of being an exporter expounded for several factors

Exactly how the effect of labour productivity on the probability of exporting (importing) differs across firm ownership (foreign versus domestic), industry and size-class can best be observed from the series of graphs presented here. The effect of Dutch or foreign ownership on the likelihood of being an exporter for a wide range of labour productivity is plotted in Graph B2.1. The effects of size class and industry on the probability of exporting are displayed in Graphs B2.2 and B2.3. Since the analysis of the impact of ownership, size and industry on the likelihood of importing yielded quite similar results as for exporters, only the results for exporters are shown here.

Graph B2.1 shows that foreign owned enterprises already have a higher probability of exporting (50 percent) than Dutch enterprises (2 percent). When labour productivity increased up to e.g. the average value for enterprises that export goods and services (89 130 euros, see Table B2.3), the odds of being an exporter rose rapidly for foreign enterprises, to approximately 90 percent, and then remained relatively stable. For Dutch enterprises, the probability of being an exporter remained much lower, and even if labour productivity increased up to 150 000 euros the chance of being an exporter remained around 20 percent. Thus, at each level of labour productivity, foreign controlled enterprises had a much higher chance of being an exporter than Dutch controlled firms.

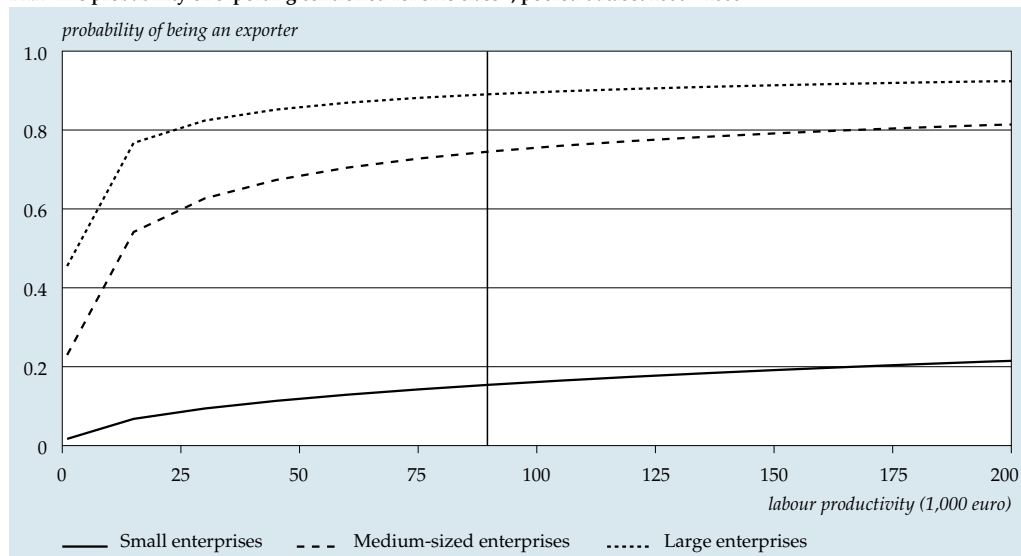
B2.1 The probability of exporting controlled for origin of the parent company, pooled dataset 2006*-2008*



NB The straight line represents average labour productivity of exporters of goods and services in 2008 (Table B2.3).

Graph B2.2 displays the likelihood of being an exporter at various levels of labour productivity for small, medium-sized and large enterprises. Small-sized enterprises had a relatively low probability of being an exporter, even at higher levels of labour productivity. On the other hand, even when labour productivity was very low, large firms already had a 46 percent chance of being an exporter. Therefore, size is a sign of past success and may also be associated with lower marginal costs, providing two separate mechanisms for size to increase the likelihood of exporting (Bernard and Wagner, 1998). When labour productivity increased up to the average level of productivity for firms that trade in goods and services (89 130 euros, see Table 3), this percentage even grew to 90 percent. Medium-sized enterprises showed a development similar to that of large enterprises, although on a lower level. This indicates that exporting is mainly undertaken by medium-sized and large enterprises, and that small enterprises are in this respect a relatively separate group.

B2.2 The probability of exporting controlled for size class¹⁾, pooled dataset 2006*–2008*

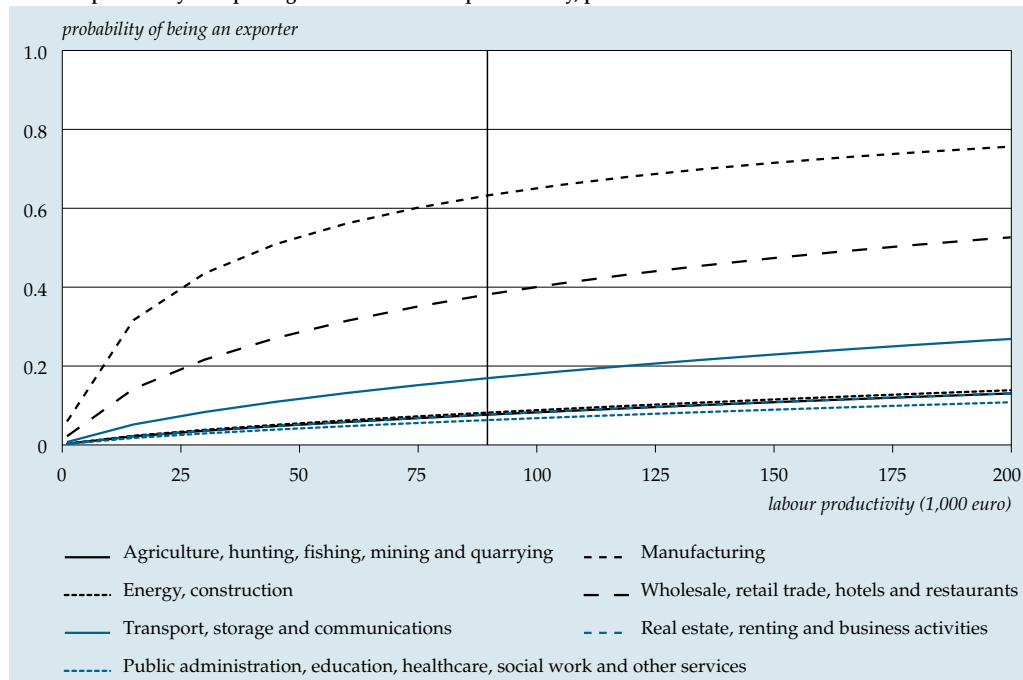


NB The straight line represents average labour productivity of exporters of goods and services in 2008 (Table B2.3).

¹⁾ Small enterprises < 50 employees; medium-sized enterprises ≥ 50 and < 250 employees; large enterprises ≥ 250 employees.

Graph B2.3 shows the effect of economic activity of enterprises on the probability of exporting. When all industries were concerned, enterprises in the manufacturing industry were most likely to be exporters. Firms in this industry were closely followed by enterprises in the wholesale, retail trade, hotels and restaurants sectors, in which most traders in goods were active (see e.g. Table 4 in chapter C1 and Table 4 in B1). On the other hand, enterprises in the industries that included, among others, the public administration, real estate, energy and agriculture sectors had the lowest chance of being an exporter. These last-mentioned industries included a high percentage of enterprises that trade in services, whereas most firms that trade in goods were found in the manufacturing industry. It is not surprising that industries that comprise mainly services enterprises, have a lower probability of being an exporter. In addition, it is known from the literature that services are traded less across borders than goods. One important reason for this is that many services must be consumed at the point of production. Furthermore, firms that export services are also confronted with a broad range of national regulatory barriers which make trading more difficult (Kox et al., 2009).

B2.3 The probability of exporting controlled for enterprise activity, pooled dataset 2006*–2008*



NB The straight line represents average labour productivity of exporters of goods and services in 2008 (Table B2.3).

2.5 Conclusions

In this chapter three new datasets on international traders in goods and services were used to investigate whether there were significant differences in labour productivity and turnover between various types of traders in the period 2006–2008. The influence of being a Dutch controlled or a foreign controlled enterprise on labour productivity and turnover was also investigated. Finally, regression analyses showed how the association between labour productivity and the likelihood of exporting or importing varied across industries, foreign ownership and size class.

In 2008, exporters of goods and/or services generated almost 80 percent of total Dutch turnover and two-thirds of total value added. In terms of importers of goods and/or services, these shares were even higher, hence enterprises active in international trade make a significant contribution to the Dutch economy.

A comparison between the various types of exporters and non-exporters showed that each type of exporter had a significantly higher average turnover and was more productive than non-exporters. Similar results were observed for importers

and non-importers. Foreign controlled exporters (importers) were significantly more productive and had a higher average turnover value than Dutch controlled exporters (importers).

It can be concluded from the regression analyses that increased labour productivity raised both the probability of exporting and importing significantly, even when controlled for size, industry and ownership. The probability that an enterprise is active in exporting was almost twice as high if its ln labour productivity increased by one unit (e.g. from around 33 thousand to 89 thousand euros). Comparatively, the likelihood of being an importer increased by 65 percent. In addition, we established that the relationship between labour productivity and the probability of exporting (importing) varied across foreign ownership, firm size and industry. Given a certain level of labour productivity, foreign controlled firms had a much higher chance of being an exporter than Dutch controlled enterprises. Larger enterprises, and medium-sized firms to a lesser extent, were also much more likely to be exporters than small enterprises. As regards economic activity, enterprises in the manufacturing industry had the highest probability of being an exporter. Firms with the lowest chance of being an exporter were found in the industries that contained, among others, the public administration, real estate, energy and agricultural sector.

As such, our findings support the academic literature, and empirical studies show that exporters are different from enterprises that do not trade. Labour productivity, firm size and foreign ownership are all positively related to the probability of exporting, and also to the probability of importing. Since our data do not yet allow for longitudinal analyses, the direction of causality between trade status and productivity was beyond the scope of this research project. However, extending the present micro-datasets on goods and services traders allows for further research in this area.

References

- Bernard, A. and Jensen, J. (1999). 'Exceptional exporter performance: cause, effect, or both?'. *Journal of International Economics*, 47(1): 1–25.
- Bernard, A. and Jensen, J. (2001). 'Why some firms export'. NBER Working Paper No. W8349, National Bureau of Economic Research, Cambridge.
- Bernard, A., Jensen, J., Redding, S. and Schott, P. (2007). 'Firms in international trade'. *Journal of Economic Perspectives*, 21(3): 105–130.

- Bernard, A. and Wagner, J. (1998). 'Export entry and exit by German firms'. NBER Working Paper No. 6538, National Bureau of Economic Research, Cambridge.
- Blalock, G. and Gertler, P. (2004). 'Learning from exporting revisited in a less developed setting'. *Journal of Development Economics*, 75(2): 397–416.
- Breinlich, H. and Criscuolo, C. (2008). 'Service traders in the UK'. CEP Discussion Paper No. 901, Centre for Economic Performance, LSE, London.
- Hijzen, A., Pisu, M. and Upward, R. (2006). 'A portrait of trade in services'. Report for the DTI, London.
- Kox, H., Lejour, A. and Verweij, G. (2009). 'Regulatory barriers in business and transport services trade'. Paper prepared for the First Meeting of Globalisation Investment and Services Trade, June, Milan.
- Mayer, T. and Ottaviano, G. (2007). 'The happy few: the internationalisation of European firms. New facts based on firm-level evidence'. Bruegel Blueprint Series, Volume 3, Brussels.
- Melitz, M. (2003). 'The impact of trade on intra-industry reallocations and aggregate industry productivity'. *Econometrica* 71(6): 1695–1725.
- Muûls, M. and Pisu, M. (2007). 'Imports and exports at the level of the firm: Evidence for Belgium'. Working Paper Research No. 114, National Bank of Belgium, Brussels.
- Schank, T., Schnabel, C. and Wagner, J. (2008). 'Higher wages in exporting firms: Self-selection, export effect, or both? First evidence from German linked employer-employee data'. IZA Discussion Papers 3359, Institute for the Study of Labor (IZA), Bonn.
- Smeets, R., Creusen, H., Lejour, A. and Kox, H. (2010). 'Export margins and export barriers. Uncovering market entry costs of exporters in the Netherlands'. CPB Discussion Paper No. 208, The Hague.
- Vogel, A. (2009). 'Exporter performance in the German business services sector: First evidence from the services statistics panel'. Working Paper Series in Economics No. 111, University of Lüneburg, Lüneburg.
- Wagner J. (2005). 'Exports and productivity: A survey of the evidence from firm level data'. Working Paper Series in Economics No. 4, University of Lüneburg, Lüneburg.

Notes in the text:

¹⁾ The average labour productivity level of exporters in goods and services in 2008 (Table B2.3).

B3 In-depth analyses: international trade and R&D

René Bongard

3.1 Introduction

Globalisation and technological development are essential for economic growth in the Netherlands. More than ever before, people and enterprises cross country borders in order to undertake economic activities. The integration and further development of the European Union has led to a more open internal European economy. Trade barriers fade and competition intensifies. The free flow of capital, goods, services and labour eliminates the borders between member states and stimulates more economic interaction. This is in line with the increasing globalisation of the world economy. Improved transportation and communication systems, fostered by developments in ICT, contribute to a more interconnected global economy. Shifts in political attitudes of protective economies towards foreign access to their economies result in even more openness, international trade and other cross-border activities of economic actors, such as foreign direct investment (FDI) and outsourcing. Large multinational enterprises (MNEs) in particular play an important role in our globalising economy. MNEs perform their core and support activities in the countries where the relevant production factors are available and most advantageous to them. Labour-intensive activities are capitalised in countries where plenty of cheap labour is available, for example Eastern Europe and South-East Asia. Enterprises requiring access to natural resources locate their plants where it is most advantageous, in terms of infrastructure, available resources and regulations. Knowledge-intensive activities, such as R&D and innovation, are used to advantage in countries where enterprises have access to the knowledge they need. High human capital, good universities and innovative enterprises and government support for innovation all attract enterprises looking for knowledge and knowledge development. It is the Netherlands' aim to become a leading knowledge economy (see also chapter A4). Further Dutch productivity growth can no longer be achieved by increasing the input of labour in the economy. Policymakers focus on the creation of knowledge in order to boost innovativeness, and productivity, and hence economic and welfare growth. The globalising economy offers opportunities for the Netherlands, as an open economy, to benefit from the application and further development of the knowledge in this country. The Netherlands is, historically, an open economy, where international trade is essential for its welfare. Continued benefit from exports in this globalising economy, in which there is strong competition from countries in Eastern Europe and Asia where labour costs are low, can only be

achieved if the Netherlands increases its competitiveness by focusing on the development and application of knowledge.

3.1.1 *Trade and knowledge*

The challenge is to measure the effects of increasing globalisation on knowledge creation and innovativeness in the Netherlands. Chapter A4 describes trends in Dutch R&D and innovation in an international perspective. This chapter provides an in-depth analysis of the interrelation between R&D (and innovation) and international trade. What are the characteristics of exporting enterprises? Are exporters more active in R&D and innovation than non-exporters? And are R&D enterprises more active in the export of high-tech goods? We expect that enterprises that invest in R&D will have to scale up, in terms of sales, in order to generate returns on the high R&D investments. As a result of increased productivity resulting from innovation, R&D enterprises may achieve comparative advantages which enable them to export their (differentiated) products. This could lead to innovation diffusion from the innovator to the adopter. When enterprises in the Netherlands import high-tech goods one may expect that innovation diffusion occurs in the direction of the Netherlands. So not only does knowledge development lead to productivity growth, but the adoption of knowledge created abroad also yields productivity growth. International trade plays an important role in knowledge diffusion and therefore also in the development of new knowledge. For the Netherlands as an open knowledge economy it is interesting to analyse the interrelation between international trade and R&D and innovation activities by enterprises in the Dutch business sector.

3.1.2 *Structure of this chapter*

The next section (3.2) gives an overview of recent studies into the interrelation between R&D and international trade. The methodological section (3.3) expands on the source data and methods used in this study. Section 3.4 presents new tables about trade in high-tech goods by foreign and domestic-controlled R&D enterprises. Both export and import are broken down into destination and origin respectively for 2002, 2004, 2006 and 2008. Further, in this section we distinguish several categories of firms as defined by Eurostat, based on technology intensity, and compare them on business economic indicators, including share of high-tech goods exporters and high-tech goods importers, government innovation support, R&D activity, innovativeness and labour productivity. The results of two sets of binary logistic regression models are presented in 3.5. The first regression models shed light on the characteristics of innovating enterprises. The second set of regression models focuses on exporters of high-tech goods and their characteristics. Finding evidence for causality is challenging as the relationships between the indicators are not straightforward and they are therefore hard to describe. Several indirect

relationships between economic aspects play a role, for example competition in the relevant market and scale effects, just like intrinsic aspects of R&D activities and international trade, time lags and risk factors. The chapter concludes with a discussion of the relationship between trade and knowledge (3.6).

3.2 *Literature review on international trade and knowledge*

Chapter A4 in this Internationalisation Monitor describes trends in Dutch R&D and innovation and benchmarks them in a European perspective. The figures reveal that enterprises that trade internationally invest higher sums of money and more often in R&D, and they tend to be more innovative. However, the same figures also reveal that international trading enterprises are, on average, larger than enterprises not involved in international trade. Enterprises that invest in R&D are also larger than enterprises that do not invest in R&D. So the size of an enterprise does seem to explain, to a certain extent, both the trading behaviour of enterprises and the likelihood of a company investing in R&D.

3.2.1 *Self-selection effects and productivity*

Scholars have researched this topic extensively. There is a large body of empirical literature that documents the relationship between exporting and productivity. In general, scholars find that exporting enterprises are more productive than non-exporting enterprises, which reflects the self-selection process of more productive enterprises in the export market (Girma et al., 2004). Productive enterprises have comparative advantage and start to export. Others state that exporting makes them even more productive (Aw, Roberts, Xu, 2008). This further increases their comparative advantage, which, in turn, leads to even more export. The productivity of enterprises correlates highly with the size of enterprises. Expansion enables enterprises to benefit from economies of scale by reducing unit cost, resulting in lower long-run average costs and therefore higher added value and increased productivity. Both R&D and export involve high fixed costs. So enlarging the scale of an enterprise, while keeping fixed costs constant, implies lower average fixed costs per unit. This explains why the figures in chapter A4 show that exporters and R&D enterprises are, on average, larger than non-exporters and enterprises that do not invest in R&D. The self-selection of productive enterprises drives them to participate in the export market or it drives them to start investing in R&D. Scholars find the self-selection effect for both embarking on export and for starting R&D activities. R&D and exporting have a positive effect on the enterprise's future productivity which reinforces the selection effect (Aw, 2008). The question is therefore: how do enterprises achieve the initial productivity level that drives them to start export activities? Girma et al. (2004) state that profit-maximising firms enter export markets only if the present value of their profits exceeds the fixed costs of

entry. One may expect that the same applies when starting R&D activities. Enterprises generate profit when they manage to generate higher output value than input value. So profits depend on productivity, which is the function between operating inputs and outputs. Several types of input can be discerned: capital, labour, energy, materials, and services. A more efficient use of input increases productivity. R&D increases the probability of being involved in innovations that yield more efficient use of inputs. See Hall et al. (2009) for a review of the relevant literature on this topic. We conclude from this part of the literature that exporting and R&D involve high fixed costs. Enterprises require a certain level of productivity in order to be triggered to start exporting or investing in R&D. This self-selection effect is further reinforced by the productivity gains from exporting and innovating. So from this perspective there seems to be no direct relationship between exporting and R&D, other than the possibility that productivity gains achieved through export may drive enterprises to start R&D, and vice versa.

3.2.2 *Innovation diffusion*

Another relevant aspect of the interrelation between trade and R&D is that trade leads to innovation diffusion since international trade facilitates technology transfer. Many scholars argue that innovation diffusion is an important source of productivity growth. From his empirical research on 16 OECD countries for the period 1870–2004, Madsen (2007) concludes that there is a robust relationship between productivity and knowledge imports, and that 93 percent of the increase in productivity over the past century was thanks to knowledge import alone. Coe and Helpman (1995) also find that international transmission of R&D knowledge through the channel of trade has contributed significantly to productivity growth. “While R&D raises rates of innovation, international trade enhances the speed of technology transfer,” (Cameron et al., 2003). So R&D increases an enterprise’s odds for embarking on innovation, while international trade increases innovation diffusion. Technology transfer is particularly important for countries behind the technological frontier. Countries that are less developed in technological terms tend to converge quickly to steady-state levels of productivity when trading with countries at the technological frontier. So enterprises that innovate and trade provide their trading counterparts with productivity advantages in terms of technological development. The more educated and skilful the importers are, the better the adoption of the innovation will be and the faster and higher the productivity growth. “It may be seriously argued that, historically, European receptivity to new technologies, and the capacity to assimilate them whatever their origin, has been as important as inventiveness itself,” (Rosenberg, 1982). This indicates the relevance of the interrelation between R&D and international trade. For a comprehensive study on the diffusion of innovations see Rogers (2003). Hejazi (1999) adds foreign direct investment (FDI) stocks to international trade as a diffusion channel for R&D between countries. He argues that the importance of

the trade channel as a source of productivity growth is reduced once FDI is considered. Although the focus in this paper is on the interrelation between international trade and R&D, we also take FDI into account. FDI by foreign firms in the Netherlands is covered by the locus of control breakdown, since this indicates the foreign ownership of enterprises in the Dutch business sector. Knowledge from abroad may flow into the Netherlands via the FDI channel as a result of intra-firm knowledge spillovers when a foreign enterprise acquires or starts an enterprise in the Netherlands. FDI is also more appropriate for some types of knowledge transmission than the international trade channel (Hejazi, 1999). To conclude, the literature on innovation diffusion provides evidence for the importance of international trade as a facilitator of technology transfer and the cause of knowledge spillovers, resulting in productivity gains for the receiving counterpart.

3.3 *Data and methodology*

We constructed a database on micro level, i.e. at enterprise level, in order to assess the effects of globalisation on R&D and innovation activities in the Dutch business sector. The Community Innovation Survey (CIS) is the backbone of this research. This EU-coordinated survey on innovation can be weighted to the population of all enterprises in the Netherlands with ten or more employees. Since international trade and foreign direct investment are indicators of globalisation, we match our CIS database on enterprise level with indicators on international trade in goods and with locus of control. Both globalisation indicators are binomial, so each enterprise has either a zero or one. The indicators on international trade in goods enable us to distinguish exporters from non-exporters and importers from non-importers. A more detailed level in this dimension is provided by distinguishing international trade in high-tech goods (according to the OECD high-tech goods list) and by disaggregating international trade to region of destination and origin. We can make a distinction between the following regions: the main European Union member states (EU 14), the United States (US), China, Japan, and the rest of the world (ROW). It should be borne in mind that we do not use data about international trade in services. The locus of control indicator distinguishes Dutch controlled enterprises from foreign controlled enterprises. The Ultimate Controlling Institute (UCI) list is the source for this variable.

The matching task yields new datasets that open up many new research opportunities. Data on innovation input (R&D activities) and innovation output can now be broken down by globalisation indicators. In addition, we match this dataset with yet another database in order to add all kinds of relevant business performance indicators, such as turnover, employment, added value, labour productivity and profitability. Contrary to the match with international trade and locus of control data, which corresponded 100 percent, these business performance

indicators only match 70 to 85 percent of all enterprises in the CIS database, depending on the variable of interest.

NACE classifications are used to distinguish different industries. A special aggregation, defined by Eurostat, is made on the basis of technology intensity in NACE classes. Manufacturing enterprises are categorised in the *high-tech*, the *medium-high-tech*, the *medium-low-tech* or in the *low-tech* groups. Enterprises in the services sector are either classified as *knowledge intensive* or as *less knowledge intensive*. Enterprises that do not fit in one of the above categories are in the *other* group. These new classifications facilitate better opportunities for comparing enterprises and they produce more sound comparisons. In addition, enterprise size level is available for all dimensions: small (10–49 employees), medium (50–249 employees), and large (250 or more employees). An additional size class was added to the regression analyses in this chapter: very large enterprises. As a result, the *large* size class is reduced to 250–999 employees. Enterprises with 1,000 or more employees are categorised as *very large*. This was done because analyses showed that very large enterprises play an important role in R&D, so this extra size class is useful for R&D activities.

The new micro level datasets are available and consistent for the period 2002–2008, which makes it possible to provide time series in order to indicate trends.

3.4 *Trade and knowledge*

3.4.1 *International trade in high-tech goods*

In order to shed light on the interrelation between R&D and exports of high-tech goods in the Dutch business sector, Table B3.1 shows the share of R&D enterprises that export and import high-tech goods. More detail on this relationship is achieved by the breakdown on destination and origin and on the locus of control of the R&D enterprise. High-tech goods are defined by the OECD on the basis of their 3, 4, or 5 digit SITC code (SITC stands for Standard International Trade Classification). An enterprise is referred to in this paper as being a high-tech goods exporter or importer when the enterprise exports or imports at least one of the goods defined as a high-tech good.

“Increases in high-technology exports suggest that learning and industrial upgrading is taking place in the exporting country,” (Sturgeon & Gereffi, 2009). The share of R&D enterprises in the Netherlands that exports high-tech goods increased in the period 2002–2008. This suggests that Dutch industry is performing relatively well in terms of technological development. Enterprises that are able to sell their high-tech goods abroad have a comparative advantage in producing that

good compared with competitors in the importing countries. The underlying reason for this advantage is likely to be technology related. These Dutch exports of high-tech goods may lead to productivity growth in other countries as a result of innovation and knowledge spillovers.

The share of enterprises in the Netherlands that import high-tech goods is greater than the share of enterprises that export high-tech goods. This is in line with general figures on exports and imports and may be caused by the fact that importing is 'easier' than exporting. Exporting requires higher entry costs and is only profitable for firms with a certain productivity level, while almost every firm is able to import (high-tech) goods. See also chapter B1.5 in the 2009 edition of the Internationalisation Monitor. However, according to the literature on innovation diffusion, the import of high-tech goods leads to knowledge inflow to the Netherlands, which fosters productivity growth. According to table B2.1, most of the importing R&D enterprises receive their high-tech products from exporters in the United States. This could indicate that in the relevant branches of industry, US-based enterprises are closer to or are on the technology frontier (i.e. are leading in the development of a certain technology). We assume that access to advanced knowledge and technologies is essential for the production of high-tech goods. The share of enterprises that import high-tech goods from China is increasing rapidly, which indicates that enterprises in China are developing quickly in technological terms. China seems to be moving to the technology frontier. Foreign controlled enterprises tend to export and import high-tech goods more than their Dutch controlled counterparts. This can be explained by the fact that foreign controlled enterprises are larger and more productive than Dutch controlled enterprises. Further, it is worth noting that in 2008 fewer enterprises imported and exported high-tech goods than in 2006. This may be an early consequence of the "economic crisis", which led to significant decreases in global trade.

Enterprises may also focus on R&D and exploit the inventions by licensing or selling technologies (i.e. patents) instead of producing and exporting high-tech goods. So the R&D enterprises in this table that export high-tech goods are probably vertically integrated firms which develop, produce and sell (export) their high-tech products. The knowledge outflow that does not occur through trade in goods from R&D enterprises is not visible in this table. Knowledge outflow may also go through FDI, sourcing of business activities or international trade in services. Small R&D enterprises without production facilities may use channels other than the exporting of high-tech goods to achieve returns on R&D investment.

Table B3.1
Dutch and foreign controlled R&D enterprises' high-tech exports and imports to / from destination and origin

	2002		2004		2006		2008	
	Dutch	foreign	Dutch	foreign	Dutch	foreign	Dutch	foreign
<i>% of R&D enterprises</i>								
Exporter of high-tech goods	8	13	8	19	11	20	13	15
to EU 12	2	5	3	4	4	6	3	5
to United States	4	6	3	9	5	12	6	7
to China	2	4	1	3	3	7	5	4
to Japan	1	5	2	4	2	4	3	4
to ROW	2	3	2	7	3	6	4	3
Importer of high-tech goods	14	24	17	27	21	29	18	25
from EU 12	3	6	2	7	3	8	4	8
from United States	7	14	9	15	12	10	9	11
from China	2	7	3	7	8	10	6	6
from Japan	4	5	4	4	4	8	4	5
from ROW	4	5	5	7	5	7	5	5

3.4.2 Key economic indicators for aggregations on technology and knowledge intensity

Eurostat distinguishes seven different aggregations based on technology intensity for manufacturing enterprises and knowledge intensity for services enterprises, see Table B3.2. Manufacturing enterprises are categorised in four groups, based on the technology intensity of their NACE sector (from high technology to low technology). Enterprises operating in the services sector are either classified as knowledge-intensive or as less knowledge-intensive. The 'other' group consists of all enterprises that are not in any of the above groups. The seven firm categories are benchmarked on several variables for 2002, 2004, 2006 and 2008.

The share of high-tech goods exporters is, as expected, by far the highest for the high-technology enterprises and the lowest for the low-technology and other enterprises. This confirms that high-tech goods are mainly exported by enterprises that invest in R&D and that they are equipped with state-of-the-art technologies. The share of importers of high-tech goods is also highest for the high-tech enterprises. Note that more enterprises import high-tech goods than export high-tech goods. The reason for this is that importing is easier than exporting. Further, these high import percentages may indicate that high-tech enterprises in the Netherlands are part of global value chains. Obviously not all parts of the high-tech output from enterprises in the Netherlands are produced in the Netherlands and therefore need to be imported.

In 2008 the share of enterprises in the high-technology category that exported high-tech goods is higher than the share of enterprises that imported high-tech goods. Compared with 2006, there is a decline of almost 7 percent in the share of importers of high tech-goods, while the share of exporters increases by almost 7 percent. It would be interesting to conduct further research on this observation in order to establish an explanation for this.

Table B3.2
Economic and innovation indicators by industry technology-intensity category

Technology-intensity category	Export high-tech goods	Import high-tech goods	Governmental innovation support ¹⁾	R&D activities	Innovation	Patent application	Labour productivity
	%						1,000 euro
High-technology							
2002	16.7	23.9	35.5	31.8	46.1	n.a.	72
2004	17.8	33.1	64.0	30.9	56.2	14.2	93
2006	24.3	36.2	52.8	35.6	56.2	15.7	106
2008	31.0	29.5	45.7	35.4	59.2	18.8	n.a.
Medium-high-technology							
2002	6.8	10.6	26.8	39.2	56.7	n.a.	83
2004	7.7	12.2	69.3	33.2	56.0	19.4	95
2006	10.2	16.5	60.5	28.0	55.0	18.9	108
2008	8.6	11.8	47.5	27.0	50.2	15.7	n.a.
Medium-low-technology							
2002	3.0	6.6	12.1	17.0	39.1	n.a.	77
2004	2.8	5.3	46.8	14.8	37.4	7.0	86
2006	3.3	7.0	41.9	11.9	40.3	11.3	98
2008	4.5	10.8	39.3	14.9	42.3	8.4	n.a.
Low-technology							
2002	1.3	5.6	9.4	10.4	30.6	n.a.	77
2004	1.9	6.3	31.9	10.4	35.1	4.0	99
2006	1.9	6.4	30.5	9.4	33.9	5.8	94
2008	2.3	4.7	26.1	9.0	34.7	3.8	n.a.
Knowledge-intensive services							
2002	3.2	7.5	12.3	8.7	22.7	n.a.	126
2004	2.6	6.8	23.3	8.8	30.8	2.2	177
2006	3.2	7.4	23.8	6.8	27.7	2.6	156
2008	2.7	4.8	19.1	6.3	25.9	2.3	n.a.
Less knowledge-intensive services							
2002	2.8	5.4	7.6	2.4	13.3	n.a.	86
2004	2.7	5.9	18.6	2.6	19.1	1.6	101
2006	2.8	5.7	14.9	1.8	19.2	2.3	111
2008	2.5	5.2	12.5	2.0	19.6	2.3	n.a.
Other							
2002	1.1	2.2	8.5	1.6	10.4	n.a.	75
2004	1.0	2.1	27.8	2.7	15.0	1.8	76
2006	1.0	2.4	22.9	1.5	15.2	3.2	107
2008	1.5	3.2	29.0	1.7	15.8	2.1	n.a.

¹⁾ As % of innovative enterprises.

The share of innovative enterprises that received government innovation support declined in 2008, apart from the enterprises in the other category. In 2008 almost half the medium-high-technology and high-technology enterprises received government innovation support, either from local, national or European government agencies. The technology and knowledge intensive enterprises tend to be the most active in R&D and are most often innovative. The labour productivity is highest for the knowledge intensive services branches and for the medium-high-technology and high-technology manufacturing branches. This is in line with the findings in the literature that knowledge generation and technology development require high productivity and yield further productivity growth.

3.5 *Innovators and high-tech exporters: their characteristics*

This section presents tables with several binary logistic regression models in order to characterise innovators (Table B3.3) and exporters of high-tech goods (Table B3.4). These binary regression models estimate standardised coefficients by normalising all the covariates so that these variables have a mean of zero and a standard deviation of one. This makes it possible to compare the relative effect of independent variables on the dependent variables ‘innovator’ and ‘high-tech exporter’ respectively (Pampel, 2000).

3.5.1 *Innovators*

Table B3.3 shows very significant results: all variables in all six models have a p-value lower than 0.01. Further, the coefficients are robust, showing limited relative fluctuations when adding or removing variables in the models. These models do not explain all the variance of the dependent variable innovator. It is likely that indirect relations exist between the control variables in the models. Further, other economic indicators that are not used in these regression models may explain part of the variance of the dependent variable. Neither can we say anything about causality, because the relations are not straightforward as concluded from the literature on trade and R&D. However, the regression models are suited to characterise innovating enterprises in terms of the explanatory variables.

Table B3.3
Binary logistic regression (dependent variable: innovator)

	Regression models					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-0.436*** (0.033)	-0.583*** (0.036)	-0.825*** (0.039)	-1.050*** (0.044)	-1.085*** (0.042)	-1.241*** (0.048)
Size of enterprise (<i>ref.</i> medium-sized)						
small	-0.686*** (-0.046)	-0.593*** (-0.047)	-0.657*** (-0.049)	-0.584*** (-0.050)	-0.525*** (-0.053)	-0.474*** (-0.054)
large	0.613*** (0.076)	0.544*** (0.077)	0.513*** (0.079)	0.482*** (0.079)	0.411*** (0.088)	0.390*** (0.088)
very large	0.741*** (0.147)	0.740*** (0.149)	0.781*** (0.151)	0.700*** (0.152)	0.527*** (0.171)	0.471*** (0.172)
Manufacturing sector (<i>ref.</i> services and other sectors)			1.005*** (0.049)	0.784*** (0.053)	0.689*** (0.055)	0.532*** (0.059)
Foreign controlled (<i>ref.</i> Dutch controlled)		0.644*** (0.058)	0.537*** (0.060)	0.404*** (0.061)	0.439*** (0.067)	0.333*** (0.068)
R&D activities (<i>ref.</i> without R&D activities)					3.437*** (0.125)	3.384*** (0.125)
Exporter of goods (<i>ref.</i> non-exporters)				0.565 (0.05)		0.411*** (-0.054)
N	9,935	9,935	9,935	9,935	9,935	9,935
Nagelkerke R Square	0.062	0.078	0.132	0.148	0.311	0.317

*** p < 0.01; ** p < 0.05; * p < 0.1

Small (10–49 employees), large (250–999 employees) and very large (1,000 or more employees) enterprises are distinguished from and compared with medium-sized (50–249 employees) enterprises. The negative coefficients for small enterprises in all regression models indicate that small enterprises are less likely to be innovators than medium-sized enterprises. The positive coefficients for large and very large enterprises show that these enterprises are more often innovators than medium-sized enterprises. The coefficients for the very large enterprises are slightly higher than the coefficients for the large enterprises indicating that the largest enterprises are the most likely of all size classes to be innovative. The quantitative estimation of the odds for each of the regression results is beyond the scope of this paper. Pampel (2000) describes how the standardised coefficients of the covariates relate to increases in the odds for the binary dependent variable to have the value one. In sum, the regression models indicate that the larger an enterprise, the higher its probability of being an innovator. Take into account that the size of an enterprise correlates highly with its productivity and that a high level of productivity may be the real reason for being innovative.

Enterprises in the manufacturing sector are more innovative than enterprises in the services and other sectors. This is not surprising, because most R&D investments involve technological research and development, and the manufacturing sector is known for being more technology intensive than the services and other sectors.

The regression models reveal that, when controlling for size class, foreign controlled enterprises are more likely to innovate than Dutch controlled enterprises. This is in line with the conclusions of the 2009 edition of the Internationalisation Monitor. One explanation may be that foreign controlled enterprises are more productive than Dutch controlled enterprises. We know that productivity is an important explanatory economic aspect for starting R&D activities and that innovation is often a result of R&D. The fact that foreign controlled enterprises have an international network which they can benefit from could explain their higher productivity. Further, foreign controlled enterprises in the Netherlands may save costs because they can book certain fixed costs in their affiliates abroad. However, further research may lead to an explanation for this observation.

In line with the findings of other scholars, the regression analyses reveal that enterprises that have R&D activities are more likely to be innovators than enterprises that do not invest in R&D. The coefficients are relatively high, indicating the expected strong relationship between R&D and innovation, which many other studies have described.

Exporters of goods are more often innovators than non-exporters of goods. This confirms the assumption that a certain level of productivity is needed in order to start high fixed cost activities like export and R&D. Obviously, enterprises that are productive enough to export their products are also likely to start innovating. However, the relationship between innovation and export seems to be a two-way relationship.

To conclude, innovative enterprises in the Netherlands can be characterised as being large in terms of employee numbers, being members of an enterprise group with the locus of control abroad, being active in a manufacturing branch, investing in R&D and exporting goods.

3.5.2 *Exporters of high-tech goods*

What are the characteristics of enterprises that export high-tech goods? In order to answer this question we have to look at the binary logistic regression models in Table B3.4 where the dummy high-tech goods exporter is the dependent variable.

Table B3.4
Binary logistic regression (dependent variable: high tech good exporter)

	Regression models					
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-2.480*** (-0.060)	-2.937*** (0.074)	-2.584*** (0.066)	-2.784*** (0.070)	-2.843*** (0.075)	-2.933*** (0.077)
Size of enterprise (<i>ref.</i> medium-sized)						
small	-1.083*** (0.105)	-0.818*** (0.109)	-1.090*** (0.105)	-0.895*** (0.108)	-0.900*** (0.108)	-0.817*** (0.109)
large	0.642*** (0.116)	0.409*** (-0.120)	0.615*** (0.116)	0.511*** (0.118)	0.499*** (0.118)	0.409*** (0.120)
very large	1.138*** (0.185)	1.010*** (0.192)	1.145*** (0.186)	1.142*** (0.189)	1.153*** (0.189)	1.008*** (0.193)
Manufacturing sector (<i>ref.</i> services and other sectors)			0.369*** (0.091)		0.240 (0.093)	-0,022 (0.101)
Foreign controlled (<i>ref.</i> Dutch controlled)		0.907*** (0.095)		1.011*** (0.093)	0.976*** (0.094)	0.909*** (0.096)
R&D-activities (<i>ref.</i> without R&D-activities)		0.911*** (0.101)				0.919*** (0.108)
N	9,935	9,935	9,935	9,935	9,935	9,935
Nagelkerke R Square	0.068	0.117	0.072	0.097	0.099	0.117

*** p < 0.01; ** p < 0.05; * p < 0.1

Regarding enterprise size class the same conclusion as in the previous part about innovators applies. The coefficients for all size class dummies are very significant. Small enterprises are less likely to be exporters of high-tech goods than medium-sized enterprises. Large and very large enterprises are more often innovators than medium-sized enterprises. The main difference with the regression models on the *innovator* dependent variable in Table B3.3 is that the coefficients for very large enterprises are relatively high compared with large enterprises in the regression on *high-tech good exporter*. This indicates that exporters of high-tech goods are more likely to be very large enterprises compared with innovators. An explanation for this observation may be that R&D and innovation is often a requirement for starting to export high-tech goods. A high level of R&D is needed to come up with innovations and develop high-tech products.

The coefficients for the manufacturing enterprises are not robust and not significant in all models. So we cannot characterise high-tech goods exporters in terms of the sector in which they are active. One may expect high-tech good exporters to be active in the manufacturing sector, which is the most technology-intensive. However, part of the high-tech exports could be sourced to wholesale enterprises.

In particular, enterprises with R&D and innovation as their core business may want to focus on their core business, and leave the production, marketing and sales to others. This could explain why we do not find significant results for the manufacturing sector in all the regression models.

Foreign controlled enterprises are more often exporters of high-tech goods than Dutch controlled enterprises. Probably the fact that foreign controlled enterprises in the Netherlands are more productive than Dutch controlled enterprises is the underlying reason for this observation.

The regression models show that enterprises with R&D activities are more often exporters of high-tech goods compared with enterprises that do not invest in R&D. Many enterprises that export high-tech goods are probably also producers and developers of high-tech goods. This implies that they conduct R&D activities. An exception to this observation is the group of wholesale enterprises that are hired by R&D enterprises to export their products.

In sum, enterprises that export high-tech goods can be characterised as (very) large in size, relatively often under foreign control, and often have their own R&D activities.

3.6 *Summary and conclusion*

Both export and R&D increase productivity. A certain level of productivity (and future profit expectations) is needed in order to start exporting or investing in R&D, because fixed costs are high. Once enterprises reach a certain productivity level, the odds of them becoming exporters or R&D enterprises increase. This is referred to as the self-selection effect. Productive enterprises become even more productive because they start exporting or start up R&D activities. This suggests that it is important for enterprises to achieve the initial productivity level that triggers them to start exporting or to start up R&D activities.

In order to innovate, creation and combination of knowledge are essential. Trade often includes the transfer of technologies and knowledge. So innovation diffusion is fostered by (international) trade and is regarded as an important source of productivity growth. Increasing international trade and increasing foreign direct investment are, among other things, inherent to globalisation. We argued in this paper that the international trade aspect of globalisation increases and accelerates the pace of innovation diffusion. While the increasing exports of high-tech goods by enterprises in the Dutch business sector indicate that industrial “upgrading” is taking place, increasing imports of high-tech goods shows that more enterprises are importing (valuable) knowledge into the Netherlands. The inflow of knowledge

from abroad yields spillover advantages in the Netherlands, which add directly or indirectly to productivity growth. In addition, the inflow of knowledge in combination with knowledge already available offers opportunities for creating new knowledge. Therefore, globalisation offers an open economy like the Netherlands opportunities to attract and use foreign knowledge.

The binary logistics regressions show that innovating enterprises are generally large enterprises in the manufacturing industry. They are relatively often foreign controlled, are exporters of goods and invest in R&D. In particular, the relationship between investing in R&D and being an innovator is strong. An indirect indicator that is not taken up in the models is productivity. Probably and according to the literature there is a correlation between the *innovator* dependent variable and several independent variables. Controlling for size class, locus of control and sector we can state that exporters are more innovative than non-exporters. However, due to indirect relations and intrinsic aspects of R&D activities and international trade, such as time lags and risk factors, it is difficult to study the causality between export and innovation.

Exporters of high-tech goods can be characterised as (very) large in size, relatively often foreign controlled, and with their own R&D activities.

References

Aw, B. Y. (2008). 'R&D Investment, Exporting, and Productivity Dynamics'. *NBER Working Paper Series*, Working Paper 14670.

Cameron, G., Proudman, J., Redding, S. (2005). 'Technological convergence, R&D, trade and productivity growth'. *European Economic Review* 49, 775–807.

Coe, D.T., Helpman, E. (1995). 'International R&D spillovers'. *European Economic Review* 29, 859–887.

Girma, S., Greenway, D., Kneller, R. (2004). 'Does Exporting Increase Productivity? A microeconomic Analysis of Matched Firms'. *Review of International Economics*, 12 (5), 855–866.

Hall, B.H., Mairesse, J., Mohnen, P. (2009). 'Measuring the Returns to R&D'. Chapter for the *Handbook of the Economics of Innovation*.

Hejazi, W., Safarian, A. (1999). 'Trade, Foreign Direct Investment, and R&D Spillovers'. *Journal of International Business Studies*, Vol. 30, No. 3, 491–511.

Lumenga-Neso, O., Olarreaga, M., Schiff, M. (2005). 'On 'indirect' trade-related R&D spillovers'. *European Economic Review* 49, 1785–1798.

Madsen, J.B. (2007). 'Technology spillover through trade and TFP convergence: 135 years of evidence for the OECD countries'. *Journal of International Economics*, 72, 464–480.

Pampel, F. C. (2000). 'Logistic regression: A primer'. *Sage Quantitative Applications in the Social Sciences Series*, 132. Thousand Oaks, CA: Sage Publications.

Roberts, E.M. (2003). 'Diffusion of Innovations'. *Free press*, fifth edition.

Statistics Netherlands (2009). *Internationalisation Monitor 2009*. The Hague/Heerlen.

Sturgeon, T. J., Gereffi, G. (2009). 'Measuring success in the global economy: international trade, industrial upgrading, and business function outsourcing in global value chains'. *Transnational Corporations*, Vol. 18, No. 2.

B4 Wage and employee differences between trading and non-trading firms in the Netherlands

Sandra Genee, Marjolein Korvoorst and Fabienne Fortanier

4.1 Introduction

Economic globalisation in the form of increased trade flows has a multitude of potential consequences. There is a substantial body of empirical research that has documented the higher wages of exporting firms relative to non-exporters, partly as a function of their other superior performance characteristics, such as productivity (see Schank et al., 2006 for a recent overview). To date, few studies have investigated the underlying business characteristics of importing firms, and moreover, little is known about the *employee* characteristics of the workforce of firms that import, export or both. Is the export wage premium linked to the specific selection of human capital i.e. education and experience of workers, in exporting firms? Are imports also an important wage determinant?

This paper analyses the difference in average wage level per employee between trading and non-trading firms, and also considers whether there is still an observable wage differential when employee characteristics are explicitly taken into account. Using the term “traders” to identify companies that either export or import goods or services and introducing the term “two-way traders” for companies that do both, we continue by looking at the structure of the workforce as an explanation as to why (two-way) trading firms pay higher wages than their non-trading counterparts.

An integrated employer-employee dataset was developed for this analysis, enabling links to be made between employee-level information, in the form of wages earned and employee characteristics, such as gender, age, country of origin etc., and employer-level information such as enterprise size, sector of activity, and ownership. This enables us to empirically establish and quantify the net effect of trading on productivity and wages in the Dutch context. For the Netherlands in particular, with its open economy and major reliance on trading and its international economic outlook, it is interesting to be able to shed new light not only on the economic but also on the social consequences of globalisation.

This paper is organised as follows. We first present a number of stylised facts from the theoretical and empirical literature that has explored the question of trading firms and wages in other, i.e. non-Dutch, empirical contexts. We then briefly describe the process of matching employer and employee-level data, and subsequently present the results.

4.2 *Theory and background*

Current theoretical and empirical literature generally shows that exporting firms pay higher wages and are more productive than non-exporting firms (e.g. Schank et al. 2006). Although learning-by-exporting has been presented as a major reason as to why exporting firms are generally more productive and therefore pay higher wages, most evidence points to self-selection of more productive, and therefore better paying firms, into exporting (e.g. Bernard and Jensen, 2004). Therefore, higher wages are generally explained by higher productivity. Indeed, as we have seen in other Statistics Netherlands publications (cf. Genee and Fortanier, 2010), exporting enterprises in the Netherlands are, on average, more productive than their non-exporting counterparts (see Box 4.1). In an analysis of the production and R&D characteristics of firms in the years just before and just after the decision to export goods and services abroad, there was also an observable self-selection effect as productivity was already considerably higher in the years prior to exporting. Another related explanation as to why certain firms pay higher wages than others is the impact of foreign investment. Fortanier and Korvorst (2009) conclude that foreign owned enterprises pay significantly higher wages than domestically owned enterprises, most likely because of higher productivity levels, and in order to prevent labour migration and the ensuing transfer of superior technical knowledge.

Box B4.1: Economic, R&D and employee differences between exporters and non-exporters.

There are many factors that influence a firm's decision to start exporting products. Statistics Netherlands has carried out a three-way analysis to see to what extent exporting companies differ significantly from non-exporting companies, as well as identifying the underlying factors that played a role in the decision to start exporting (cf. Genee & Fortanier, 2010).

Using our matched employer-employee database, the first descriptive analysis showed that in 2007 approximately 7% of the total Dutch enterprise population can be defined as an exporter, which also includes those companies that belong to a corporate group of which one or more affiliates is an exporter. For the second 'event-history' analysis for the period 2002–2007, a representative sample consisting of 2% of the total Dutch enterprise population was further decomposed into the following groups: exporters, non-exporters, starting exporters, stopping exporters, and changing exporters. It became apparent from these analyses that exporting and non-exporting companies differ in the following ways: exporters are larger, more innovative and more efficient (in terms of net turnover and added value) than non-exporters. Particular attention was paid to the group of starting exporters and their development right before

and after the decision to start exporting. It was found here that self-selection plays an important factor; in the period before export started exporters are substantially larger (turnover), more innovative (R&D), more productive (labour productivity), more flexible (share of temporarily employed workers), and spend a larger percentage of their turnover on marketing and sales than non-exporters.

In the third analysis a group of starting and non-exporters was sampled from the matched dataset by means of propensity score matching. Accordingly, the selected non-exporting companies had the highest 'export potential'; they were similar to starting exporters on economic and R&D characteristics, but have not (yet) made the decision to start exporting. Even though this method resulted in a sample of comparable non- and starting exporters from the period 2002–2007, when matching these enterprises to their corresponding social statistics it was found that there are still some observable differences in terms of the composition of their labour force. For example, potential exporters (non-exporters with a high export potential) have, on average, a considerably lower total number of employees (enterprise size) than starting exporters, of which a substantially higher percentage are employees with flexible work contracts. Moreover, potential exporters also employ marginally more part-time workers compared with starting exporters and therefore also have a lower percentage of full-timers in their labour force. Potential exporters also employ a higher percentage of low-paid employees and a slightly higher percentage of job-starters (i.e. graduates starting their first job on the labour market) and more native Dutch employees than starting exporters.

When sector and company size were taken into account it became apparent that the observed differences between starting and potential exporting firms with respect to enterprise size and workforce composition are strongest in the wholesale and production sectors, as well as in small and large companies, fewer than 50 and more than 250 employees respectively.

Source: *Genee and Fortanier (2010)*

Only a few studies have investigated the performance characteristics of importing firms, while there is an extensive body of research on the superior characteristics of exporting firms. Although the focus in the literature is on exports, imports have also been shown to be an important wage determinant (e.g. Martins et al., 2009). Furthermore, using a dataset of US enterprise-level data, Bernard et al. (2005) find that the most globally-engaged firms, i.e. two-way traders, dominate trade flows and employment at trading firms.

However, most of the empirical literature is based on firm-level data rather than on linked employer-employee data. This means that there are few studies that have considered whether the observed export (or import) wage premium is still in evidence if employee characteristics are taken into account which can influence

their productivity, and therefore their wages. It might be expected that the impact of exports on wages is considerably reduced when controlling for the effects of employer *and* employee characteristics. Recent studies (e.g. Schank et al., 2004; Munch & Skaksen, 2006) have tested whether comparable workers (e.g. same education level) are indeed better paid when working for a comparable firm that exports (e.g. same industry or size class). In fact, Schank et al. (2004) find that the “export wage premiums vanish if linked employer-employee data instead of plant-level data are used” (pg.11). However, Munch and Skaksen (2006) find that the export wage premium is still observable, even when controlling for the possible selection of high quality workers into exporting firms.

It is therefore not sufficient to make a simple comparison between wages paid at exporting, importing and two-way trading firms in order to empirically establish the extent to which and how trading affects wages in the Netherlands. First of all, other factors are known or expected to affect both wages and the propensity of enterprises to start exporting and/or importing, including industry, enterprise size, and foreign ownership. In addition, the effect of employee characteristics has to be taken into account in order to establish if wage premiums are indeed attributable to trading activities.

4.3 *Data and methodology*

In order to assess the consequences of economic globalisation, in the form of trading activities, for employees working in the Netherlands, we built an integrated employer-employee dataset that allows us to link employee-level information (wages, gender, age, education level etc.) with employer-level information, including enterprise size, activity sector, and locus of control (foreign vs. domestic). The linked employer-employee dataset for the Netherlands, originally created for 2000–2005 for foreign and Dutch enterprises, was now updated for 2006–2007 and enriched with information on trading status (import and/or export activities) from the International Trade data, and the education level of employees, estimated at the enterprise level from the Social Statistics Database (SSB). More detailed methodological information on the dataset can be found in the 2009 Internationalisation Monitor (Fortanier and Korvorst, 2009).

The resulting employer-employee dataset presented in this paper comprises a sample of an average of 373,000 enterprises from the General Business Register in each year (2002–2007) (total number of observations is 2,238,274) for which the Social Statistics Database (SSB) employment data were available. The micro data integration was done at enterprise level with the unique enterprise identifier (BEID) as key variable. In this linked sample of enterprises in 2007, there are approximately 12% exporters, 17% importers, 10% two-way trading firms and 61% non-traders.

We first present a set of descriptive tables in order to explore the differences in wages between exporters, importers and two-way traders. These tables compare the average annual wage levels between these three groups of firms in 2007, which is subsequently broken down by industry, size class, and locus of control (i.e. if the enterprise is Dutch or foreign owned). We then combine the various factors influencing wages in a regression analysis, in order to establish whether trading firms pay higher wages if all other variables are controlled for, using the following regression model:

$$\begin{aligned} \text{LogWage}_{ijt} = & \alpha_t + \delta_j + \beta_1 \text{LogEmployees}_{ijt} + \beta_2 \% \text{HighEducated}_{ijt} + \beta_3 \% \text{Female}_{ijt} + \\ & \beta_4 \% 50+_{ijt} + \beta_5 \% \text{NativeDutch}_{ijt} + \beta_6 \text{Foreign}_{ijt} + \beta_7 \text{Importer}_{ijt} + \\ & \beta_8 \text{Exporter}_{ijt} + \beta_9 \text{2wayTrader}_{ijt} + \varepsilon_{ijt} \end{aligned}$$

This regression equation contains variables for several employee characteristics, including the percentage of highly-educated employees (i.e. tertiary education); female employees; 50+ employees; and native Dutch employees as firm-level aggregates for education, gender, age, and ethnicity, respectively. The equation also includes various firm level variables, including a set of industry dummies (δ_i) and a measure of firm size (log employees). International orientation is assessed through binary variables ‘foreign’ (foreign ownership), importer, exporter, and 2-way-trader (note that the last variable in essence represents the interaction between the binary variables ‘importer’ and ‘exporter’). A set of year dummies (α_t) controls for time fixed effects.

4.4 Results

Based on the linked employer-employee dataset for the Netherlands, enriched with information on trading firms and the education level of employees, we determined whether annual wage levels and labour force composition differ substantially between exporters, importers, two-way traders and non-trading firms. The first results are displayed in Table B4.1, indicating the differences in sample means between the different groups of firms, using an independent t-test.

The table shows that both exporters and two-way trading firms pay higher wages than importers, while the difference between exporters/two-way traders and non-trading firms is minimal. The fact that exporters pay higher wages is in line with the theoretical observation that exporters are able to afford the cost of entering foreign markets because they are more productive in general and therefore also pay higher wages (according to the fair wage-effort hypothesis (Akerlof and Yellen, 1990)). However, the fact that importer wages are lower than the wages of non-traders is surprising: it may be expected that since the Netherlands is an advanced economy, primarily labour intensive, low value added inputs are imported, and

the more advanced (and hence higher paying) work would remain in the Netherlands. We explore this issue in more detail in the subsequent tables.

Table B4.1
Average differences between exporters, importers, two-way traders and non-traders, 2007

	Exporter			Importer			Two-way trader		
	yes	no	t-stat	yes	no	t-stat	yes	no	t-stat
	<i>1,000 euro</i>			<i>1,000 euro</i>			<i>1,000 euro</i>		
Average wages	43.3	42.2	-7.30***	40.0	42.8	20.99***	43.9	42.1	-11.06***
	<i>%</i>			<i>%</i>			<i>%</i>		
Share of female employees	27	37	74.67***	34	37	17.21***	28	37	68.73***
Share of high-paid employees	29	28	-9.82***	25	28	30.09***	30	27	-13.40***
Share of older (50+) employees	25	27	16.34***	24	27	23.07***	25	27	15.30***
Share of Dutch native employees	83	85	12.99***	84	85	12.52***	83	85	14.65***
Share of starters	24	28	23.74***	26	27	11.11***	23	28	28.21***
Share of high-skilled employees	46	42	-12.71***	44	43	-3.11***	46	42	-13.75***
Labour turnover	40	74	56.52***	49	74	39.91***	37	74	64.45***
	<i>log</i>			<i>log</i>			<i>log</i>		
Number of employees	0.91	0.48	-143.28***	0.85	0.47	-153.89***	0.96	0.48	-146.49***

*** p< 0.01; ** p< 0.05; * p<0.10

In addition to wages, we also explored differences in other employee characteristics such as gender and age, as well as human capital variables such as education level. Finally, two additional firm-level variables were included, namely labour turnover (job-outflow rate) and the logarithm of the average number of employees (enterprise size).

At first glance, exporters and two-way traders are very similar with respect to the composition of their workforce, but on enterprise level, two-way traders tend to have slightly more employees and a somewhat lower labour turnover. There are however some significant differences between firms that do not trade or only import and firms that do have export activities. With regard to the employee characteristics of importers, it is particularly the percentage of highly paid workers that stands out, as it is significantly lower compared with the other groups of firms. As expected, exporters and two-way traders that capitalise on their competitive advantages abroad and that therefore have to overcome the various fixed and variable costs employ relatively highly-educated and highly-paid employees. Both importers and non-traders have a higher labour turnover and fewer employees than exporters and two-way traders. However, the differences between non-traders

and firms with export activities are much greater than the differences between importers and firms with export activities.

So far these results do not control for firm heterogeneity. Since it is known that labour productivity and wages can vary greatly across industries, not controlling for industries would distort the comparison between non-trading firms and the groups of trading firms. Numerous studies have also reported a positive correlation between firm size, exports and productivity. This was also seen in an earlier study by Statistics Netherlands which included the entire Dutch enterprise population, where in 2007 approximately 67 percent of larger firms had export activities (>250 employees), whereas of the medium-sized and smaller firms (<50 employees) 51 percent and 10 percent respectively have export activities (Genee and Fortanier, 2010). Furthermore, in earlier SN studies (c.f. Fortanier and Korvorst, 2009) a significant wage differential was also observed between Dutch and foreign controlled firms. In order to adequately compare wages between trading and non-trading firms, we need to control at least for these factors. Tables 4.2, 4.3 and 4.4 do exactly that.

Table B4.2 shows the average annual wage level of exporters, importers, two-way traders and non-traders broken down by industry. Generally, even when correcting for industry, wages in trading firms are higher than the average annual wages paid by non-trading firms. Wages are significantly higher particularly in the food and beverage, trade and repairs and financial intermediation industries.

Table B4.2
Average wage differences between exporters, importers, two-way traders and non-traders by sector, 2007

	Exporter			Importer			Two-way trader		
	yes	no	t-stat	yes	no	t-stat	yes	no	t-stat
	1,000 euro			1,000 euro			1,000 euro		
Agriculture, forestry, fishing	29.9	25.3	-12.44***	29.2	25.4	-12.25***	31.3	25.4	-14.51***
Mining, quarrying	62.7	56.2	-0.89	61.6	56.7	-0.68	63.4	55.7	-1.05
Food, beverages	37.8	25.6	-24.18***	36.1	25.5	-22.81***	38.4	25.8	-24.42***
Paper, paper prod., publishers	39.2	36.1	-4.74***	39.3	36.2	-4.64***	39.7	36.3	-4.75***
Chemicals/ plastics	41.2	42.0	0.61		40.8	43.3	1.62		41.2
41.9	0.48								
Metal products	35.4	33.7	-4.68***	34.8	34.0	-2.34**	35.5	33.8	-4.80***
Machinery, equipment	38.9	36.8	-3.61***	38.6	37.3	-2.19**	38.9	37.1	-2.95**
Other industry and utilities	36.6	33.4	-9.50***	35.7	33.6	-6.10***	36.8	33.5	-9.76***
Construction	38.9	34.4	-13.73***	36.8	34.3	-10.82***	39.3	34.4	-14.10***
Trade, repairs	40.4	29.1	-79.12***	36.0	29.1	-53.42***	40.9	29.3	-78.38***
Hotels, restaurants	26.3	20.8	-7.53***	22.4	20.8	-5.95***	26.8	20.8	-7.68***
Transport, storage, comm.	43.9	37.6	-13.82***	43.0	37.6	-12.86***	44.3	37.8	-12.60***
Financial intermediation	73.5	63.3	-8.47***	72.1	63.3	-9.03***	75.2	63.3	-8.84***
Business services	54.2	54.7	0.84	52.8	54.9	4.11***	56.4	54.6	-2.80*
Other services	40.6	36.7	-4.49***	36.4	36.8	0.69	41.5	36.7	-4.38***

*** p< 0.01; ** p<0.05; * p<0.10

There are also a number of exceptions. Wages in the chemicals and business services industries are slightly lower for exporting and two-way trading firms than for their non-trading counterparts, but the wages of importers are significantly lower. Given the large number of firms in the business services sector, this may partly explain why in Table B4.1 the total average importer wages are lower.

Table B4.3
Average differences between exporters, importers, two-way traders and non-traders by size class¹⁾, 2007

	Exporter			Importer			Two-way trader		
	yes	no	t-stat	yes	no	t-stat	yes	no	t-stat
	<i>1,000 euro</i>			<i>1,000 euro</i>			<i>1,000 euro</i>		
<i>Average wages</i>									
Small enterprises	43.1	42.2	-5.61***	39.6	42.9	23.73***	43.8	42.2	-9.28***
Medium enterprises	43.9	40.3	-8.32***	43.8	39.8	-9.29***	44.1	40.2	-8.84***
Large enterprises	45.9	39.0	-11.41***	45.3	38.0	-13.44***	46.1	39.0	-11.72***
	%			%			%		
<i>Share of female employees</i>									
Small enterprises	28	37	65.87***	35	36	9.85***	28	37	59.38***
Medium enterprises	24	43	41.99***	26	44	37.84***	24	42	41.11***
Large enterprises	30	58	33.18***	34	59	28.06***	29	58	32.87***
<i>Share of Dutch native employees</i>									
Small enterprises	84	85	9.78***	84	85	9.43***	83	85	11.10***
Medium enterprises	81	81	0.34	81	81	1.65*	81	81	0.48
Large enterprises	80	82	3.70***	81	82	3.21**	80	82	3.52***
<i>Share of high-skilled employees</i>									
Small enterprises	44	42	-5.08***	42	44	4.64***	45	43	-5.43***
Medium enterprises	47	38	22.24***	46	37	-14.95***	47	38	-17.98***
Large enterprises	50	43	-4.50***	49	42	-4.74***	50	43	-5.14***
<i>Labour turnover</i>									
Small enterprises	41	74	50.87***	50	74	34.93***	38	74	57.97***
Medium enterprises	31	77	-16.98***	33	81	20.53***	30	77	22.90***
Large enterprises	32	63	7.61***	33	69	8.16***	30	64	9.09***

*** p < 0.01; ** p < 0.05; * p < 0.10

¹⁾ Small enterprises < 50 employees ; medium-sized enterprises ≥ 50 and < 250 employees; large enterprises ≥ 250 employees.

Table B4.3 shows wages by trading activity and size class. It demonstrates that even when correcting for firm size, exporters and two-way traders still pay higher wages than non-traders. It can also be seen that the differences between traders and non-traders become more pronounced as companies become bigger. This is also the case for the comparison between importers and non-traders; however, importer wages at small firms are actually lower than at non-trading firms.

Table B4.4
Average differences between exporters, importers, two-way traders and non-traders by origin of the parent company, 2007

	Exporter			Importer			Two-way trader		
	yes	no	t-stat	yes	no	t-stat	yes	no	t-stat
	<u>1,000 euro</u>			<u>1,000 euro</u>			<u>1,000 euro</u>		
<i>Average wages</i>									
Dutch controlled	41.0	42.0	6.78***	4.0	3.7	-107.59***	4.2	3.7	-133.48***
Foreign controlled	51.1	47.5	-6.57***	5.0	4.5	-46.25***	5.0	4.6	-43.58***
	<u>%</u>			<u>%</u>			<u>%</u>		
<i>Share of female employees</i>									
Dutch controlled	28	37	61.34***	36	37	4.93***	28	37	53.96***
Foreign controlled	25	31	17.51***	26	30	10.96***	25	31	17.15***
<i>Share of Dutch native employees</i>									
Dutch controlled	84	85	8.45***	84	85	7.92***	84	85	9.53***
Foreign controlled	82	80	-4.48***	81	80	-2.76***	82	80	-3.63***
<i>Share of high-skilled employees</i>									
Dutch controlled	44	42	-4.30***	41	43	5.82***	44	42	-4.42***
Foreign controlled	48	39	-16.45***	47	38	-15.34***	48	38	-17.72***
<i>Labour turnover</i>									
Dutch controlled	43	74	46.01***	52	74	30.80***	39	74	52.34***
Foreign controlled	31	66	21.48***	33	71	20.47***	30	66	22.73***

*** p < 0.01; ** p < 0.05; * p < 0.10

It can be seen from the composition of the workforce that there are few substantive differences across size classes between trading and non-trading firms with regard to the share of native Dutch employees in each size class. The differentials of the percentage of women are however substantial: trading firms employ far fewer women than non-trading firms; this difference becomes even more pronounced as

companies become bigger. With the exception of small importers, trading firms have a more highly-educated workforce, although the differentials of small exporters and two-way traders are also very small. However, it must be taken into account that in very small firms our measure of education (i.e., the percentage of highly-educated employees per firm) becomes sensitive to the education of a single worker. Finally, labour turnover (annual job outflow rate) is considerably lower at trading firms, with the largest differentials for medium-sized enterprises. On the other hand, while labour turnover is lower at small importers than at non-traders, it is still considerably higher compared with the labour turnover of firms with export activities.

Finally, Table B4.4 shows that foreign ownership of firms has a significant effect on the annual wage level. While differences between trading and non-trading firms are small, the differences between Dutch owned and foreign controlled enterprises are much larger, regardless of the trading activities of firms. The differentials with regard to the composition of the workforce show a similar pattern, and resemble the results reported in last year's Internationalisation Monitor (Fortanier & Korvorst, 2009).

4.5 *Regression results*

Table B4.5 presents the results of the regression analyses. The bivariate findings reported above are generally confirmed by these results. All the models control for time and industry effects, and show that the overall effect of firm size on wages is positive, though not very large. In addition, we see that primarily the level of education and gender are important determinants of wages. We can calculate from the results that if the share of high-skilled employees increases by 10 percentage points, average wages increase by 5.6%. Likewise, if the share of female employees increases by 10 percentage points, average wages decrease by 3%.

The regression results also point to the presence of wage premiums associated with international activity. First of all, we find that, *after controlling for the level of education and other employee characteristics*¹⁾, foreign controlled firms pay 10% higher wages than domestic firms. Similarly, we find a 7% wage premium for importers (including two-way traders) and a 5% wage premium for exporters (including two-way traders). It should be noted however that the results, particularly for exporters, were not extremely significant, which means that in light of the large number of observations in our dataset, the effect may be not be practically meaningful.

Table B4.5
Regression results (dependent variable logWage per employee)

	(1)	(2)	(3)	(4)	(5)
Constant	4.35***	4.34***	4.38***	4.38***	4.37***
	8,325.29	3,318.86	2,490.12	2,500.30	2,497.05
Log_employees	0.02***	0.02***	0.03***	0.02***	0.01***
	90.85	57.91	61.39	42.59	25.95
Share of high-skilled employees		0.24***	0.23***	0.23***	0.22***
		235.17	223.85	218.78	203.28
Share of female employees			-0.13***	-0.13***	-0.12***
			-124.10	-122.33	-116.19
Share of older (50+) employees			0.00***	0.00**	0.00
			-2.82	-2.39	0.01
Share of native Dutch employees			-0.01***	-0.01***	0.00
			-7.08	-4.19	-0.96
Foreign controlled enterprise				0.04***	0.04***
				45.86	38.06
Importer					0.02***
					23.70
Exporter					0.01***
					6.87
Two-way-trader					0.01***
					4.27
R Square	0.22	0.30	0.34	0.35	0.36
F	30,332.26***	4,995.24***	5,284.81***	5,204.98***	4,824.12***

T-values below the coefficients. All models include time and industry dummies (not reported).

4.6 Discussion and conclusion

This paper analyses the difference in average wage level per employee between trading and non-trading firms, explicitly taking employee characteristics into account. Using the term “traders” to identify companies that either export or import goods or services and introducing the term “two-way traders” for companies that do both, we continue by looking at the composition of the workforce as an explanation as to why (two-way) trading firms pay higher wages than their non-trading counterparts.

Using linked employer-employee data for the 2002–2007 period, we find that on average, exporters, importers and two-way traders pay significantly higher wages compared with non-trading firms. This is partly a reflection of the higher productivity levels of trading firms (necessary to counteract the cost of doing business overseas), but partly also a reflection of the differences in the composition of the workforce of exporters and importers. For example exporters and two-way traders employ relatively highly-educated employees, and fewer women. Similarly, differences in other firm characteristics influence the wage differential between trading and non-trading firms. For example, firms engaged in exports or imports are much more likely to be foreign owned, and it has been established that foreign

subsidiaries pay higher wages e.g. to prevent labour turnover (c.f. the 2009 Internationalisation Monitor). Yet, even controlling for those differences, we established wage premiums of 7% and 5% for importers and exporters (including two-way traders) respectively.

However, we also observed that the results were not extremely significant, particularly for wage premium for exporters, which means that in light of the large number of observations in our dataset, the effect may be not be practically meaningful. This is in line with recent findings that suggest that the wage premium is wholly the result of differences in the composition of the workforce at exporting and non-exporting firms. Further research at the individual employee level should help provide further answers.

References

Akerlof, G. A., Yellen, J.L., 1990. "The fair wage-effort hypothesis and unemployment." *Quarterly Journal of Economics* 105, 255–283.

Bernard, A., Jensen, J., 2004. "Why some firms Export." *Review of Economics and Statistics* 86, 561–569.

Bernard, A., Jensen, J., Schott, P., 2005. "Importers, exporters and multinationals: A portrait of firms in the US that trade goods." *Center for Economic Studies (CES)*.

Fortanier, F. and Korvorst, M. (2009). "Effects of globalisation: wage differences between employees at Dutch and foreign controlled enterprises in the Netherlands." *Internationalisation Monitor 2009*, A5, p. 71–80, Statistics Netherlands.

Genee, S., Fortanier, F., (2010) *Internationalisation and productivity*, Statistics Netherlands: Heerlen/Den Haag.

Martins, Pedro S. & Opromolla, Luca David, 2009. "Exports, Imports and Wages: Evidence from Matched Firm-Worker-Product Panels." *IZA Discussion Papers 4646*, Institute for the Study of Labor (IZA).

Munch, J., Skaksen, J., 2006. "Human Capital and Wages in Exporting Firms." *IZA Discussion Papers 2409*, Institute for the Study of Labor (IZA).

Schank, T., Schnabel, C., Wagner, J., 2004. "Exporting firms do not pay higher wages, ceteris paribus. First evidence from linked employer-employee data." *IZA Discussion Papers 1185*, Institute for the Study of Labor (IZA).

Schank, T., Schnabel, C., Wagner, J., 2006. "Do exporters really pay higher wages? First evidence from German linked employer–employee data." Working Paper Series in Economics, University of Lüneburg.

Notes in the text:

¹⁾ Please note that the 15% wage premium for foreign controlled firms as reported in last year's Internationalisation Monitor (Fortanier and Korvorst, 2009) did not control for employee characteristics.

C1 International trade in goods by enterprises

Introduction

The aim of the tables and graphs in chapter C1 is to describe the pattern of international trade in goods of enterprises in the Netherlands. This is a demonstration of recent developments in the international trade statistics and provides further insight into the composition and evolution of the population of resident traders. International trade flows between 2002 and 2008 are enriched with enterprise characteristics such as economic activity, size class and foreign or domestic control. The matching process and its results are still under development, which implies that the findings presented in this chapter are preliminary.

The international trade in goods statistics describe the value and volume of goods crossing the Dutch border on a monthly basis. Approximately 10 thousand commodities and around 250 trading partners can be distinguished. To obtain these data, Statistics Netherlands conducts a monthly survey on intracommunity trade and obtains information on extra-EU trade flows mainly from customs.

Around 80 percent of imports and 75 percent of export flows can be attributed to enterprises registered in the General Business Register (GBR). However, some trade flows cannot be assigned to an enterprise in the GBR. Some international traders are not registered in the GBR, for instance because they have no establishment in the Netherlands or because they are not required to register their economic activities (e.g. farmers or medical professionals or attorneys).

Changing methodology

- The methodology behind the matching process has changed over the past few years. In addition, new sources of information have become available which are of considerable value in the matching process. Due to these developments, the general business register underwent significant changes in 2006, which implies that the quality of matching traders to enterprises is significantly better as of reference years 2007 and 2008.
- The method of determining whether an enterprise is foreign controlled or Dutch controlled changed in 2005 to the concept of the Ultimate Controlling Institute (UCI) as defined by the FATS Regulation. This causes a slight reinforcement of the trend as of 2006.
- The distinction between re-exports (belongs to Dutch trade according to National Concept) and quasi-transit trade (does not belong to Dutch trade according to the National Concept) has changed as of 2008. The net effect of this

methodological change is a downward revision of the total trade level, where exports decreased somewhat more strongly than imports.

(Dutch) enterprise: an enterprise is the actual transactor in the production process, characterised by independence in decisions about the process and by providing products to others. As a result of the definition and particularly the required independency, one enterprise can comprise several local units or several legal units.

Foreign controlled vs. Dutch controlled enterprise: The Ultimate Controlling Institutional Unit (UCI) is defined as the institutional unit, proceeding up a foreign affiliate's chain of control, which is not controlled by another institutional unit. 'Foreign controlled' means that the resident country of the UCI is a country other than the Netherlands. 'Control' means the ability to determine the general and strategic policy of an enterprise by choosing appropriate directors. The UCI is determined on a yearly basis by combining enterprise information from various sources.

1.1 *Distinguishing international trade in goods between Dutch and foreign controlled enterprises in the Netherlands*

Table C1.1 shows the value of international trade in goods that took place in the past seven years. Between 2002 and 2008 the Dutch international trade in goods increased by approximately 10 percent annually. In 2008, this resulted in a total import value of 336 billion euros. The total export value of goods in 2008 was 370 billion euros. This resulted in a trade surplus of 35 billion euros.

A significant part of Dutch international trade is carried out by foreign controlled enterprises. In 2002 approximately 40 percent of Dutch trade was conducted by foreign controlled enterprises. Since then, the share of trade engaged in by foreign controlled enterprises has increased steadily. However, in terms of population count, foreign controlled enterprises make up approximately 5 percent of all trading enterprises. This implies that the vast majority of traders are Dutch controlled.

In 2008, about 54 percent of the total import value of goods was attributed to foreign controlled enterprises and 46 percent to Dutch controlled enterprises. Compared with 2002, this implies that the balance has shifted towards a majority of imports carried out by foreign controlled enterprises.

With regard to exports, the share that foreign controlled enterprises make up is generally somewhat smaller. Still, in 2008 their share in the total export value was almost as large as that of domestically controlled enterprises.

The share of re-exports carried out by foreign controlled enterprises is significantly higher than for goods exports as a whole. In 2008, roughly 60 percent of re-exports was handled by foreign controlled enterprises. A change in the definition of re-exports in 2008 explains the marked decrease in re-exports and the increase in foreign ownership between 2007 and 2008.

Re-exports are defined as goods, in temporary custody of a Dutch resident, which are transported through the Netherlands without any significant industrial processing. Re-exports are goods that are cleared for customs by, for instance, Dutch distribution centres and distributed to other countries (mostly European Member States). Contrary to quasi-transit trade, re-exports are part of Dutch international trade (National Concept). Quasi-transit trade refers to goods entering and exiting the Netherlands, without domestic ownership. As of 2008, the definition of re-exports has been expanded to include trade conducted by Dutch affiliates of foreign enterprises.

Table C1.1

International trade in goods; foreign controlled versus Dutch controlled enterprises

	Import value	of which		Export value	of which		Re-export value	of which	
		Dutch controlled	foreign controlled		Dutch controlled	foreign controlled		Dutch controlled	foreign controlled
	<i>billion euro</i>	%		<i>billion euro</i>	%		<i>billion euro</i>	%	
2002*	205.6	60	40	232.7	60	40	98.1	53	47
2003*	206.9	58	42	234.2	60	40	98.0	54	46
2004*	228.2	56	44	255.7	59	41	110.9	54	46
2005*	249.8	49	51	281.3	54	46	122.0	44	56
2006*	285.4	49	51	319.0	53	47	140.0	44	56
2007*	307.3	48	52	347.5	54	46	155.3	45	55
2008*	335.9	46	54	370.5	51	49	154.8	40	60

1.2 *International trade in goods organised by size class*

Since 2002, the exports of goods of both SMEs and large enterprises increased by about 8 percent annually. Imports of large enterprises increased more strongly than that of SMEs between 2002 and 2008.

When trading enterprises are differentiated in terms of size, foreign ownership is most often a characteristic of large enterprises. Large enterprises imported goods to a value of 65 billion euros in 2002. Approximately 59 percent of these imports belonged to large importers under foreign control. The remaining 41 percent were imported by Dutch owned enterprises. Between 2002 and 2008 the share of foreign owned importers in the total imports of large enterprises (115 billion euros) increased slightly.

SMEs imported goods to a value of 109 billion euros in 2002. The majority of these imports were imported by Dutch owned SMEs. Only 30 percent of these SME imports were carried out by SMEs under foreign control. In 2008 this share was significantly higher, namely 44 percent.

The share of exports carried out by foreign controlled, large enterprises decreased between 2002 and 2008. In 2002, approximately 59 percent of the exports of large enterprises belonged to large foreign controlled enterprises. Subsequently this share decreased to 54 percent in 2008. This was not due to a decrease in the number of foreign controlled exporters (on the contrary) but because the exports carried out by Dutch owned exporters had increased in value.

For SME exporters of goods, the share of exports carried out by foreign controlled SMEs has increased since 2002. Of the total exports of 157.2 billion euros in 2008, roughly 58 percent was exported by domestically-owned SMEs and 42 percent by foreign controlled SMEs. In 2007 there was a slight increase in the amount of exports that could not be attributed to either type of enterprise (102 billion euros). This is due a change in the methodology of identifying international traders in the enterprise population.

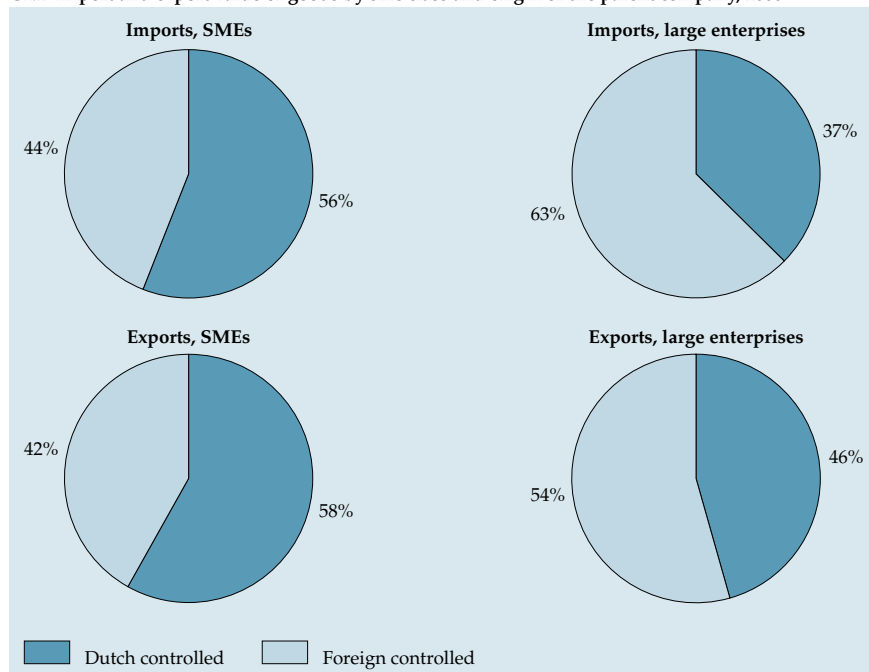
SME: small and medium-sized enterprises. An SME is an enterprise that employs less than 250 people. A small enterprise employs less than 50 people and a medium-sized enterprise employs between 50 and 249 people. Enterprises with no employees were excluded from the analysis.

Table C1.2
Import and export value of goods by size class and origin of the parent company

	SMEs		of which		Large enterprises		Unknown ¹⁾
	<i>billion euro</i>	%	Dutch controlled	foreign controlled	Dutch controlled	foreign controlled	
Import value							
2002*	109.2	70	30	65.1	41	59	31.3
2003*	108.4	70	30	63.1	42	58	35.4
2004*	114.9	66	34	67.0	40	60	46.3
2005*	125.6	57	43	75.9	39	61	48.3
2006*	138.4	57	43	87.4	45	55	59.6
2007*	135.6	59	41	100.2	40	60	71.5
2008*	151.2	56	44	115.0	37	63	69.7
Export value							
2002*	106.5	72	28	80.1	41	59	46.1
2003*	108.0	72	28	74.1	42	58	52.1
2004*	114.3	69	31	77.3	42	58	64.1
2005*	131.5	62	38	79.4	42	58	70.4
2006*	139.3	60	40	95.2	47	53	84.5
2007*	140.0	63	37	105.3	46	54	102.2
2008*	157.2	58	42	120.6	46	54	92.7

¹⁾ See C1 Introduction.

C1.2 Import and export value of goods by size class and origin of the parent company, 2008*



1.3 *International trade in goods by industry*

Table C1.3.1 shows that enterprises active in wholesale trade and manufacturing imported the bulk of goods in the period 2002–2008. The total value of goods imported by the manufacturing industry in 2008 was over 80 billion euros whereas the import value of the wholesale sector amounted to almost 100 billion euros.

More than half the import value of the manufacturing sector could be attributed to enterprises under foreign control. In 2002, Dutch controlled wholesalers imported almost two-thirds of the total imports of that sector. By 2008 the share of imports carried out by foreign controlled wholesalers had increased significantly to more than 50 percent. In general, Dutch controlled enterprises imported 60 percent of goods in 2002. This balance shifted in favour of foreign controlled enterprises by 2008, which imported roughly 54 percent of all imports.

Table C1.3.2 shows that in 2002 the total export value of goods amounted to 233 billion euros, compared with 371 billion euros in 2008. In 2002, about 60 percent of the export value could be attributed to domestically owned enterprises, while in 2008 the balance was almost 50-50.

The Dutch manufacturing industry accounted for roughly 40 percent of the total Dutch export value in 2008, while wholesalers exported 36 percent. In the manufacturing sector, the share of exports carried out by foreign controlled enterprises remained relatively stable in the observed period at around 53 percent. As for imports, the impact of foreign controlled enterprises on the exports of wholesalers increased significantly.

Table C1.3

Import and export value of goods by economic activity and origin of the parent company

	2002*			2008*		
	Total value	of which		Total value	of which	
		Dutch controlled	foreign controlled		Dutch controlled	foreign controlled
	billion euro	%		billion euro	%	
Import value	205.6	60	40	335.9	46	54
<i>Economic activity (NACE Rev.1.1)</i>						
Agriculture, hunting fishing, mining and quarrying	2.0	89	11	1.4	83	17
Manufacturing	54.1	42	58	81.2	44	56
Energy, construction, retail trade, hotels and restaurants	22.5	66	34	36.7	55	45
Wholesale trade	68.6	67	33	98.8	48	52
Transport, storage and communications	17.0	56	44	35.4	43	57
Financial intermediation	0.8	94	6	1.9	64	36
Real estate, renting and business activities	8.5	80	20	10.2	55	45
Public administration, education, healthcare, social work and other services	0.8	89	11	0.7	90	10
Unknown (see introduction)	31.3	–	–	69.6	–	–
Export value	232.7	60	40	370.5	51	49
<i>Economic activity (NACE Rev.1.1)</i>						
Agriculture, hunting fishing, mining and quarrying	7.4	96	4	3.5	76	24
Manufacturing	83.0	46	54	113.7	47	53
Energy, construction, retail trade, hotels and restaurants	8.5	76	24	28.1	77	23
Wholesale trade	64.4	63	37	98.7	50	50
Transport, storage and communications	12.8	64	36	18.8	56	44
Financial intermediation	0.5	98	2	1.1	72	28
Real estate, renting and business activities	9.8	78	22	13.4	53	47
Public administration, education, healthcare, social work and other services	0.3	95	5	0.5	87	13
Unknown (see introduction)	46.1	–	–	92.7	–	–

1.4 *International goods traders in the Netherlands*

Between 2002 and 2008, the enterprise population increased by approximately 15 percent. In the observed period, the number of enterprises active in real estate, renting and business activities increased by far the most, namely by more than 60 thousand enterprises. The agricultural, hunting, fishing, mining and quarrying industries experienced a decline in the number of active firms between 2002 and 2008.

Of all enterprises active in the Netherlands in 2002, roughly 9 percent exported goods abroad. In 2008, this share had increased by one percentage point, to 10 percent of the enterprise population. In terms of exporting enterprises, this was an increase of more than 20 percent, which is more than the average growth of the enterprise population between 2002 and 2008.

Approximately 14 percent of all enterprises imported goods in 2002, which had increased to 16 percent of the enterprise population in 2008. The increase in the number of importing firms was also much larger than the average growth rate of the enterprise population.

In both years, most Dutch enterprises were active in energy, construction, retail trade, hotels and restaurants. However, only a few of these enterprises had exported goods abroad in those years. Importing was somewhat more common practice for these enterprises.

The majority of goods traders are found in the wholesale sector (see Tables 4 and 5 in chapter B1). Table C1.4 shows that nearly half of all wholesale enterprises exported goods in 2008, while 57 percent also imported goods.

Firms in the manufacturing industry comprise about 7 percent of the total enterprise population in 2008. Many of these enterprises were involved in international trade, namely 31 percent reported exports and 39 percent also had imports in that year. Enterprises active in public administration or agriculture had the lowest trade incidence between 2002 and 2008.

General business register: The general business register comprises all enterprises in the Netherlands that make a contribution to the domestic product. Several characteristics are recorded for each enterprise, such as the economic activity and size class (in terms of number of employees).

Enterprise population: The number of *active* enterprises in the Netherlands. Based on the general business register and includes enterprises that employ one or more people for at least 15 hours a week. For certain sectors, such as agriculture, a different methodology is applied to obtain the number of active enterprises.

Table C1.4
Share of importers / exporters of goods in the enterprise population by economic activity

	2002*			2008*		
	total	importers	exporters	total	importers	exporters
	%			%		
Total	693,430	14	9	797,840	16	10
<i>Economic activity (NACE Rev.1.1)</i>						
Agriculture, hunting, fishing, mining and quarrying	103,145	3	3	93,065	6	5
Manufacturing	46,440	33	28	47,600	39	31
Energy, construction, retail trade, hotels and restaurants	210,545	14	5	237,500	18	5
Wholesale trade	55,965	53	44	59,860	57	47
Transport, storage and communications	27,850	8	8	29,045	9	8
Financial intermediation	14,535	7	5	16,880	15	9
Real estate, renting and business activities	134,290	7	6	197,725	8	6
Public administration, education, healthcare, social work and other services	100,660	4	2	116,165	6	2

C2 International trade in services by enterprises

Introduction

The aim of the tables and graphs in chapter C2 is to describe the pattern of international trade in services by enterprises in the Netherlands. This is a demonstration of recent developments in the international trade in services statistics and provides further insight into the composition and evolution of the population of resident traders. International trade flows between 2006 and 2008 are enriched with enterprise characteristics such as economic activity, size class and foreign or domestic control. The matching process and its results are still under development, which implies that the findings presented in this chapter are preliminary.

The statistics on international trade in services provide information on the Dutch import and export values of services from and to a foreign country respectively. Each quarter, Statistics Netherlands (SN) uses the business survey to collect data for a large part of the international trade in services. However, data on, for instance, government services and travel are obtained by different data collection methods and are therefore not available for the analyses presented here.

The data of the annotated tables in this chapter are based on integration of the micro data of the business survey of SN and the UCI. The services include: transportation services, communications services, construction services, insurance services, financial services, computer and information services, royalties and licence fees, other business services and personal, cultural and recreational services.

The business survey is according to the size value of the international trade in services, based on two groups. The first group contains enterprises with a significant share in the total size value of the international trade in services. These enterprises ($n = 350$) are integrally observed on enterprise group level. The second group contains enterprises with a less significant share in the total size value of the international trade in services. These enterprises are questioned based on a sample survey of approximately 5 000 companies at enterprise level.

The UCI is defined as the institutional unit, proceeding up a foreign affiliate's chain of control, which is not controlled by another institutional unit. Therefore, foreign controlled enterprises have a centre of control outside the Netherlands, whereas Dutch controlled means that the locus of control is in the Netherlands. 'Control' means the ability to determine the general and strategic policy of an enterprise by choosing the appropriate directors. The UCI is determined on a yearly basis by combining enterprise information from various sources.

2.1 *Overview of international trade in services by origin of the parent enterprise*

Graph C2.1 shows the evolution of the overall Dutch imports and exports of international trade in services. In 2008, the value of imported services was 11 percent higher than in 2006. For the same period, the export of services increased by almost 12 percent. Moreover, the graph shows that the Netherlands had a trade surplus in 2006–2008.

Table C2.1 shows the composition of the share of Dutch and foreign controlled enterprises in our sample. For all enterprises that imported services, the share of Dutch versus foreign controlled was equally distributed by value. On the other hand, Dutch controlled enterprises had a larger share in the export value (54 percent) than the foreign controlled enterprises.

Furthermore, Dutch and foreign controlled enterprises took equal advantage of the increasing import and export values since the proportion of Dutch and foreign controlled enterprises remained almost the same for three years.

The import and export values for **total services** reported in this section are based on data in the SN (StatLine) database. All other data presented in this chapter are based on the integrated dataset of the micro data business survey and the UCI. Although the total sample does not include all services, it represents 55 percent of the total import value and 74 percent of the total export value.

C2.1 Total Dutch imports and exports of international trade in services

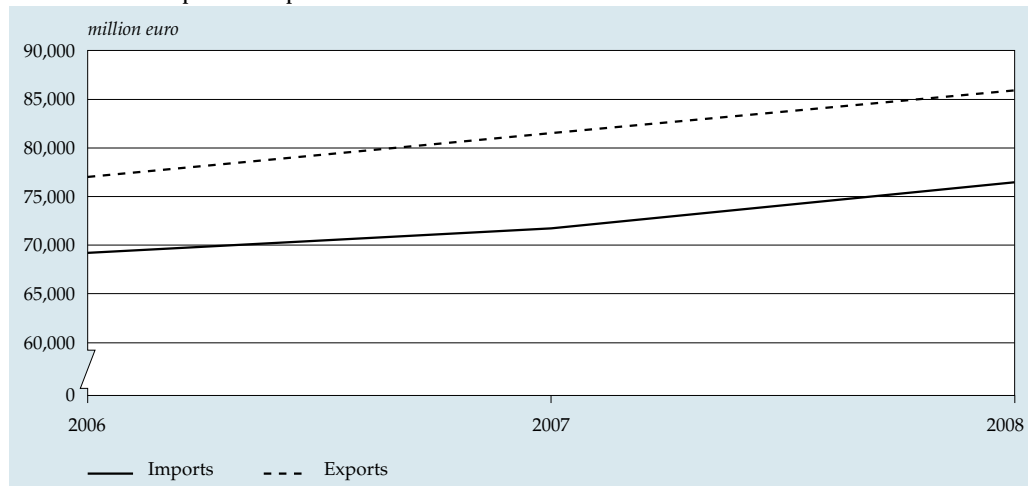


Table C2.1
International trade in services by origin of the parent enterprise

	Imports			Exports		
	total	Dutch controlled	foreign controlled	total	Dutch controlled	foreign controlled
	million euro	%		million euro	%	
2006	69,199	51	49	77,020	54	46
2007	71,721	52	48	81,534	55	45
2008	76,470	50	50	85,935	54	46

2.2 *International trade in services organised by size class*

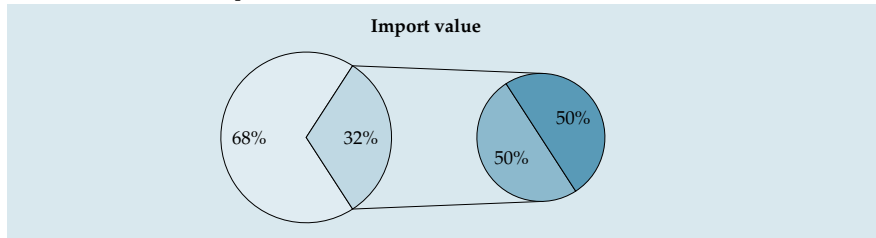
Graphs C2.2 give an overview of the share of Dutch and foreign controlled enterprises by size class for 2008. Over two thirds of trade in services, for import and for export, was conducted by large enterprises. These percentages were similar to those for 2006–2007.

Where imports are concerned, equal distributions were found between Dutch and foreign controlled enterprises in the small to medium-size class as well as in the large enterprise group.

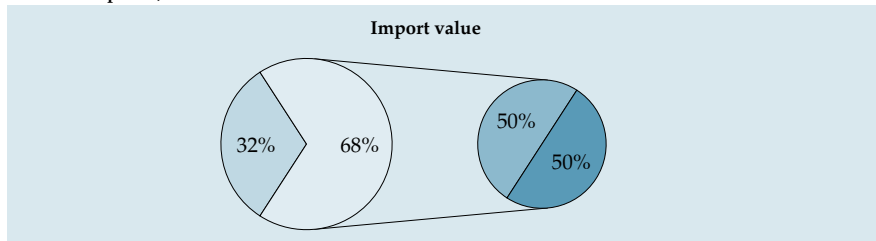
In terms of exports, 57 percent of the export value in the small to medium-size class accounted for Dutch controlled enterprises. However, in the larger size class the Dutch controlled enterprises were to some extent relatively less represented (53 percent).

A small or medium enterprise is an enterprise that employs less than 250 people.
A large enterprise is an enterprise with 250 employees or more.

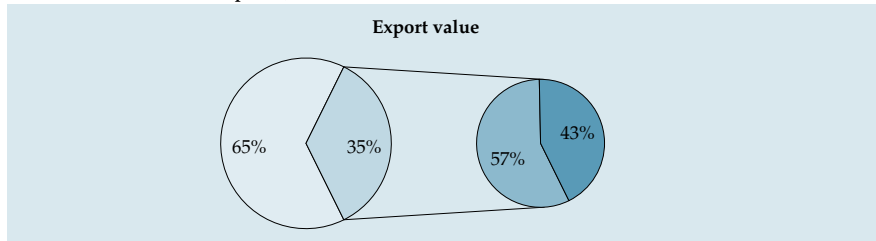
C2.2a Share of Dutch and foreign controlled enterprises in the imports of services of small and medium-sized enterprises, 2008



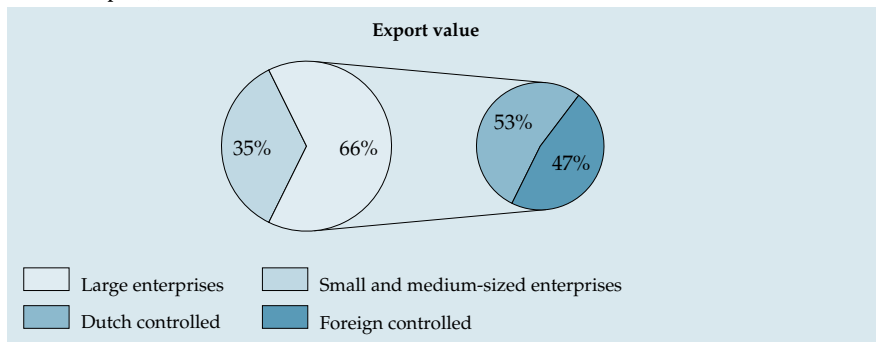
C2.2b Share of Dutch and foreign controlled enterprises in the imports of services of large enterprises, 2008



C2.2c Share of Dutch and foreign controlled enterprises in the exports of services of small and medium-sized enterprises, 2008



C2.2d Share of Dutch and foreign controlled enterprises in the exports of services of large enterprises, 2008



2.3 *International trade in services by industry*

In 2008, 33 percent of the import value of international trade in services was performed by enterprises in the 'agriculture, mining and manufacturing' industry section. The second largest share of trade (31 percent) was carried out by enterprises in the 'transport, storage and communication' section, see also Graph C2.3.

As can be seen in Graph C2.3, the opposite results were found for exports. The 'transport, storage and communication' industry section accounted for 40 percent of the total export value, whereas the enterprises in the 'agriculture, mining and manufacturing' industry sector contained 27 percent of the export value.

In Table C2.3A, a subdivision was made for the imports of international trade in services by origin of the parent enterprise and industry section in 2008. The Dutch controlled enterprises dominated with nearly 56 percent the largest industry section, containing among others the 'agriculture' and 'manufacturing' industries. Other industry sections in which the Dutch controlled enterprises were in the majority were: 'transport, storage and communication', 'financial intermediation' and 'public administration, education, healthcare, social work and other services'.

Table C2.3B shows that at 54 percent the foreign controlled enterprises dominated the largest export industry section in 2008, containing the 'transport, storage and communication' industries. The following industry sections contained, relatively seen, more Dutch controlled enterprises: 'agriculture, mining and manufacturing', 'financial intermediation', 'real estate, renting and business activities' and 'public administration, education, health, social work and other services'.

C2.3 International trade in services by industry, 2008

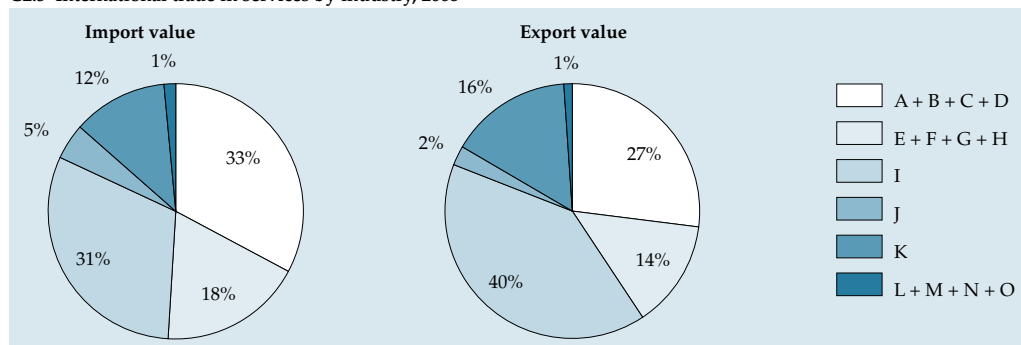


Table C2.3A
Imports of international trade in services by industry and origin of the parent enterprise, 2008

		Dutch controlled	Foreign controlled
		%	
<i>Industry (NACE Rev.1.1)</i>			
A + B + C + D	Agriculture, mining and manufacturing	55.8	44.2
E + F + G + H	Utilities, construction, trade and hospitality	31.7	68.3
I	Transport, storage and communication	52.9	47.1
J	Financial intermediation	79.0	21.0
K	Real estate, renting and business activities	42.5	57.5
L + M + N + O	Public administration, education, health, social work and other services	65.7	34.3

Table C2.3B
Exports of international trade in services by industry and origin of the parent enterprise, 2008

		Dutch controlled	Foreign controlled
		%	
<i>Industry (NACE Rev.1.1)</i>			
A + B + C + D	Agriculture, mining and manufacturing	73.9	26.1
E + F + G + H	Utilities, construction, trade and hospitality	40.5	59.5
I	Transport, storage and communication	46.0	54.0
J	Financial intermediation	61.2	38.8
K	Real estate, renting and business activities	50.9	49.1
L + M + N + O	Public administration, education, health, social work and other services	52.9	47.1

2.4 *International services traders in the Netherlands*

In the table and Graph C2.4 the share of international services traders is broken down by industry section. Of all industries, the 'transport, storage and communication' industry section comprised the highest share of importing services traders (5.6 percent) in 2008. In addition, exporting services traders were also for the greater part (7.9 percent) present in this industry section. Therefore, for every hundred traders in this industry, 5.6 and 7.9 traders were engaged in the import and export of international trade in services respectively in 2008. Financial intermediation was the second largest industry for import (3.8 percent) and for export traders (2.7 percent).

When import and export were compared with each other it can be concluded that there were slightly more export traders (1.5 percent) than import traders (1.3 percent) for the international trade in services.

General business register (GBR): The general business register comprises all enterprises in the Netherlands that make a contribution to the domestic product. For each enterprise, several characteristics are recorded such as the economic activity and size class (in terms of number of employees).

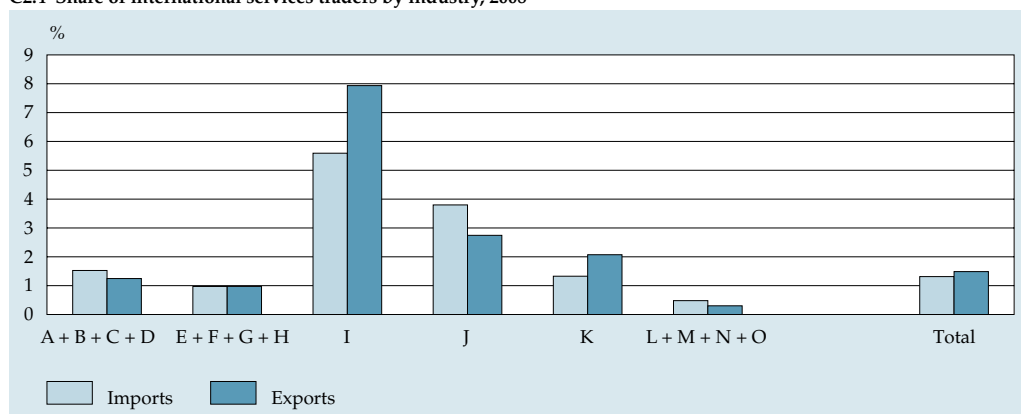
Enterprises population: The number of active enterprises in the Netherlands. Based on the general business register and includes enterprises that employ one or more people for at least 15 hours per week. For certain sectors, such as agriculture, a different methodology is applied to obtain the number of active enterprises.

The share of international services traders is given by industry section as a percentage of the total number of economically active enterprises in the SN general business register. Each enterprise in the sample is defined as a unique international services trader. It should be noted that these results give a good indication of the **minimum** percentage of international services traders by industry section in the Netherlands. The word 'minimum' is used because when designing the international trade statistics some enterprises were omitted from the statistics which are indeed involved in the international trade in services. These enterprises are mainly marginal international services traders. It is desirable in future for these enterprises to be identified in order to optimise the estimated number of services traders.

Table C2.4
Share of international services traders by industry, 2008

		GBR	International services traders	
			imports	export
		<i>n</i>	<i>%</i>	
Total		797,840	1.3	1.5
<i>Industry (NACE Rev.1.1)</i>				
A + B + C + D	Agriculture, mining and manufacturing	140,665	1.5	1.2
E + F + G + H	Utilities, construction, trade and hospitality	297,360	1.0	1.0
I	Transport, storage and communication	29,045	5.6	7.9
J	Financial intermediation	16,880	3.8	2.7
K	Real estate, renting and business activities	197,725	1.3	2.1
L + M + N + O	Public administration, education, health, social work and other services	116,165	0.5	0.3

C2.4 Share of international services traders by industry, 2008



C3 Foreign Direct Investments

Introduction

The tables in chapter C3 describe patterns in Dutch foreign direct investments. These tables depict both flows and stocks to and from countries and economic sectors. Furthermore, Dutch FDI is placed in an international perspective by comparing it with that of other countries. The data describes the period 2003–2008, and where possible, 2009.

Foreign direct investment (FDI) is a category of cross-border investment made by a resident in one economy (the *direct investor*) with the objective of establishing a lasting interest in an enterprise (the *direct investment enterprise*) resident in an economy other than that of the direct investor. The motivation of the direct investor is a strategic long-term relationship with the direct investment enterprise to ensure a significant degree of influence in the management of the direct investment enterprise. The “lasting interest” is evidenced when the direct investor owns at least 10% of the voting power of the direct investment enterprise (OECD, 2008).

The leading authority on FDI in the Netherlands is De Nederlandsche Bank (**DNB**). DNB collects and compiles the data following the IMF Balance of Payments Manual (**BPM5**, IMF 1993). DNB publishes on incoming and outgoing FDI on aggregate level every quarter. Once a year, DNB publishes on country and economic sectors level. The Special Purpose Entities (see chapter A3) are excluded from these detailed figures.

Flows of foreign direct investments consist of the annual changes in share capital, reinvested profits and other investments (among others, loans).

Stocks of foreign direct investments are measured at the end of the year and consist of capital participations, loans (including trade credits, intra concern loans) and other liabilities. The difference between stocks at the end of two subsequent years is equal to the flow of FDI plus reassessments because of changed exchange rates, changed prices and other reasons such as goodwill write-downs.

Transactions of a subsidiary enterprise to the parent enterprise are netted out with the transactions of the parent to the subsidiary. This is in accordance with the directional principle in BPM5.

Note that the direct investor is not necessarily the ultimate controlling institutional unit (UCI). For example, suppose a Dutch enterprise owns, and controls, a German enterprise that owns, and controls, an Austrian enterprise. The UCI of the Austrian enterprise is then Dutch, but the direct investor in Austria is German.

3.1 *Foreign direct investment: stocks and flows*

Even though the value of stocks of inward FDI was far higher in 2009 than in 2003, its share in Dutch GDP remained the same. The fact that the value of FDI did not change relative to the size of the economy suggests that the level of openness of the Dutch economy for foreign economies did not rise during the given time period. This indicator is part of the OECD globalisation indicators (OECD, 2008), just like the ratio of outward FDI to GDP. While FDI decreased during the crisis, the effect on both globalisation indicators was dampened by a decrease in Dutch GDP of 4 percent in 2009.

The ratio of outward FDI to GDP behaved differently, as it rose substantially during the same period. However, a large part of this increase was caused by the restructuring of Shell in 2005. In that year it changed from an enterprise with two headquarters in the Netherlands and in the United Kingdom, to an enterprise with a single headquarters in The Hague. The activities in the United Kingdom were reclassified as Netherlands foreign investments abroad.

Large acquisitions have caused FDI flows to vary substantially during the period under investigation. One example is the acquisition of ABN AMRO in 2007 by foreign enterprises and the subsequent sale of the Dutch part of Belgium-based Fortis to the Dutch state in the following year. This last sale was the cause of the negative flow of inward FDI in 2008. In general, outward flows were larger than inward flows, which yielded a deficit on the Financial Account in the Balance of Payments. Furthermore, it is one of the reasons that the difference between outward and inward FDI stocks increased during the period 2003–2009.

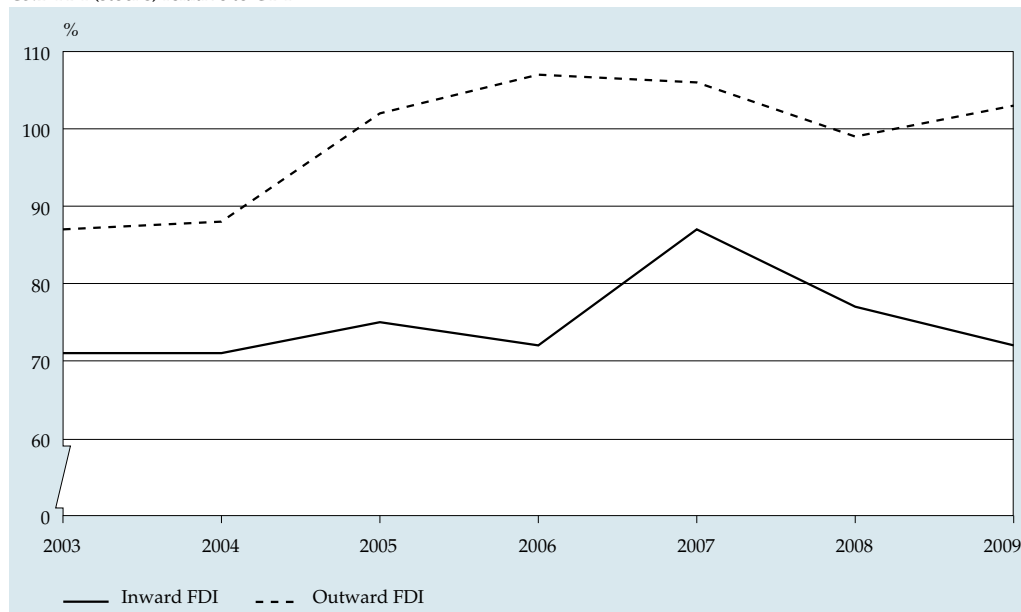
The large fluctuations of FDI flows diminish the relevance of the indicators that compare the size of flows to GDP. Previously, these indicators would give information on the relative attractiveness of economies, both that of the Netherlands and that of foreign countries. However, the current decrease in these indicators cannot be separated from sudden flows caused by large acquisitions or from the decrease in FDI caused by the economic crisis.

Table C3.1
FDI stocks and flows: value and share in GDP

	2003	2004	2005	2006	2007	2008	2009
<i>million euro</i>							
<i>Value</i>							
Inward FDI, flows	18,645	3,705	38,430	6,245	84,290	-5,203	19,399
Outward FDI, flows	39,016	23,488	105,996	51,841	20,754	13,696	12,799
Inward FDI, stocks	337,776	350,355	382,499	391,561	494,676	459,008	414,181
Outward FDI, stocks	414,257	431,137	521,935	579,652	604,211	590,067	590,416
<i>%</i>							
<i>Share in Dutch GDP</i>							
Inward FDI, flows	4	1	7	1	15	-1	3
Outward FDI, flows	8	5	21	10	4	2	2
Inward FDI, stocks	71	71	75	72	87	77	72
Outward FDI, stocks	87	88	102	107	106	99	103

Source: De Nederlandsche Bank (FDI) and Statistics Netherlands (GDP), calculated by Statistics Netherlands.

C3.1 FDI (stocks) relative to GDP



Source: De Nederlandsche Bank (FDI) and Statistics Netherlands (GDP), calculated by Statistics Netherlands.

3.2 *Foreign direct investment: by economic sector*

Table A3.1 showed that the share of manufacturing in inward Dutch FDI rose from 39 percent to 42 percent during the period 2003–2009, whereas the share of services declined. For example, while the value of inward FDI in the *food products* manufacturing sector doubled during this period, the value of inward FDI in the *trade* service sector actually declined.

In general, it seems that inward investments became more concentrated in specific sectors. For example, foreign enterprises saw ever more opportunities in economic sectors such as *mining and quarrying, petroleum and chemical products*. It is impossible to say whether this is because that sector became more important in general worldwide, because that sector is particularly interesting in the Netherlands, because of specialisation, or because of the general investment climate. Yet it is noteworthy that both Vattenfall and RWE invested in Dutch enterprises (Nuon and Essent respectively) after liberalisation of the Dutch energy market.

The *mining and quarrying, petroleum and chemical products* economic sector also considerably increased its outward FDI. Again, Table A3.1 shows that the share of manufacturing in outward Dutch FDI rose during the period 2003–2009, namely from 39 to 50 percent, whereas the share of services in outward Dutch FDI declined. The value of investments in the *monetary intermediation and insurance* sector in particular declined during that period, just as it did in the *trade* sector. There was a large increase in outward FDI in *other services*, mainly because of increasing financial intermediation.

Just as for inward investments, outward investments became more targeted and specialised. Investments are increasingly more concentrated in specific sectors, such as *mining and quarrying, petroleum and chemical products*, which had a share of 30 percent in total outward FDI in 2009.

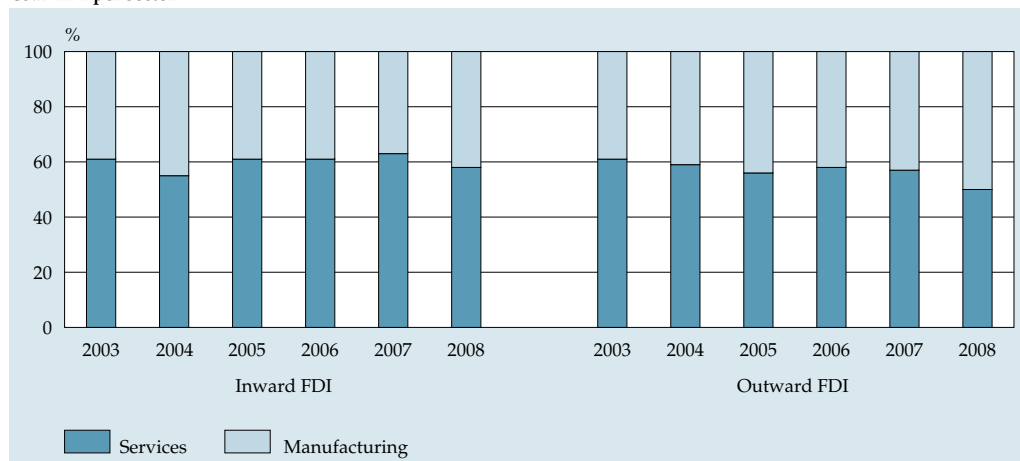
DNB divides FDI into two categories: manufacturing (the sectors A through F in NACE Rev. 2) and services (the sectors G up to S, excluding O). Manufacturing consists of agriculture, mining, quarrying, utilities, construction and other manufacturing activities, for example in the food, petroleum or chemical industry. Services consist of trade and repair, transport, storage, communication, financial intermediation, real estate, renting and business activities, education, health, social work, entertainment and recreation, and other services. Public administration is not included.

Table C3.2
FDI (stocks), by economic sector

	Value						Share in 2008
	2003	2004	2005	2006	2007	2008	
	million euro						%
<i>Inward FDI</i>							
Total	337,776	350,355	382,499	391,561	494,676	459,008	100
Manufacturing	131,111	158,179	150,371	152,661	183,610	193,164	42
Mining and quarrying, petroleum and chemical products	68,552	84,850	78,839	77,911	99,221	103,849	23
Electro technical and metal products	21,350	21,894	21,866	21,526	19,362	24,000	5
Food, beverages and tobacco	23,732	33,924	30,794	33,842	45,568	44,413	10
Other	17,477	17,511	18,872	19,383	19,459	20,901	5
Services	206,666	192,175	232,128	238,899	311,065	265,843	58
Trade	46,448	36,883	40,446	41,173	40,094	34,283	7
Transport, storage and communication	11,921	10,524	12,693	12,854	15,184	13,035	3
Monetary intermediation and insurance	12,268	10,568	13,031	14,222	27,203	14,268	3
Other	136,028	134,201	165,957	170,650	228,584	204,257	44
<i>Outward FDI</i>							
Total	414,257	431,137	521,935	579,652	604,211	590,067	100
Manufacturing	163,188	178,801	227,817	244,145	262,530	292,736	50
Mining and quarrying, petroleum and chemical products	93,707	107,884	142,953	147,522	161,794	174,385	30
Electro technical and metal products	29,920	25,372	32,858	41,298	39,340	43,158	7
Food, beverages and tobacco	26,626	30,258	35,552	35,712	41,303	50,820	9
Other	12,935	15,287	16,455	19,614	20,094	24,373	4
Services	251,068	252,336	294,117	335,507	341,681	297,332	50
Trade	42,274	33,057	38,674	42,540	37,040	29,444	5
Transport, storage and communication	21,966	31,158	33,798	31,409	29,613	29,750	5
Monetary intermediation and insurance	26,629	29,514	36,520	40,856	42,497	22,650	4
Other	160,199	158,607	185,125	220,702	232,531	215,487	37

Source: De Nederlandsche Bank (FDI), calculated by Statistics Netherlands.

C3.2 FDI per sector



Source: De Nederlandsche Bank (FDI), calculated by Statistics Netherlands.

3.3 *Foreign direct investment: by country*

The main investors in the Netherlands are the countries in the euro zone, and the US and the United Kingdom. Together they account for 379 billion euros, or 83 percent of stocks of total inward Dutch FDI in 2008. This is almost the same share as in 2003. The investments of emerging countries such as China or the countries that acceded to the European Union in 2004 or 2007 remained relatively small.

The total share of the European Union in inward Dutch FDI rose from 58 percent in 2003 to 64 percent in 2008. The shares of Luxembourg and France doubled during the period 2003–2008, whereas Germany's share gradually decreased. The accession of new member states only had a small effect on inward Dutch FDI coming from the European Union.

As far as outward FDI is concerned, stocks are also concentrated in the countries in the euro zone, the United Kingdom and the US. Together they accounted for 404 billion euros, or 68 percent, of stocks of total outward Dutch FDI in 2008. This is almost the same share as in 2003. The shares of emerging economies such as Brazil, Russia, India and China (the BRIC countries) are still relatively small, but they generally increased between 2003 and 2008.

The US share decreased from 17 percent in 2003 to 11 percent in 2008, but the shares of Germany and Luxembourg increased. The share of the European Union in outward Dutch FDI increased from 58 percent in 2003 to 62 percent in 2008. However, a large part of this increase is attributable to the accession of new member states. It should also be taken into account that part of the shift from the US to the European Union is caused by a changing exchange rate. During the period 2003–2008 the euro-dollar exchange rate depreciated by 17 percent, so even if investments in the US had retained their value in dollars, their value in euros would have decreased.

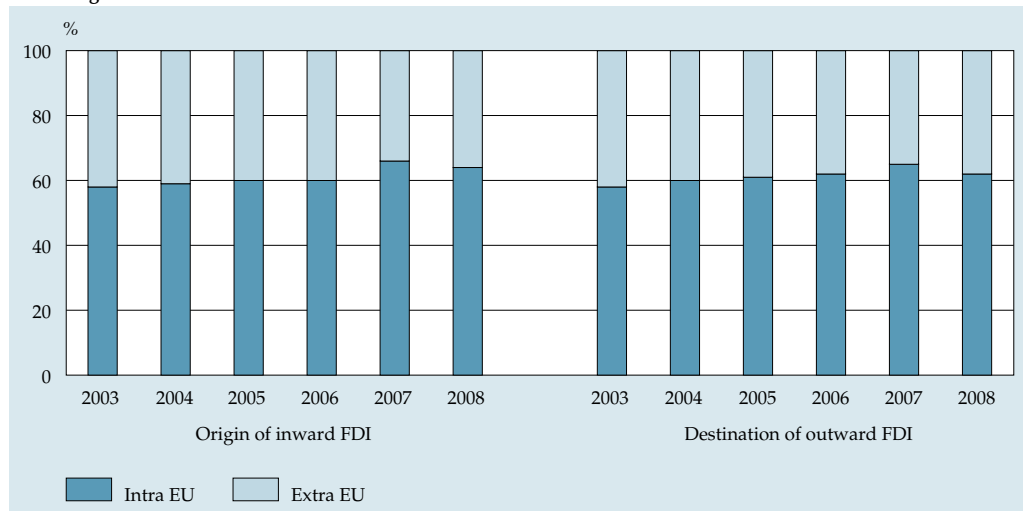
Note that outward Dutch FDI is distributed differently among the countries than inward Dutch FDI. For example, Switzerland, Canada and several Asian countries such as China have larger shares for outward FDI than for inward FDI. On the other hand, the shares of outward FDI to the US and the United Kingdom are far smaller.

Table C3.3
Dutch FDI (stocks), by country of origin or destination

	Value						Share in
	2003	2004	2005	2006	2007	2008	2008
	<i>million euro</i>						<i>%</i>
<i>Inward FDI</i>							
Total	337,776	350,355	382,499	391,561	494,676	459,008	100
Total European Union	195,104	205,676	227,942	235,525	326,378	294,328	64
Belgium	33,207	31,324	35,706	46,365	56,958	34,943	8
Germany	43,796	41,433	40,238	39,788	42,397	34,464	8
France	12,902	17,637	27,048	20,582	40,684	43,094	9
Ireland	10,942	11,310	14,411	15,876	17,376	19,221	4
Italy	2,363	895	1,828	2,593	2,020	2,047	0
Luxembourg	20,376	26,090	33,989	35,917	51,127	51,307	11
Spain	5,297	7,973	8,445	8,843	24,024	8,799	2
United Kingdom	56,286	58,326	53,247	53,378	78,768	87,042	19
Sweden	6,266	3,674	3,740	3,661	4,058	4,109	1
Other EU countries	3,669	7,014	9,290	8,522	8,966	9,302	2
Russia	70	93	117	40	230	274	0
Switzerland	14,753	18,101	17,652	18,763	16,618	11,379	2
Other European countries	11,381	11,141	18,587	15,315	9,860	12,779	3
United States	69,258	68,972	73,181	73,841	90,032	91,968	20
Dutch Antilles and Aruba	8,055	6,816	7,680	7,805	8,569	9,628	2
Japan	13,007	10,654	6,969	9,073	8,119	9,092	2
Brazil	43	334	837	960	859	314	0
China	56	30	21	35	74	176	0
India	628	51	1	1	7	8	0
Other countries	25,421	28,487	29,512	30,203	33,930	29,062	6
<i>Outward FDI</i>							
Total	414,257	431,137	521,935	579,652	604,211	590,067	100
Total European Union	241,275	260,159	318,320	357,584	390,520	368,105	62
Belgium	35,869	34,710	36,410	57,932	69,502	60,930	10
Germany	30,271	44,622	54,670	55,970	61,579	59,660	10
France	29,150	25,865	30,951	34,501	34,998	31,546	5
Ireland	11,438	10,585	11,155	9,916	10,405	10,786	2
Italy	9,966	12,200	14,648	20,256	20,983	19,394	3
Luxembourg	19,474	24,128	17,194	22,945	32,529	40,277	7
Spain	17,672	16,794	23,556	24,661	28,240	25,786	4
United Kingdom	54,633	60,857	95,186	87,692	87,337	77,749	13
Sweden	6,598	5,775	6,827	6,862	5,515	5,423	1
Other EU countries	26,204	24,623	27,723	36,849	39,432	36,554	6
Russia	3,092	4,663	5,643	11,726	8,593	7,243	1
Switzerland	33,634	30,041	34,873	38,629	40,796	40,049	7
Other European countries	6,390	5,310	4,433	8,148	7,655	7,374	1
United States	70,881	70,038	83,855	76,439	56,829	62,815	11
Dutch Antilles and Aruba	3,119	1,616	1,794	1,861	2,506	2,422	0
Japan	1,039	805	1,117	1,882	2,810	4,925	1
Brazil	4,721	6,189	8,228	8,814	11,623	6,340	1
China	1,758	1,252	1,825	2,182	4,345	5,197	1
India	680	1,067	1,251	1,607	2,161	1,945	0
Other countries	47,668	49,997	60,596	70,780	76,373	83,652	14

Source: De Nederlandsche Bank (FDI), calculated by Statistics Netherlands.

C.3.3 Origin of inward FDI and destination of outward FDI



Source: De Nederlandsche Bank, calculated by Statistics Netherlands.

3.4 *Share of the Netherlands in worldwide FDI*

The share of the Netherlands in worldwide inward FDI is decreasing. In 2003 this share was 5.2 percent and it decreased to 4.3 percent in 2008. Belgium and the United Kingdom experienced similar drops, but France and Germany retained their shares. These developments have led to a decrease in the share of the European Union in worldwide inward FDI. The share of the states that joined the European Union in 2004 or 2007 was small, but is increasing steadily.

Outside the European Union, there has been a substantial decrease in the share of the US in total worldwide inward FDI. The shares of Brazil, Russia and India are on the rise, but surprisingly China's share decreased during the period 2003–2008. Note that the share of Russia increased rapidly during 2004–2007, but was halved in 2008. This might be related to the rapid decrease in the price of oil and raw materials at the end of 2008, because mining and mineral extraction industries account for a large part of Russian inward FDI.

The share of the Netherlands in worldwide outward FDI also decreased. In 2003 this share was 6.1 percent and it decreased to 5.2 percent in 2008. The Belgian share remained the same. Other countries that are similar to the Netherlands, such as Austria and Denmark, even increased their share of worldwide outward FDI. The share of the European Union slowly decreased during the period 2003–2008, but still accounted for almost half worldwide outward FDI.

Outside the European Union, the share of the US decreased slowly. The shares of emerging countries, such as Brazil, Russia, India and China, are all rising.

Again, there are large differences in distribution of inward and outward FDI for the different countries around the world. The share of the European Union plus that of the US is smaller for inward FDI than for outward FDI. It is the opposite case for emerging countries.

A possible explanation for the decreasing share of the Netherlands in worldwide FDI is a different treatment of the Special Purpose Entities (SPEs). The Netherlands generally does not include the SPEs in FDI, but most other countries do. If SPEs are included in Dutch FDI, then the share of the Netherlands in worldwide outward FDI increased during the period 2003–2008, whereas that for inward FDI remained the same.

Table C3.4
Share in worldwide FDI

	2003	2004	2005	2006	2007	2008
	%					
<i>Inward stocks</i>						
Total	100	100	100	100	100	100
EU 27	45.8	46.9	44.0	45.0	44.1	43.1
EU 15	43.2	43.8	40.8	41.3	40.2	39.2
The Netherlands	5.2	5.0	4.5	4.1	4.6	4.3
Austria	0.7	0.7	0.8	0.9	1.0	0.9
Belgium	4.3	4.9	3.8	3.9	3.8	3.5
Denmark	0.8	0.9	0.9	0.9	0.8	1.0
France	6.5	6.7	6.2	6.1	6.1	6.6
Germany	4.8	5.3	4.7	4.8	4.3	4.7
Sweden	1.9	2.0	1.7	1.8	1.9	1.7
United Kingdom	7.4	7.3	8.4	9.2	8.1	6.6
Switzerland	2.0	2.1	1.7	2.1	2.2	2.5
Brazil	1.6	1.7	1.8	1.8	2.0	1.9
China	2.8	2.6	2.7	2.4	2.1	2.5
India	0.4	0.4	0.4	0.6	0.7	0.8
Russia	1.2	1.3	1.8	2.1	3.1	1.4
United States	17.1	15.8	16.3	14.8	13.5	15.3
<i>Outward stocks</i>						
World	100	100	100	100	100	100
EU 27	53.1	51.9	51.0	51.3	51.2	49.9
EU 15	52.9	51.7	50.7	50.9	50.8	49.4
The Netherlands	6.1	5.8	5.8	5.9	5.4	5.2
Austria	0.6	0.7	0.7	0.8	1.0	0.9
Belgium	3.5	3.7	4.5	4.8	4.6	3.6
Denmark	0.8	0.9	1.0	1.0	0.9	1.2
France	8.4	8.4	8.2	8.1	8.0	8.6
Germany	9.6	9.2	8.7	8.3	8.0	9.0
Sweden	2.1	2.1	2.0	2.0	2.0	2.0
United Kingdom	13.7	12.4	11.3	11.2	11.3	9.3
Switzerland	4.0	4.0	4.1	4.3	4.1	4.5
Brazil	0.6	0.7	0.7	0.9	0.8	1.0
China	0.4	0.4	0.5	0.6	0.6	0.9
India	0.1	0.1	0.1	0.2	0.3	0.4
Russia	1.1	1.1	1.4	1.7	2.3	1.3
United States	20.5	21.4	21.1	19.1	18.0	19.5

Source: UNCTAD.

References

IMF Balance of Payments Manual (1993), fifth edition, International Monetary Fund.

OECD (2008). OECD Benchmark Definition of Foreign Direct Investment, fourth edition.

C4 Internationalisation of research and development (R&D)

Introduction

This set of annotated tables on the internationalisation of R&D presents information on the contribution of foreign controlled enterprises to the R&D and innovation activities in the Dutch business sector. Data is based on the *Community Innovation Survey* (CIS), which is conducted every even year. The data is categorised by sector and by size class. The survey enables the compilation of innovation profiles for specific types of enterprises, and compares firms by their R&D expenditures, innovation activities and cooperation. The last table in this chapter is a benchmark table in which Dutch R&D inputs are compared with those of several European member states and the EU 27.

The distinction between Dutch controlled and foreign controlled enterprises is based on where the Ultimate Controlling Institutional Unit (UCI) resides. The UCI is defined as the institutional unit, proceeding up a foreign affiliate's chain of control, which is not controlled by another institutional unit. Accordingly, foreign controlled enterprises have a centre of control outside the Netherlands, whereas Dutch controlled means that the locus of control is in the Netherlands. 'Control' means the ability to determine the general and strategic policy of an enterprise by choosing appropriate directors. The UCI is determined on an annual basis by combining enterprise information from various sources.

Please note that as the distinction between Dutch and foreign controlled enterprises in the *Internationalisation Monitor 2009* was still based solely on a question in the Community Innovation Survey itself, and defined by the location of the enterprise's main office, the figures presented in this chapter differ somewhat from figures published in former editions of this publication.

Classification

For 2008 the classification of enterprises is based on NACE Rev. 2. For preceding years the classification used was NACE Rev. 1.1. Subsequently, *Manufacturing* based on NACE Rev. 1.1 is not completely comparable with Manufacturing based on the new classification NACE Rev. 2.

There are three sectors in the annotated tables (NACE Rev. 2):

- *Manufacturing*: NACE Rev. 2 Section C
- *Services sector*: NACE Rev. 2 Sections G, H, I, J, K, L, M (excluding class 72) and N.
- *Other*: NACE Rev. 2 Sections A, B, D, E and F

Data for the Other sector are not shown separately because the number of enterprises in this category is too small.

4.1 *R&D expenditures of foreign controlled enterprises in the Dutch business sector*

In 2008 one third of the R&D expenditures were realised by foreign controlled enterprises. In 2002 this was just over one quarter. The share of R&D expenditures of foreign controlled enterprises in the total R&D expenditures of the Dutch business sector is an indication of the level of involvement of foreign multinationals or investors in R&D performed in the Netherlands.

In 2008 the share of foreign controlled R&D was about the same in the manufacturing and the services sectors. However, the absolute amounts of the R&D expenditures differ considerably: 75 per cent of total foreign controlled R&D expenditures are to be found in manufacturing.

In all size classes the contribution of foreign controlled enterprises to the R&D performed in the Netherlands is substantial. Over the years the share of R&D performed by foreign controlled enterprises seems to be the largest in the medium-sized enterprises (50–249 persons employed) with a share of 43 percent. The value of Dutch controlled enterprises decreased in all size classes in 2008.

With 1.7 billion euros of investments in R&D activities by foreign controlled enterprises, the Netherlands sustains a suitable location for performing R&D. This foreign controlled R&D may be the result of greenfield investments i.e. starting new R&D activities, which increases the R&D performed in the Netherlands, and has positive effects on the Dutch knowledge economy. Yet it may also be the result of mergers and acquisitions, meaning that existing R&D activities of Dutch enterprises are taken over by foreign enterprises with a view to their gaining access to specific knowledge or technologies. The latter does not increase the amount of R&D performed in the Netherlands. It just changes the ratio between R&D performed by Dutch controlled enterprises and R&D performed by foreign controlled enterprises. The political interest is in expanding the R&D activities of existing foreign controlled enterprises and greenfield investment and not so much in mergers and acquisitions of existing R&D activities of Dutch enterprises. There are recent examples of foreign controlled enterprises that have taken over Dutch enterprises and after just a few years put a stop to the R&D activities of this enterprise in the Netherlands.

The ratio between Dutch controlled and foreign controlled R&D is very sensitive to a limited number or even just one merger or takeover of a (large) enterprise. R&D expenditures in the Netherlands are dominated by a restricted number of large enterprises. If one of these enterprises changes from Dutch to foreign controlled it immediately has an impact on this ratio. This is what happened in 2008 when foreign controlled R&D increased substantially compared with 2006. It is not caused by a widespread phenomenon, but by just a few mergers and acquisitions.

Table C4.1
R&D expenditure of foreign and Dutch controlled enterprises in the business sector

	2002		2004		2006		2008 ¹⁾	
	<i>mln euro</i>	%	<i>mln euro</i>	%	<i>mln euro</i>	%	<i>mln euro</i>	%
Total	4,543	100	5,071	100	5,480	100	5,263	100
Dutch controlled	3,322	73	3,791	75	4,124	75	3,546	67
Foreign controlled	1,221	27	1,281	25	1,357	25	1,717	33
<i>Industry</i>								
Manufacturing	3,454	100	3,898	100	4,094	100	3,758	100
Dutch controlled	2,555	74	2,881	74	3,202	78	2,464	66
foreign controlled	899	26	1,017	26	892	22	1,294	34
Services sector	884	100	974	100	1,200	100	1,307	100
Dutch controlled	576	65	730	75	830	69	892	68
foreign controlled	308	35	244	25	370	31	415	32
<i>Size class</i>								
Small (10–49 persons employed)	422	100	431	100	421	100	390	100
Dutch controlled	404	96	402	93	374	89	335	86
foreign controlled	18	4	29	7	47	11	54	14
Medium (50–249 persons employed)	830	100	934	100	992	100	862	100
Dutch controlled	565	68	636	68	682	69	494	57
foreign controlled	265	32	298	32	310	31	367	43
Large (250 or more persons employed)	3,291	100	3,707	100	4,068	100	4,012	100
Dutch controlled	2,353	71	2,753	74	3,068	75	2,717	68
foreign controlled	938	29	954	26	1,000	25	1,296	32

¹⁾ Based on the new NACE Rev. 2 classification of the business enterprise sector.

4.2 *Technological innovation profile*

Foreign controlled enterprises in the Netherlands are much more involved in innovation than domestically controlled enterprises. Overall, 23 percent of Dutch enterprises and 48 percent of foreign controlled enterprises innovated in the period 2006–2008. Monitoring the whole period 2002–2008, the share of innovative foreign controlled enterprises is at least twice as large as the share of innovative Dutch enterprises. The difference in innovation activity between Dutch and foreign controlled enterprises is reflected in both the manufacturing and the services sectors.

The differences in innovation between Dutch and foreign controlled enterprises are less pronounced, but still persistent when broken down by the size class of the enterprises concerned. This difference is relatively the greatest in the 10–49 persons employed size class. The table reveals that innovation by Dutch enterprises in this size class is below average. The difference in innovation activity between Dutch and foreign enterprises is less extreme in the 250 and more persons employed size class. Furthermore, foreign controlled enterprises are more active in implementing product and process innovation. For example, in the period 2006–2008 about 37 percent of foreign controlled enterprises were product innovators, while the share of enterprises active in process innovation is 27 percent. This is a striking difference compared with the number of Dutch controlled enterprises. Subsequently, it shows that foreign controlled enterprises are more often *product* innovators rather than *process* innovators, while these shares are more or less the same for the Dutch controlled enterprises.

From the divergence in 2008 mentioned above, the difference between the shares of product innovators is relatively the largest in the services sector. However, the share of innovators is always the highest in the manufacturing sector.

These observations illustrate that foreign controlled enterprises are more innovative than Dutch controlled enterprises. However, this is also influenced by the characteristics of these foreign controlled enterprises. They are larger and more productive than the average Dutch enterprise, almost always part of an enterprise group, and more often active on international markets and so on. But if all these factors are taken into account, the fact still remains that foreign controlled enterprises make a positive contribution to the overall innovation of the business enterprise sector in the Netherlands (see also part B3 of this publication).

Innovation

The concept of innovation can be split into technological innovation (product and process innovation) and non-technological innovation (organisational and marketing innovation). This part refers only to technological innovation.

Table C4.2
Technological innovation profile; foreign and Dutch controlled enterprises

	Innovation				Product innovation				Process innovation			
	2002	2004	2006	2008 ¹⁾	2002	2004	2006	2008 ¹⁾	2002	2004	2006	2008 ¹⁾
	<i>% of enterprises</i>											
Total	20	25	25	25	15	17	16	17	10	17	16	15
Dutch controlled	18	23	22	23	13	15	14	15	916	15	15	
Foreign controlled	42	46	50	48	34	35	39	37	21	31	28	27
<i>Industry</i>												
Manufacturing	40	42	42	42	30	29	32	30	23	29	28	28
Dutch controlled	37	39	39	39	28	27	29	27	21	27	26	26
foreign controlled	61	63	65	65	51	48	53	51	38	44	44	42
Services sector	17	23	22	22	12	15	14	15	815	14	13	
Dutch controlled	16	22	20	21	1114	13	14	814	14	13		
foreign controlled	30	35	40	36	24	26	31	28	1122	20	18	
<i>Size class</i>												
Small (10–49 persons employed)	16	22	21	21	12	14	14	14	814	14	13	
Dutch controlled	16	21	20	21	1114	12	14	814	13	13		
foreign controlled	27	31	40	34	24	24	31	27	10	21	19	16
Medium (50–249 persons employed)	35	38	38	37	26	26	26	26	18	26	25	25
Dutch controlled	33	35	35	34	23	23	23	23	17	24	23	23
foreign controlled	48	53	51	52	38	41	40	41	24	33	32	32
Large (250 or more persons employed)	51	59	56	54	38	42	43	41	33	46	42	39
Dutch controlled	47	55	52	52	34	40	37	39	29	42	40	39
foreign controlled	61	67	63	58	46	46	53	44	43	52	46	39

¹⁾ Based on the new NACE Rev. 2 classification of the business enterprise sector.

4.3 *Cooperation profile of innovators*

The share of enterprises that cooperate in order to innovate is higher for foreign controlled enterprises, than for Dutch controlled enterprises: 43 percent and only 37 percent respectively. This difference has declined steadily since 2002 as a result of increasing cooperation among Dutch enterprises and decreasing cooperation among foreign controlled enterprises.

The greatest difference between Dutch and foreign controlled enterprises is in the manufacturing sector. Just 41 percent of the Dutch controlled firms cooperate in innovation, compared with 56 percent of foreign controlled enterprises in the manufacturing sector. And this difference has been persistent over time. There is no significant difference between foreign and Dutch controlled enterprises in the services sector.

Compared with Dutch controlled enterprises, foreign controlled firms are more likely to cooperate with consultants, commercial labs, or private R&D institutes and with universities. They also cooperate more with suppliers and customers, but Dutch controlled enterprises tend to partner more with competitors. There is no difference between Dutch and foreign controlled enterprises with respect to cooperation with government partners, as shown in Graph C4.3.

Foreign controlled enterprises often cooperate with foreign partners. Even excluding cooperation within an enterprise group, a large majority (69 percent) cooperate with partners abroad, compared with only 41 percent of Dutch controlled enterprises. Dutch controlled enterprises cooperate more frequently within the Netherlands, but the difference with foreign controlled enterprises is much smaller: 93 percent versus 84 percent.

Overall, foreign controlled enterprises cooperate during the innovation process and thereby contribute to knowledge flows between the different partners involved.

The cooperation profile describes how many of the innovating enterprises cooperate and with whom.

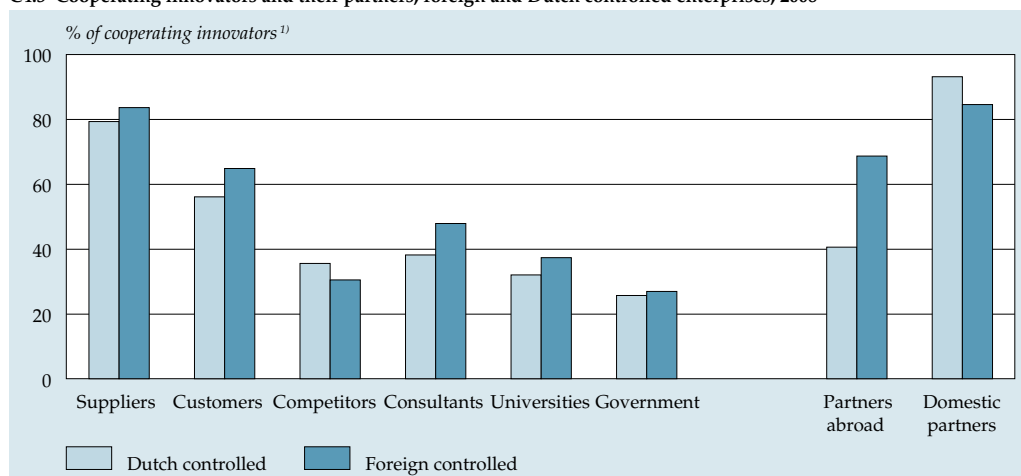
In addition to the parent company or enterprise group itself, innovation partners include suppliers and customers. Other possible external partners are competitors, consultants, universities, other research institutes or governments.

Table C4.3
Cooperation profile; foreign and Dutch controlled enterprises

	2002	2004	2006	2008 ¹⁾
<i>% of innovators</i>				
Total	33	37	36	38
Dutch controlled	30	36	35	37
foreign controlled	50	46	42	43
<i>Industry</i>				
Manufacturing	33	44	44	44
Dutch controlled	29	41	40	41
foreign controlled	52	60	58	56
Services sector	33	34	32	34
Dutch controlled	30	34	32	34
foreign controlled	48	36	33	35
<i>Size class</i>				
Small (10–49 persons employed)	27	32	32	34
Dutch controlled	26	32	31	34
foreign controlled	44	36	33	30
Medium (50–249 persons employed)	38	47	43	46
Dutch controlled	35	46	42	45
foreign controlled	49	51	46	49
Large (250 or more persons employed)	59	65	64	63
Dutch controlled	56	65	63	63
foreign controlled	63	64	66	64

¹⁾ Based on the new NACE Rev. 2 classification of the business enterprise sector.

C4.3 Cooperating innovators and their partners; foreign and Dutch controlled enterprises, 2008



¹⁾ Excluding cooperation within the enterprise group.

4.4 *Gross domestic expenditure on research and development (GERD)*

Table C4.4A shows that when comparing gross domestic expenditures on R&D, the Netherlands spends relatively little compared with many other countries. In 2008, the R&D intensity of the Dutch economy was the lowest of the countries in Figure C4.4B, including the EU 27. In addition, the Netherlands is one of the two countries for which the R&D expenditures did not increase between 2003 and 2008. The gross domestic expenditure on R&D (GERD) is one of the key variables when comparing R&D performance or intensity between countries. An explicit target of the Lisbon strategy of the European Commission for 2010 was to spend 3 percent of GDP on R&D in the EU. Since it is likely that this target will not be met, new targets for R&D expenditure in the EU will be defined for 2020. It is expected that the target will stay at 3 percent (*Europe 2020. A strategy for smart, sustainable, and inclusive growth, COM (2010) 2020*).

The low level of GERD in the Netherlands is primarily explained by the role of the Dutch business enterprise sector. Only half of Dutch GERD is performed by the *business enterprise sector*, which is low compared with the other countries and the EU 27. R&D expenditure in the *higher education sector* and the *other sectors* (government and private non-profit sectors) in the Netherlands is not sufficiently high to compensate for the low business enterprise sector expenditures up to the level of the Lisbon target.

Gross domestic expenditure on R&D (GERD)

GERD is total intramural expenditure on R&D performed on national territory in a given period. Intramural expenditures are all R&D expenditures within a statistical unit or sector of the economy during a specific period, irrespective of the source of funds.

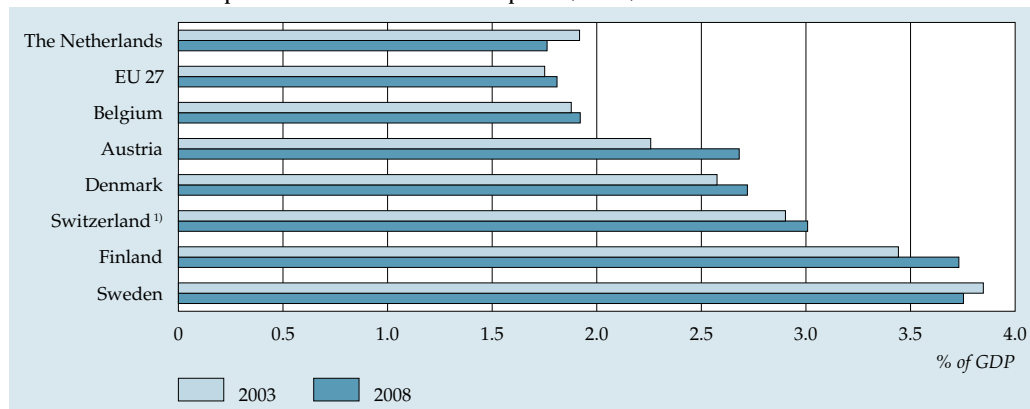
GERD includes R&D performed within a country and funded from abroad but excludes payments for R&D performed abroad. GERD is constructed by adding together the intramural expenditures of the four performing sectors. These four sectors are:

- Business enterprise sector (BES)
- Private non-profit sector (PNP)
- Government sector (GOV)
- Higher education sector (HES)

Sweden, Finland, Switzerland, Denmark, Austria and Belgium are comparable to the Netherlands in economic development and size but may have a different economic structure.

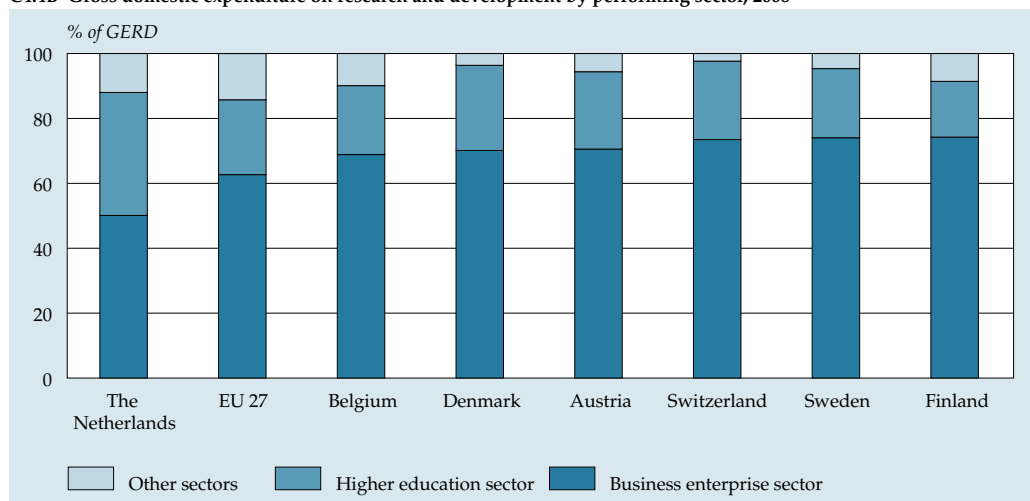
Source: OECD, *Frascati Manual 2002*.

C4.4A Gross domestic expenditure on research and development (GERD)



Source: Statistics Netherlands and OECD.

C4.4B Gross domestic expenditure on research and development by performing sector, 2008



Source: Statistics Netherlands and OECD.

C5 International traffic and transport flows

Introduction

The ongoing innovation and diffusion of technology in the transport sector has lowered transaction costs and increased the demand and supply for transportation capacity. The developments are most pronounced in the container trade, which has grown tremendously since the mid-1970s. Vessels have become gigantic, with the latest capable of carrying 15 thousand standard containers. Containerisation has reduced the costs of shipping goods, facilitating the creation of global supply chains, and spurring international trade. The Netherlands has become an important link in the hub-and-spoke model of overseas transport flows of goods to and from Europe, feeding into other modes of transport and creating a variety of related economic activities and network effects. Associated commercial partners and suppliers are benefiting from each other's presence and competing with each other for a share of the market.

Overall in 2008, the land, water, air and supporting transport activities generated 3.7 percent of the total added value of the Dutch economy and employed over 371 thousand persons. The total output of this sector was 55 billion euros of which 39 percent was produced by land transport, 12 percent by water transport, and 16 percent by air transport activities.

The tables and graphs in chapter C5 illustrate the pattern of international traffic and transport flows in the Netherlands, demonstrating how recent developments in the international transport statistics help to provide further insight into the composition and evolution of transport flows. More information on the value, origin and destinations of international trade of goods can be found in chapters A1 and C1. See A2 and C2 for international trade in transport services (such as cargo handling and storage, warehousing, customs clearance and port services).

Section C5.1 starts with an overview of international air passenger flow from and to the Netherlands and continues with a benchmark top 10 of European airports in order to measure the relative comparative position of the Dutch market area. Section C5.2 monitors the Dutch position in international goods transport by air in a European comparative perspective. Section C5.3 examines the transport flows of goods to and from the Netherlands by modality and nationality of the transport equipment. Section C5.4 surveys the container flow from and to the Netherlands by sea.

Definitions

EU 15 includes member states Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Portugal, Spain, Sweden, United Kingdom and the Netherlands.

EU 27 includes EU 15 plus the new member states Bulgaria, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia.

5.1 *International air passenger transport*

In 2008, the Netherlands ranked sixth among the EU 15 member states with respect to international air passenger transport, with 50.4 million passengers.

In 2000, aircraft carried over 600 million passengers to, from or between the EU 15 member states (national air transport excluded). Eight years later close to 856 million passengers were carried. This 4.5 percent annual growth rate is partly due to air transport liberalisation, which resulted in an explosive rise in the number of low-cost carriers that made air transport increasingly competitive compared with other modes of transport. Measured in passenger-kilometres, EU air travel boomed in the 2003–2007 period. In mid 2008 the Netherlands introduced a flight tax on tickets for departing passengers, collecting 127 million euros in tax revenue. Since 2000, the United Kingdom, Germany, Spain, France, Italy, and the Netherlands have all ranked in the top six countries, with the United Kingdom the absolute number one every year, with 22 percent in 2008. The Dutch air passenger market share dropped 1 percentage point to 6 percent in this period, indicating that a large part of the rapid growth in the number of air passengers in the EU since 2003 has been absorbed by other member states.

Moreover, in 2008, at the EU 27 level, 55 percent of international air passenger transport is intra-EU transport. Over the last nine years, this type of air passenger transport has grown twice as fast (+50 percent) than extra-EU air passenger transport (+25 percent).

In terms of absolute number of *international* passengers handled in 2008, Amsterdam/Schiphol (48 million) is the third airport after London Heathrow (61 million) and Paris/Charles de Gaulle (55 million); and just ahead of Frankfurt/Main (47 million).

94 percent of all international air passengers in the Netherlands fly to or from Amsterdam/Schiphol. Based on absolute passenger numbers, Schiphol still leads the top 30 for intra-EU passenger transport with more than 26.5 million passengers in 2008. In second and third place are Paris/Charles de Gaulle and London Heathrow, with 25.7 and 22.3 million passengers respectively in 2008.

Most air passengers flying beyond the EU 27 region pass through London Heathrow which handles 39 million air passengers in 2008. With nearly 21 million passengers to or from Amsterdam/Schiphol, this airport is ranked fourth.

The information presented in this table is primarily based on On Flight Origin/Destination (OFOD) data and supplemented by Flight Stage (FS) data and airport declaration forms. Data is collected on the basis of the first origin/destination of passengers, and not on the final origin/destination in the case of flight connections.

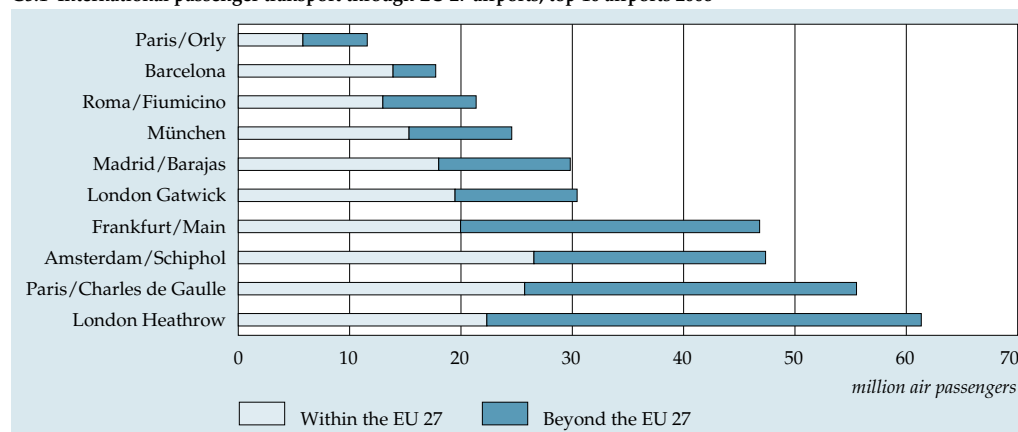
The flight tax on tickets for departing passengers was abolished on 1 July 2009. There are two fixed rates. A levy of 11.25 euros was added to the ticket price of destinations within the European Union and/or a distance no greater than 2500 kilometres, and a charge of 45 euros for destinations beyond this distance. Total revenues were 127 million euros in 2008 (6 months) and 101 million in 2009 (6 months).

Table C5.1
International passenger transport through EU 15 airports

	2000	2001	2002	2003	2004	2005	2006	2007	2008
<i>million air passengers</i>									
EU-15	605.2	603.7	602.7	630.3	694.1	747.0	794.2	847.7	855.5
United Kingdom	142.8	142.2	146.1	153.5	166.6	177.3	184.6	191.2	189.0
Germany	98.6	97.2	94.0	99.9	114.5	124.1	131.3	139.5	140.9
Spain	81.1	83.3	83.2	88.9	95.8	104.7	110.2	119.4	120.6
France	65.6	65.8	68.6	69.6	76.0	81.3	86.2	92.8	95.8
Italy	44.3	43.4	42.7	49.4	57.0	63.2	69.5	77.6	76.9
The Netherlands	40.4	39.4	40.6	41.0	44.4	46.4	48.5	50.4	50.4
Ireland	24.6	24.9	24.8	23.2	24.0	25.0	26.6	28.1	29.2
Greece	16.0	16.7	17.6	18.8	20.2	23.6	26.8	29.0	27.8
Austria	14.2	14.1	14.4	15.2	17.7	19.1	20.2	22.3	23.2
Denmark	17.1	18.0	18.2	17.8	19.4	20.5	21.2	22.1	22.6
Portugal	13.4	13.3	14.5	14.9	16.0	17.3	19.0	21.4	22.3
Belgium	21.6	19.8	14.3	15.1	17.5	17.8	19.1	20.7	21.9
Sweden	16.3	16.2	14.6	13.6	14.7	15.6	18.7	20.1	21.1
Finland	7.6	7.7	7.5	7.8	8.9	9.5	10.5	11.6	12.1
Luxembourg	1.7	1.6	1.5	1.4	1.5	1.5	1.6	1.6	1.7

Source: Eurostat/Statistics Netherlands.

C5.1 International passenger transport through EU 27 airports, top 10 airports 2008



Source: Eurostat.

5.2 *International air freight and mail transport*

In spite of the economic crisis in 2008, the total volume of freight and mail between the EU 15 member states and the rest of the world increased by 2.8 percent to a total of 13 million tonnes in 2008. However, over this period the volume for the Netherlands decreased by 3.6 percent to less than 1.7 million tonnes, which meant the Netherlands continued to be the third largest transporter of air freight and mail among the 15 EU member states with a market share of 13 percent. The Netherlands, Germany and United Kingdom together accounted for over 56 percent of the total tonnage of air freight and mail handled by the EU 15 in 2008 (including intra-EU 15 double-counting).

The extra-EU air freight market is by far the most important segment and represents 80 percent of the total volume. Amsterdam (Schiphol) is an important hub airport for the transport of *intercontinental* goods. Most of the total volume of freight handled by the Netherlands is to and from Asia and Australasia and accounts for 54 percent of all Dutch transport of goods by air.

The volume of freight and mail between the Netherlands and the other European countries is relatively small. Only 6 percent of the total Dutch air transport volume has a European partner – compared with a European average of 25 percent.

Of all continents in 2008, the flow of air freight via the Netherlands to and from Africa grew by six percent, which meant the Netherlands continued to be ranked number one of all 27 EU member states in air freight volume destined for or originated in Africa.

Air freight and mail transport are registered according to the principle of loaded and unloaded by country, not including national movements. The mail volume is less than 2.5 percent of the total Dutch air transport weight. The importance of air freight and mail transport generally increases with the distance covered.

Since the same movement of goods is reported as a departure by one airport and as an arrival by the partner airport, the EU totals exclude double-counting for intra-EU international transport. Data collection is based on the first origin/destination of freight, and not on the actual origin/destination if there are flight connections. In addition, data for France are underestimated since the two Paris airports, Charles de Gaulle and Orly, do not report all freight and mail handled; 2007 data for Denmark do not include Copenhagen Kastrup airport.

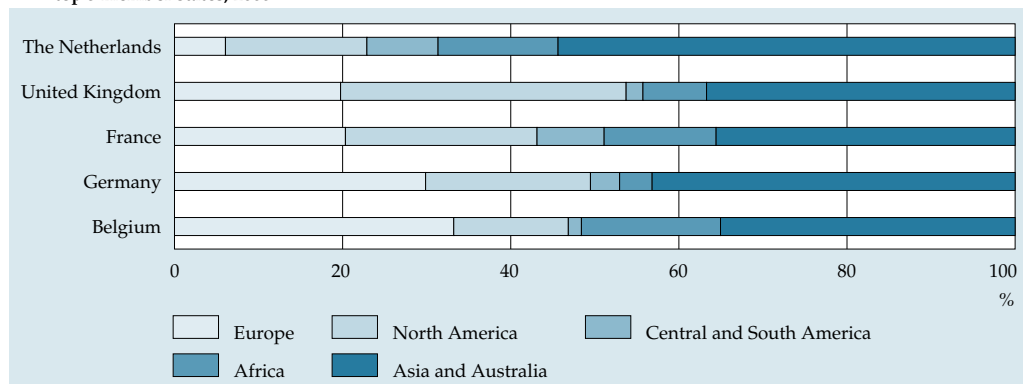
Table C5.2

International transport of freight and mail through EU 15 airports by continent of origin or destination, 2008

	Europe	North America	Central and South America	Africa	Asia and Australasia	Total	Growth 2007-2008
	1,000 tonnes						%
Germany	1,027.3	674.4	119.4	133.0	1,485.0	3,439.0	3.8
United Kingdom	451.7	776.5	45.8	173.0	839.2	2,286.1	-1.6
The Netherlands	99.9	277.4	139.6	235.3	896.3	1,648.5	-3.6
France	309.6	347.1	121.5	202.8	541.6	1,522.6	-1.5
Belgium	355.7	145.9	16.7	177.2	375.3	1,070.8	-11.0
Luxembourg	54.4	145.2	45.7	88.9	420.1	788.2	12.2
Italy	288.1	116.4	22.5	19.1	298.3	746.7	-10.0
Spain	175.6	65.2	119.4	17.1	60.9	438.3	9.3
Denmark	138.1	35.2	0.0	0.1	78.0	251.5	.
Austria	67.2	20.1	0.0	1.7	116.3	205.3	-0.2
Sweden	107.3	17.4	0.0	0.3	59.3	184.4	.
Finland	67.2	7.5	0.0	0.1	69.4	144.2	1.8
Ireland	76.2	36.5	0.0	0.2	6.0	119.1	-2.3
Portugal	63.3	5.5	28.7	16.5	0.2	114.3	5.3
Greece	65.1	8.2	0.0	2.8	18.4	94.5	5.6

Source: Eurostat.

C5.2 International transport of freight and mail through EU 15 airports by continent of origin or destination; top 5 member states, 2008



Source: Eurostat.

5.3 *Internationalisation of goods transport flow by modality and by nationality of the transporters*

Apart for a small decline in 2003, the transport of goods to and from the Netherlands increased by 37 percent since 2000 to almost 1.1 billion tonnes in 2008. The majority of goods are transported by non-Dutch transport equipment enterprises. In 2008, 76 percent of the total unloaded weight in the Netherlands was transported by foreign transport-equipment enterprises. Of the total loaded weight, 42 percent is transported by non-Dutch transport-equipment enterprises.

56 percent of transportation of goods by road is handled by Dutch registered vehicles. This is a three percentage point decrease since 2006. Over the past few years we have observed an increase in road transport by vehicles from Germany and Poland. The weight of unloaded goods by German registered vehicles increased by 21 per cent since 2006 and loaded goods by 13 percent. This increase was 24 and 41 percent respectively for Polish registered vehicles. Together, German (42 percent), Belgian (22 percent) and Polish trucks (11 percent) account for three quarters of the foreign registration plates on Dutch roads, expressed in tonnes hauled.

Compared with all other modes of transport, Dutch sea-shipping is very small. Just 3 percent of all goods to and 10 percent of all goods from the Netherlands are transported by ships flying the Dutch flag.

The transport of goods on inland waterways mainly uses Dutch registered transport equipment. Two thirds of all carried goods loaded in the Netherlands were transported by a Dutch vessel. Over 70 percent of the goods on inland waterways unloaded in the Netherlands that crossed the border with Germany or Belgium were shipped by inland vessels flying the Dutch flag. Because of the Netherlands' geographical position, most foreign transporters in this mode of goods carriage were Belgian or German.

Goods transported by rail and pipeline, both modes of transport under 'other', are 100 percent Dutch business. Yet about 54 percent of the air freight and mail weight is transported by planes registered in the Netherlands. Air transport-equipment registrations from Asian (25 percent), American (11 percent) and European (9 percent) countries account for the remainder.

Transporting goods to and from the Netherlands is not the exclusive domain of Dutch enterprises with transport equipment. Foreign enterprises with transport equipment also compete to load and unload goods in the Netherlands.

The nationality of seagoing transport equipment is not specified by vessel owner, but by the country of registration. A ship is said to be flying a flag of convenience if it is registered in a foreign country. The most popular flags of convenience as identified by the International Transport Workers' Federation (ITF) are those of Panama, Liberia, the Bahamas, and the Marshall Islands.

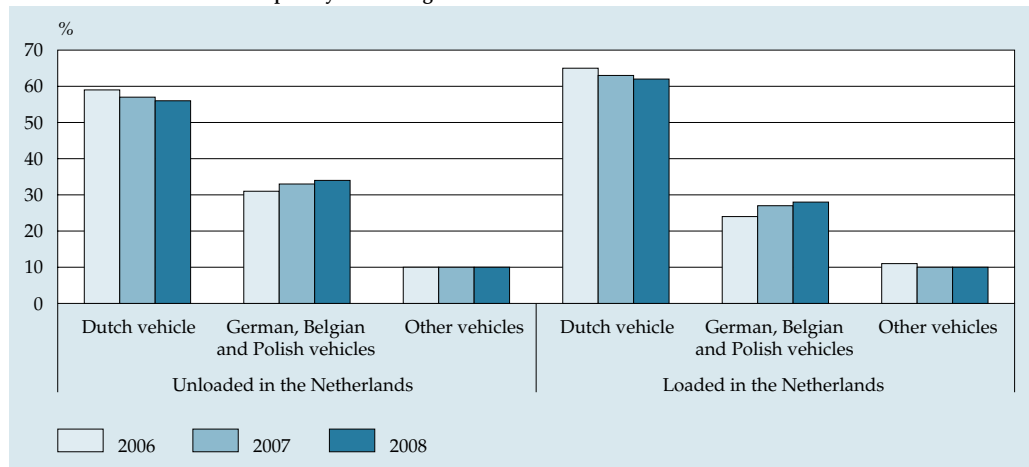
Table C5.3
Weight of transported goods by nationality of transport equipment, 2008

	Unloaded in the Netherlands					Loaded in the Netherlands				
	total	sea- ship- ping	inland water- ways	road trans- port	others ¹⁾	total ship- ping	sea- water- ways	inland trans- port	road	others ¹⁾
	<i>1,000 tonnes</i>									
Total	600,823	412,164	66,057	88,264	34,338	491,317	148,193	122,427	92,986	127,711
<i>Dutch transport equipment</i>	145,851	14,239	48,003	49,709	33,900	283,716	14,278	84,314	57,731	127,393
<i>Foreign transport equipment</i>	454,971	397,925	18,054	38,555	437	207,601	133,916	38,113	35,254	318
Europe	239,857	183,156	18,048	38,555	98	142,634	69,221	38,113	35,254	46
EU 14 incl.	154,509	106,133	17,007	31,295	74	108,915	46,006	36,238	26,643	28
Belgium	21,522	3,383	9,389	8,729	21	23,930	2,279	14,282	7,354	15
Denmark	10,364	10,022		342	0	6,904	6,583		321	0
Germany	34,704	10,754	6,266	17,684	0	42,377	8,471	20,099	13,807	0
France	6,374	4,394	985	995	0	4,852	2,174	1,204	1,474	0
Greece	32,948	32,848	–	100	0	3,965	3,822	–	143	0
United Kingdom	32,519	32,519	–	–	–	16,235	16,235	–	–	–
Sweden	4,528	4,428	–	100	0	2,025	1,923	–	102	0
other European countries incl.	85,349	77,023	1,042	7,260	24	33,719	23,215	1,875	8,611	18
Cyprus	13,543	13,543	–	0	–	5,736	5,734	–	1	1
Malta	25,907	25,907	–	–	–	6,501	6,501	–	–	0
Norway	26,850	26,775	–	75	0	6,474	6,356	–	118	0
Poland	3,806	99	41	3,666	–	4,906	267	58	4,581	0
Russia	2,828	2,828	–	–	0	1,012	1,011	–	–	1
Africa	44,422	44,414	–	–	8	11,830	11,825	–	–	5
incl.										
Liberia	44,078	44,078	–	–	–	11,598	11,598	–	–	–
America	110,051	109,945	8	–	98	36,893	36,806	–	–	87
incl.										
Antigua and Barbuda	10,987	10,987	–	–	–	13,466	134,66	–	–	–
Bahamas	30,893	30,893	–	–	–	5,277	5,277	–	–	–
Panama	58,481	58,481	–	–	–	13,416	13,416	–	–	–
Asia	44,392	44,159	–	–	233	10,690	10,510	–	–	180
incl.										
Singapore	14,086	14,042	–	–	44	5,133	5,097	–	–	36
Hong Kong	14,574	14,565	–	–	9	2,251	2,240	–	–	11
Oceania and others	16,250	16,250	–	–	0	5,554	5,554	–	–	0
incl.										
Marshall Islands	14,963	14,963	–	–	–	5,493	5,493	–	–	–
	%									
Total	100	100	100	100	100	100	100	100	100	100
<i>Dutch transport equipment</i>	24	3	73	56	99	58	10	69	62	100

¹⁾ Transport by air, railway and pipelines.

Source: Statistics Netherlands, Eurostat.

C5.3 Share of Dutch road transport by vehicle registration



Source: Eurostat, Statistisch Netherlands.

5.4 *International sea container flow by origin and destination*

Since its introduction in the mid-sixties, the container has become crucial to the development of international trade. Container traffic along the European coasts (SSS) and long distance container traffic (DSS) are developing fast. Over the period 2000–2008 SSS container transport through the Netherlands increased by 61 percent, while DSS transport grew by 72 percent.

Not all the origins and destinations display the same growth rate. In short range transport Russia grew the fastest in absolute (+114 thousand containers) and relative terms (+600 percent) in the period 2000–2008. More than 50 percent of the SSS containers handled in the Netherlands came from and went to the United Kingdom and Ireland. The share of traffic from and to the top 10 countries increased in this period at the expense of the ‘other countries’.

Container transport to and from small European countries like Iceland is sizeable. Iceland produces a lot of aluminium, and the fishing industry is also a significant supplier. Finland and Sweden export paper and wood to the rest of the world. The Dutch ports play an important role in the distribution of these products.

Changes in trade volumes between Europe and Eastern Asia are well reflected in the data. Long distance transportation in both directions is dominated by China. Volume increased by 400 percent and 640 percent respectively. This flow took a 33 percent share of the DSS transport in 2008 (excluding Hong Kong). Malaysia is another eastern Asian country with a massive growth of 350 percent to 121 thousand containers. Almost 4 of every 5 the containers have Asia as origin or destination. The share of the top ten loading and unloading countries continues to increase. In the short sea traffic toward the Netherlands, the share went up from 83 to 90 percent. The destination top 10 has also increased its share from 80 to 88 percent. The Deep Sea Shipping top 10 had a share of more than 83 percent in 2008.

Containers are registered according to the principle of loaded in NL and unloaded in NL. “Short Sea Shipping or Coastal Shipping” (SSS) includes all partner ports situated in geographical Europe, on the Mediterranean and the Black Sea. “Deep Sea Shipping” (DSS) is the complementary geographical aggregate. Short Sea Shipping includes “feeder services”: a short sea network between ports in order for the freight to be consolidated or redistributed to or from a deep sea service in one of these ports (“hub ports”).

Table C5.4

Container transport to and from the Netherlands in Short Sea Shipping and Deep Sea Shipping, 2000-2008

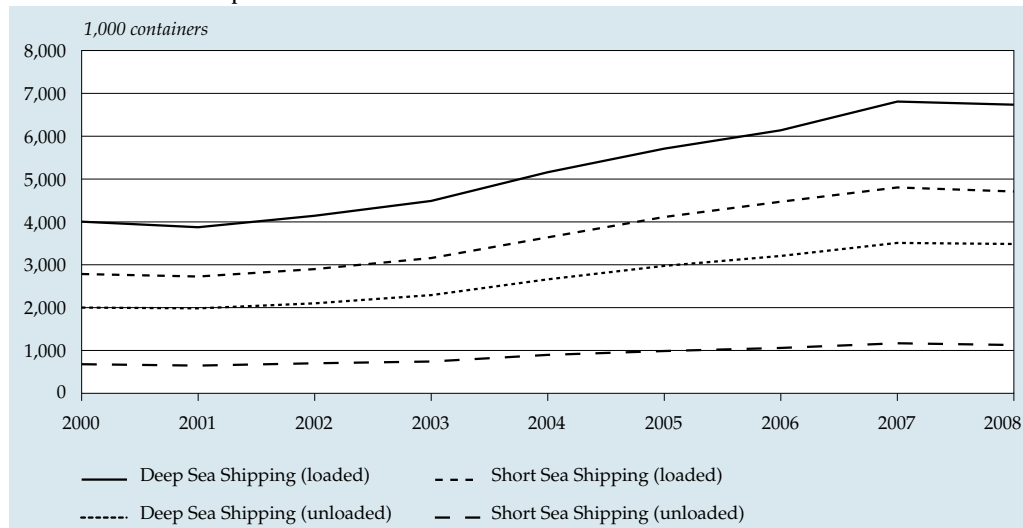
	2000	2001	2002	2003	2004	2005	2006	2007	2008
	<i>1,000 containers</i>								
Total	4,006	3,875	4,143	4,490	5,161	5,710	6,138	6,809	6,737
Unloaded in the Netherlands	2,001	1,982	2,100	2,293	2,660	2,974	3,205	3,510	3,485
<i>Short Sea Shipping</i>	679	647	701	742	897	987	1,059	1,168	1,127
Unloaded in the Netherlands and loaded in:									
top 10 countries:	562	542	596	636	785	857	933	1,042	1,018
United Kingdom	250	243	274	298	350	378	378	382	354
Ireland	100	115	116	145	186	162	181	180	165
Russia	19	16	17	23	53	74	90	112	133
Finland	25	17	17	18	16	22	43	73	95
Spain	41	43	53	44	51	60	62	77	65
Iceland	20	18	23	20	21	27	35	45	47
Sweden	29	17	19	14	20	29	30	48	44
Norway	37	32	33	32	37	39	46	48	43
Portugal	23	26	30	26	34	47	39	42	40
Germany	19	17	13	15	17	20	29	36	32
other countries	117	104	105	107	112	129	126	126	109
share of top 10 countries (%)	82.8	83.8	85.0	85.7	87.5	86.8	88.1	89.2	90.3
<i>Deep Sea Shipping</i>	1,322	1,336	1,399	1,550	1,763	1,987	2,147	2,342	2,358
Unloaded in the Netherlands and loaded in:									
top 10 countries	1,066	1,069	1,129	1,229	1,405	1,485	1,776	1,949	1,966
China	157	168	228	304	398	533	601	755	768
United States	207	220	228	218	177	231	247	254	262
Singapore	206	160	169	170	191	149	254	239	236
Japan	131	128	119	118	144	105	134	137	156
Hong Kong	145	133	120	129	148	141	154	152	136
Malaysia	27	48	67	68	94	78	100	121	121
Brazil	45	51	52	68	87	86	87	97	96
Taiwan	61	51	47	54	59	59	79	77	72
South Korea	64	60	59	58	63	58	71	76	66
South Africa	23	50	41	42	44	47	48	43	52
other countries	257	267	270	321	358	503	370	393	392
share of top 10 countries (%)	80.6	80.0	80.7	79.3	79.7	74.7	82.7	83.2	83.4

Table C5.4
(cont'd)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
	<i>1,000 containers</i>								
Loaded in the Netherlands	2,005	1,893	2,043	2,197	2,500	2,736	2,933	3,299	3,252
<i>Short Sea Shipping</i>	783	743	799	865	980	1,141	1,266	1,294	1,225
Loaded in in the Netherlands and unloaded in:									
top 10 countries	626	620	675	736	827	968	1,063	1,117	1,082
United Kingdom	250	253	285	313	350	406	421	424	390
Ireland	99	110	132	144	154	162	169	175	151
Russia	19	16	26	25	44	73	100	104	121
Spain	54	52	55	63	73	90	101	113	112
Finland	31	26	28	31	30	29	35	66	74
Portugal	46	47	43	47	58	68	63	54	65
Sweden	46	34	28	31	30	32	33	66	57
Norway	34	32	31	35	39	34	42	40	45
Germany	30	30	27	27	28	48	64	38	35
Iceland	17	20	18	21	22	27	34	37	33
other countries	156	123	124	129	153	173	203	177	143
share of top 10 countries (%)	79.9	83.4	84.5	85.1	84.4	84.8	84.0	86.3	88.3
<i>Deep Sea Shipping</i>	1,222	1,150	1,245	1,333	1,520	1,595	1,667	2,005	2,026
Loaded in in the Netherlands and unloaded in:									
top 10 countries	922	852	965	1,035	1,229	1,281	1,367	1,661	1,694
China	81	98	107	140	247	305	369	561	601
United States	233	233	256	231	240	250	228	226	231
Singapore	172	112	138	145	152	178	197	183	215
Hong Kong	102	102	97	95	113	119	158	181	131
Japan	123	107	120	122	112	98	111	125	125
Malaysia	27	40	53	64	80	74	78	113	112
Brazil	18	23	28	42	60	42	38	76	81
Taiwan	70	59	78	97	111	94	76	70	78
South Korea	53	38	45	47	66	74	76	84	69
United Arab Emirates	43	39	43	51	49	48	37	42	51
other countries	300	298	279	298	290	314	300	345	333
share of top 10 countries (%)	75.5	74.1	77.5	77.6	80.9	80.3	82.0	82.8	83.6

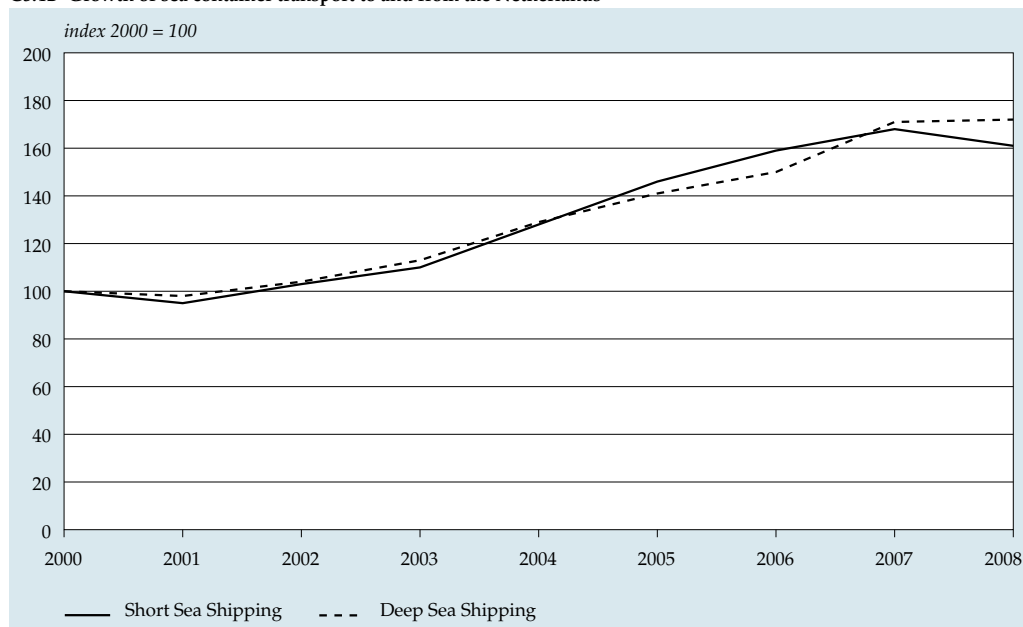
Source: Statistics Netherlands, Maritime Statistics.

C5.4A Sea container transport to and from the Netherlands



Source: Statistics Netherlands.

C5.4B Growth of sea container transport to and from the Netherlands



Source: Statistics Netherlands.

C6 Internationalisation and employment

Introduction

The linked employer-employee dataset: methodological improvements

The linked employer-employee dataset (LEED) complements existing SN data by making a distinction between foreign and Dutch controlled enterprises in the Netherlands. Foreign controlled enterprises have a centre of control outside the Netherlands; Dutch controlled enterprises are nationally owned. The distinction enables an analysis of the consequences of inward foreign direct investment (FDI) on the employment situation in the Netherlands at the micro level.

The dataset has been created by linking business and social data with the unique enterprise identifier (BEID) as the key variable. The variable Ultimate Controlling Institute (UCI), which identifies the country in which strategic decision-making takes place, has been used to describe the differences between Dutch and foreign controlled enterprises. The UCI is determined on an annual basis by combining enterprise information from various sources. Two surveys conducted by SN, which were used to determine the location of control, are the Financial Statistics of Large Enterprise Groups (SFGO) and the Community Innovation Survey (CIS). They mainly target large firms, thereby leading to a slight underrepresentation of small to medium-sized firms in the original LEED dataset (see Table Section B5, *Internationalisation Monitor 2009*, for an overview).

However, from 2006 onwards, the UCI list of enterprises in the General Business Register (GBR), which is based on SFGO and CIS information at SN, has been completed by the addition of information from an external source (Dun & Bradstreet database), providing a better insight into the total share of foreign enterprises in the Netherlands. In addition, a redesign of the Social Statistical Database in that year has resulted in a better match of the key indicators on employment, via the unique enterprise identifier (BEID), with the concurrent economic indicators. These improvements mean that the locus of control can now be established for over 90 percent of the total population of enterprises (with registered jobs in the Social Statistical Database) in the Netherlands. A weighting procedure was developed for the remaining share of enterprises that could not be matched to the GBR.

Tables C6.0a and C6.0b present an overview of the estimated share of foreign and Dutch controlled enterprises with registered jobs in the Netherlands, based on the extended employer-employee dataset. Weighted figures are broken down by size class and industry for the years 2006–2007.

Table C6.0A
Dutch controlled and foreign controlled enterprises in the linked employer-employee dataset (weighted) by size class

	2006	2007
Total	444,162	466,561
<i>Dutch controlled</i>	437,653	460,510
0–4 employees	308,790	313,175
5–9 employees	62,431	73,549
10–19 employees	34,307	38,742
20–49 employees	20,310	22,244
50–99 employees	5,922	6,335
100–249 employees	3,469	3,908
250 or more employees	2,425	2,557
<i>Foreign controlled</i>	6,509	6,051
0–4 employees	1,255	1,062
5–9 employees	804	720
10–19 employees	992	912
20–49 employees	1,318	1,214
50–99 employees	796	781
100–249 employees	787	798
250 or more employees	558	565

Table C6.0B
Dutch controlled and foreign controlled enterprises in the linked employer-employee dataset (weighted) by industry

	2006	2007
Total	444,162	466,561
<i>Dutch controlled</i>	437,653	460,510
Agriculture, mining and quarrying	18,641	18,912
Food and beverages	3,607	3,600
Paper, paper products and publishers	4,221	4,260
Chemicals and plastic products	1,560	1,624
Metal products	4,869	5,139
Machinery and equipment	3,112	3,241
Other manufacturing and utilities	10,199	10,525
Construction	29,010	31,148
Trade and repairs	93,508	97,599
Hotels and restaurants	26,893	27,959
Transport, storage and communication	14,086	15,004
Financial intermediation	69,957	71,279
Real estate, renting and business services	95,646	105,562
Other services	62,345	64,658
<i>Foreign controlled enterprises</i>	6,509	6,051
Agriculture, mining and quarrying	58	57
Food and beverages	107	100
Paper, paper products and publishers	155	146
Chemicals and plastic products	305	297
Metal products	110	99
Machinery and equipment	248	215
Other manufacturing and utilities	385	383
Construction	121	107
Trade and repairs	2,530	2,334
Hotels and restaurants	67	57
Transport, storage and communication	493	444
Financial intermediation	526	461
Real estate, renting and business services	1,251	1,212
Other services	152	140

6.1 *Employment in foreign and Dutch controlled enterprises*

By setting up affiliates and hiring workers, inward investment by multinational enterprises (MNEs) may directly affect employment, wages, and labour conditions in host countries. Our linked employer-employee data indicate that foreign ownership has a positive effect on employment in the Netherlands. Other empirical studies on the effects of inward investment have also indicated that foreign enterprises create employment (for recent contributions see e.g. Driffield, 1999; Fu and Balasubramanyam, 2005; Görg, 2000; Radosevic et al., 2003).

As Graph C6.1 shows, foreign controlled enterprises (mostly MNEs) are consistently larger and therefore generally have a bigger workforce than Dutch controlled enterprises. From 2006 onwards there is a general upward trend in terms of average number of jobs with foreign controlled enterprises compared with Dutch controlled counterparts. Accordingly, foreign controlled enterprises have a positive impact on the job situation in the Netherlands.

Table C6.1 presents a more detailed overview of the employment situation at foreign and Dutch controlled enterprises in the Netherlands for 2006 and 2007, broken down by activity sector. There are more jobs at foreign enterprises across all industries. However, the greatest differences between Dutch and foreign controlled enterprises are to be found in the hotels and restaurants sector, and also, to a similar extent, in the food and beverages sector and transport, storage and communication sectors.

The increase in the average number of foreign controlled jobs from 2006 to 2007 is also the highest in the abovementioned industries, as well as in the machinery and equipment and other services sectors. In contrast, Dutch controlled enterprises did not grow as fast as foreign controlled enterprises in that period, and only showed a slight increase in the machinery and equipment and transport, storage and communication sectors. With regard to all other sectors, the number of jobs in 2006–2007 in Dutch controlled enterprises either stabilised or showed a modest decline.

In Table C6.1 average employment was calculated as the (weighted) average number of jobs per year, by locus of control (foreign vs. Dutch) and industry of the enterprise.

Table C6.1
Average employment in foreign and Dutch controlled enterprises by industry, 2006–2007 (weighted)

	2006		2007	
	foreign controlled	Dutch controlled	foreign controlled	Dutch controlled
	<i>average number of employees</i>			
Total	120	15	125	15
<i>Industry</i>				
Agriculture, mining and quarrying	76	6	75	6
Food and beverages	227	27	246	27
Paper, paper products and publishers	151	16	153	17
Chemicals and plastic products	144	34	147	33
Metal products	130	16	133	16
Machinery and equipment	97	21	109	23
Other manufacturing and utilities	190	29	195	29
Construction	142	12	147	12
Trade and repairs	75	11	81	11
Hotels and restaurants	475	9	552	10
Transport, storage and communication	205	21	199	23
Financial intermediation	74	4	66	4
Real estate, renting and business services	144	13	149	13
Other services	98	37	115	36

6.2 *Labour turnover rate at foreign and Dutch controlled enterprises*

Labour turnover, or the job separation rate per enterprise, is an important indicator of labour dynamics. It is determined by the outflow of jobs as a share of the average number of jobs per enterprise per year. Labour turnover gives an indication of employees' willingness or ability to change jobs. Outflow might be caused by involuntary employee loss (firing, layoffs), termination of seasonal jobs, or by discharges resulting from mergers or downsizing. Additionally, outflow of jobs within an enterprise may also be driven by retirement or voluntary job changes. Information on labour turnover is therefore a valuable indicator in labour market analysis and serves as a complement to the unemployment rate.

Dutch controlled enterprises in general show a higher labour turnover, in terms of outflow of jobs, than foreign controlled enterprises in the Netherlands. This also applies to the enterprises included in our linked employer-employee dataset, as shown in Graph C6.2. However, foreign enterprises did achieve a lower retention rate, with labour turnover increasing by 5 percentage points, from 2006 to 2007.

Table C6.2 specifies the labour turnover rate at foreign and Dutch controlled enterprises broken down by sector of activity. Across the board, in all industries, Dutch controlled enterprises show a higher turnover rate than foreign controlled enterprises, in 2006 and in 2007. Firm size, however, does play a significant role in labour turnover rates at Dutch controlled enterprises. Overall, the rate tends to be lower as Dutch controlled enterprises are larger (average number of employees).

There is a particularly high turnover of employees at Dutch controlled enterprises in the hotel and restaurant industries, and in the agriculture, mining and quarrying sectors. This also applies to some extent to foreign controlled enterprises with activities in these sectors. It is likely that this is due to short-term work contracts and seasonal employment, which leads to a greater outflow of jobs in these sectors per year.

The mean labour turnover rate in the Netherlands was calculated as the (weighted) average number of outgoing employees, as a percentage of the average number of jobs per year, by locus of control (foreign versus Dutch controlled enterprises). In addition, separate turnover ratios were then calculated for each category of interest, i.e. industry and size class.

Table C6.2
Labour turnover at foreign and Dutch controlled enterprises by industry and size class, 2006-2007 (weighted)

	2006		2007	
	foreign controlled	Dutch controlled	foreign controlled	Dutch controlled
	<i>outflow / average number of jobs (%)</i>			
Total	30	40	35	41
<i>Industry</i>				
Agriculture, mining and quarrying	19	83	21	82
Food and beverages	17	26	16	27
Paper, paper products and publishers	27	24	24	23
Chemicals and plastic products	12	17	12	19
Metal products	13	20	13	22
Machinery and equipment	13	18	15	19
Other manufacturing and utilities	13	14	12	14
Construction	19	22	18	23
Trade and repairs	27	34	28	38
Hotels and restaurants	42	77	45	83
Transport, storage and communication	19	31	23	33
Financial intermediation	15	17	17	18
Real estate, renting and business services	58	87	74	84
Other services	44	24	41	24
<i>Size class</i>				
0-4 employees	25	43	24	46
5-9 employees	29	46	33	50
10-19 employees	28	43	28	46
20-49 employees	33	42	26	43
50-99 employees	24	43	23	44
100-249 employees	23	37	24	40
250 or more employees	33	38	40	36

6.3a Share of high and low-paid employees in foreign and Dutch controlled enterprises

The ratio of skilled versus unskilled wage is referred to as the relative wage and may serve as a proxy for overall income inequality. Foreign enterprises tend to pay higher wages, attract more highly-educated employees, and at the same time prevent labour migration to nearby (domestic) enterprises or prevent people from setting up their own enterprises. Furthermore, foreign enterprises may be more productive in general, substantiating a higher wage level.

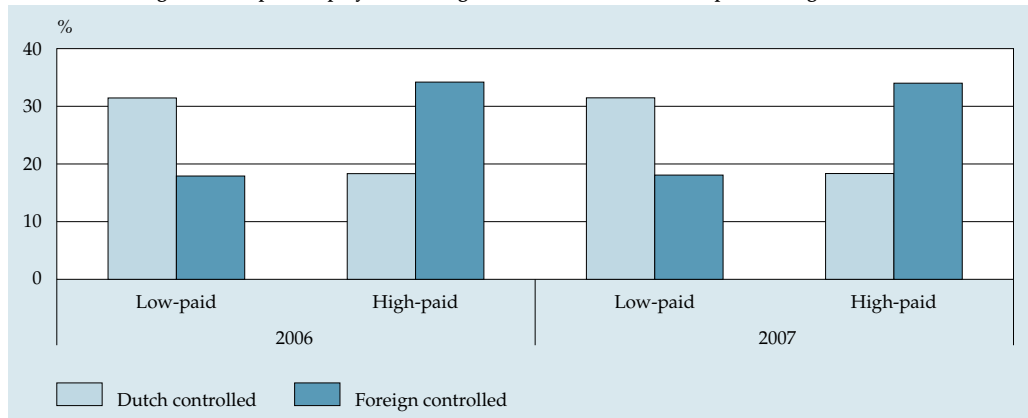
In line with this, foreign controlled enterprises in the Netherlands have a substantially higher share of high-paid employees in their workforce than their Dutch controlled counterparts; and conversely, Dutch controlled enterprises have a higher share of low-paid employees. Graph C6.3a illustrates in more detail that Dutch and foreign controlled enterprises have a relatively stable share of high-paid and low-paid workers both in 2006 and 2007; foreign controlled enterprises in the Netherlands employ approximately 0.8 times more high-paid workers and Dutch enterprises employ 0.6–0.7 times more low-paid workers.

The difference between foreign and Dutch controlled enterprises in terms of highly paid workers might be a result of FDI demanding more highly-skilled functions to coordinate the new foreign venture in the Netherlands. Another reason why foreign enterprises pay higher wages might be to attract highly-educated employees, while simultaneously preventing labour migration to nearby (domestic) enterprises or to prevent people from setting up their own enterprises. Furthermore, foreign enterprises may be more productive in general, while operating in new, innovative sectors, thereby substantiating a higher wage level.

Employees and their jobs are classified as high-paid if their wage is in the 81st percentile or higher of all registered jobs in the Netherlands. Jobs are classified as low-paid if they are in the 30th wage percentile or lower.

The mean share of high-paid employees was calculated as the (weighted) average number of high-paid jobs, as a percentage of the average number of total jobs registered in the Netherlands per year, by locus of control (foreign versus Dutch controlled enterprises). A similar approach was taken to determine the mean share of low-paid employees.

C6.3a Share of high and low-paid employees at foreign and Dutch controlled enterprises (weighted)



6.3b Share of high and low-paid employees in foreign and Dutch controlled enterprises, by industry and size class

Table C6.3b shows that foreign enterprises in the Netherlands paid substantially higher wages in 2007 than Dutch controlled enterprises, across all industries. Conversely, Dutch enterprises consistently have a higher share of low-paid workers than foreign enterprises.

When comparing the ratio of high versus low-paid workers by industry, the differences between Dutch and foreign controlled enterprises are most pronounced in the agriculture, mining and quarrying, food and beverages, other manufacturing, hotel and restaurant and trade and repair sectors. The agriculture sector in particular stands out, where foreign enterprises employed about 5 times more highly paid workers than Dutch controlled enterprises in 2007. The hotels and restaurant sector also stands out, for both foreign and Dutch controlled enterprises alike, in having a disproportionate share of low-paid workers, and very few high-paid workers.

Foreign enterprises in the Netherlands also paid substantially higher wages in 2007 than Dutch controlled enterprises, across all size classes, as Graph C6.3b shows. Even very large foreign controlled enterprises (250+ employees), often referred to as MNEs, have a substantially larger share of high-paid workers compared with their Dutch counterparts.

Furthermore, for Dutch controlled enterprises there is a strong positive correlation between enterprise size and the relative share of high-paid workers. Conversely, in foreign controlled businesses, the highest share of high-paid workers can be found in very small businesses, consisting of the owner and one or two employees. This might be explained by the fact that foreign business owners pay out part of the firm's profit as their own salary and that they are generally more highly educated.

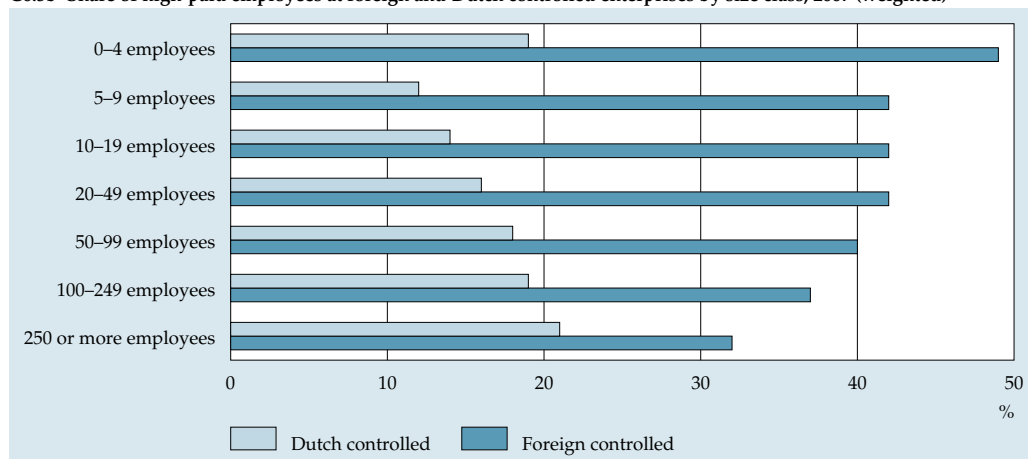
Employees and their jobs are classified as high-paid if their wage is in the 81st percentile or higher of all registered jobs in the Netherlands. Jobs are classified as low-paid if they are in the 30th wage percentile or lower.

The mean share of high-paid employees was calculated as the (weighted) average number of high-paid jobs, as a percentage of the average number of total jobs registered in the Netherlands per year, by locus of control (foreign versus Dutch controlled enterprises). A similar approach was taken to determine the mean share of low-paid employees. In addition, separate ratios were then calculated for each category of interest, i.e. industry and size class.

Table C6.3b
Share of high and low-paid employees working at foreign and Dutch controlled enterprises by industry, 2007
(weighted)

	High-paid		Low-paid	
	foreign controlled	Dutch controlled	foreign controlled	Dutch controlled
Total	34	18	18	31
<i>Industry</i>				
Agriculture, mining and quarrying	51	10	5	44
Food and beverages	45	19	4	27
Paper, paper products and publishers	39	26	6	15
Chemicals and plastic products	53	37	4	9
Metal products	26	17	4	14
Machinery and equipment	34	29	5	11
Other manufacturing and utilities	46	19	4	15
Construction	39	22	4	11
Trade and repairs	30	11	25	46
Hotels and restaurants	6	2	46	72
Transport, storage and communication	31	19	11	26
Financial intermediation	56	49	6	14
Real estate, renting and business services	30	22	28	35
Other services	22	16	21	29

C6.3b Share of high-paid employees at foreign and Dutch controlled enterprises by size class, 2007 (weighted)



6.4 *Labour force composition in foreign and Dutch controlled enterprises*

Foreign and Dutch controlled enterprises do not differ dramatically with respect to the make-up of their workforce in terms of gender, age and nationality. However, there are a few small differences, some of which become more pronounced when looking at the breakdown by industry or size class, as shown in Table C6.4.

On average, foreign and Dutch controlled enterprises have an equal share of older workers, as shown in Graph C6.4. However, a substantially higher share of older employees work for foreign controlled enterprises in the agriculture, mining and quarrying and hotel and restaurant sectors compared with their Dutch counterparts, see Table C6.4. Conversely, there is a substantially higher share of older employees working for Dutch controlled companies in the transport, storage and communication and other services sectors.

There is a significant difference between foreign and Dutch enterprises with regard to their share of female workers, as shown in Table C6.4. In general, Dutch controlled enterprises employ more females: almost one in two workers compared with one in three at foreign controlled counterparts. This might be explained by the fact that part-time working contracts are more common among Dutch controlled enterprises and this in turn might attract more female workers. Overall, the share of female workers is highest in the trade and repair, hotels and restaurants, financial intermediation, real estate, renting, business and other services sectors.

Perhaps not surprisingly, there is a substantially lower share of native Dutch employees working at foreign controlled enterprises. This could be due to a larger share of expatriate workers acquired through takeovers and offshoring, or simply because the working language or international orientation of foreign enterprises attracts or necessitates more foreign employees. Nevertheless, the share of native Dutch workers is still relatively high, around 75 percent in 2007, whereas at Dutch companies the share of native Dutch employees is only 10 to 15 percent higher. The difference in the relative share of Dutch native workers is most pronounced for very small enterprises.

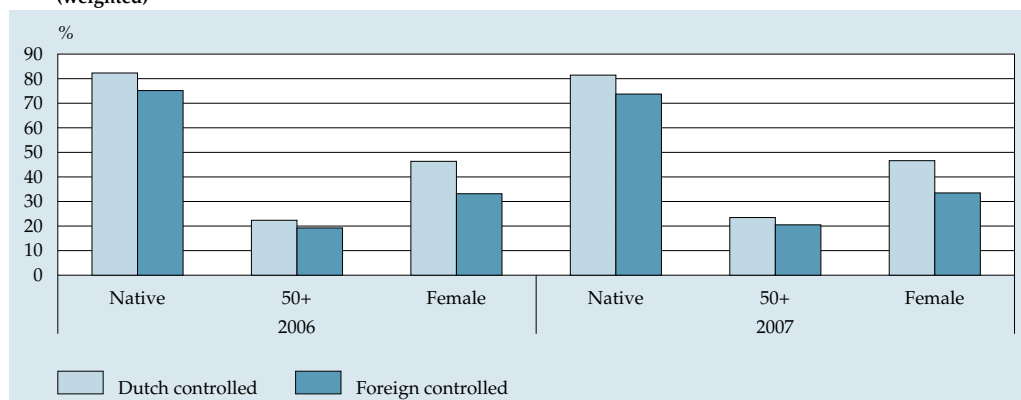
The composition of the workforce describes the characteristics of employees within an enterprise. By linking characteristics of employees useful information is gathered about different, more or less homogeneous, groups of employees. From the perspective of globalisation it is of interest whether the groups differ depending on the locus of control of an enterprise (foreign versus Dutch controlled).

The mean share of female employees in the Netherlands was calculated as the (weighted) average percentage of women in the total workforce in the Netherlands at the end of the year, by locus of control. Similar calculations were made for the share of older (50 years and over) and native Dutch employees. In addition, separate ratios were then calculated for each category of interest, i.e. industry and size class.

Table C6.4
Share of female, older (50+) and native Dutch employees working at foreign and Dutch controlled enterprises by industry and size class, 2007 (weighted)

	Female employees		Older (50+) employees		Native Dutch employees	
	foreign controlled	Dutch controlled	foreign controlled	Dutch controlled	foreign controlled	Dutch controlled
	%					
Total	33	47	20	23	74	81
<i>Industry</i>						
Agriculture, mining and quarrying	22	28	28	17	79	84
Food and beverages	24	36	24	23	76	83
Paper, paper products and publishers	29	35	25	27	80	85
Chemicals and plastic products	21	24	26	25	79	81
Metal products	10	11	27	24	79	82
Machinery and equipment	13	12	26	24	80	86
Other manufacturing and utilities	12	22	31	32	78	83
Construction	12	9	25	25	81	90
Trade and repairs	44	47	16	17	77	84
Hotels and restaurants	61	52	21	10	68	72
Transport, storage and communication	31	25	21	29	73	84
Financial intermediation	42	40	23	26	76	85
Real estate, renting and business services	37	40	16	17	65	69
Other services	41	67	17	29	77	85
<i>Size class</i>						
0–4 employees	31	43	23	23	67	81
5–9 employees	30	45	20	19	71	83
10–19 employees	31	39	19	19	76	83
20–49 employees	28	38	18	20	75	82
50–99 employees	27	40	19	22	77	81
100–249 employees	27	43	21	25	74	81
250 or more employees	36	54	21	26	73	81

C6.4 Share of female, older (50+) and native Dutch employees working at foreign and Dutch controlled enterprises (weighted)



Contributors to the Internationalisation Monitor 2010

Anne-Peter Alberda
Piet Boersma
René Bongard
Fabienne Fortanier
Sandra Genee
Marjolijn Jaarsma
Marjolein Korvorst
Andries Kuipers
Chantal Lemmens-Dirix
Oscar Lemmers
Martin Luppés
Frits Mullenders
Eugene van der Pijll
Peter Smeets