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seo economic research

"The science of knowing"

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SEO-report No 2015-88

Summary

Empirical analysis provides no evidence that the higher wage threshold for migrants aged 30 and above keep many highly skilled migrants from working in the Netherlands. At the same time, empirical evidence shows that these highly skilled migrants stay in the Netherlands longer if the partner is employed. Increasing the number of opportunities for foreign students to gain work experience during their study does not have substantial effects on their retention rate.

Most highly skilled migrants gain access to the Netherlands through the "Highly Skilled Migrants Scheme" *(Kennismigrantenregeling)*, which guarantees quick processing and high acceptance rates for migrants whose wages are above a certain threshold. The rationale is that income reflects productivity and hence the worker's value to the economy. In light of that rationale, an above-average income threshold was established to ensure above-average contributions to the Dutch economy.

This strategy for managing the admission of highly skilled migrants based on one or more wage criteria offers certain advantages over supply-driven point systems. The wage threshold serves to guarantee a certain productive value for highly skilled migrants (and their jobs), whereas a supply system provides no such guarantees. The wage threshold is a logical consequence of the focus on quality over quantity. In the Dutch system, the wage threshold for younger migrants (up to age 29) is lower than that for older migrants (age 30 and above).

There is no evidence that the higher threshold for migrants aged 30 and above would keep many highly skilled migrants from working in the Netherlands. Nor is there any evidence of large selection effects. The number of highly skilled migrants aged 30 is just slightly lower than the figure for those aged 29: only around 70 individuals in 2012, and fewer in the preceding years.

No less than 78 percent of the 29-year-old group of highly skilled migrants started with wages that were already above the higher threshold, although this cohort was actually still eligible for the lower threshold. The fact that most entered employment at wages far above the threshold means that an increase in the threshold would affect only a small group: the *average* effects of the higher wage threshold are limited.

However, the average conceals more interesting discontinuities in the lower ranks of the wage distribution. For the 10 percent of highly skilled migrants with the lowest wages, a 12 percent jump in starting wages is observed between individuals starting at age 29 (last age for lower threshold) and those starting at age 30 (first age for higher threshold). This extraordinary wage jump suggests that employers are willing to pay higher wages in order to benefit from the advantages that the Highly Skilled Migrants Scheme (*Kennismigrantenregeling*) provides. For this small group of migrants, whose wages are close to the threshold level, employers appear to prefer the short processing and high acceptance rates of residence permit applications over lower salaries.

High skilled migrants with a working partner have a higher chance of staying longer in the Netherlands. If policy aims to encourage highly skilled migrants to stay for longer period of time,

there may be room for improvement in this regard. Between 2005 and 2012, no more than 26 percent of the migrants' partners held jobs. If more partners could be enabled or encouraged to work at the Dutch labour market, migrants would stay in the Netherlands longer.

Foreign students in higher education benefit from work experience during their studies. It raises their chances of being able to stay in the Netherlands in the first few years after graduation. The magnitude of the effect, however, is rather small. There is a stronger reversed causality: students with the intention to remain longer in the Netherlands are more inclined to build up (relevant) work experience while they are studying. As a consequence, policies that increase opportunities for foreign students to work more hours before graduation would hardly affect the duration of stay in the Netherlands after graduation.

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1 Introduction

In order to support an upcoming OECD review on labour migration policy in the Netherlands, SEO Economic Research asked the Dutch ministry of Social Affairs to conduct in-depth quantitative analyses on migration policy. Three topics were investigated: the salary thresholds in the admission scheme, the relevance of the labour market status of partners among migrant couples and the relevance of work experience for foreign students.

The Organisation for Economic Co-operation and Development (OECD) is undertaking a series of reviews of the management of labour migration. Each review analyses whether a country uses labour migration effectively and efficiently to meet its labour demand, and how it fares in this respect as compared with other OECD countries. The review on the Netherlands was supported by the Dutch Ministry of Social Affairs and Employment (SZW). It seeks to assess whether Dutch labour migration policies are effective in meeting their objectives. It takes a close look at the functioning of the system to determine its strengths and the areas that require improvement. The first part of the OECD review considers the demographic context for labour migration, the recent evolution of migration policy, and administrative procedures. The second part is expected to involve more in-depth analyses of a few selected issues and to present policy-relevant conclusions.

The Ministry of Social Affairs and Employment commissioned SEO Economic Research to conduct this in-depth analysis in order to support the OECD review and expand the knowledge base among Dutch policy makers. Other government bodies involved in these efforts are the Ministry of Economic Affairs (EZ) and the Ministry of Justice (V&J). The analysis commissioned was required to be quantitative, and to focus on three specific topics:
- the impact of different salary thresholds on the inflow (and retention) of highly skilled migrants,
- the effect of partner employment status on the retention of highly skilled migrants,
- the effect of work experience (during the study) on the retention of international students after graduation.

This report analyses these topics, using detailed quantitative information from population registers on jobs, wages and residence permits for highly skilled migrants. The analysis zooms in primarily on the following three research questions:

1. What effect does the wage criterion (or would a change in it) have on the number and type of highly skilled migrants coming to the Netherlands?
2. What effect does the labour market status of migrants' partners (or would a change in it) have on the length of stay (and probability of return) of highly skilled migrants?
3. What effect does work experience in the Netherlands during the study period have on the length of stay (and probability of return) for foreign graduates?

A very comprehensive qualitative and quantitative evaluation of recent Dutch migration policy is already available from the IND (the Dutch Immigration and Naturalisation Service), see Obradović (2014). Thus, the aim of this study is not to offer a comprehensive evaluation of the Dutch system. Rather, this report seeks to provide additional building blocks for such an evaluation in a broader perspective in the upcoming OECD analysis. The focus is primarily on non-EU migrants, as EU

nationals are entitled to work anywhere in the EU, and are not subject to local migration laws. Nonetheless, estimates are that the number of EU nationals working in the Netherlands that would qualify as "highly skilled migrants" - given the wage criterion - is around 50 thousand. That is three times the number of highly skilled migrants from non-EU countries.

Section 2 below illustrates current issues in migration policy, both in the international and Dutch contexts. These issues involve questions, such as: what admission schemes are in place? What is the balance between pull factors and economic contribution? And how does Dutch migration policy compare from an international perspective? Since this report targets a broad audience, this section will be limited to a non-technical discussion. More technical details are provided, however, in the appendices. Section 3 presents facts and figures on the most important group (those admitted under the *Kennismigrantenregeling* scheme for highly skilled migrants). This data is provided in order to offer insight into the information available for quantitative estimation and the issues under investigation as relating to the wage threshold. Section 5 presents the outcomes of the analysis of wage thresholds. Section 6 outlines the findings on the role of the migrants' partners, and section 7 the findings on the importance of the students' work experience. Finally, section 8 sums up the most relevant conclusions.

Appendix A provides interested professional readers with details of the data used. Appendix B complements the general discussion in section 3 by elaborating on the technical aspects of the methodology. Appendix C contains some background statistics on the research populations listed in sections 5, 6 and 7.

2 Highly skilled migration policy issues

Increasingly, national governments are making it a priority to attract skilled migrants. More and more countries are designing policies to make their countries more easily accessible for selected groups of migrants (OECD, 2009; Facchini & Lodigani, 2014; PBL, 2014).

The interest of policy makers in skilled migrants is based on two economic arguments (Kremer et al., 2012; Ruhs & Anderson, 2012). First, migrants are seen as a solution for current and anticipated labour market shortages. Developed countries face ageing labour forces and fear shortages in labour supply. A second rationale is that skilled migrants make a positive contribution to economic growth and boost the competitiveness of an economy. Following the logic of endogenous growth theories, human capital is seen as an indispensable input for economic growth. Skilled migrants immediately increase the human capital stock. Additionally, there is a political argument. In accordance with the Lisbon Strategy and Europe 2020, European countries are committed to be among the most competitive and dynamic knowledge-based economies in the world. Mobility of skilled students and workers is part of these strategies.

Global competition for skilled migrants is expected to intensify in the coming decades. The demand for skilled migrants will grow – not only in developed countries, but also in BRICs and other upcoming economies (OECD, 2009; Papademetriou, 2012). Hence, the Netherlands is not only competing with countries, such as the United States and Germany, but also with Brazil and Turkey.[1] In popular terms, this has been dubbed as the "battle for the brightest", the "battle for brains" or the "war for talent".

The Netherlands does not seem to be at the frontline of the battle for the brightest. PBL (2014) concluded that the percentage of skilled migrants in the Netherlands was around the OECD average. In addition, that group's growth rate lags behind other OECD countries. This is not due to a lack of interest from policy makers. Over the past decade, the Dutch government has introduced several policies to attract skilled workers and international students.

The design of some of these schemes (and their features) will be analysed in the remainder of this report. This chapter provides a brief overview of current admission policies in the Netherlands. In addition, it sums up the main conclusions from Dutch policy evaluations and international literature regarding pull factors and the economic contribution of skilled migrants. It also provides some background to the three research questions explored with empirical analyses in the remainder of this report.

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[1] At the same time, the OECD (2009) anticipates that there will be notable changes on the supply side as well. Regions, such as Latin America and China, also face ageing labour forces. This restricts their potential as donors of skilled migrants. By contrast, other regions, such as Southeast Asia or Africa, will continue to have young populations. Moreover, enrolment in tertiary education will continue to rise in many parts of the world, thus increasing the supply of highly skilled labour. All in all, the OECD does not expect a decline in the supply of skilled migrants.

2.1   Admission schemes in the Netherlands

The institutional setting for migration to the Netherlands differs fundamentally between nationals of European Union member states (EU) and non-EU nationals.[2] EU nationals are guaranteed the rights of free movement of persons and free movement of services.[3] Every EU national has the fundamental right to settle in the Netherlands and seek employment on the Dutch labour market, or offer services as an employee from a foreign company.[4] EU nationals are not required to apply for a residence permit. In effect, this means that the Dutch government cannot use admission policy as an instrument to select specific groups of EU migrants: consequently, the scope of migration policy is limited to so-called "third countries".

Non-EU migrants do need to apply for residence and work permits in the Netherlands. There are different schemes for different purposes of immigration. For skilled migrants, the Netherlands offered seven schemes in the period from 2005 to 2012.[5] Table 2.1 provides an overview of the importance of each of these admission schemes.

Table 2.1   Number of approved applications per admission policy

	2008	2009	2010	2011	2012	2013
Highly Skilled Migrants Scheme (national policy)	6,650	5,060	5,440	5,880	5,810	7,370
European Blue Card (2009/50/EC)	-	-	-	0	<10	<10
Scientific Researcher (2005/71/EC)	220	1,100	1,410	1,610	1,690	2,360
Scientific Researcher (national)	160	10	<10	0	0	10
Scientific Researcher with Research Grants (national)	490	200	60	20	10	10
Self-employed point system (national)	20	30	50	50	60	30
"One-year Job Seeker Permit for Highly Skilled Workers" (national)		≈ 80	≈ 120	≈ 115	≈ 150	n.a.
"One-year Job Seeker Permit for Recent Graduates"[6]	*5,050 during 2008-2011*					

Source: Obradović, 2014; WODC, 2014. Numbers regard the first type of permission granted.

- The *Highly Skilled Migrants Scheme (Kennismigrantenregeling)* was introduced in December 2004 and offers a relatively quick and transparent procedure for obtaining a residence permit. It is the most relevant admission scheme. Skilled migrants are identified on the basis of a job offer that

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[2]   Citizens of Iceland, Liechtenstein, Norway and Switzerland are included in most of the Dutch and European migration policies that apply to EU citizens.

[3]   Note that citizens of Bulgaria and Romania have been entitled to free movement of persons since 1-1-2014.

[4]   Despite the free movement of persons and services, there are numerous differences in legal status, social security regimes and taxes between EU/EEA migrants, depending on employment conditions (Berkhout et al., 2014). Different regimes apply to migrants employed by Dutch companies as compared to those employed by foreign companies (that offer services in the Netherlands) and (foreign) self-employed workers.

[5]   There are also separate policies for other labour migrants (seasonal workers, employees), students, family reunification applicants, asylum seekers, au pairs and permanent residence seekers.

[6]   There are no officially published records in the literature regarding the number of one-year permit applications approved for recent graduates to enable them to seek employment (*Zoekjaar Afgestudeerde Studenten*). The number in this table is valid only for the first permits granted, but the real usage is higher. Many students are first granted a permit for "study", and after graduation, are issued a new permit as "job seekers".

meets a minimum income threshold from an "officially recognized" employer.[7] The rationale is that income reflects productivity, and hence, the worker's value to the economy. An above-average income threshold has thus been established in order to ensure above-average contributions to the Dutch economy. Residence permits can be granted for a maximum of 5 years; after 5 years, foreign nationals may apply for permanent residence, or naturalization. In addition, partners of highly skilled migrants receive permission to work in the Netherlands (without being required to qualify as "highly skilled migrants" themselves).

- In 2009, the *European Blue Card Initiative* (2009/50/EC) was published. In 2011, the scheme was introduced in the Netherlands. As with the Highly Skilled Migrants Scheme, skilled migrants from non-EU/EEA countries are identified on the basis of a job offer (not necessarily from a recognized employer), which meets a minimum income threshold. In addition, the migrant must have successfully completed a post-secondary programme of higher education of at least three years. Given the higher threshold and additional diploma criterion, this initiative is more restrictive than the Dutch scheme, and is thus rarely used.

- Migrants who wish to pursue a career as a scientific researcher may be eligible for three different schemes:
  - Under the *Scientific Researcher (2005/71/EC)* EU directive, non-EU/EEA foreign nationals can obtain a residence permit if they are selected by a "recognized" research institute to carry out a research project. The legal relationship between the migrant and research institute is specified by means of a guest agreement. In addition to the terms of employment, the guest agreement shows that the migrant has appropriate qualifications to participate in a university doctoral degree programme, and states that the research project has been approved by the research institute. The migrant's partner also receives permission to work in the Netherlands (without the restrictions that apply to the researcher). Since 2008, this has been the most popular scheme among scientific researchers.
  - If the research institute is not recognized by the Dutch Immigration and Naturalisation Service (IND), and the migrant does not qualify for the Highly Skilled Migrants Scheme, he/she may obtain a permit under the national *Scientific Researcher Scheme*.
  - Previously, there was a separate scheme for Scientific Researchers with Research Grants. However, with the introduction of the Modern Migration Policy Act (*Wet Modern Migratiebeleid*), this scheme was terminated and replaced by the EU directive, Scientific Researcher. Only people previously admitted can extend their permit under the conditions of this scheme.

- The Modern Migration Policy Act also offers a scheme for *self-employed* (skilled) migrants. The main criterion is that the business activities serve an essential Dutch interest. The Dutch Immigration Service uses a point system to assess the value of business activities. Special rules apply for freelancers and for US, Japanese and Turkish nationals (who are not covered by the point system registration). Furthermore, a special programme for start-ups was introduced on 1 January 2015.

- Foreign nationals, who have obtained a Bachelor's or Master's degree in the Netherlands, are eligible for the *One-year Job Seeker Permit for Recent Graduates (Regeling Zoekjaar Afgestudeerden)*. This scheme allows free entry into the Dutch labour market for a maximum period of one year following graduation. This one-year period gives graduates the opportunity to search for a job

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[7] The minimum income threshold is revised biannually and is currently (effective 1-1-2015) set at €4,524 per month for people aged 30 and above. For young people (under 30 years) and recent graduates, a lower minimum applies: €3,317 and €2,377, respectively. If one does not receive a holiday allowance the threshold is slightly less.

in the Netherlands. For job offers to highly skilled migrants, a low(er) income threshold applies. Migrants are not permitted to enter the Netherlands under this scheme; it is used exclusively for migrants who have previously held a residence permit as a student. PhD graduates are currently not eligible for this scheme, but will be in the new scheme once the current revision is finalized.

- The *One-year Job Seeker Permit for Highly Skilled Workers (Regeling Hoogopgeleiden)* targets migrants that have obtained a Master's degree or PhD. Those eligible are issued a residence permit for a period of one year to seek suitable employment in the Netherlands. The main criterion required of applicants is that their Master's degree or PhD come from a university that ranks in the top 200 of the most recent Times Higher Education World University Rankings, QS World University Rankings, or Academic Ranking of World Universities. Master's degrees and PhDs from Dutch universities also qualify. Those who find employment during this job seeking year are required to obtain an additional work permit. This scheme also offers highly skilled migrants the opportunity to look for a job in the Netherlands. Evaluations showed that the majority of those who applied under this scheme were already living in the Netherlands, although it was originally designed for graduates from foreign universities. In the version that is currently under revision, this scheme will be merged with the One-year Job Seeker Permit for Recent Graduates.

Although a variety of schemes are available, not all are equally important. In recent years, most skilled migrants have gained admission on the basis of the Highly Skilled Migrants Scheme (see Table 2.1). Moreover, a considerable number of people have migrated as Scientific Researchers under Directive 2005/71/EC. Table 2.1 also also shows that the European Blue Card and the scheme for self-employment are not relevant. Policy evaluations (Obradović, 2014; WODC, 2014) note that the European Blue Card initiative targets the same group as the Dutch Highly Skilled Migrants Scheme, but is more restrictive. The point system for self-employed individuals is too rigid and complicated. Consequently, a special scheme for start-ups has been introduced.

2.2   Pull factors

One of the goals of redesigning Dutch admission schemes is to facilitate the admission of highly skilled migrants. According to the majority of organizations and intermediary agencies involved in skilled migration in the Netherlands, admission policies have become easier, quicker and more transparent. This is particularly true for the Highly Skilled Migrants Scheme and Scientific Researcher Directive; other schemes have either been abandoned or need improvement (Obradović, 2014).

Do countries with easy and transparent admission policies attract more skilled migrants than those with less favourable schemes? There is no substantial literature on this topic, but the case of the Netherlands demonstrates that this relationship is not evident. With the Highly Skilled Migrants Scheme, the Netherlands has one of the most transparent admission schemes (Facchini & Lodigani, 2014). Yet, PBL (2014) claims that the percentage of highly skilled migrants in the Dutch labour force is around the OECD average, not above it (based on figures from the year 2000). Moreover, the growth of this group lags behind the OECD average. AWT (2012) found that 3.4 percent of the highly skilled workers in the Netherlands were foreign (either EU/EEA nationals or from other countries), whereas the EU average was 5 percent (based on figures from 2007). All in all, the

exemplary Dutch schemes did not appear to have been a strong pull factor for skilled migrants. However, more recent figures (Obradović, 2013), based on Eurostat figures, show that between 2008 and 2011, the Netherlands ranked second in the admission of highly skilled workers, both in absolute and relative numbers. An important explanation for the weak pull factors is that, from the perspective of skilled migrants, admission policies are not crucial. Papademetriou (2012) argues that skilled migrants, and in particular the *super skilled*, can choose any destination country. Skilled migrants are not hindered by admission schemes and are welcome anywhere in the world (OECD, 2009). That gives rise to the question: what are the main pull factors for skilled migrants?

In general, employment and career opportunities are the most important pull factors for skilled migrants, followed by the living environment and culture in a country. The immigration regime matters far less. A vast amount of literature points to these conclusions (OECD, 2009; Papademetriou, 2012; Facchini, & Lodigiani, 2014; Berkhout et al., 2010; PBL, 2014). However, the literature does not offer any clear-cut strategies for attracting migrants. Obviously, there is no single strategy, as not all migrants are alike (nor, for that matter, are all host countries). There are large differences in the relative importance of pull factors between migrants from – say – India and those from the United States. Such differences can also occur within these groups. Outlined below are a number of general conclusions about pull factors that are – according to the literature – effective, both in attracting and in retaining skilled migrants:

- Skilled migrants carefully weigh employment opportunities. Obviously, the salary level is important, as are other terms of employment. Skilled migrants also consider future career opportunities and chances for personal development.
- Countries or regions with a dense cluster of research institutes and world class companies have a major appeal. This is even more so in places where there are already many skilled nationals and skilled migrants at work.
- Skilled migrants want to live in attractive neighbourhoods, as do the skilled workers who are native to a country. Young skilled migrants prefer to live in vibrant cities with a rich cultural environment. As skilled migrants move into their thirties or forties, and start families, they may prefer less urban environments. However, they do value good transportation facilities and high-level (international) educational opportunities for their children.
- More abstract concepts are also taken into consideration, including safety, social services, and the extent of tolerance that characterizes countries or regions. Negative feelings about the "atmosphere" will certainly diminish the appeal of a destination.
- One specific immigration regulation that is important to migrants with partners, is whether their partners are also eligible for residence and work permits.

No empirical research appears to exist on the role of the partner in decisions to migrate or return, or about the effect of relevant working experience for migrant students. This report provides new information on precisely these issues.

2.3   Economic contribution of skilled migrants

Skilled migrants are not all alike. Several authors distinguish between super skilled migrants and "regular" skilled migrants (Kremer et al., 2012; PBL, 2014). Super skilled migrants are scarce and the most highly desired. The super skilled migrants make a real difference to the knowledge

economy and are extremely productive, even more so than skilled nationals. Regular skilled migrants are less valuable in the sense that they are just as productive, or possibly even less productive, than skilled nationals. Several studies find empirical support for this distinction between the "regulars" and the super skilled. PBL (2014) and Facchini & Lodigiani (2014) found that the majority of skilled migrants earn as much as their national counterparts or less.

Box 2.1   Pull factors explored in this study

This study aims to increase empirical knowledge about specific pull factors. In the case of the Netherlands, three elements of policy design were explored:

- *Wage threshold*. In the Netherlands, most skilled migrants are subject to a wage criterion. What is the effect of the lower wage threshold in the Highly Skilled Migrants Scheme? How many and what type of migrants does this appear to affect?
- *The role of the partner*. Employment opportunities for partners of skilled migrants are probably important. To what extent do working partners increase the duration of stay for skilled migrants?
- *Employment opportunities for students*. EU students in the Netherlands are offered the opportunity to search for a relevant job during the study. The residence permit for non-EU students restricts their work experience to a maximum of 10 hours per week. Is this significant? Does relevant working experience have any effect at all on the length of stay (after graduation)?

The design of admission policies affects the size and composition of migration flows to some degree. In their empirical work, Aydemir (2009) and Facchini & Lodigiani (2014) found that supply-orientated schemes, such as point systems in Canada, are successful in raising the number and percentage of skilled migrants. Yet, several authors (Aydemir, 2009; Ruhs & Anderson, 2012; PBL, 2014) have also found that not all these skilled migrants are equally successful on the labour market. Under supply-orientated schemes in particular, skilled migrants have smaller chances of finding employment, and sometimes end up in low-skilled jobs, such as driving taxis. This is contrary to demand-led regimes, where a job offer is necessary. In essence, this job offer serves as a certificate of relevance. For example, the Dutch Highly Skilled Migrants Scheme sets a relatively high wage criterion for the job offer. Such a regime thus prevents highly skilled migrants from ending up in low-skilled, poorly paid jobs, and fosters the productive value of migrants. Quality, in terms of productive value, is thus set above quantity.

The main lesson that emerges from the literature is that the skills of migrants should be complementary to the current and future economic structure of the host county (Kremer et al, 2012; Ruhs & Anderson, 2012; OECD, 2014). Quality matters more than quantity. To secure quality admission, policies should be even more selective and target skilled migrants with very particular skills instead of attracting any migrant that has completed higher education. It will be a challenge for policy makers, scientists and other experts to develop a vision of the economic structure and occupations of the future and translate that into specific criteria for selection among highly skilled workers.

2.4   Dutch policy in perspective

From the literature discussed above, the Dutch migration regime has three distinct features. First, it is demand-driven. The two most relevant schemes (Highly Skilled Migrants Scheme and Scientific Researcher Directive) require a job offer. Without a job offer, only EU nationals can enter the Netherlands, although young, non-EU migrants can extend their stay (for a maximum of one year) if they have a study permit and have recently graduated. In the Highly Skilled Migrants Scheme, a relatively high wage criterion serves to ensure the migrants' productive value for the local economy. The Scientific Research Directive is restricted to scientific institutions.

Secondly, quality is more important than quantity. Both schemes prevent the admission of highly skilled migrants who have no relevance to the Dutch labour market. It thus prevents skilled migrants from ending up in low-skilled or poorly paid jobs, as has been observed in some cases with supply-driven systems.[8]

Thirdly, partners of highly skilled migrants are also welcomed. The two most relevant schemes entitle the migrants' partners to work in the Netherlands as well, without requiring a work permit.

Given these distinct features, the relatively low number of skilled migrants is not troublesome in itself. Dutch policy aims at attracting and selecting highly skilled migrants that contribute positively to the economy. Countries that are less selective (targeting all highly educated migrants without using selection criteria) have a higher chance of attracting large volumes of migrants.

The Netherlands may have an issue in marketing this transparent regime and the country's attractive living environment. The latter is an important pull factor. Berkhout et al. (2010) considered a broad range of global indicators for employment opportunities, culture and living environment. Although the Netherlands is not in a pole position on these indicators, it is at the front of a larger middle group. The Netherlands performs well as compared to other Western European countries. The Netherlands has an innovative and dynamic knowledge economy, a highly skilled labour force, high-quality universities and research institutes and is home to the headquarters of a number of world class companies with good international reputations. The "30 percent tax facility" is also noteworthy.[9] Berkhout et al. (2010) concluded that a possible problem was the fact that many skilled migrants are unaware of the Dutch potential, a conclusion also supported by PBL (2014). PBL (2014) stressed that Dutch companies and government bodies should put more energy into "selling" the Netherlands to potential skilled migrants and developing strong market pull factors.

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[8]   To be eligible to apply for permanent residence or naturalization status, foreign nationals who were admitted under the Highly Skilled Migrant Scheme or Scientific Researcher Directive must retain their residence permits for five consecutive years. Migrants to whom either status is granted may remain in the Netherlands, even if they have poor jobs or no job at all.

[9]   Under the conditions of this provision, foreign employees working and living in the Netherlands are granted a 30 percent tax exemption from their wages. The rationale is that migrants face extra costs, which a tax exemption serves to reimburse. More details about this provision and specific conditions can be found at: http://www.belastingdienst.nl/wps/wcm/connect/bldcontenten/belastingdienst/individuals/living_and_working/ working_in_another_country_temporarily/you_are_coming_to_work_in_the_netherlands/30_facility_for_incoming_ employees/

3 Three lines of research

This section describes the three different lines of research in this report, with focused on the relevant questions, the relevant research population and why it is relevant to Dutch migration policy.

This report seeks to provide empirical evidence in order to facilitate discussions about Dutch migration policy (and possibly those of other countries). The focus is on testing several hypotheses and estimating the true size of expected effects, which are relatively easy to study for the Netherlands due to the high quality of Dutch population registers. Estimates are provided on three different topics: salary thresholds, migrants' partners work experience and the students' work experience.

The three different lines of research are briefly outlined in the subsections below. Generally, a wide variety of microdata are used (registration data on individuals), which were provided by Statistics Netherlands (CBS) and the IND. More technical details regarding these data are presented in Appendix A. In the first analysis, regarding wage thresholds, the applied research techniques include different kinds of regression methods. In the second and third analyses, econometric survival analyses are applied. See Appendix B for further technical details on the methodology.

3.1 Different salary thresholds

Currently, the most commonly applied policy regarding highly skilled migrants from non-EU countries is the "*Kennismigrantenregeling*", which lays down salary criteria (see section 2.1). This policy presents an interesting discontinuity between highly skilled migrants, who start working just before they reach the age of 30, and those who start just after the age of 30. An in-depth analysis may show how the characteristics of the highly skilled migrant labour force differ on either side of the divide.

Theoretically speaking, one would expect very little difference between the productive value of a migrant starting at age 29 and the corresponding value for an individual starting at age 30. On average, starting wages do rise with age, but probably in the range of 2-3 percent per year. For older highly skilled migrants, however, the criterion is about 36 percent higher than for younger migrants. In light of that, one would expect higher salary thresholds to affect the selection of highly skilled migrants admitted to the Netherlands. Probably, the distribution of highly skilled migrants will show only few starters at the age of 30, and relatively many aged 28 and 29. Furthermore, if wages do indeed reflect the actual productivity of highly skilled migrants, one would also expect a large rise in starting wages around this divide. The highly skilled migrants starting at age 30 must be very special cases, given the fact that they are relatively expensive.

From a policy perspective, the relevant question is whether a higher (or lower) threshold would change the number and type of highly skilled migrants coming to the Netherlands. Since the counterfactual condition cannot be calculated directly, an empirical strategy would be to compare the groups at both sides of the divide (regression discontinuity design). Unfortunately, that

approach can only produce valid results if the distribution of subjects around the discontinuity is exogenous (in other words: cannot be influenced by the migrants or their employers). This condition might easily be violated: if employers know that salary thresholds are lower for 29-year-old migrants, they might be tempted to search more intensively for 29-year-olds than for older migrants. Or, in the case of a multinational company, they might encourage their foreign employees to come to the Netherlands before they turn 30 instead of afterwards. These interactions would bias the estimation of the effect of a higher threshold.

This report seeks to determine who would be affected if the lower threshold was altered. What do the empirical data from 2005-2012 tell us about the wage jump, distribution and characteristics of first-year highly skilled migrants on either side of the divide? Which differences are statistically significant? First-year highly skilled migrants were selected from the records of the "*Kennismigrantenregeling*" scheme. That data was then merged with data from administrative records on the Dutch labour market, municipal registers, and migration records. Please see Appendix A for technical limitations and peculiarities regarding the data. The resulting population consists of the "first-year highly skilled migrants in the Netherlands between 2005 and 2012, excluding those working at universities".

3.2   Partners on the labour market

To what extent do highly skilled migrants leave the country because their partner cannot find suitable employment in the Netherlands? Although it seems plausible that some migrant couples might face such a problem, nothing is known about the magnitude of this effect. Section 6 seeks to answer this question, based on an analysis of administrative records on the Dutch labour market between 2005 and 2012. These records contain individual data on every employee, and can be merged with data from municipal records of married partners with migration files and with registrations of highly skilled migrants from the "*Kennismigrantenregeling*" scheme. Please see Appendix A for technical limitations and peculiarities regarding the data. The resulting population consists of "highly skilled migrant couples in the Netherlands between 2005 and 2012".

The length of stay is modelled in a duration model with multiple variables, which is based on the model by Bijwaard et al. (2014). This allows the simultaneous analysis of different effects, such as personal and labour market characteristics (for both the highly skilled migrant and the partner), other time-varying variables, such as labour market tightness and the presence of young children in the household, and the length of stay (duration dependence). The duration model also makes it possible to correct for incomplete observations (*censoring*): the duration of stay in the Netherlands is only fully known after a migrant has left. Naturally, it is still impossible to determine the full duration of stay for all the migrant couples that were still living in the Netherlands at the end of the observation period. This "unobserved duration" does not pose any problems for duration models that examine the "probability of migration" in several spells. Furthermore, similar to the model used by Bijwaard et al. (2014), this model allows for the problem of administrative removal in the data. This occurs when a migrant leaves the Netherlands without notifying their municipality of residence of their permanent departure from the country. In these cases, the individuals end up being removed from the municipality's current population register without any specification of their actual migration date. Aside from these issues, this study's model also tackles the more

technical problems of endogeneity and unobserved heterogeneity; please see Appendix B for details.

By investigating the relevance of this issue, it becomes easier to determine what can be gained by improving the partners' labour market situation. As mentioned in section 2.1, the "*Kennismigrantenregeling*" scheme places fewer legal restrictions on the partners than on the highly skilled migrants themselves; partners have unlimited access to the labour market. However, the absence of legal restrictions does not mean that partners can make their way easily into the Dutch labour market. However, due to budget, time and data constraints, this analysis does not investigate the potential obstacles that partners face. Rather, the focus here is on establishing the size of the effects by providing statistically reliable estimates based on real data.

3.3   Work experience during the study period

How much longer do students remain in the country after graduation, if they have had the opportunity to gain (relevant) work experience during their studies? As EU students are free to move and return later, while non-EU students must find a job within a year of graduation, do the effects differ between EU and non-EU students? Does more experience mean longer stays? Section 7 seeks to answer these questions, based on an analysis of administrative records on graduates from Dutch tertiary education from 2008 to 2012. These records contain individual data on every Bachelor's and Master's diploma, and can be merged with data from municipal registers and migration records. Please see Appendix A for technical limitations and peculiarities regarding the data. The resulting populations consists of EU and non-EU "foreign graduates from Dutch tertiary education, who graduated between 2008 and 2012".

The length of stay (after graduation) is also modelled in a duration model with multiple variables. This allows the simultaneous analysis of different effects, such as personal characteristics (age, nationality), time-varying labour market indicators (tightness, region), the level and field of education, and the relevance of work experience. The relevance of work experience is determined on the basis of the job sector, in relation to the field of education. Empirical analyses of previous graduate cohorts show, for example, that a job in a supermarket is not a relevant job, except for Bachelor's students in logistics (see Appendix B for a detailed explanation, or Table B.1 and Table B.2 for an overview of the resulting relevant sectors). The duration model also makes it possible to correct for administrative removal, incomplete observations (*censoring*) and more technical problems, such as endogeneity and unobserved heterogeneity; please see Appendix B for details.

At present, non-EU students are limited in the amount of work experience they are allowed to acquire. The insights gained through this analysis might help in shaping policy, so as to retain more international students. A more complex analysis would be possible, focusing on the types of permit or the process of finding work. However, due to budget, time and data constraints, this analysis was limited to establishing the size of the effects on the length of stay by providing statistically reliable estimates based on real data.

4   Highly skilled migrant employees in the Netherlands

The number of highly skilled migrants working in the Netherlands rose steadily between 2005 and 2012. In the latter year, the number of employees reached nearly 17 thousand. Highly skilled migrants are often male, relatively young, and working full-time in larger companies. The majority are Indian, US, Chinese, Japanese or Turkish nationals.

Although the primary focus is not on producing statistics on the highly skilled migrant population, this section presents a brief illustration of the setting in which the Dutch highly skilled migrant policy finds its way. A very detailed evaluation of Dutch migration policy is available from the IND, see Obradović (2014).

Since the introduction of the "*Kennismigrantenregeling*" scheme for highly skilled migrants, the number of residence applications by this group has increased. According to the dataset available, 16,666 employees on the Dutch labour market in 2012 had initially migrated to the Netherlands on the basis of this scheme.[10] Around 47 percent (7.8 thousand) of these highly skilled migrants were aged 30 year or older when they started their jobs; consequently, their wage was subject to the higher wage threshold (see Figure 4.1). Around 41 percent of the migrant jobs (6.9 thousand) were subject to the lower threshold. For 12 percent (2 thousand), no threshold was imposed, as they were employed in a university job (see Appendix A).

More males than females were working as highly skilled migrants. It follows from Figure 4.2 that since the start of the scheme in 2005, the percentage of females has been rather constant, at around 25 percent. Over half of all highly skilled migrant employees were married.[11] As Figure 4.3 shows, the number of married migrants has increased in recent years.

Recently, more and more highly skilled migrants have been employed on a permanent contract (see Figure 4.4). This is contrary to the general trend on the Dutch labour market, where the number of flexible contracts is growing steadily.

Larger companies (>100 employees) employ the grand majority of highly skilled migrants (see Figure 4.5). Intuitively, this makes sense, as larger companies are often also the more internationally orientated companies. They have an international internal labour market, and may also have fewer problems paying for residence application fees.

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[10]   All statistics in this chapter only refer to individuals whose *first* residence permit application was filed under the Highly Skilled Migrants Scheme. The numbers do not include migrants who entered the country on a different permit (for example "study") and changed their permit status to "highly skilled migrant" at a later date. The numbers do include employees who changed from "highly skilled migrant" to a permanent status. See Appendix A for more details regarding these data issues.

[11]   This refers to married or officially registered couples. The partner does not necessarily have to live in the Netherlands as well. The definition used in chapter 6 is different; see Appendix A for details on these data issues.

Figure 4.1   Number of highly skilled migrants employed in the Netherlands is on the rise
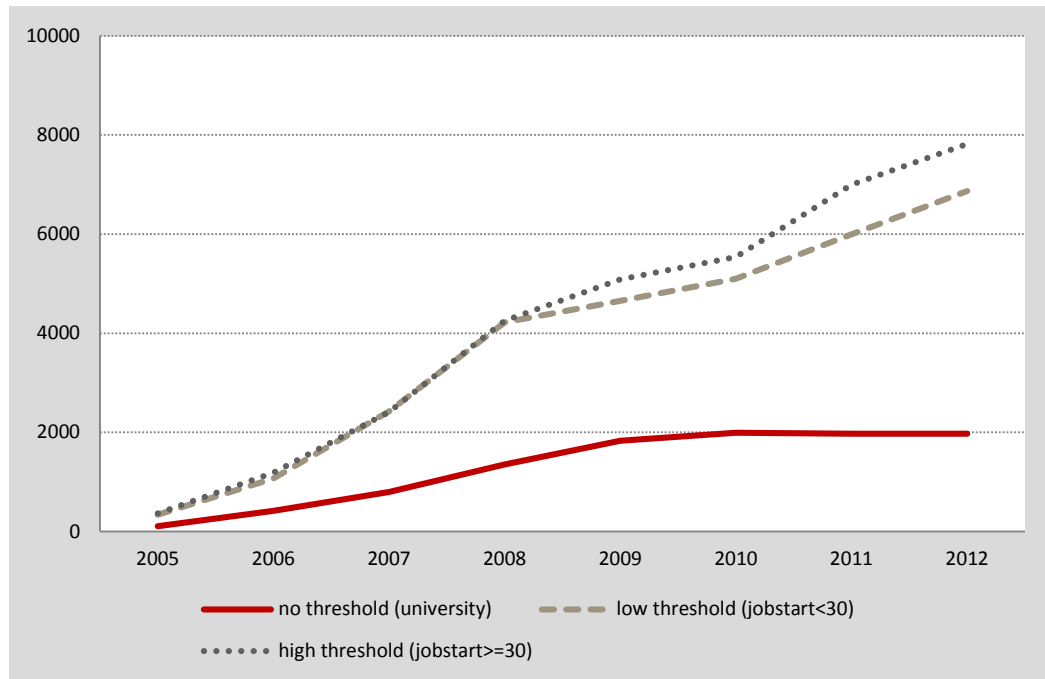
Highly skilled migrant employees, living in the Netherlands.
Source: SEO calculations, based on CBS microdata.

Figure 4.2   Highly skilled migrants predominantly male
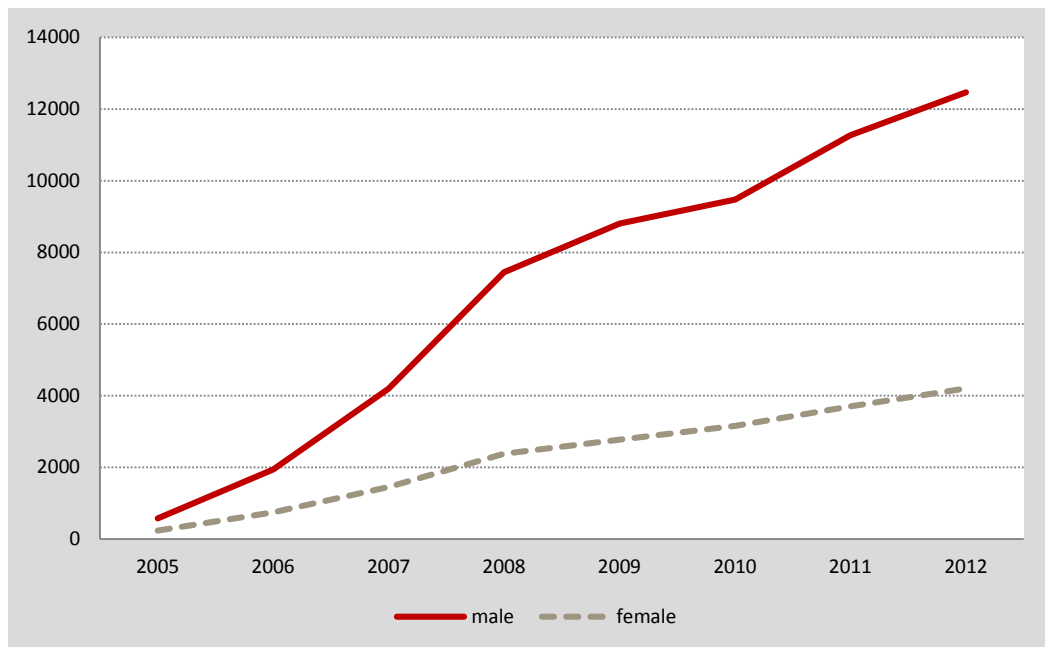
Highly skilled migrant employees, living in the Netherlands.
Source: SEO calculations, based on CBS microdata.

Figure 4.3   Half of the migrants live with an official partner
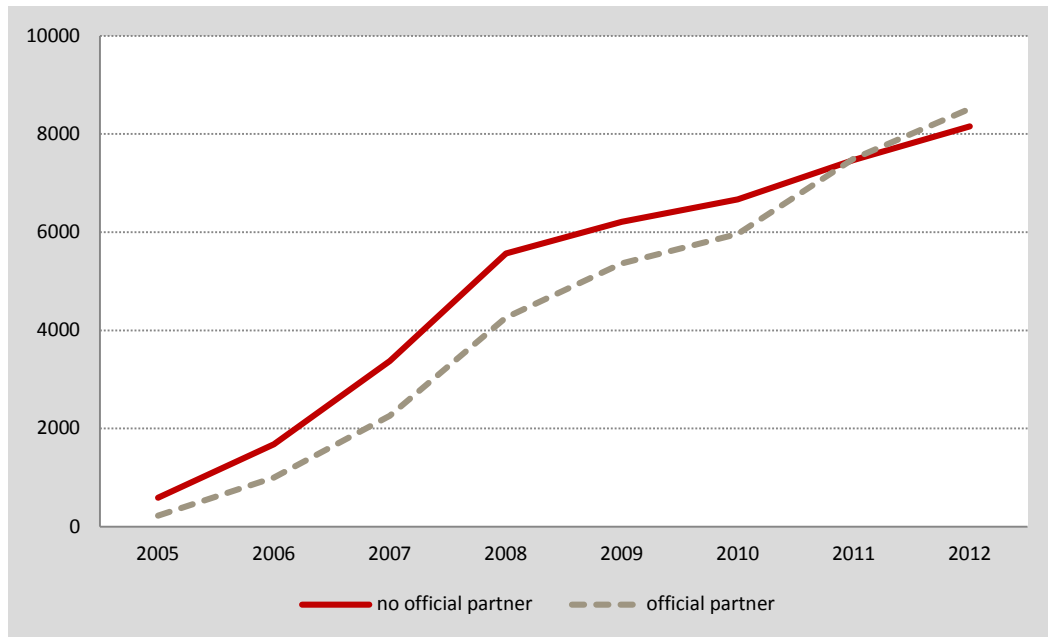
Highly skilled migrant employees, living in the Netherlands.
Source: SEO calculations, based on CBS microdata.

Figure 4.4   Growing importance of permanent contracts
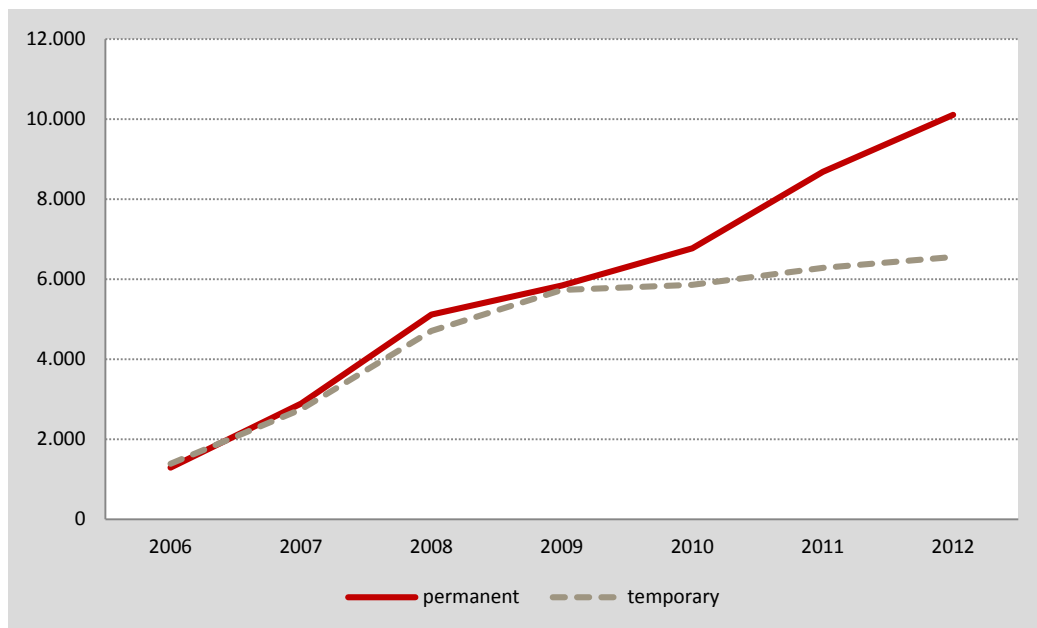
Highly skilled migrant employees, living in the Netherlands.
Source: SEO calculations, based on CBS microdata.

Figure 4.5   Larger companies employ most of the highly skilled migrants

Highly skilled migrant employees, living in the Netherlands. Large companies have >=100 employees, medium-sized companies employ between 10 and 99 workers.
Source: SEO calculations, based on CBS microdata.

One out of every four highly skilled migrants comes from India (see Table 4.1). After the USA, the third and fourth largest countries of origin are China and Japan. In total, more than half of the highly skilled migrants come from the Asian continent. Important countries closer to the EU are Turkey, Russia and Romania.[12] These figures are similar to those in Obradović (2014).

The dominant percentage of Indian migrants probably reflects the importance of the IT consultancy sector, where India is a major supplier worldwide. Compared to the Dutch labour force, highly skilled migrants are over-represented in business, financial and IT services, in wholesale and at universities (see Figure 4.6).

More detail on the sectoral distribution is available in Table C.1 in Appendix. As can be inferred in Figure 4.6, information & communication can be read as "computer programming, consultancy and related services" (Nace sector 62), whereas "business services" merely refers to professional and judicial subsectors, such as head offices, management consultancy, engineering and scientific R&D (non-university). "Wholesale" is a category that is more difficult to interpret; part of these activities might be closely linked to the actual production of goods, such as (in this case) clothing, electrical household appliances, pharmaceuticals and sporting equipment. For administrative reasons, the logistics department of a manufacturer might be registered as a separate unit, which means that in official statistics, they might be recorded as "wholesale" instead of "manufacturing".

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[12]   Although Romania was already a member of the EU in 2012, restrictions were still in place for Romanians who want to work in the Netherlands. Individuals who had officially qualified for "highly skilled migrant" status were exempted from these restrictions.

Table 4.1   Most highly skilled migrant employees come from India

nationality	percentage in 2012	nationality	percentage in 2012
Indian	25.3%	Canadian	2.5%
USA	12.8%	South-African	2.4%
Chinese	6.7%	Iranian	2.2%
Japanese	6.5%	Australian	2.1%
Turkish	5.1%	Korean	1.9%
Russian	4.2%	Brazilian	1.9%
Romanian	3.5%	Ukrainian	1.7%

Source: SEO calculations, based on CBS microdata.

Figure 4.6   Highly skilled migrants over-represented in IT and professional business services
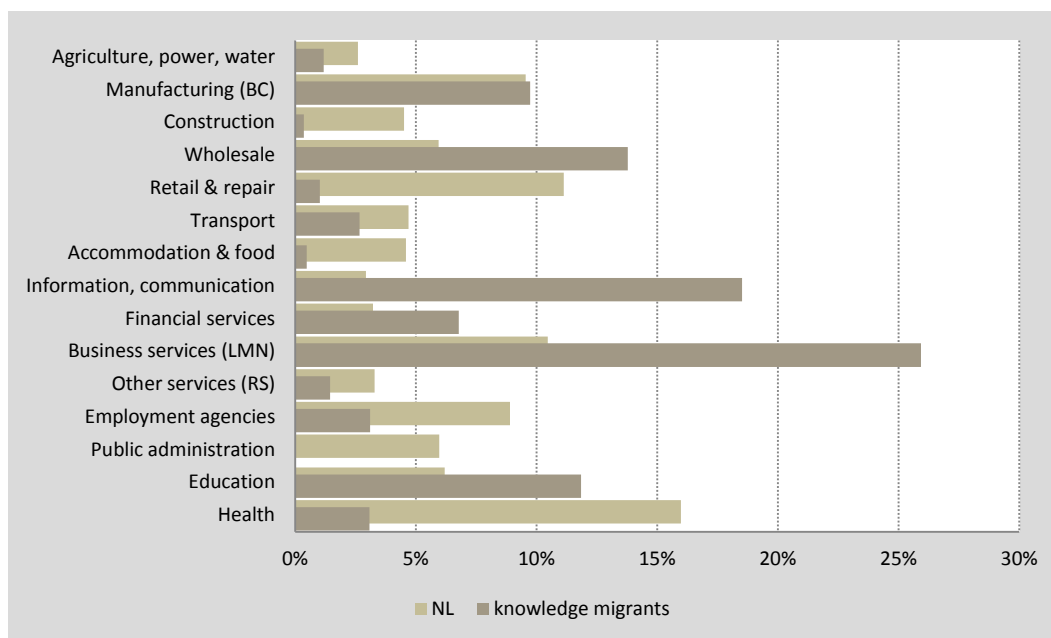
Sectoral distribution of highly skilled migrants, compared to Dutch labour force as a whole (2012).
Source: SEO calculations, based on CBS microdata.

Figure 4.7 shows that the highly skilled migrant population is gradually ageing. However, the average age at which highly skilled migrants start their job is more or less constant, just below age 32. Comparing the highly skilled migrants with the Dutch labour force, Figure 4.8 shows that the age distribution of highly skilled migrants is quite different. Their distribution peaks at age 30, and ages 25-40 are over-represented.

Figure 4.7   The average age of migrants is on the rise, although the average starting age has remained constant

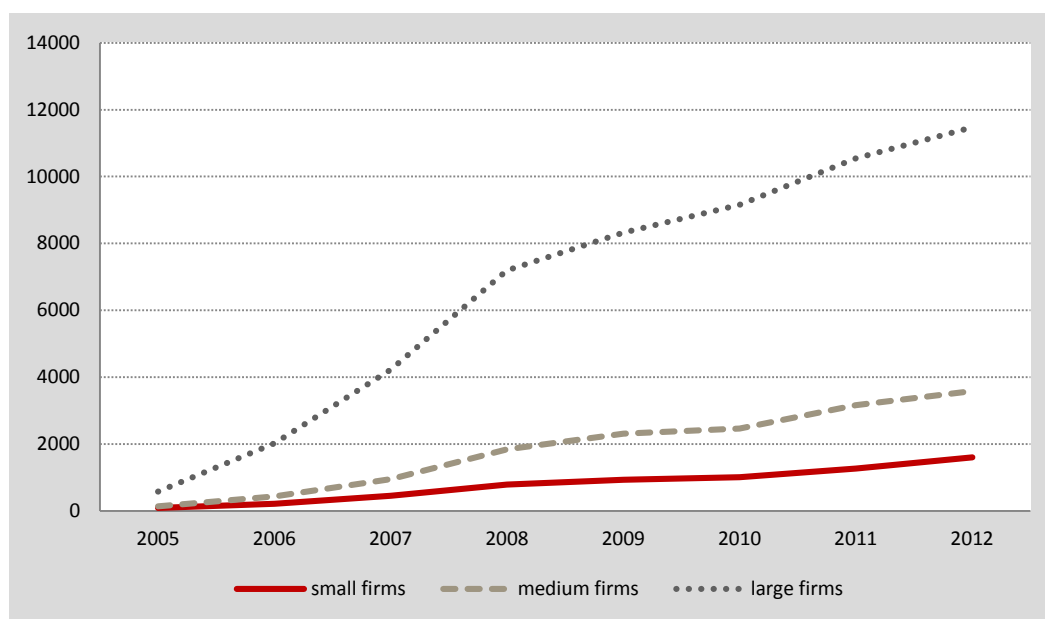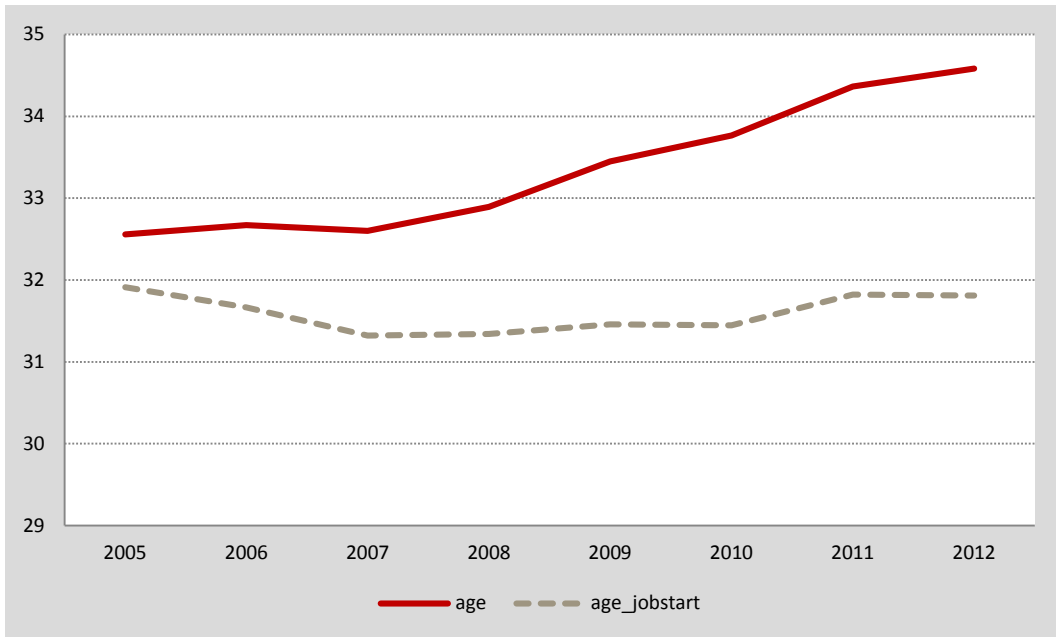Highly skilled migrant employees, living in the Netherlands.
Source: SEO calculations, based on CBS microdata.

Figure 4.8   Highly skilled migrants are on average much younger than regular employees
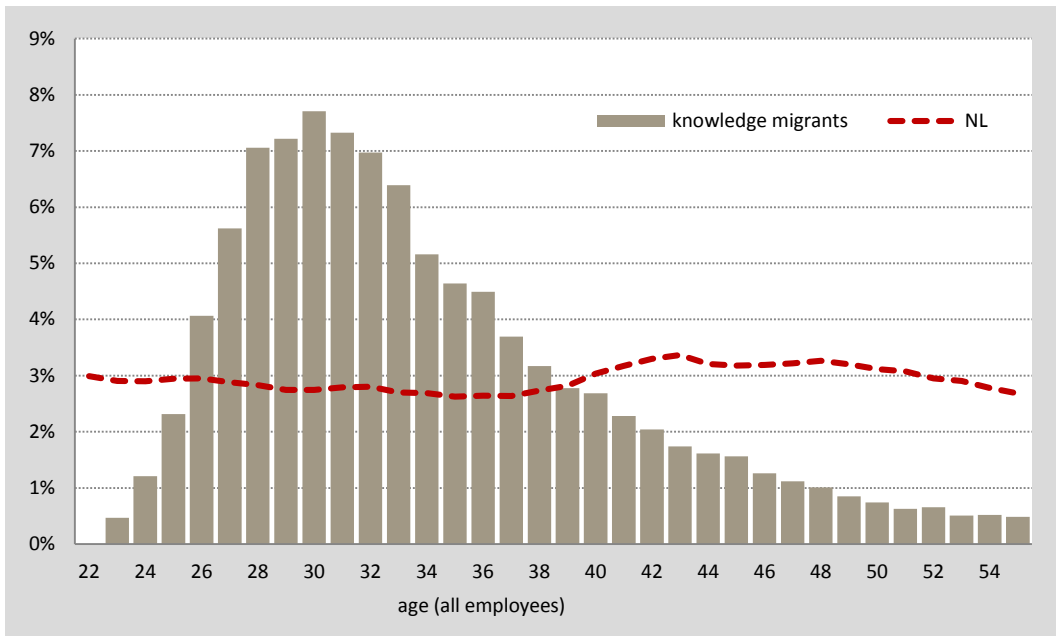
Age distribution of highly skilled migrants (2005-2012), compared to Dutch labour force as a whole (2012).
Source: SEO calculations, based on CBS microdata.

For the analysis of wage thresholds, the interest, however, is not in the distribution of all employees, but only in that of first-year employees.[13] The age distribution of highly skilled migrants in their first year is presented in Figure 4.9, and compared again with the distribution of job starters in the Dutch labour force in 2012. Here, it becomes clear that the gradually declining pattern between ages 26-35 shows an extra drop between the ages of 29 and 30. It suggests that the higher wage threshold for highly skilled migrants from age 30 on effectively reduces the number of migrants after age 30. At the same time, the reduction seems to be limited.

Figure 4.9   Slight drop in migrant job starters after age 29
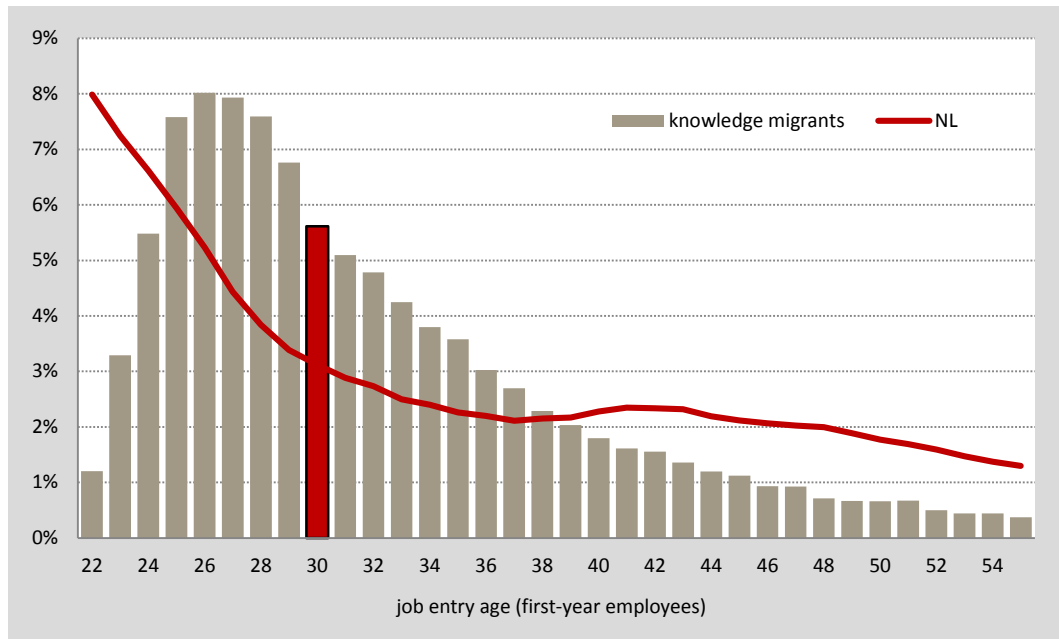
Age distribution of highly skilled migrant job starters (2005-2012), excluding university employees.
Source: SEO calculations, based on CBS microdata.

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[13]   This is because the wage threshold was evaluated at the start of the job; see Appendix B for details on methodology. University employees are not subject to the threshold.

5   Impact of different salary thresholds

The higher salary threshold for highly skilled migrants from age 30 on hardly affects the number and composition of migrants under the "Highly Skilled Migrants Scheme". More than 78 percent of the migrants that start at age 29 already earn wages above the higher threshold. For the 20 percent of highly skilled migrants with the lowest incomes for whom the threshold is relevant, there is evidence that employers are willing to pay higher wages in order to benefit from advantages under the scheme. As a consequence, the number and composition of highly skilled migrants does hardly differ between ages 29 and 30.

The most commonly applied policy regarding highly skilled migrants from non-EU countries is the "*Kennismigrantenregeling",* which uses salary thresholds as admission criteria. The wage thresholds depend on the age at which highly skilled migrants start their jobs: if the migrant enters employment after reaching his/her 30th birthday, a higher wage criterion applies. The relevant question here is: how important is this shift in the wage threshold of more than 36 percent to the composition of the highly skilled migrant labour force. Who would be affected if the threshold were lowered or raised? Does the discontinuity in the thresholds between the starting ages of 29 and 30 show up in the empirical data on wage levels or number of migrants? Are these differences statistically significant? How many migrants could this concern and do they differ in personal characteristics from those who are not affected?

To answer these questions, section 5.1 begins by exploring discontinuities in wages. Section 5.2 then examines differences in background characteristics between the individuals directly below and those directly above the threshold. In which respects do those who start at age 30 differ from their younger counterparts? Using a multivariate approach, section 5.3 examines whether the difference in starting wages on both sides of the divide is statistically significant, even after correcting for several other factors that influence starting wages.

The Dutch 30 percent tax provision and adjusted criteria

Many foreign employees coming to the Netherlands can benefit from an important tax discount. The employer is allowed to pay 30 percent of the agreed wage as a reimbursement for "extraterritorial costs", irrespective of the actual expenses that the employee has incurred for housing, etc. This reimbursement does not count as salary, and is, therefore, non-taxable. However, it does count against the wage threshold. For a correct comparison, therefore, an adjusted wage criterion is used. It is assumed that all employers of highly skilled migrants take advantage of this tax provision. In technical terms, this means that only 70 percent of the wage threshold is relevant when evaluating registered salaries. Please see Appendix A for a more detailed explanation.

5.1   Wage discontinuity for first-year employees

How large is the expected shift in starting wages between migrants who start at age 29 and those who start at age 30? No discontinuity is observable in average wages (see Figure 5.1). Since average wages can be distorted by very high outliers, it is useful to look at the geometric mean, as it is less vulnerable to outliers.[14] The figure shows that both definitions give the same result: a gradual rise between a starting age of 27 and a starting age of 36.

Figure 5.1   Average starting wage shows no clear discontinuity between starting ages 29 and 30
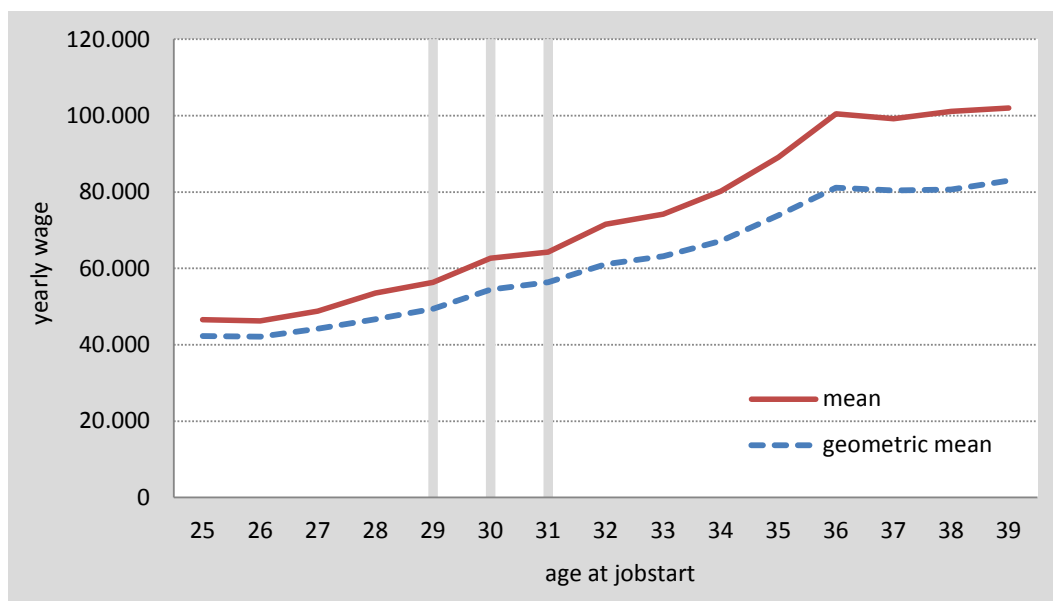
Source: SEO calculations, based on CBS microdata. Excluding university employees. Real wages, 2012 euros.

However, the average may not be the outcome of interest. The discontinuity in wage levels can be seen much clearer at the 5th and 10th percentile (Figure 5.2). The starting wages for the lowest paid employees entering their jobs at age 30 are remarkably higher than those for the lowest paid employees starting their jobs at age 29. This effect becomes clear on examining percentiles 5 and 10; however, it is already less clear for percentile 25. Not surprisingly, the discontinuity vanishes when the mean is examined.[15]

Figure 5.2 also reveals another interesting fact. Among the highly skilled migrants who start at age 29, the wage in the 25th percentile is already above the higher wage threshold that applies to those who start at age 30 or older. In fact, more detailed analyses shows that around 78 percent of the

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14   The geometric mean is defined as the exponent of the average logarithm of wages.
15   The graph also shows that a certain percentage of highly skilled migrants earned a wage below the threshold (the line for the 5th percentile is below the line for the wage criterion at some ages). Naturally, this should not be possible, as the wage criterion is an absolute criterion. However, in practice, these types of errors may occur because of data issues (see Appendix A). For example, registration errors in starting dates and unregistered salary components can cause the calculated wage to appear. The wage data (from the Tax Office) do not stem from the same source as the data used to evaluate the wage criterion (from the IND).

starters aged 29 earned wages that already met the (adjusted) higher criterion, although they were subject to the lower criterion only.[16]

Figure 5.2   Discontinuity is hidden in the lower part of the wage distribution
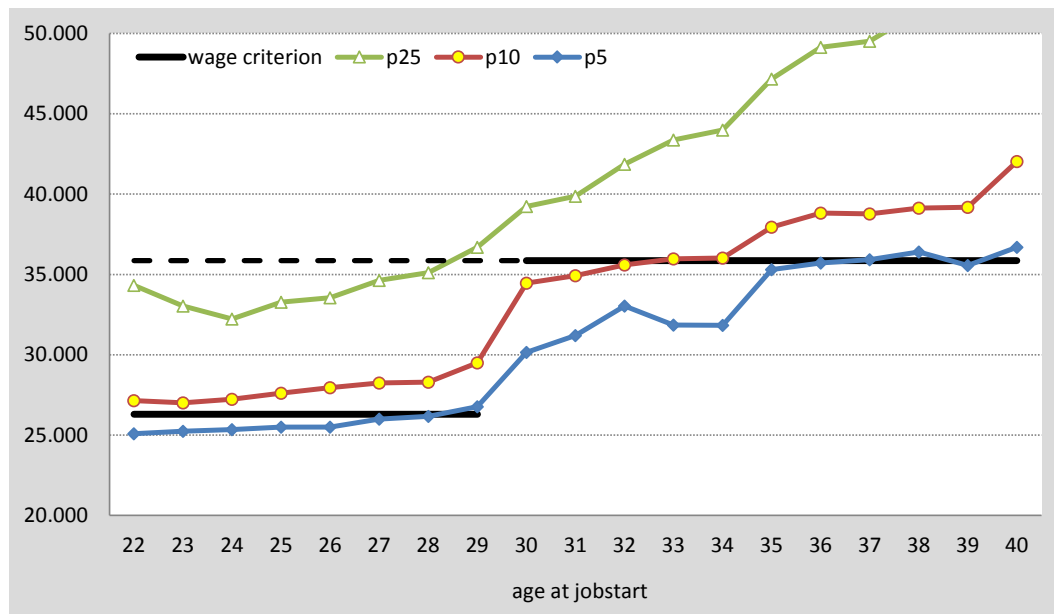
p5, p10 and p25 denote the 5th, 10th and 25th percentile, respectively.
Source: SEO calculations, based on CBS microdata. Excluding university employees. Real wages, 2012 euros.

The magnitude of the wage discontinuity is more clearly visible in Figure 5.3, where the average wage difference between the "starting age cohorts" is plotted, rather than the actual wages. The figure shows that the increase in starting wages is by far the largest for those starting at age 30, as compared with those starting one year younger. The increase is most prominent in the 5th and 10th percentile of the wage distribution.

5.2   Comparison of groups directly above and directly below the threshold

Although the effects on wages appear limited, the question remains whether the wage threshold causes any effect on the number or the type of highly skilled migrants. Does the higher threshold prevent many (probably less productive) highly skilled migrants from starting jobs in the Netherlands once they are 30? Do the highly skilled migrants that start their job at age 29 differ significantly from those that start at age 30? The answer to the first question comes from Table 5.1: the number of highly skilled migrants starting at age 30 is somewhat lower than expected, based on the number at other starting ages, which was also illustrated in Figure 4.9.

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[16]   It is important to note that when individuals start at age 29, their wage threshold is *not* increased in the next year when they turn 30. As long as they stay in the same job, the same low threshold applies. It is only if they change jobs after age 30 that the high threshold becomes relevant to their new job. (Their age of job entry is no longer 29 at this point). Thus, the relevant comparison in this chapter is between individuals in their first year on the job.

Figure 5.3   Starting wages are clearly higher for highly skilled migrants entering their jobs at age
                30 compared to entering at age 29

p5, p10, p25 and p50 denote the 5th, 10th, 25th and 50th percentile, respectively.
Source: SEO calculations, based on CBS microdata. Excluding university employees.

Table 5.1   Number of highly skilled migrant job starters: small drop between ages 29 and 30

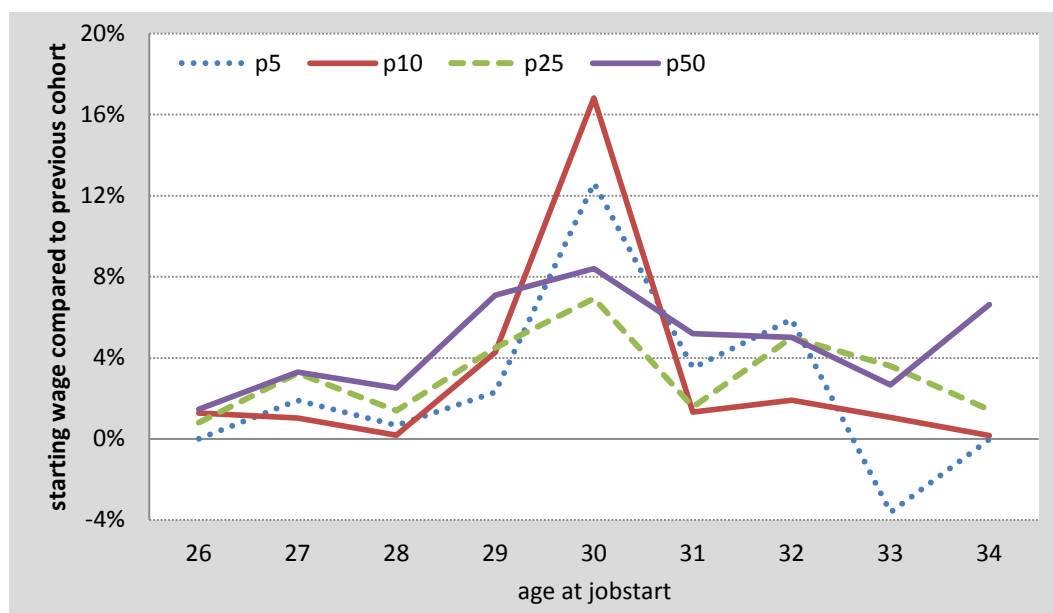|	highly skilled migrant starters	of which age 27	of which age 28	of which age 29	of which age 30	of which age 31	of which age 32
2005	527	53	41	39	28	26	22
2006	1,475	112	116	85	83	70	56
2007	2,812	218	195	193	150	143	113
2008	4,041	332	312	283	241	201	181
2009	3,014	242	205	188	180	160	150
2010	3,504	243	267	229	195	143	170
2011	4,823	368	350	314	249	264	231
2012	4,338	359	358	312	237	231	239
Total 2005-2012	24,534	1,927	1,844	1,643	1,363	1,238	1,162

Age distribution of highly skilled migrants in their first year on the job (2005-2012), excluding university employees.
Source: SEO calculations, based on CBS microdata.

The magnitude of the differences actually appear to be quite small. The higher threshold at age 30 lowers the inflow of highly skilled migrants by a maximum of 70 individuals per year. In 2012, just over 300 highly skilled migrants started their jobs at the age of 29. On average, 78 percent of that group already earned more than the higher wage threshold. However, the lower threshold was a concern for around 70 individuals. Table 5.1 shows that the number of 30-year-old starters was around 70 lower than the number of 29-year-olds. That should be considered the maximum number of highly skilled migrants who would not be working in the Netherlands if the higher wage criterion were applied to 29-year-old starters. The real effect would probably be lower, because the higher threshold would cause some migrants to come to the Netherlands at age 29 instead of age

30. In the absence of a higher threshold, the inflow of individuals aged 29 would probably decrease somewhat, whereas that of migrants aged 30 would increase slightly.

To analyze possible effects of the threshold on the composition of migrants, the personal and job characteristics of those directly below and above the threshold age can be compared. Using a one-year bandwidth, that comparison would focus on migrants who entered their jobs at ages 29 and 30, respectively. Figure 5.4 presents a comparison of migrants in their first job year who fall just above and just below ages 29 and 30, using bandwidths of 1 year, 2 years and 3 years. The conclusion is that these groups differ very little in terms of their relevant characteristics. Significant differences actually relate to personal characteristics (being single versus living with a family) rather than job characteristics, such as employment on a part-time basis, in a small company, or in a specific sector. Differences in the distribution over economic sectors, regions and nationalities have also been tested, but are not included in the graph as they are not significantly different between the younger and the older group.

Figure 5.4   Differences between migrants directly below and directly above the threshold age of 30: family characteristics more important than job characteristics
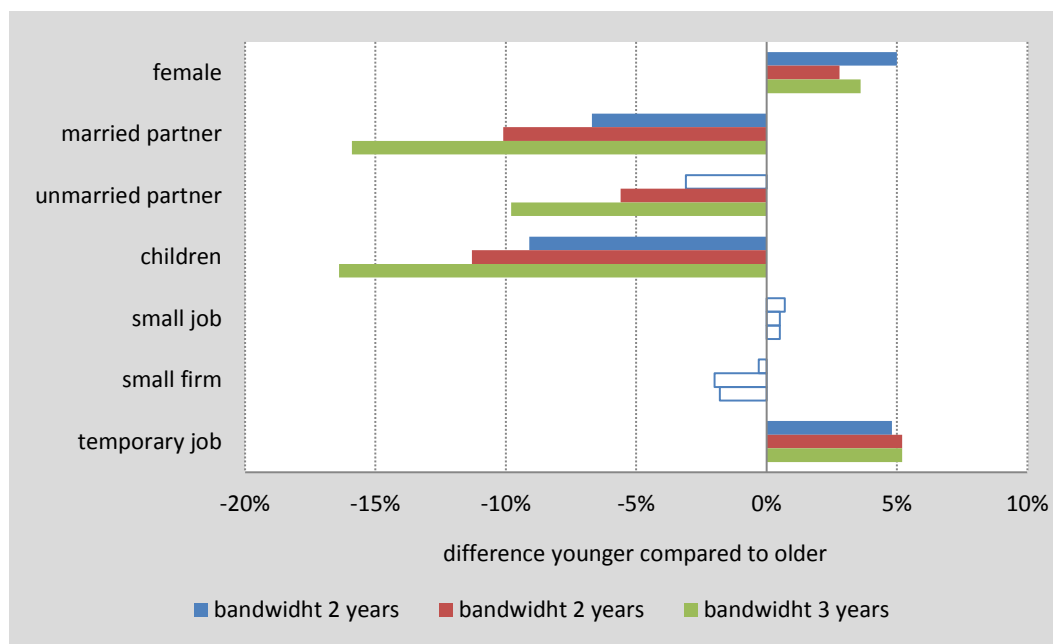
Source: SEO calculations, based on CBS microdata. Excluding university employees. Unfilled bars point at statistically insignificant differences.

Figure 5.5 presents a comparison of job starters with starting salaries below and above the wage threshold. This comparison is done within the group of 29-year-old starters, 30-year-old starters and starters aged 30 to 34. The conclusion is that these groups differ very little in terms of their relevant characteristics. In the group of 29-year-olds, none of the tested variables shows a statistical significant difference. Significant differences among the older groups are more personal related (having children) than job-related.

Figure 5.5   Differences between migrants directly below and directly above threshold income
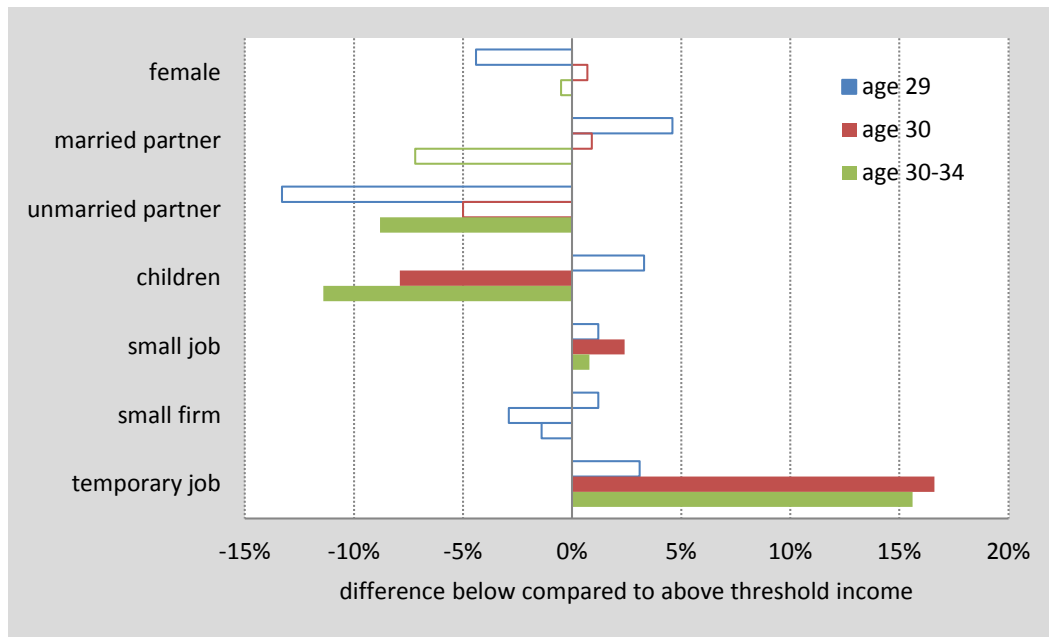
Source: SEO calculations, based on CBS microdata. Excluding university employees. Unfilled bars point at statistically insignificant differences.

5.3   Regression outcomes

Since the threshold only seems to affect the lower part of the wage distribution, the effect is best analysed with quantile regressions (see Appendix B for methodological details). The key results are presented in Table 5.2. They show that, among the lower wages, the starting wages are 2 to 3 percent higher for every increase in age cohort. This falls in line with economic theory, which suggests that older workers have more labour experience, and therefore higher (perceived) productivity, which in turn is reflected in a higher wage. In this analysis, it is assumed that this experience effect is linear: with every year of age the productivity/wage would increase with the same percentage.

However, in the lower ranks of the wage distribution, the increase between migrants starting at ages 29 and 30 is significantly large. Apart from the linear increase, the 10th percentile shows an extra increase of 12 percent between the wages for individuals starting before their 30th birthday and those starting afterwards. This additional increase diminishes further up in the wage distribution. In the 25th percentile the additional increase around the threshold is only 4 percent.

From a policy perspective, the question is what would happen if wage thresholds were altered. If the threshold were raised, would highly skilled migrants start searching for jobs in other countries, or would employers simply be willing to raise wages in order to meet the higher criterion?

It is impossible to provide a conclusive answer to this question based on historical data only, as that would involve a counterfactual reasoning. However, the results from the analyses in this chapter do provide valuable suggestions. The fact that most starters earn wages far above their threshold suggests that an increase in the threshold would affect only a small group: for most highly

skilled migrants, the employer does not even have to raise the wage in order to meet a higher threshold.

Table 5.2   Starting wages are higher at higher starting ages, but the difference is significantly larger between starting ages 29 and 30

Estimation parameters of (quantile) wage regression. Y = ln (real wag)	linear wage increase by age of entry	additional wage increase by job entry after age 29	interaction between wage increase by age of job entry after age 29
at 5th percentile	0.021	0.116	n.s.
at 10th percentile	0.023	0.116	n.s.
at 15th percentile	0.023	0.086	n.s.
at 20th percentile	0.026	0.054	n.s.
at 25th percentile	0.027	0.041	n.s.
at 50th percentile	0.032	n.s.	0.016
OLS	0.040	0.032	n.s.

Source: SEO calculations, based on CBS microdata. Excluding university employees.

Thus, on average, employers would probably not raise their salaries, because they would not need to. However, the average is not the interesting statistic. What is of interest is the shift that occurs around the discontinuity: migrants around age 30 and those in the bottom 10 percent of the wage distribution. For this specific group, (which consisted of a mere 70 individuals in 2012), a remarkable shift occurred in the starting wages between ages 29 and 30. This extraordinary wage jump cannot be solely a reflection of higher productivity. Rather, it also indicates a willingness among employers to pay higher wages in order to fulfil the eligibility requirements for provisions under the "*Kennismigrantenregeling*" scheme for highly skilled migrants. The benefits of short and easy admission processing for highly skilled migrants aged 30 apparently outweigh the extra wage costs for employers. Nonetheless, the analysis is not sufficient to determine to what extent this compensation actually occurs in practice.

Effects would probably just be reversed if the wage threshold were lowered instead of raised. In the short term, the decrease would have limited effects. The data from 2005 to 2012 does not provide evidence that large numbers of potential highly skilled migrants are kept from migrating by the wage threshold. While there are indications of denied residence permits, the denials in these cases may have been due to the additional "market conformity test" that the UWV applies rather than to the wage threshold. Since nearly all highly skilled migrants in the "*Kennismigrantenregeling*" scheme benefit from a 30 percent tax provision, the actual criterion is not as high as it may seem.

6 Employment of partner effect on length of stay

Highly skilled migrants with employed partners have a higher probability of staying in the Netherlands than those with non-working partners. After 5 years, this probability rises to around 18 percentage points higher.

To what extent do highly skilled migrants leave the country because their partner cannot find suitable employment in the Netherlands? Although it seems plausible that some migrant couples might face such a problem, nothing is known about the magnitude of this effect. This chapter seeks to answer this question, based on an analysis of administrative records on the Dutch labour market between 2005 and 2012.

6.1 Empirical results

Migrants with a working partner are more likely to stay in the Netherlands than those with a non-working partner. This conclusion may seem fairly self-evident. Nonetheless, our analysis not only proves this "common knowledge" statistically, it also facilitates an estimation of the order of this effect. Moreover, it distinguishes effects from selection: partners of migrants who plan to stay for a longer time may be more willing to work. The findings are illustrated in this section by using simulations based on a duration model (see Appendix B for details).

The probablity of staying in the Netherlands after five years is 18 percentage points higher for highly skilled migrants with employed partners.[17] That is shown in Figure 6.1, which presents simulation results based on the estimation of the duration model after correction for unobserved heterogeneity (selection).

The effect of the partner's job is estimated accounting for the influence of several other variables (see Appendix B for a more detailed description of the methodology). These variables include job characteristics of both the partner and the migrant, personal characteristics and economic circumstances. Duration dependence is also taken into account for the migrants' length of stay and the duration of their employment. Below, it is demonstrated that the correction for unobserved heterogeneity is not trivial: if this correction is omitted, the effect of employment of the partner would be seriously overestimated.

The difference in return migration due to the employment status of partners is a sizeable effect and is even larger than the effect for the migrants' own jobs. If a highly skilled migrant loses his/her own job very soon after migrating into the Netherlands, the chance of return migration rises by around 5 percentage points after five years. Once again, the importance of the heterogeneity correction is significant.

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[17] A partner (or a migrant) is considered to be employed, when he or she has a registered job as an employee. When a partner (or a migrant) is not working as an employee, then he or she is regarded as unemployed.

Figure 6.1   Probablity of staying in the Netherlands 18 percentage points higher after five years for highly skilled migrants with employed partners

Months since migration to the Netherlands

— Unemployed partner   —— Employed partner
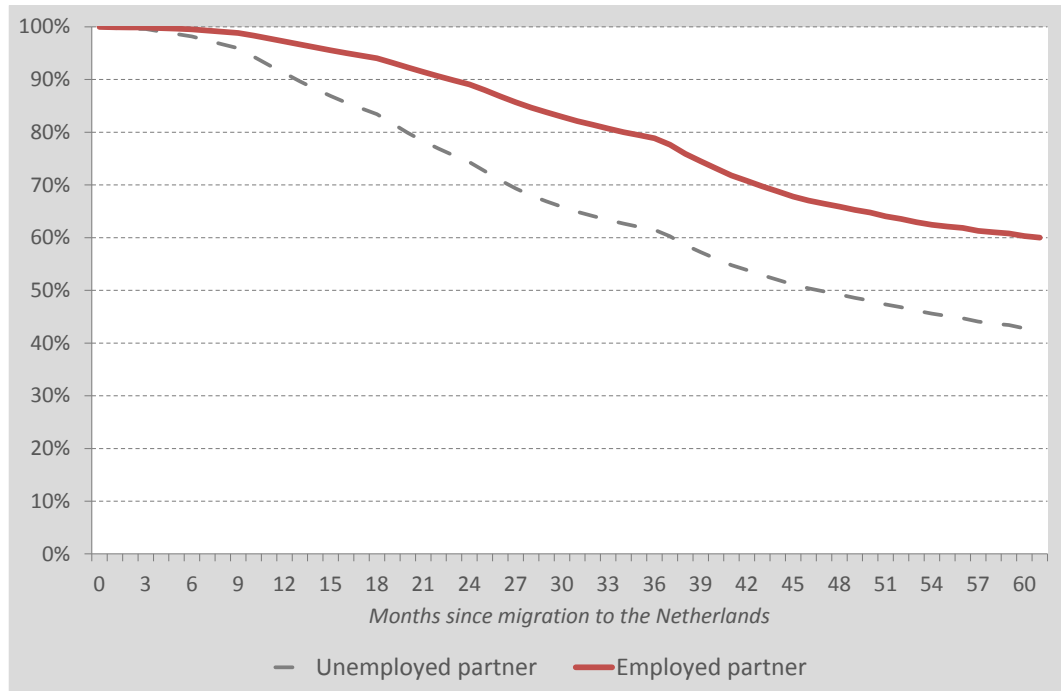
Source: SEO calculations, based on CBS microdata.

Figure 6.2   Probablity of staying in the Netherlands is 5 percentage points higher after five years for highly skilled migrants who remain employed

Months since migration to the Netherlands

— Unemployed migrant   —— Employed migrant
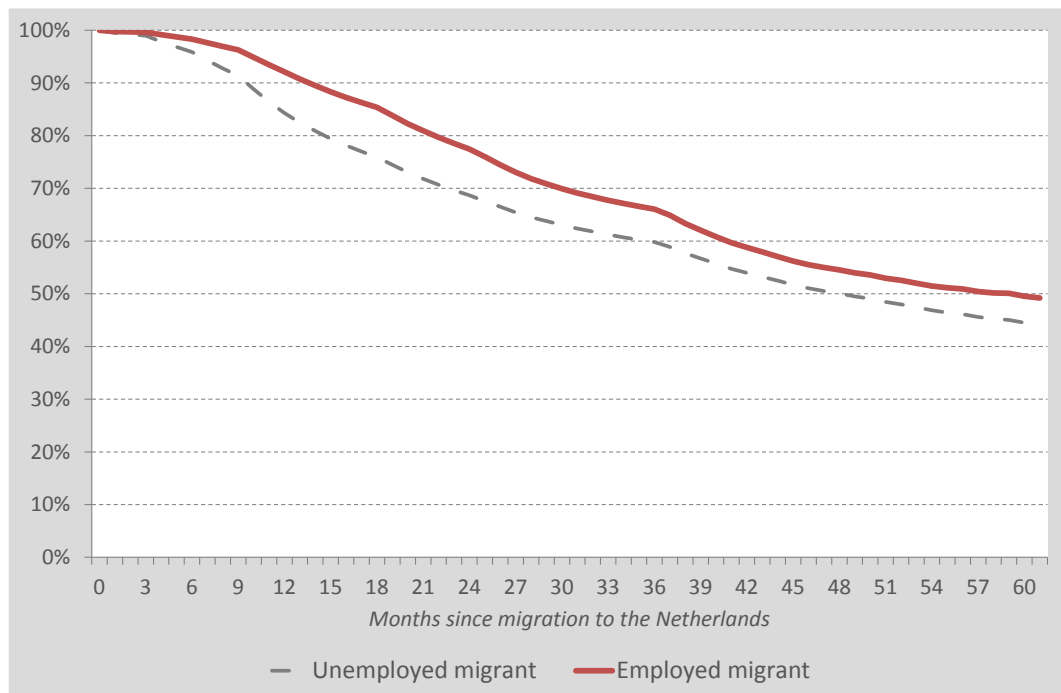
Source: SEO calculations, based on CBS microdata.

Partners' job characteristics

It is not obvious beforehand how the quality of the partners' jobs would relate to the probability of return migration. A temporary job might be better than none at all, but is it perceived as worse than a permanent job? The duration analysis shows that:

- The type of job contract partners have (temporary or permanent) do not matter statistically. Apparently, temporariness does not make much difference to the household dynamics of highly skilled migrant couples.
- The duration of the partner's job does matter. In fact the probability of return migration is "reverse U-shaped", which means that it is lowest when the partner has just started a job, highest if the job has lasted 6 to 9 months, and then lowers again if the job lasts longer. It stands to reason that migrant couples would not want to migrate if the partner has just taken on a new job. Then, after some months, they might evaluate the job and decide, if their situation is favourable, to stay, or conversely, to move on if they are dissatisfied.
- In some cases, the partner might be studying, rather than working. With this dataset, however, the number of partners in education was too low to justify separate inclusion in the analyses. The few partners officially enrolled in degree programmes were simply included in the group of "non-working partners".

Migrants' job characteristics

Apart from the partners' jobs, the quality of the migrants' jobs is also important, as the decision to stay in the Netherlands or migrate elsewhere is probably not taken by one person, but decided in mutual consultation. Duration analysis shows that:

- The job sector is an important factor. Highly skilled migrants working in business services, wholesale or transport have a relatively high migration probability. By contrast, those working in financial services, education, health or "other" services have a relatively low probability of migrating further.
- Migrants working in large companies (at least 100 employees) have a higher migration probability than those employed in smaller companies. Intuitively, it stands to reason that this is due to the role of multinational companies: generally they are larger and also show higher intra-company mobility among highly skilled employees from different countries.
- On taking account of unobserved heterogeneity, the migrants' type of contract appeared to be significant. Individuals with permanent contracts had a slightly lower probability of migrating from the Netherlands.
- Generally, if migrants lose their jobs, they are more likely to migrate again. When the model corrects for unobserved heterogeneity, the duration of the job becomes a significant factor. Highly skilled migrants with longer job durations have higher probabilities of return migration.

Couples' personal characteristics

Besides job characteristics, personal characteristics, such as age, gender and the presence of children may also influence emigration decisions. The analysis shows that:

- The effect of nationality in this analysis interacts with the effect of being employed. Highly skilled migrants who become naturalized Dutch nationals are not very likely to migrate; understandably, as they have developed social ties to the Netherlands. If naturalized Dutch nationals lose their jobs, however, their probability of migration does rise. This is also

understandable, as unemployment cuts their ties to the Dutch labour market. Americans and Oceanians have the highest expected return migration rates.

- Figure 6.3 shows the estimated effect of nationality by the duration of stay in the Netherlands. Asian and American migrants leave relatively early. A possible explanation may be that these nationalities are often intra-company migrants (see Berkhout et al., 2010). Probably, multi-national companies assign their employees to work in their Dutch branch for a fixed period of time.

Figure 6.3   Probablity of staying in the Netherlands higher for non-EU Europeans than for Asians and Americans
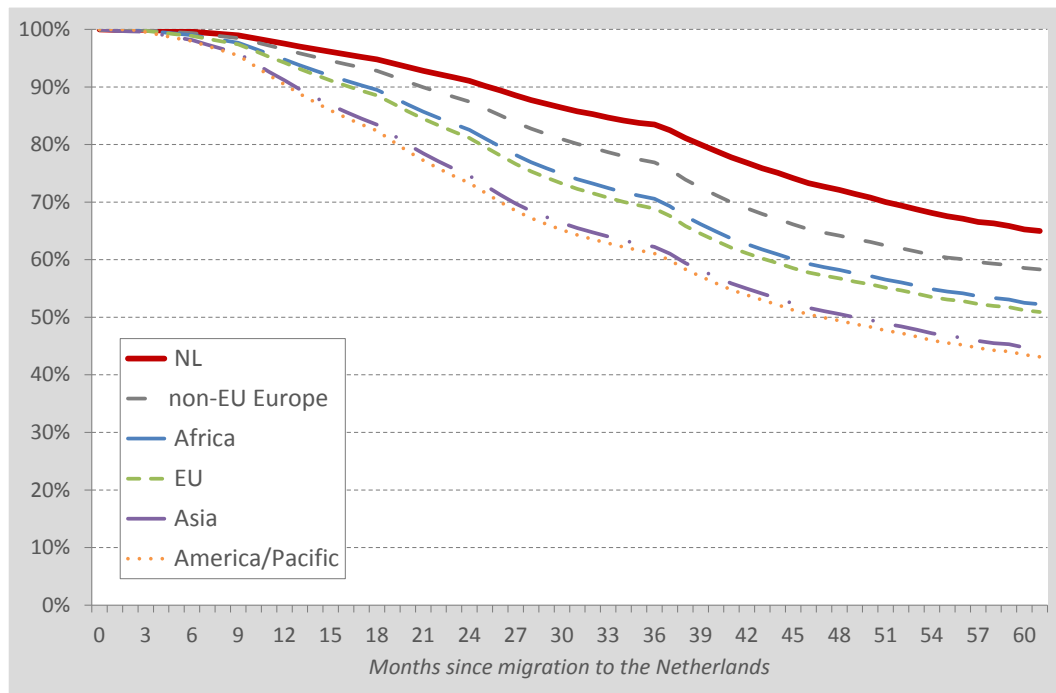
Source: SEO calculations, based on CBS microdata.

- The nationality of the partner is also important; in that respect, if the partner is Dutch, the migration probability is much lower than otherwise. Similarly, if the Dutch partner has a job, that probability is even lower. The migration probability is the highest when the partner is of African nationality. Figure 6.4 shows the estimated effect of the partner's nationality on the duration of stay in the Netherlands.
- For Africans and Europeans (both EU and non-EU), the effect of having employment is higher than for other nationalities. To put it more technically: the interaction effect of "nationality" and "having employment" on the probability of stay is significant.
- Gender does not significantly influence the return migration probability.
- The effect of age on the migration probability is U-shaped. Young couples have a relatively high chance of leaving, while the migration probability drops among middle-aged couples (age range 40-44), but increases again for the elderly (60+).

- Whether or not a migrant household includes any children has no statistical influence on migration probability. Neither the age of the youngest child nor the number of children shows any significant.
- One finding in particular is not surprising: migrants whose partners migrated out of the Netherlands (without being officially divorced) had a substantially higher probability of migration. This finding might just reflect an administrative record of separate departure dates for couples in which both partners decided to emigrate together.

Figure 6.4   Probablity of staying in the Netherlands higher for highly skilled migrants with Dutch partners
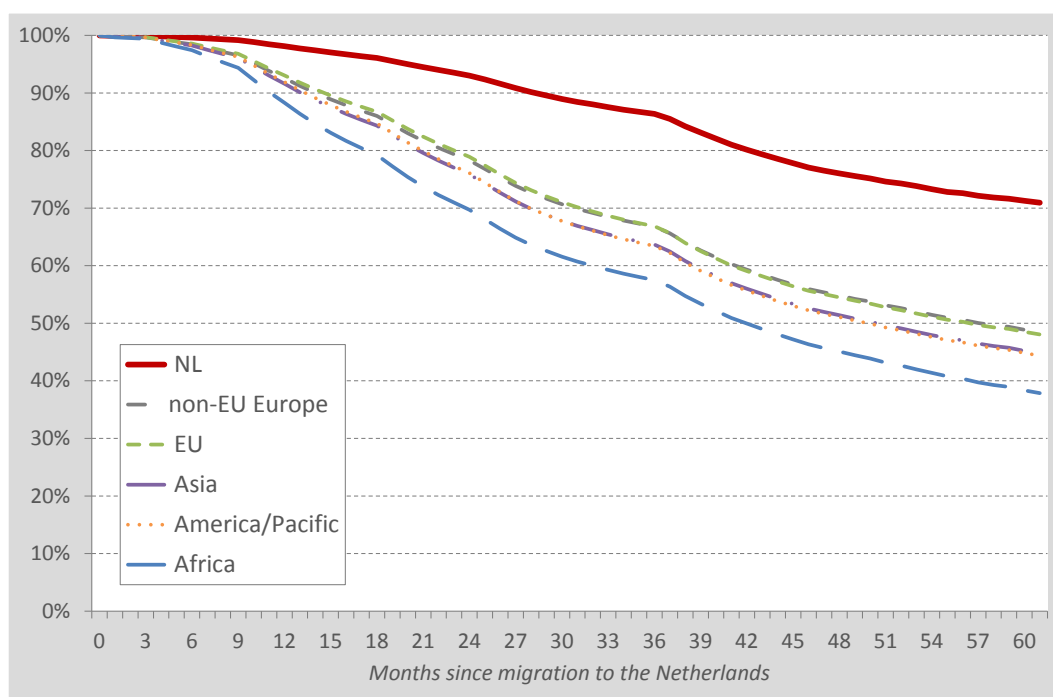
Source: SEO calculations, based on CBS microdata.

Economic circumstances

Economic conditions can also have an effect on migration decisions. If a particular region's labour market is characterized by high demand during a certain period, it may be easier for partners to find jobs than it is in places where unemployment is high. The analysis shows that:

- The effect of labour market tightness has no significant effect on return migration.[18]
- In the years 2009 to 2012, which are characterized by the financial and subsequent economic crisis, the migration probability was higher than it was in earlier years (2005 to 2008).
- There are no important regional effects.

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[18]   It is significant, however, in the estimation of the migrant's job duration. Labour market tightness was measured as the logarithm of the ratio of vacancies and unemployment, on a quarterly basis.

Duration dependence

Given the procedures and costs that come with migration, it is unlikely that couples will migrate shortly following their arrival. However, over time, some couples may become dissatisfied, or are simply forced to leave by their employer, in which case, their return migration probability rises. On the other hand, others can become accustomed to the host country through time, and develop more roots in the local community through friends or work. In these cases, the return migration probability drops. This gives rise to a question: what is the average relationship between the duration of time following migration to the Netherlands and the chance of leaving again? Our duration analysis shows that:

- The duration dependence of return migration probability is logarithmically shaped. That means that the probability to leave again is lowest 0-3 months after migration, and then rises, but less steeply in every subsequent period. After 18 months, the probability becomes more or less stable.

Selection effects

When estimating the effect of employment of the partner on the retention rate of highly skilled migrants, one has to account for selection effects. Selection takes place when partners of migrants who are more inclined to stay longer in the Netherlands are more willing to accept a job. This 'reversed causality' makes the correlation between employment of the partner and the length of stay in the Netherlands of the migrant stronger, but the correlation is then only partly attributable to the effect of the partner's employment on the retention rate of the migrant. For the remaining part it is due to selection.

On an intuitive level, selection effects can be explained as follows. A couple's decision to stay for a longer time in the Netherlands may induce partners to search for and accept a job. When this occurs, the partner's job is not the reason for the couple's longer stay, the causation is rather the other way around: the longer stay of the migrant is the reason for his or her partner to become employed. The effect of the partner's employment on the retention rate of the migrant should be corrected for this selection effect.

Selection can be represented by characteristics that are observed for the migrant and his or her partner, like gender, age, nationality, etc. But there always remain a number of factors that influence the retention rate, that are not observed, and at the same time determine the willingness of the partner to search for and accept a job. This so called 'unobserved heterogeneity' partly determines the selection effect and must thus be corrected for. In the empirical analysis this is done by estimating two probabilities: the probability of migrating from the Netherlands and the probability of the partner of starting employment in the Netherlands. Both probabilities are estimated using a duration model.[19] Correlating the error terms of both probability models enables the picking up of the unobserved heterogeneity that represent selection effects.

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[19]   The model used is a so called "timing of events model" (Abbring & Van den Berg, 2003), following similar specifications as implemented by Bijwaard et al. (2014).

Figure 6.5   Effect of employed partner is smaller after correction for selection
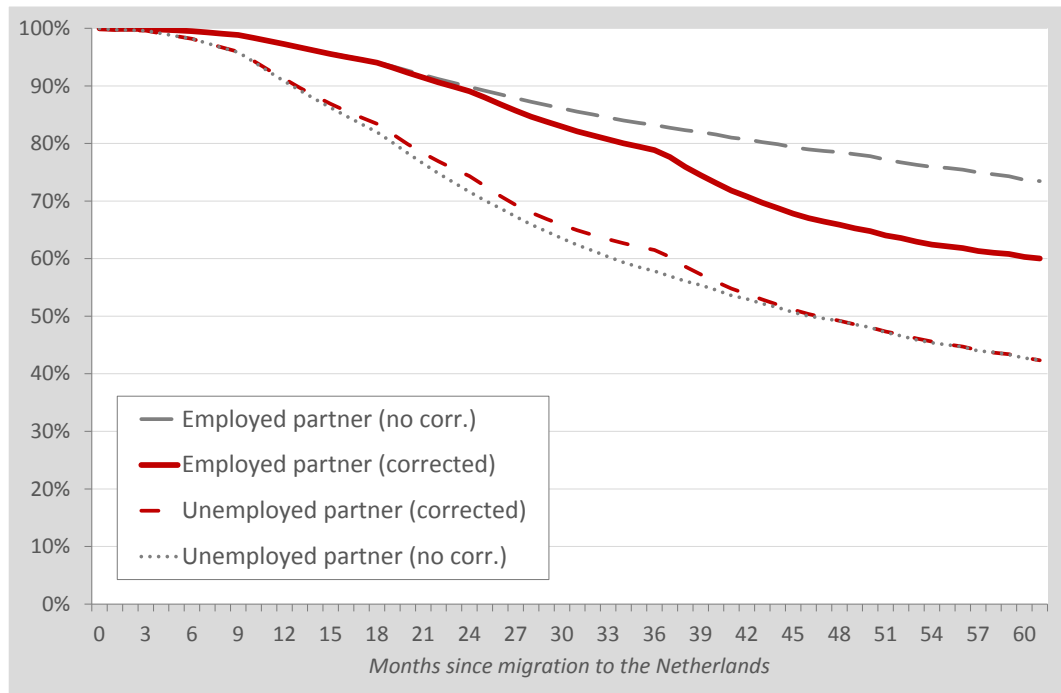
Source: SEO calculations, based on CBS microdata.

Figure 6.6   Effect of migrants' own jobs is much smaller after correction for selection
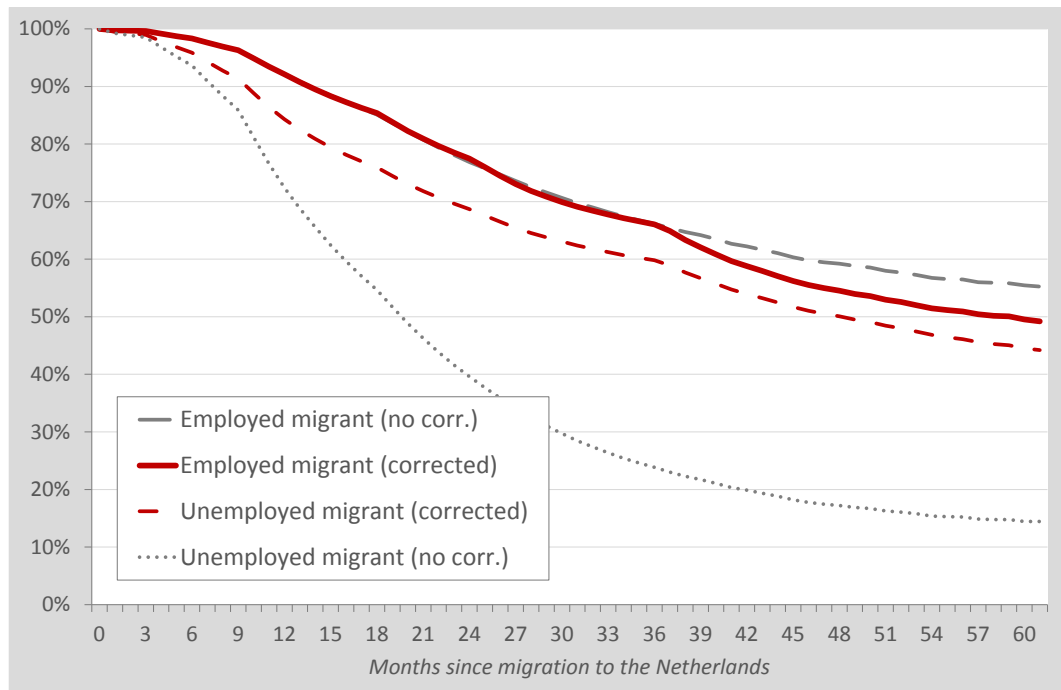
Source: SEO calculations, based on CBS microdata.

Figure 6.5 presents simulations showing the effect of the partner's labour market status based on the model that does and does not account for unobserved heterogeneity. The figure points out that after correction for selection, the effect of the partner's job on retention rates is smaller, especially after three years following migration to the Netherlands (around 17 instead of 30 percentage points).

Figure 6.6 shows that the same applies to the effect of employment by the migrant self: the effect is much smaller after correction for selection (5 instead of 40 percentage points after three years).

6.2   Characteristics of the research population

For a clear interpretation of the results, it is essential to know the characteristics of the research population: highly skilled migrants and their partners. Appendix B contains detailed tables; this section illustrates only the most interesting facts. See the graphs below.

Between 2005 and 2008, highly skilled migration rose in the Netherlands. Since then, between 1000 and 1500 highly skilled migrant couples have been welcomed yearly. Of the cohort that entered in 2012, around 97 percent (1418 out of 1464) still lived in the Netherlands by the end of that year (see Figure 6.7). Of the 2008 cohort, around 45 percent (673 out of 1501) still lived in the Netherlands by the end of 2012.

Figure 6.7   Since 2007, between1000 and 1500 highly skilled migrants come to the Netherlands with their partners annually
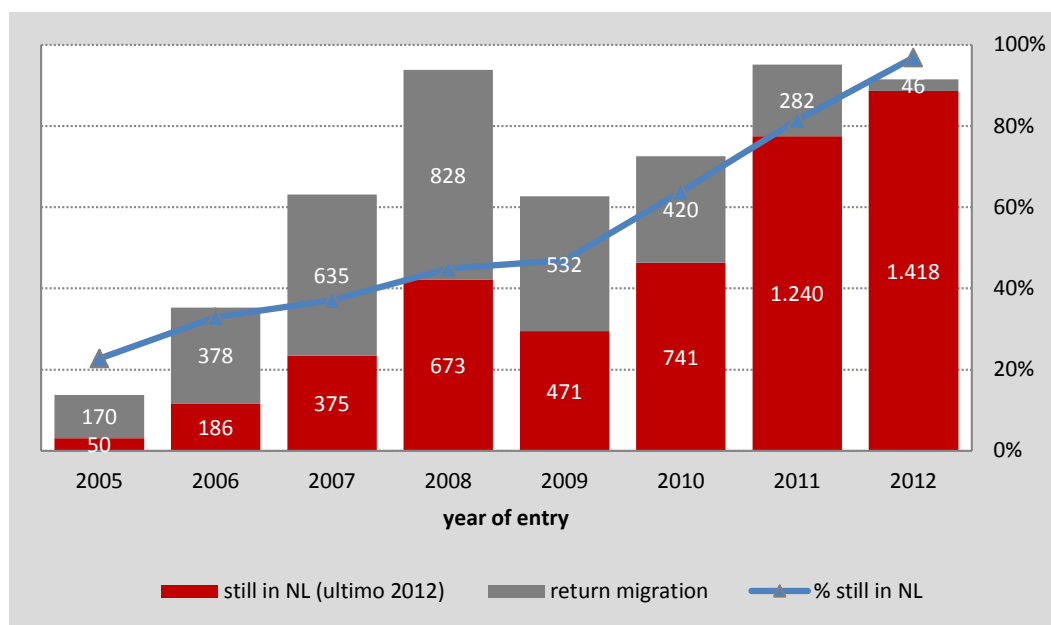
Left axis, bars: Highly skilled migrant couples immigrating to the Netherlands, by year of entry.
Right axis, line: Percentage of cohort living in the Netherlands in late 2012.
Source: SEO calculations, based on CBS microdata.

The data above does *not* support the conclusion that migrants tend to stay longer in the Netherlands in recent years. In fact, the multivariate duration analysis shows that, after correcting for several other variables, the return migration *probability* was higher in the 2009-2012 period. The survival function shows that, without correcting for other variables, the rate of return migration is rather constant after the first 12 months (see Figure 6.8).

Figure 6.8   After 12 months the percentage of "remaining migrants" gradually declines
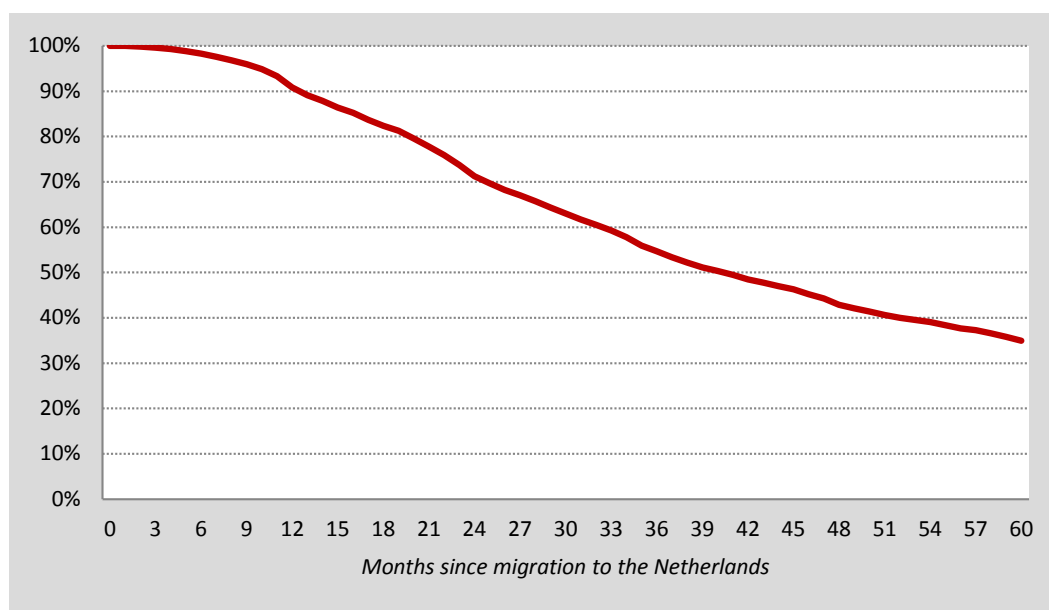
Percentage of migrants living in the Netherlands, by # months after immigration (survival function).
Source: SEO calculations, based on CBS microdata.

In the duration model, the age of highly skilled migrants is taken into account as one of the explanatory variables. Figure 6.9 shows that, on average, their partners are somewhat younger, although both distributions are quite similar.

The duration analysis is based on a total of 8,445 highly skilled migrants *with a partner*. They were observed between 2005 and 2012. The duration analysis starts on the day of migration to the Netherlands and ends in one of two ways: either because they leave the country, or because their last available record in the Netherlands in 2012 indicates retention. Among the couples, most of the highly skilled migrants are male; consequently, most partners are female. At the start of the analysis, only 64 percent of the partners lived in the Netherlands and only 9 percent had a job. Apparently, many partners arrived after their spouse. They often also leave the country before the migrants themselves: at the end of the analysis (either in late 2012 or just before return migration) the percentage of partners living in the Netherlands was 91, and that of working partners was 18.[20] The two last columns of Table 6.1 show similar results for the sub-group of couples for whom the analysis ended due to their return migration before the end of 2012.

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[20]   Only partners who were officially registered and whose identities were established in municipality records have been included. Thus, all of the partners were living in the Netherlands at some point.

Figure 6.9   Partners are somewhat younger than migrants themselves
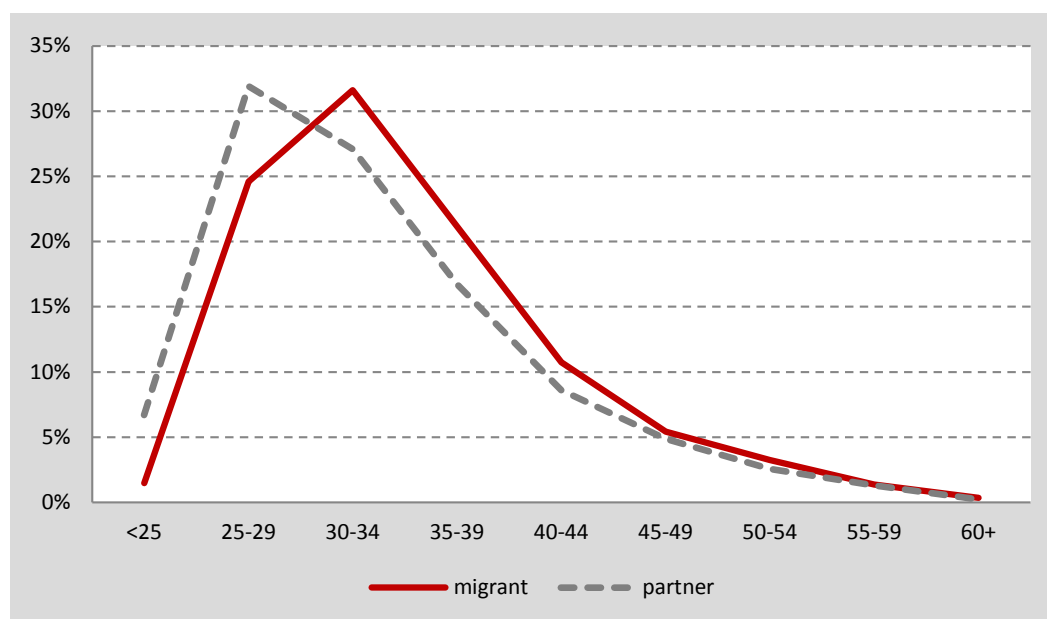
Distribution of migrants and partners over age categories.
Source: SEO calculations, based on CBS microdata.

Table 6.1   Additional characteristics of highly skilled migrant couples

	migrant	partner
number of couples	8,445	
of which migrated from the Netherlands	3,551	
of which were still in the Netherlands in late 2012	4,894	
female	14%	86%
at the date of migration to the Netherlands (=start of analysis)		
living in the Netherlands	100%	64%
job in the Netherlands	100%	9%
by the end of the observation period (=end of analysis)		
living in the Netherlands	100%	91%
job in the Netherlands	87%	18%
by the end of the observation period before return migration (complete observations)		
number of subjects	3,551	3,551
living in the Netherlands	100%	88%
job in the Netherlands	79%	12%

Source: SEO calculations, based on CBS microdata.

Over the entire observation period, no more than 26 percent of the partners held a job.[21] In other words: 74 percent of the partners were not employed during the period of observation. The percentage of employed partners is lower than those published by the IND (see Obradović, 2014). There is however a logical explanation for this difference. The IND figures are based on a cross-section sample, measured at one moment in time. By contrast, this reports uses population registrations, measuring longer periods. Those who stay longer have a higher chance of appearing in a cross-section sample than those who stay for only a short period. Population registrations are not susceptible to this over-representation bias.

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[21]   Not every nationality shows the same rate of partner participation. Over half of the partners in the sample are Asian. Of this group, only 19 percent ever held a job in the Netherlands at any time during the observation period. Among American partners, that figure is 27 percent, and among the European partners, it is even higher.

7 Effect of work experience on foreign students' length of stay

Non-EU graduates from higher education, who worked in a (relevant) job in the Netherlands during their study, stay in the country for a longer period after graduation than those who had no (relevant) work experience. However, after correction for selection of students into work, the effect is not very large for non-EU graduates and even smaller for EU graduates. Moreover, the effect only holds in the short term and almost disappears two years after graduation.

7.1 Empirical results

Foreign students in higher education, who worked during their study in the Netherlands, stay in the country for a longer period after graduation. This effect is higher for those who worked in a sector relevant to their field of education. Both effects are larger for non-EU graduates than for those from EU countries. However, most of the correlation between work experience and retention is due to selection effects: students that are more inclined to stay after graduation are more willing to accept work during their study. After correction for selection, the effects are still significant, but much smaller. Moreover, the difference seems to disappear after a certain period. The empirical results provide an answer to the question what the influence of work experience is on the length of stay of foreign graduates in the Netherlands and to what extend this influence is different depending on *relevance* and *duration* of the work experience. The answers are illustrated in by using simulations based on a duration model (see Appendix B for details).

Figure 7.1 predicts the percentages of foreign graduates from higher education who are still living in the Netherlands during the first three years following graduation. After one year, 48 percent of all EU nationals and 59 percent of non-EU nationals with no work experience during their study are still living in the Netherlands.[22] One year of general work experience (in a "non-relevant" sector) would increase this by 2 percentage points for EU graduates and 5 percentage points for non-EU graduates. For those with one year of *relevant* work experience during their study, the figures increase by an additional 1 (EU graduates) or 2 (non-EU graduates) percentage points. However, after approximately three years, these effects have decreased. The figure presents the results of a simulation, based on estimations after correction for selection effects.

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[22]   Naturally, the prediction model also corrects for the period in which migrants were living in the Netherlands before graduation; see Appendix C.

Figure 7.1   Work experience during the study increases retention rates of graduates only slightly
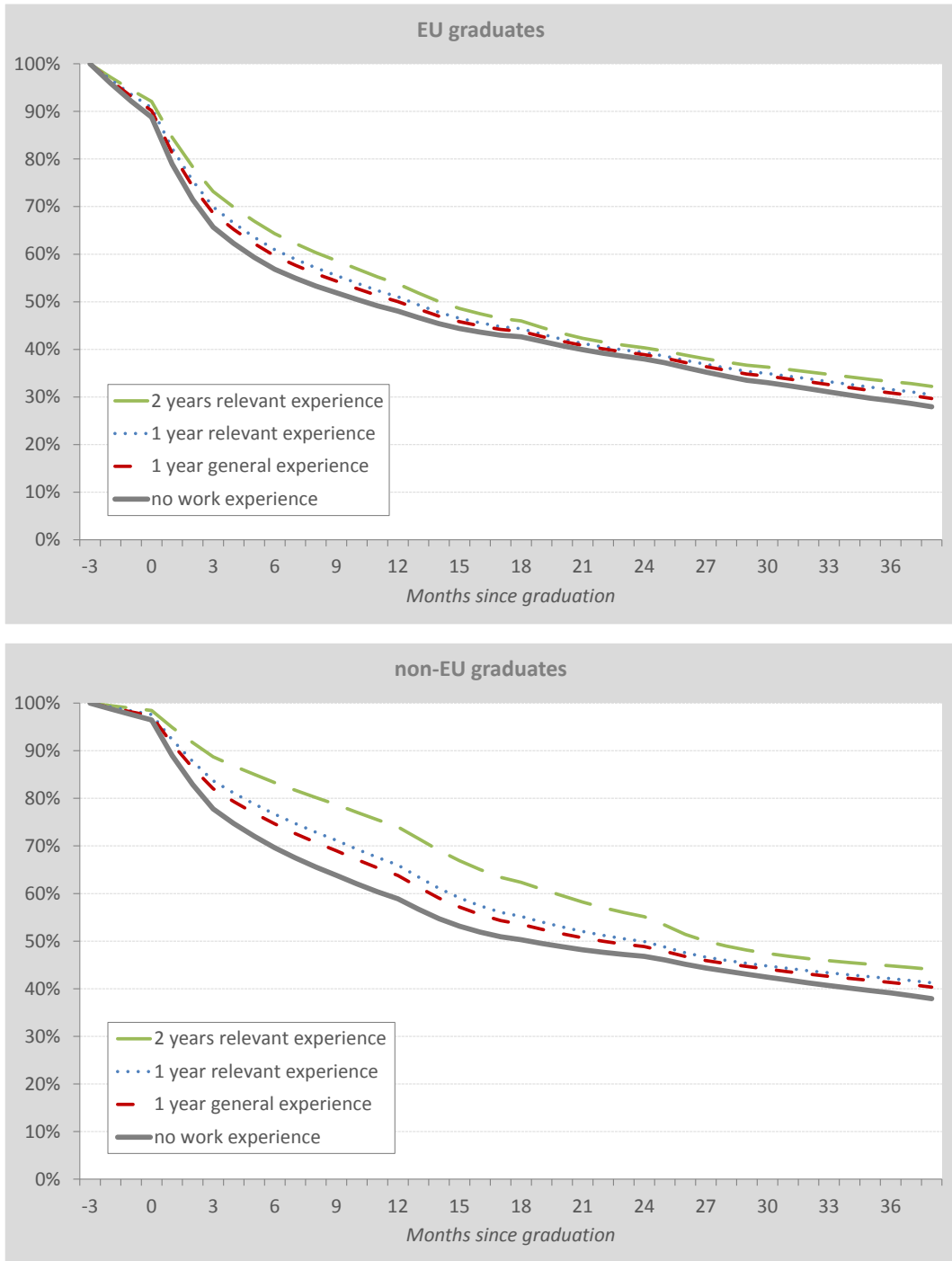
The effect of work experience during the study is estimated after correcting for the influence of several other variables (see Appendix B for a more detailed description of the methodology). These variables relate to personal characteristics of the graduates, their level and field of education, and the economic circumstances. Possible duration dependence is also taken into account, as well as the potential bias due to selection and administrative removal.[23]

Using a similar approach, it is possible to check whether the effect of work experience during the study increases when the amount of work experience is doubled.[24] Figure 7.2 shows that the effect of the second year of relevant working experience increases the retention rate significantly, especially for non-EU graduates in their first years following graduation.

The difference between paid internships and other types of work is estimated separately.[25] Although paid internships also qualify as work experience, their influence may be different. The estimation results show that internships function as another indicator of the relevance of work experience. One year after graduation, the retention rate is 4 percentage points higher for EU nationals and 3 percentage points for non-EU nationals.

More EU students leave the Netherlands after graduation than non-EU graduates. Figure 7.2 shows that three years after graduation, only 30 percent of the EU students still live in the Netherlands; the corresponding figure for non-EU students is 40 percent.

Migrants' personal characteristics

In theory, the decision to remain in the Netherlands after graduation and look for a job may also depend on personal characteristics, such as gender, nationality, and the level and field of study. This dependency is tested and corrected in the duration analysis. The results show that:

- Female graduates have a lower migration probability.
- Older graduates also have a lower migration probability.
- For individuals who become Dutch nationals, the migration probability drops substantially. EU migrants are most likely to leave. Among non-EU students, Asians and Africans migrate more frequently than do Americans and other Europeans (mainly Turkish, Russian and Ukrainian nationals).
- Graduates in the fields of science (Bachelor's and Master's) and engineering (Master's) have a low migration probability. On the other hand, those with Master's degrees in law have a relatively high migration probability.

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[23] Selection points at inverse causality in the sense that students who are more inclined to stay longer in the Netherlands after graduation are more willing to accept work during their study. Administrative removal points at migration that is not registered at exactly the moment it takes place, but at a later date when a check of administrative records points at migration from the Netherlands.

[24] Before the simulation, this effect was modelled with second order terms. For this reason, a proportional increase is not observable.

[25] Unfortunately, unpaid internships cannot be distinguished in the data.

Figure 7.2   More migration from the Netherlands of EU-graduates than of non-EU graduates
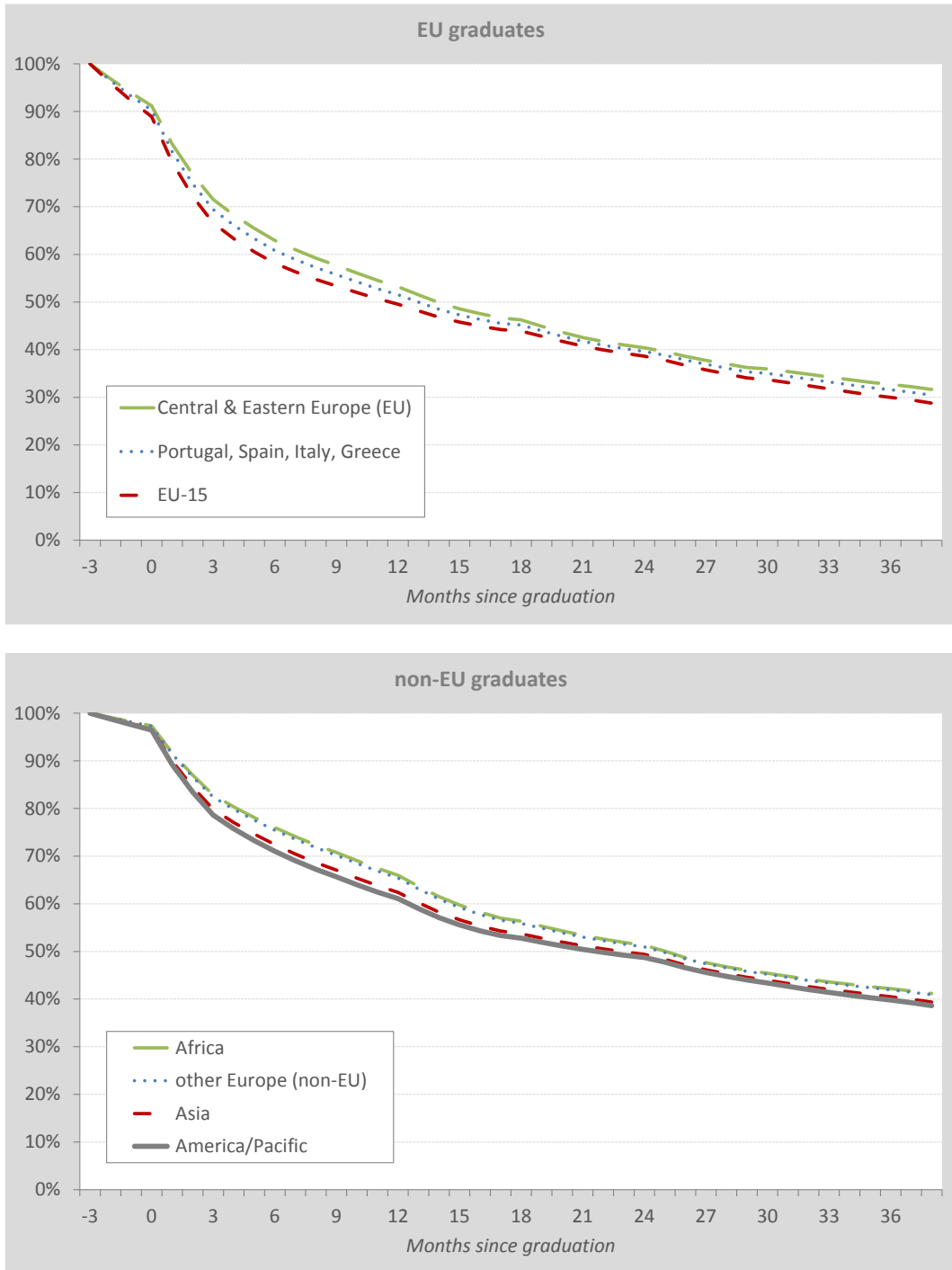
Source: SEO calculations, based on CBS microdata. Upper panel EU graduates, lower panel non-EU graduates.

Economic circumstances

It can be expected that in any country or period, when unemployment is low, foreign graduates would be more inclined to stay and look for a job. However, economic prosperity does not stop at the border: while the Dutch labour market offers an abundance of vacancies, other countries may also offer a wealth of opportunities that would induce foreign graduates to leave the Netherlands. Which of these effects is dominant? The empirical analysis shows that:

• A tight labour market (many vacancies, low unemployment) leads to lower migration rates.
• The non-EU students who graduated in 2012 appear to have a somewhat lower chance of migration than earlier cohorts.

Duration dependence

Do ties with the Netherlands become stronger when foreign graduates stay longer in the Netherlands, thereby decreasing the probability of migration? The analysis shows that the duration dependence is more complicated:

• If a migrant has lived for some years in the Netherlands before graduation, his/her migration probability is lower.
• Many students leave in the months directly before or directly after graduation (see Figure 7.3), especially EU nationals.
• Half a year after graduation, the migration rate becomes rather constant.

Figure 7.3   Many EU students leave the Netherlands in the months directly before or directly after graduation
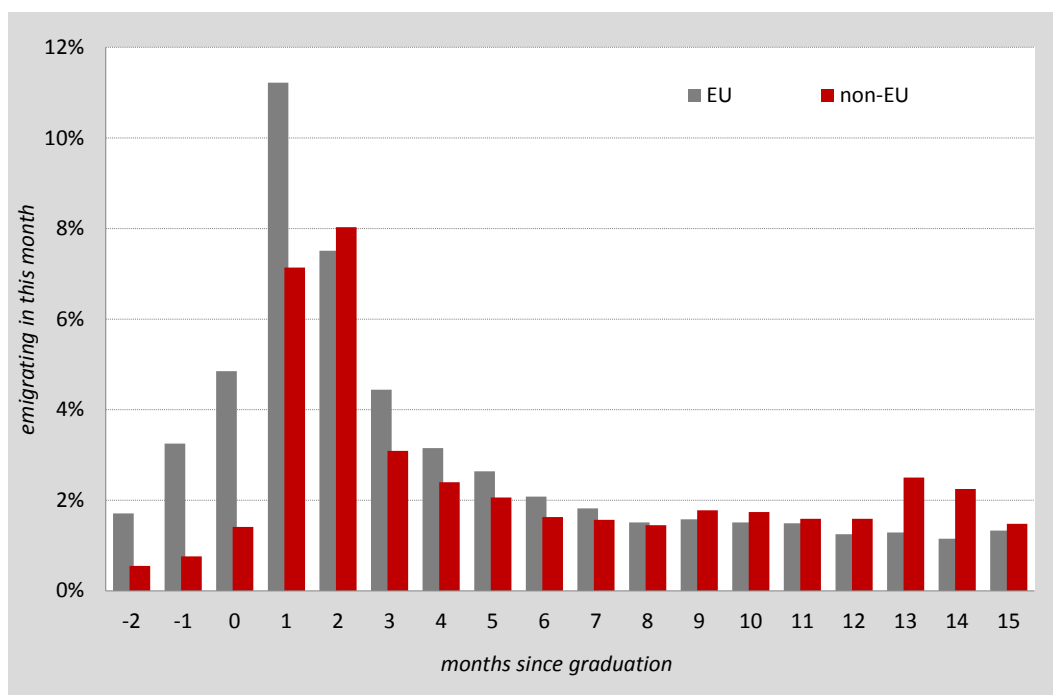
Percentage of graduation cohort that emigrates in month x after graduation. x=0 means period 0-4 weeks before graduation, x=1 means period 0-4 weeks after graduation.
Source: SEO calculations, based on CBS microdata.

An interesting question is whether the maximum one-year period that non-EU students are granted to search for a job (the "One-year Job Seeker" permit) influences emigration rates. Figure 7.3 does indeed show a slight peak in the migration rate in months 13 and 14 for non-EU migrants only. However, the effect is rather small. In months 12 and 15, the outflow is 1.6 percent, as compared to months 13 and 14, where it is 2.5 and 2.3 percent, respectively. Set against the overall survival function, the drop is limited (see Figure 7.4).

Figure 7.4   Many foreign students leave the Netherlands in the months directly before and after graduation
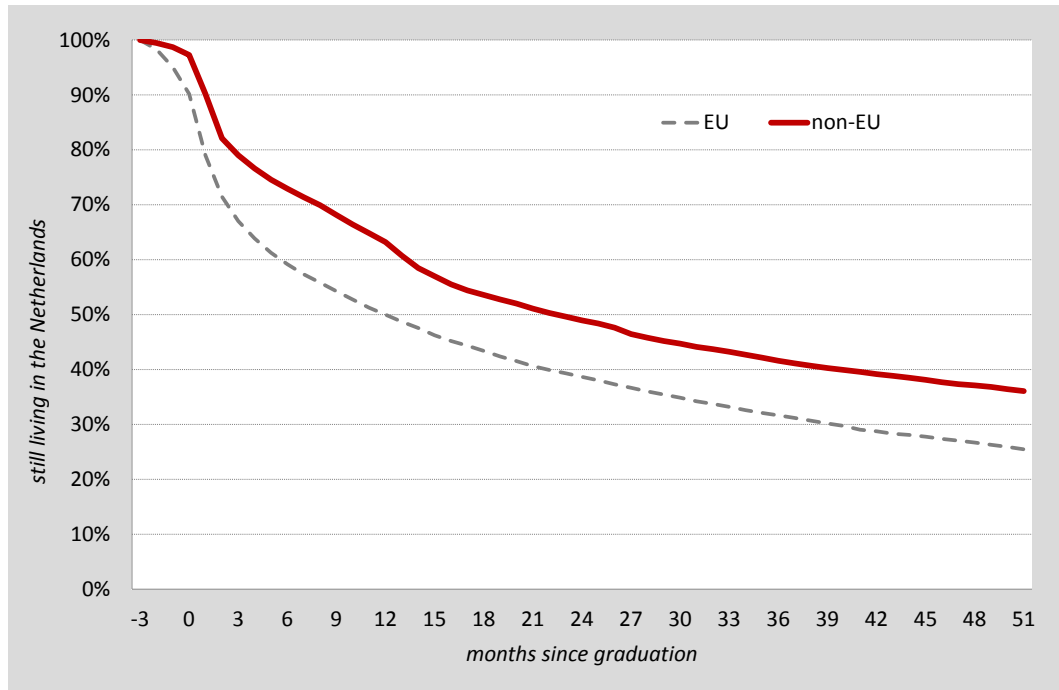
Percentage of students living in the Netherlands, by # months after graduation.
Source: SEO calculations, based on CBS microdata.

Selection effects

When estimating the effect of work experience during the study on the retention rate of foreign graduates, one has to account for selection effects. Selection takes place when students who are more inclined to stay in the Netherlands after graduation are also more willing to accept a job during their studies. This 'reversed causality' makes the correlation between work experience during the study and the length of stay in the Netherlands after graduation stronger, but the correlation is then only partly attributable to the effect of work experience on the retention rate. For the remaining part it is due to selection.

On an intuitive level, selection effects can be explained as follows. Students who have the desire to remain in the Netherlands after graduating will be more motivated to search for a job while studying, knowing that a job can expand their network, or improve their Dutch language skills. When this occurs, the student's job during the study is not the reason for his/her longer stay after graduation, but the causation is rather the other way around: the desire to stay longer after

graduation is the reason for accepting a job during the study. The effect of work experience during the study should be corrected for this selection effect.

Selection can be represented by characteristics that are observed for the individual student, like gender, age, nationality, etc. But there always remain a number of factors that influence the retention rate, that are not observed, and at the same time determine the willingness to accept a job during the study. This so called 'unobserved heterogeneity' partly determines the selection effect and must thus be corrected for. In the empirical analysis this is done by estimating two probabilities: the probability of migrating from the Netherlands after graduation using a duration model[26], and the probability that a student chooses to accept a job during his or her study, using a standard discrete choice probability model. Correlating the error terms of both probability models enables the picking up of the unobserved heterogeneity that represent selection effects.

Figure 7.5   Effect of work experience becomes much smaller after correction for selection effects by accounting for unobserved heterogeneity, case of non-EU nationals
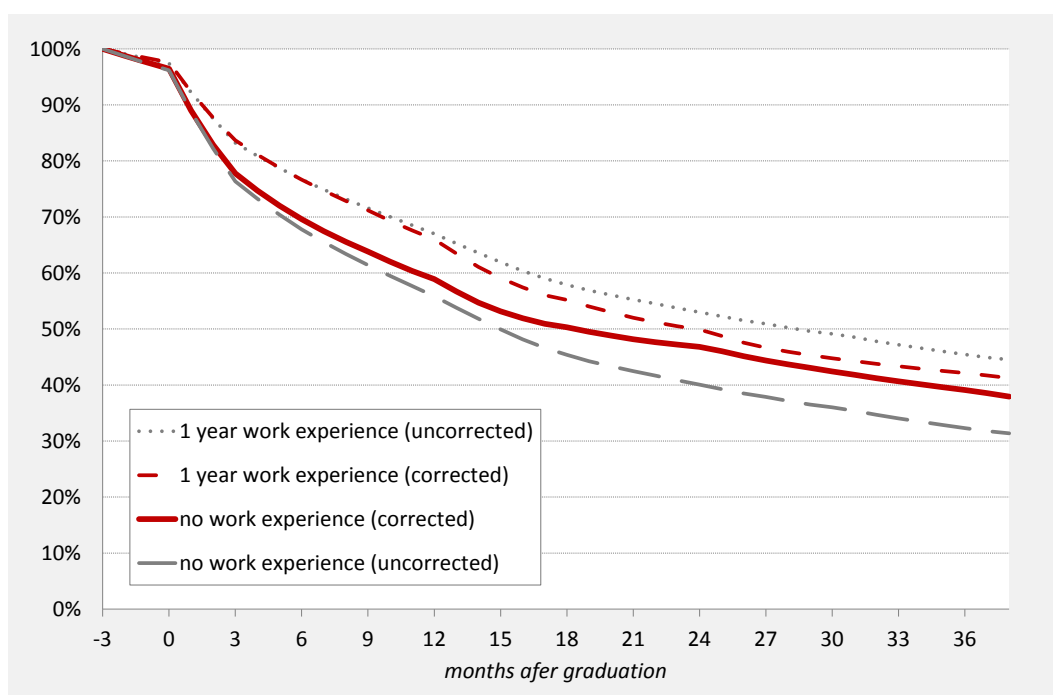
Percentage of students living in the Netherlands, by # months after graduation.
Source: SEO calculations, based on CBS microdata.

Figure 7.5 shows the magnitude of selection effects by comparing models with and without accounting for unobserved heterogeneity. The figure illustrates the following results:

- After accounting for unobserved heterogeneity, the effect of one year relevant work experience is much smaller than without correction (7 instead of 11 percentage points after 1 year, and 3 instead of 13 percentage points after three years).

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[26]   The model used here is called a "timing of events model" (Abbring & Van den Berg, 2003). Here, the method was implemented in the same way as it was by Bijwaard et al. (2014).

- This result comes both from a higher retention rate with no work experience after correction for selection, and from a lower retention rate with one year of work experience after correction for selection.
- A similar results is true for the effect of having a paid internship, which decreases from 8 to 3 percentage points higher retention rate after accounting for unobserved heterogeneity.

7.2   Characteristics of the research population

For a clear interpretation of the results, it is essential to know the characteristics of the research population: the EU and non-EU students that graduated in the Netherlands between 2008 and 2012. Bachelor's graduates who enrolled in a Dutch Master's degree programme in the following year have been excluded from the analysis.[27] Appendix B contains detailed tables of characteristics of the research population. This section merely highlights the most interesting facts in graphs and tables.

The number of foreign students graduating from Dutch tertiary education rose between 2008 and 2012. The increase is due primarily to EU students (see Figure 7.6). The multivariate duration analysis shows that graduates from the large 2012 cohort have had the highest probability of migration. That finding is reflected in Table 7.1, where the "survival rates" are split up by cohort. The table shows that retention rates have decreased during the 2008-2012 period.

Figure 7.6   Increasing number of foreign students graduate from Dutch higher education in the period 2008-2012
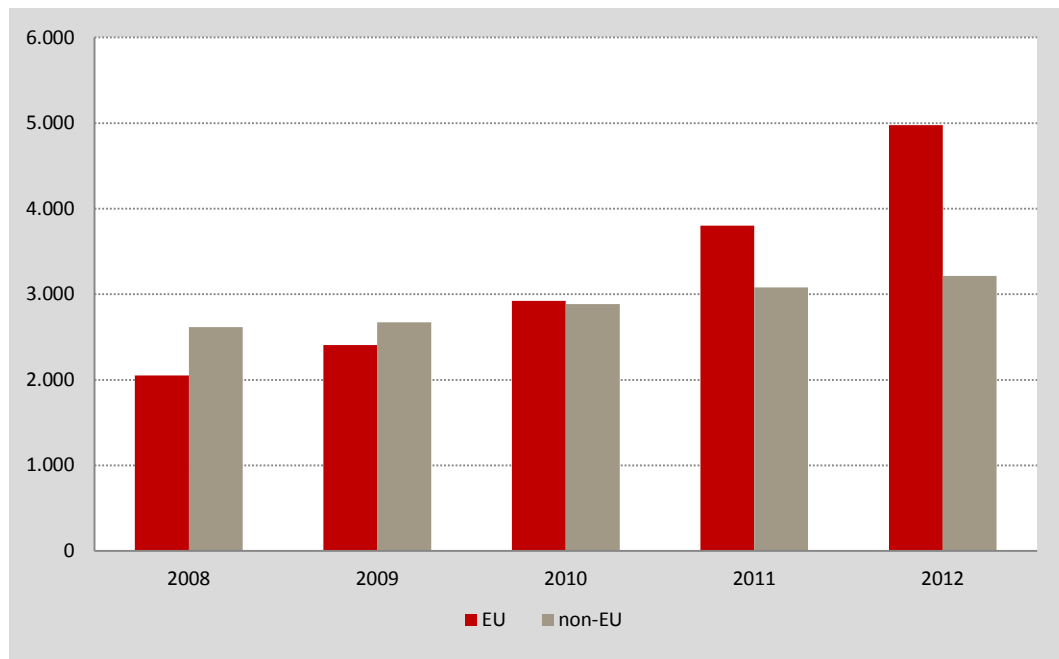
Source: SEO calculations, based on CBS microdata.

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[27]   Those who received their Master's degree between 2008 and 2012 emerged in the population records afterwards.

Table 7.1   Number of graduates living in the Netherlands, by years after graduation

EU students	at diploma date	after 1 year	after 2 years	after 3 years	after 4 years	after 5 years
2008	92%	55%	43%	36%	31%	26%
2009	90%	52%	43%	34%	29%	
2010	90%	54%	39%	32%		
2011	89%	47%	37%			
2012	90%	47%				
non-EU students	at diploma date	after 1 year	after 2 years	after 3 years	after 4 years	after 5 years
2008	97%	65%	53%	46%	41%	37%
2009	98%	65%	50%	42%	38%	
2010	97%	64%	49%	42%		
2011	98%	63%	49%			
2012	97%	60%				

Percentage of graduates living in the Netherlands after 1-5 years, by graduation cohort (2008-2012).
Source: SEO calculations, based on CBS microdata.

Fields of education differ significantly between EU and non-EU graduates (see Table 7.2). A larger part of the EU graduates have chosen arts & social studies, while more non-EU graduates have chosen engineering (Master's) or economics (Bachelor's). The majority of foreign graduates complete the Master's level. Slightly more EU than non-EU students complete a Bachelor's programme. It is unclear from the data whether these Bachelor graduates have continued on in a Master's programme outside the Netherlands. Since Bachelor's graduates who followed up directly with a Dutch Master's programme have been excluded, around 90 percent of the Bachelor graduates in the population received their diplomas from four-year colleges of higher professional education.

Table 7.2   Percentages of EU and non-EU graduates by field and level of study

	EU Bachelor's	EU Master's	Non-EU Bachelor's	Non-EU Master's
teachers	1%	1%	1%	0%
arts & social	15%	21%	6%	14%
economics	8%	16%	14%	15%
legal	1%	8%	1%	6%
science	1%	4%	2%	5%
engineering	2%	6%	3%	17%
agriculture	3%	3%	2%	5%
health	4%	3%	1%	5%
logistics, tourism	5%	0%	3%	1%
Total	38%	62%	33%	67%

Source: SEO calculations, based on CBS microdata.

On average, EU students have more (and more relevant) work experience than non-EU students (see Figure 7.7). In total, only 12 percent of EU students and 9 percent of non-EU students had work experience in a sector relevant to their field of education. For a description of how the relevance of working experience is measured, see the end of Appendix B.

Figure 7.7   Relevant work experience higher among EU than non-EU students
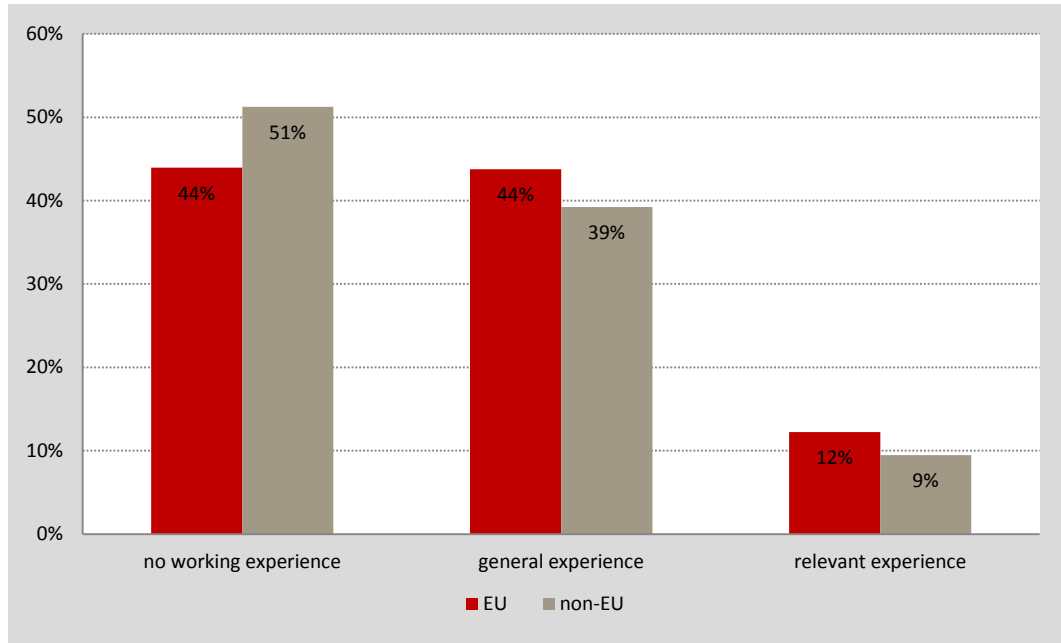
Source: SEO calculations, based on CBS microdata.

The relevance of work experience, however, differs between the levels and various fields of education (see Figure 7.8). Generally, Bachelor graduates have had more work experience than Master graduates. At both levels, however, science and engineering students gained the most work experience during their studies.

Figure 7.8   Relevance of work experience by field of education

Field	none	general	relevant
science (B)	14%	65%	21%
engineering (B)	20%	60%	20%
science (M)	50%	31%	19%
engineering (M)	42%	40%	17%
arts & social (B)	40%	44%	17%
logistics, services (B)	26%	58%	17%
arts & social (M)	59%	28%	13%
health (B)	32%	55%	13%
agriculture (M)	64%	26%	11%
health (M)	51%	41%	8%
economics, administrative (B)	35%	58%	7%
agriculture (B)	26%	69%	5%
economics, administrative (M)	54%	42%	4%
legal (M)	74%	24%	2%
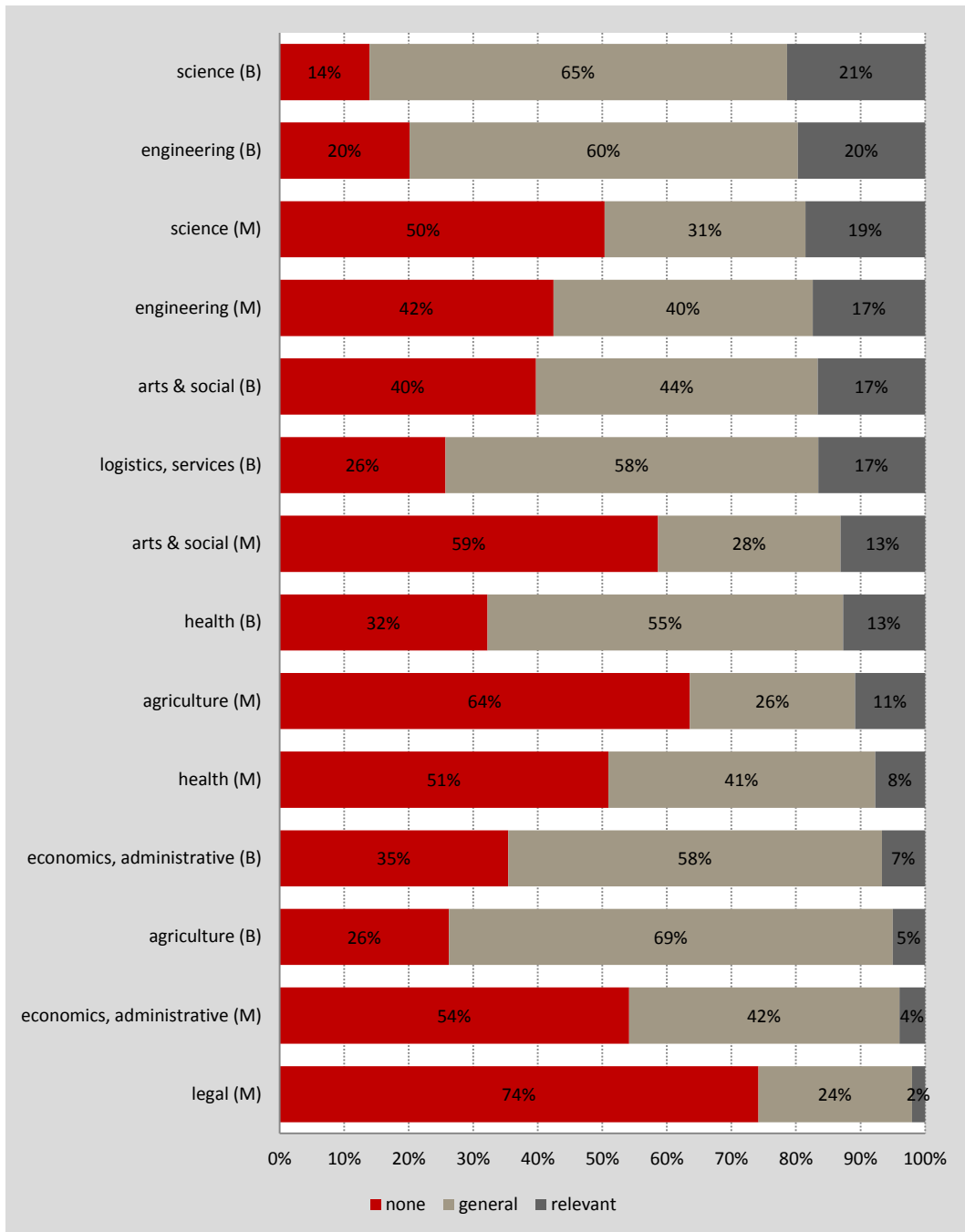
Source: SEO calculations, based on CBS microdata.

8   Conclusions

- A system that uses one or more wage criteria to manage the admission of highly skilled migrants offers certain advantages over supply-driven systems. Wage criteria serve to guarantee the productive value of highly skilled migrants (and their jobs), whereas a supply system offers no such safeguards. The wage threshold is a logical consequence of the focus on quality over quantity.

- There is no evidence that the current wage threshold would obstruct many highly skilled migrants from working in the Netherlands. A good 78 percent of the migrants that started at age 29 were earning wages already above the high threshold, although this cohort was actually still eligible for the low threshold.

- As a result, the average effect of the higher wage threshold on the number of highly skilled migrants that come to the Netherlands is limited. However, the average conceals more interesting discontinuities in the lower ranks of the wage distribution.

- There is some evidence that employers are willing to pay higher wages in order to benefit from advantages offered under the "Highly Skilled Migrants Scheme" (*Kennismigrantenregeling*): short residence permit processing and very high acceptance rates. For the 10 percent highly skilled migrants with the lowest wages, an unexplained 12 percent jump in starting wages is observed among those entering employment at age 29 (last age of low threshold) and those entering at age 30 (first age of high threshold).

- There is no evidence that the higher threshold for individuals over the age of 30 causes massive selection effects. It is likely that some migrants have incentives to come to the Netherlands at age 29, instead of age 30 or later. However, the number of highly skilled migrants starting at age 30 was only slightly lower than it was for their counterparts who started at age 29: it amounts to around 70 individuals in 2012.

- From a policy perspective, the question is what would happen if the wage thresholds were altered? It is impossible to provide a conclusive answer to this question based on historical data only. However, the results from the analyses in this report do provide valuable suggestions. The fact that most starters earn wages far above their threshold indicates that an increase in the threshold would affect only a small group: for most highly skilled migrants, the employer does not even have to raise the wage in order to meet a higher threshold. For the other migrants with lower wages, the benefits of short and easy admission processing may induce employers to accept higher salary costs in order to meet the scheme's wage criterion. However, the analysis results provide no basis for conclusions regarding how far that willingness might stretch in practice.

- Since nearly all highly skilled migrants admitted under the "*Kennismigrantenregeling*" scheme benefit from a tax exemption of 30 percent, the actual threshold in terms of net wages is not as high as it may seem at first sight by looking at gross wages.

- Migration policy should address the employment status and possibilities of the partners of highly skilled migrants. Highly skilled migrants with employed partners have a significantly higher probability of staying in the Netherlands than those with non-working partners. The size of that effect was around a 18 percentage points higher retention rate five years after migration to the Netherlands.

- If a policy goal is to encourage highly skilled migrants to stay for longer periods of time in the Netherlands, there may be an opportunity for improvement here. Between 2005 and 2012, no more than 26 percent of the partners was employed. Upon arrival, that figure was only 9 percent. If more partners would be enabled or willing to be employed on the Dutch labour market, the retention rate of highly skilled migrant couples would be likely to rise.
- Foreign students who gain work experience during their studies, have higher retention rates in the first years after graduation.
- This effect is higher for those who have worked in a sector relevant to their field of education, and is larger for non-EU students than for EU nationals.
- Nevertheless, the magnitude of the effect is rather small. Moreover, the effects disappear after two years.
- In technical terms, the selection effect is much more significant than other effects. A higher number of those who want to stay look for jobs during their studies. The main causality is not that work experience leads to a longer stay. Rather, a desire to stay longer induces students to look for (relevant) work experience while they are studying.
- In light of this, policy measures that increase opportunities for foreign students to work more hours before graduation are not expected to be very effective on the retention rate of foreign graduates.
- Measures that improve labour market prospects for foreign graduates may be more effective, but this has not been studied. Nor can it be ruled out that work experience before graduation may have an effect in the long term, raising the probability of the individual's return to the Netherlands in a later stage of his/her career. Finally, it cannot be ruled out that the ability to work more hours before graduation may enhance the country's appeal to foreign students, as it would increase the opportunity to earn more income.

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Appendix A   Data issues

For the empirical analyses in this report, microdata are made available by Statistics Netherlands (CBS). They have provided registration data on individuals who applied at the Dutch Immigration and Naturalisation Service (IND) for residence permits and visas. As this data includes the types of permits issued, it is possible to identify highly skilled migrants.[28] By using anonymized individual ID variables, data on this group is merged with data from a variety of other sources, such as employment registers, municipality files, and records on partners and on tertiary education. The use of registration data has some important advantages over the use of surveys: complete populations instead of samples, and often more accurate measurements of important variables (such as wages). The following CBS datasets are used:

- initial migration motive 2005-2011 (migration motive, for selecting highly skilled migrants)
- job & wage registers (job characteristics)
- company characteristics (company size, Nace sector)
- municipality registers (gender, age, nationality spells, migration spells, living area, household situation, children)
- higher education graduation registers
- education registers (for filtering out graduates that continue education in a different field of study)
- a proxy for households with two adults living together

Unfortunately, the Statistics Netherlands data regarding initial migration motives only ran to the end of 2011. Thanks to cooperation from the IND, it has been possible to include an additional year of highly skilled migrants from immigration records. These records were anonymized by CBS and added to the highly skilled migrant database, such that all migrants, who were initially granted permits to work in the Netherlands under the *"Highly Skilled Migrants"* scheme between 2005 and 2012 could be included in the final dataset. See section 2.1 for an overview of other schemes for highly skilled migrants.

According to Statistics Netherlands, the registration of highly skilled migrants is based on a "snapshot" of individuals living in the Netherlands on January 1st. Thus, migrants who stay in the Netherlands for short durations are probably under-represented in the data: individuals who leave in the same year they enter are not taken into account. Comparisons with IND statistics suggest that during the 2008-2011 period this number comes to roughly 1,400 individuals per year.

In the three analyses, three different research populations are identified:
1. highly skilled migrants in their first job year (excluding academics)
2. highly skilled migrants living in the Netherlands with their partners, and the partners themselves
3. foreigners who recently graduated from a Dutch institute for tertiary (higher) education

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[28]   Unfortunately, CBS only registered the residence permit category upon entry to the Netherlands. No information is kept on later changes to this initial permit category. For example: if a migrant enters as a student, he is registered as a student visa holder. If, after graduation, he changes his residence permit status to "highly skilled migrant", he cannot be identified as a highly skilled migrant and is therefore not included in the dataset. For the same reason, the category "One-year job seeker permit" cannot be found in the CBS data, as these permit holders always enter the Netherlands on student visas.

Data issues specific to the wage threshold analysis

In the first research population, the core consists of data on highly skilled migrants in the period 2005-2012, where all kinds of relevant information are merged. In most of the analysis, migrants who work at universities are excluded because the wage threshold does not apply to them. For PhD students, post-docs below age 30 and assistant professors, no threshold is required. In addition, the analysis only takes account of the migrants' primary job, which is defined as the job that earned the highest wage when calculated on a full-year, full-time equivalent basis. Furthermore, salary data is limited to wages in jobs of at least 20 hours per week that lasted longer than one month. This is done to prevent outliers and/or administrative errors overruling more relevant wage information. Nonetheless, all kinds of registration errors (e.g., incorrect administration of holiday allowances, or the application of special salary components not recorded in the official data) can yield calculation results that show salary levels just below the thresholds that applies. In theory, this is not possible, because the wage criterion is an absolute criterion without exceptions. However, registration errors may occur when the data comes from a different source (Tax Office) than the source that evaluates the criterion (IND).

A potential source of error in the analysis is the "30 percent tax provision" that is applicable to most highly skilled migrants. This tax provision allows the employer to pay up to 30 percent of the agreed wage as tax-free "extraterritorial costs", which means that those wages are exempted from taxes and social contributions. This provision requires no proof that the expenses which it is intended to reimburse are actually made. Eligibility for this tax advantage previously extended for a maximum of 10 years, but was recently changed to 8 years. However, eligibility requirements do include minimum wage thresholds, although these thresholds are lower than those that apply to the *"Highly Skilled Migrants"* scheme. Eligibility is also limited to individuals who have lived over 150 km away from the Dutch border for at least 16 consecutive months during the 24 months preceding their initial migration to the Netherlands. This is rarely an issue for highly skilled migrants, as they all come from countries outside the EU or from Bulgaria, Romania or Croatia, so practically all of them meet this requirement.

Since "extraterritorial costs" are not paid as salary, but as reimbursement, this income is not recorded in tax records. However, the IND does take account of the reimbursement in evaluating the wage threshold. Unfortunately, none of the registers available keep any records whatsoever on individual use of this tax provision. On the other hand, this provision is so advantageous that it can reasonably be assumed that everyone eligible will avail themselves of the benefits. At the very least, employers are likely to make use of it; cases are known where an employer used this provision to lower wage costs. In any case, corrections for use of this tax provision are required in the analysis of the effects of the wage threshold. Given that almost every highly skilled migrant is eligible, combined with the assumption that everyone eligible makes use of this tax provision, it can also be assumed that the wages registered for highly skilled migrants during their first years can be evaluated against 70 percent of the actual threshold.

The evaluation of the wage threshold is based on the annual wages established in the migrants' contracts, including their holiday allowances. It should be noted that, in the Netherlands, the holiday allowances in most standard jobs are typically paid in May. Thus, to ensure a valid comparison, the holiday allowance is taken into account in calculating annual wages.

Data issues specific to the migration duration analysis (partners and students)

Part of the observations are right censored, since the observation period ends on January 1st, 2013. The duration analysis used in this study accounts for this in a natural way. A more serious problem is that the municipal registers do not always contain accurately recorded dates of return migration. Although foreign nationals are required to report their emigration to local authorities, this does not always happen in practice. If a municipality discovers that a foreign national is no longer living at his/her registered address, administrative corrections are made. Fortunately, these administrative entries can be distinguished from correctly self-reported departure dates. Bijwaard et al. (2014) shows that, in their data (covering all types of migrants between 1999 and 2007), this was the case for 38 percent of emigration records. For foreign students in the dataset, administrative removal was carried out for 28 percent of all EU emigrants and 37 percent of those from non-EU countries. For highly skilled migrant couples, this percentage was much lower (under 10 percent), although corrections are still necessary. These were made by correcting explicitly for "interval censoring" in the estimation of the survival models, which is done according to the method used by Bijwaard et al. (2014).

Data issues specific to the partners' employment analysis

In the second research population, the core consists - once again - of the highly skilled migrant data from 2005 to 2012. However, this time, only individuals with a partner living in the Netherlands are included. The unit of analysis is not the individual, but the individual *during all spells throughout his/her stay* in the Netherlands. A wide variety of job and personal characteristics are merged (from both the migrant and his/her partner). Spells can be identified every time a relevant variable changes. In fact, the 8,445 couples generated a total of 149,594 spells. The precise selection includes highly skilled migrants in the period from 2005 to 2012, who held jobs (within 3 months of immigration) and had an official partner (within 3 months of immigration). To be able to identify the partner, only partners were included that were officially registered and whose identity was known from Dutch municipality records. Thus, all of the partners were living in the Netherlands at some point during the period 2005-2012 and had their own social security numbers.

Partners were included who were in an official relationship or who were living together and had a child (despite their lack of registration in an official relationship). Couples who lived together for some time in the Netherlands before getting married or having a child were considered partners during their entire stay together. The Statistics Netherlands records available for household partners have not been fully used, because they contain too many administrative errors. Use of the full household records would produce many "false positives". Examples include apparent couples who are, in fact, merely two unrelated adults living together (e.g., students) or artefacts caused by overlapping registration dates. For this reason, only "verified" partners have been used. The age of the youngest child in the household is also used in the analyses.

During the observation period, some partners are Dutch nationals, or became naturalized Dutch nationals, although this was not very common. Only 2.8 percent of all partners were Dutch during

the first observation period. In the final observation period, the corresponding figure rose to 3.2 percent. Among the highly skilled migrants themselves, 0.8 percent were found to have acquired the Dutch nationality during the last spell.

Data issues specific to the analysis of students' (relevant) work experience

In the third research population, the core consists of all foreign graduates from Dutch institutes of tertiary education, who were no longer registered as students in the year following graduation. This excludes Bachelor's students who enrolled in Master's degree programmes at Dutch universities, although this group may enter the population later on once they have received their Master's degrees.

Given the differences in the legal status, it makes sense to divide the population into EU and non-EU students. The former are allowed to come to the Netherlands and study, search for a job, leave and eventually even return without any restrictions. The latter require a student visa to live and study in the Netherlands. That visa also allows them to work, though the current regulations limit these students to a maximum work week of 10 hours.

Internships qualify as work experience, but their influence might be different than that of "real" jobs. Unfortunately, unpaid internships are not registered in the data. The effect of paid internships is analysed separately, through the inclusion of an extra dummy. If a student held a job as an intern, he/she scored a value of 1 on the dummy for (relevant) work experience and on the dummy for internships. Consequently, the effect of (relevant) work experience can be regarded as the effect of (relevant) work experience "on top of the effect from paid internships". Internships did not interfere with the definition of relevant sectors (see Appendix B).

Once again, a wide variety of personal and labour market characteristics are merged, and spells can be identified every time a relevant variable changes. Indicators for relevant work experience during the study are also included. Thus, the 14,468 non-EU students generate a total of 195,551 spells. The 16,161 EU students generate a total of 172,240 spells. These students graduated between 2008 and 2012 and were observed until the end of 2013.

Appendix B   Methodology

Wage criterion

On inspecting the data, it becomes clear that there is some wage jump between the starting ages of 29 and 30, which is probably not random. The obvious first choice for testing for differences between the low and high thresholds is a traditional OLS regression of the logarithm of the (real) wage in the first year of the job. To see which model specification would fit the age pattern best, first a model is applied that includes the variable ´age at job entry´, using dummies for every age cohort. The resulting estimates illustrate a "non-parametric function" of the relationship between the starting age and the starting wage, after correcting for the wage effects of covariates, such as sector, nationality, company size, etc. (see Table C.2 for for details). These estimates are plotted in Figure B.1.

Figure B.1   Graphical model selection: linear model between ´age at job start´ and ´starting wage´
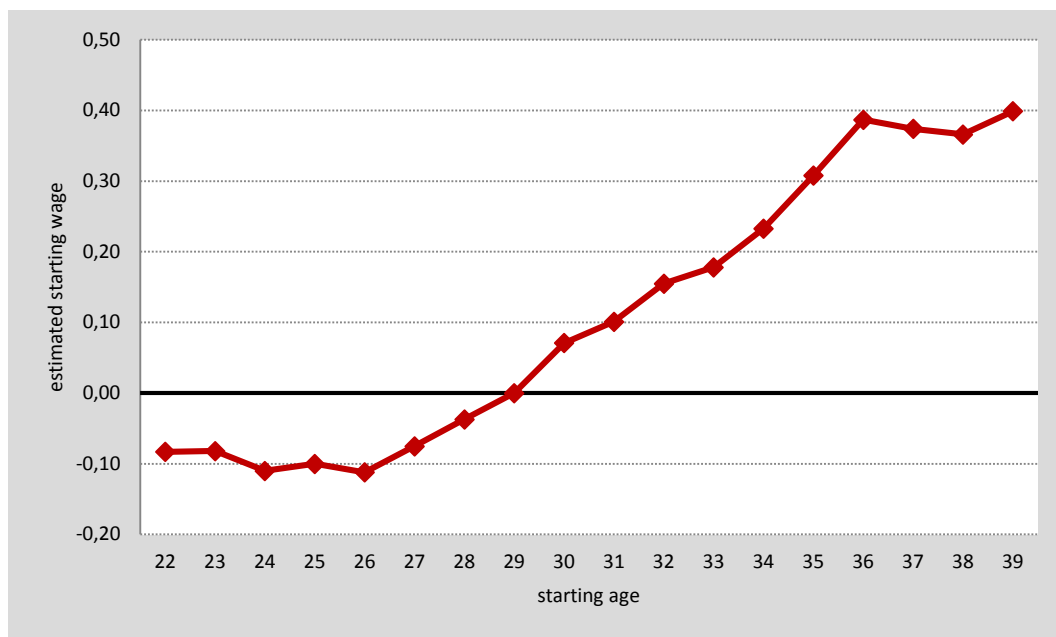
Estimation of coefficients from non-parametric estimation (see Table C.2).
Source: SEO calculations, based on CBS microdata.

Figure 6.1 shows that the best fit would probably be a model specification that includes age in a linear form, but features separate dummies for starting ages from 21 to 25. In order to test the significance of the average wage jump between starting ages 29 and 30, an extra dummy is added for the starting ages of 30 and higher. That extra shift appears to be statistically significant using OLS, although the magnitude is limited.

However, OLS regression produces only information on the average effect, and the data clearly shows that the average is not where the action is (as the average starting wage for 29-year-olds is already well above the higher threshold). To examine the effect of the higher threshold on wages of the highly skilled migrants in the lowest part of the wage distribution, additional quantile regressions are necessary. These quantile regressions reveal that the magnitude of the wage jump is, in fact, much higher for individuals with lower wages.

All regressions use price-deflated real wages, where the deflator is exactly the same as that used for the yearly correction of the wage threshold. The same regressions are also carried out for nominal wages. In those regressions, the year dummies pick up the inflation effect, while the variables of interest differ only slightly from the ones in the model with deflated wages. Detailed estimation results are available on request from the authors.

Partners' labour market status

In the second analysis, the time spent by a highly skilled migrant in the Netherlands is the dependent variable in a "survival model" (see, for example, Bijwaard et al., 2014). Migrants are assumed to return with a certain probability. This probability is made a function of individual characteristics, including personal and labour market outcomes of the migrants themselves, as well as the personal and labour market outcomes of their partners. Specifying the dependency of the probability as a proportional hazard timing of events model (Abbring & Van den Berg, 2003), the effect of the partners' labour market outcomes on the duration of highly skilled migrants in the Netherlands is estimated using maximum likelihood methods.

A survival analysis offers several advantages over probit/logit probability models. In a survival model, the outcome also depends on the length of stay. Time-varying covariates can be added, multiple spells can be analysed, and the methodological issues of right-censoring and interval-censoring can be tackled.

Interval censoring is caused by the problem of administrative removal of the registrations from municipality records of migrants who left the Netherlands, but forgot to report their departure to the municipality in which they resided. When this occurs, municipal authorities remove individuals from the population register as soon as they confirm suspicions that he/she no longer resides in the municipality. However, these cases are flagged in residence records, as the registered date of emigration is some time after the real departure date. The model tackles this problem by assuming that the real date of migration falls somewhere between the individual's last confirmed date of residence in the Netherlands (usually the employment termination date, but sometimes also the last date of changes in housing, or marital status) and the date of administrative removal. The model then assumes that the distribution of the real date follows the same survival function as the migration survival function.[29]

The approach also takes into account that migrants with a higher unobserved tendency to return might also be more likely to have a spouse with an unfavourable labour market outcome. In other

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[29]   Section III.D of Bijwaard et al. (2014) extensively discusses this topic and the solution for it, so further information regarding this topic can be found there.

words: if the couple knows they will probably be leaving, the partner is less likely to search for a job. Such a correction for unobserved heterogeneity was also carried out according to the method used in Bijwaard et al. (2014).

Students' working experience

The time spent by an international student in the Netherlands after graduation is the dependent variable in a duration model (see, for example, Bijwaard et al., 2014). International students are assumed to leave after graduation with a certain probability. This probability is made a function of individual characteristics, including different measures of work experience during the study period (time worked in sectors relevant to the field of study, time worked in non-relevant sectors, squared terms plus an indicator for internship jobs). The indicator for internship jobs functions as an indicator of "very relevant" experience. Subsequently, specifying the dependency of the return probability as a proportional hazard model, the effect of work experience on the time that international students stay after graduation is estimated using maximum likelihood methods.

Relevance of work experience

Definition of <u>relevant work experience</u>: which sectors are relevant, given the degree level and field of education?
- First, all Dutch graduates from tertiary education in the period from 2004-2011 who entered the labour market after graduation are analysed. (Thus, Bachelor's graduates who immediately enrolled in a Master's programme were excluded).
- Given that graduates need some time to settle on the labour market, the sectors in which they were working 18 months after graduation are examined (NACE v2 code, in five-digit detail[30]).
- For each (five-digit) sector, the number of graduates in total employment are calculated (# of graduates/# of employees).
- This "graduate penetration rate" is calculated separately for 18 different combinations of education level & field: for Bachelor's and for Master's graduates from each of the nine fields of education.
- For each of the 18 educational groups, the sectors are ranked on their "graduate penetration rate". The higher the relative percentage of recent graduates, the more relevant this sector is for that educational level-field combination.
- Once ranked, the most relevant sectors in the educational group are flagged, from top to bottom, until 25 percent of the graduates in the educational group are allocated. The exact threshold is arbitrary; one could also flag the top 50 percent, for example. It is just that the higher the threshold, the more sectors get flagged as relevant, while they may in fact simply be irrelevant sectors, where many graduates work while looking for better jobs (private employment agencies for example). The top 25 percent is considered to be a conservative threshold, which is still large enough to demonstrate the effect of relevance.
- Unfortunately, even in a five-digit coding system, some sectors are very small, while others are extremely large. The codes in the public, education and health sector in particular are not very detailed. Thus, 45-60 percent of teachers worked in a relevant sector. However, this does not affect migrants much, as they seldom choose the field of teaching.

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[30]   The fifth digit is not part of the Nace definition but appointed by Statistics Netherlands.

Table B.1   Relevant sectors for Bachelor's graduates (2004-2011)

	agriculture	arts & social	economics	engineering	health	legal	logistics, services	science	teachers
Agriculture	3%								
Manufacturing (BC)	4%			4%					
Construction				3%					
Wholesale	3%			1%					
Transport							2%		
Accommodation & food							8%		
Information, communication		11%	6%				2%	40%	
Financial services			7%						
Business services (LMN)	18%	8%	10%	17%		11%	8%		
Other services (RS)	2%	5%					6%		
Employment agencies			1%						
Public administration						16%			
Education		1%							45%
Health		3%			28%				
Total	30%	28%	25%	25%	28%	26%	25%	40%	45%

Percentage of Bachelor's graduates from each field of education that are working in relevant sectors 18 months after graduation.

Table B.2   Relevant sectors for Master's graduates (2004-2011)

	agriculture	arts & social	economics	engineering	health	legal	logistics, services	science	teachers
Manufacturing (BC)	3%								
Wholesale			1%						
Information, communication		1%							
Financial services			1%						
Business services (LMN)	34%	3%	23%	12%	3%	26%	22%	5%	
Other services (RS)	3%	2%					3%		
Education		8%		13%			5%	25%	60%
Health		12%			29%				
Total	40%	25%	25%	25%	32%	26%	30%	30%	60%

Percentage of Master's graduates from each field of education that are working in relevant sectors 18 months after graduation.

Appendix C   Background tables

Wage criterion

Table C.1   Highly skilled migrant employees by detailed sector, 2008-2012

	2008	2009	2010	2011	2012	average 2008-2012
Agriculture, power, water	15	32	32	90	198	0.6%
Manufacturing (n.e.c.)	230	283	288	379	472	2.5%
food	64	73	91	112	110	0.7%
chemicals	121	131	173	258	260	1.4%
pharmaceuticals	37	45	58	71	79	0.4%
computer products	145	145	158	206	267	1.4%
electrical equipment	98	63	77	100	105	0.7%
machinery	126	155	176	230	251	1.4%
repair & installation	23	44	65	76	80	0.4%
Construction	20	39	53	58	61	0.4%
Wholesale (n.e.c.)	225	307	304	457	495	2.7%
on contract basis	93	103	98	144	148	0.9%
agricultural	33	45	68	86	96	0.5%
food, bev. & tab.	54	106	141	178	184	1.0%
household goods	288	372	458	539	594	3.4%
info/com. equipment	535	627	633	712	781	5.0%
Retail & repair	70	78	83	144	172	0.8%
Transport (n.e.c.)	73	81	85	114	112	0.7%
warehousing	195	226	197	294	332	1.9%
Accommodation & food	15	31	48	72	80	0.4%
Information, communication (n.e.c.)	24	28	33	43	52	0.3%
telecommunications	125	131	161	203	222	1.3%
computer consultancy	1,901	2,001	2,043	2,330	2,742	16.8%
information services	33	44	46	60	71	0.4%
Financial services (n.e.c.)	662	700	684	806	878	5.7%
insurance	45	61	64	85	108	0.6%
auxiliary activities	109	120	117	121	145	0.9%
Business services (n.e.c.)	93	89	85	125	121	0.8%
legal & accounting	233	236	223	321	363	2.1%
head offices	817	827	827	1052	1161	7.1%
management consultancy	336	443	499	645	758	4.1%
architectural, engineering	377	429	646	633	621	4.1%
scientific R&D	279	429	538	626	662	3.9%
advertising	243	258	281	324	369	2.2%
other professional services	27	34	53	81	103	0.5%
tour operator & related	25	45	75	110	163	0.6%
Other services (RS)	143	205	229	240	241	1.6%
Employment agencies	325	352	325	367	519	2.9%
Education (universities)	1,356	1,832	1,994	1,974	1,974	13.9%
Health	209	322	420	498	513	3.0%

Number of highly skilled migrants working as an employee in a specific sector (main jobs).

Figure C.1 Higher percentage of highly skilled migrants on temporary contracts
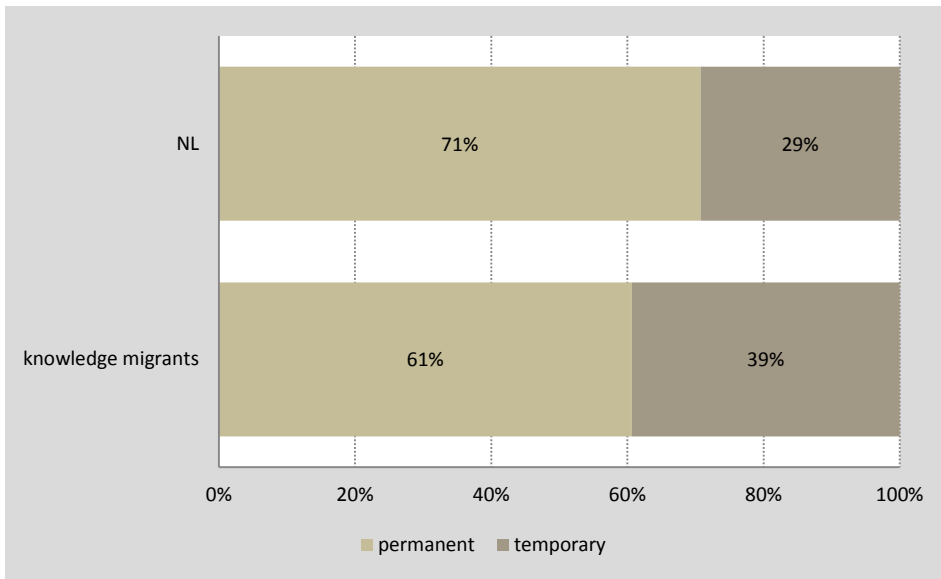
Source: SEO calculations, based on CBS microdata.

Figure C.2 Working part-time is not an issue for highly skilled migrants
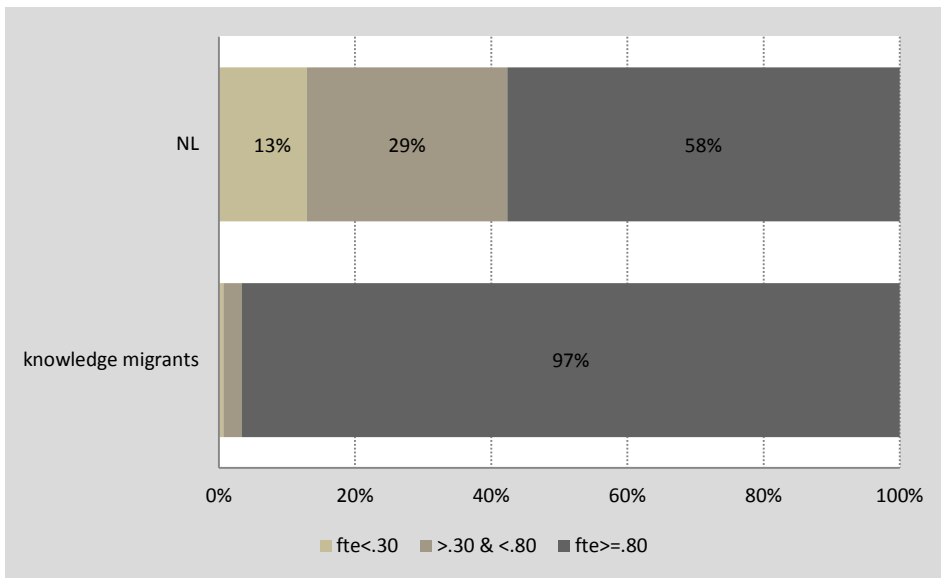
Source: SEO calculations, based on CBS microdata.

Figure C.3   Large companies employ relatively many highly skilled migrants
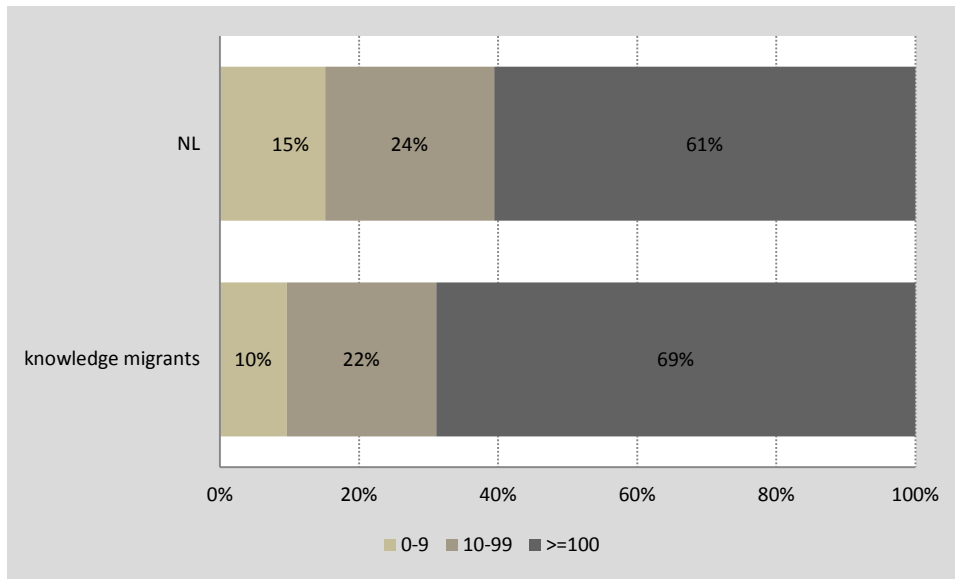
Source: SEO calculations, based on CBS microdata.

Table C.2   Non-parametric estimation of the relation 'age of job entry' on 'wage'

	job entry 21-49	job entry 21-39	job entry 22-29	percentage of population 21-49
Female	-0.02 ***	-0.02 **	-0.01	27%
Official partner	0.09 ***	0.06 ***	0.06 ***	26%
Household partner	0.02 **	0.03 ***	0.00	38%
Children	0.08 ***	0.06 ***	0.00	19%
FTE <.80	0.15 ***	0.16 ***	0.16 ***	2%
Small company	-0.09 ***	-0.07 ***	-0.04 ***	30%
Temporary contract	-0.12 ***	-0.12 ***	-0.11 ***	47%
2005	-0.03	-0.03	0.00	2%
2006	0.02	0.04 ***	0.09 ***	6%
2007	-0.04 ***	-0.03 **	0.01	12%
2008	-0.04 ***	-0.02 **	0.00	18%
2009	-0.11 ***	-0.08 ***	-0.04 ***	17%
2010	-0.07 ***	-0.06 ***	-0.03 **	12%
2011	ref.			14%
2012	-0.03 ***	-0.01	0.03 **	17%
Manufacturing (A-F)	0.06 ***	0.09 ***	0.13 ***	9%
Trade, restaurants	0.07 ***	0.09 ***	0.10 ***	12%
Transport, communication	-0.18 ***	-0.17 ***	-0.13 ***	32%
Financial services	0.06 ***	0.04 ***	0.03 *	8%
Business services	ref.			30%
Other services (RS)	-0.34 ***	-0.30 ***	-0.22 ***	1%
Employment agencies	-0.02	0.00	0.06	4%
Health	-0.29 ***	-0.27 ***	-0.25 ***	4%
Northern Netherlands	0.05 ***	0.09 ***	0.11 ***	3%
Eastern Netherlands	-0.20 ***	-0.18 ***	-0.14 ***	5%
Utrecht	-0.21 ***	-0.21 ***	-0.20 ***	7%
North-Holland	ref.			48%
South-Holland	0.03 ***	0.02 **	0.01	23%
North-Brabant	-0.11 ***	-0.10 ***	-0.07 ***	11%
Southern Netherlands	-0.08 ***	-0.09 ***	-0.04	2%
EEA	-0.27 ***	-0.24 ***	-0.16 ***	7%
Africa	-0.12 ***	-0.10 ***	-0.07 ***	5%
America/Pacific	ref.			16%
Asia	-0.25 ***	-0.22 ***	-0.14 ***	58%
Rest Europe	-0.25 ***	-0.21 ***	-0.14 ***	14%

table continued on next page…

Nominal full-time wage in first year. Partial spells are recalculated to represent a 12-month period. No correction for inflation.

Table C.2   continued

Age of job entry	job entry 21-49	job entry 21-39	job entry 22-29	percentage of population 21-49
21	-0.14	-0.16		0%
22	-0.08 ***	-0.10 ***	-0.12 ***	1%
23	-0.08 ***	-0.10 ***	-0.12 ***	3%
24	-0.11 ***	-0.12 ***	-0.14 ***	6%
25	-0.10 ***	-0.11 ***	-0.13 ***	8%
26	-0.11 ***	-0.12 ***	-0.13 ***	8%
27	-0.08 ***	-0.08 ***	-0.09 ***	8%
28	-0.04 **	-0.04 **	-0.04 ***	8%
29	ref.	ref.	ref.	7%
30	0.07 ***	0.08 ***		6%
31	0.10 ***	0.11 ***		5%
32	0.16 ***	0.16 ***		5%
33	0.18 ***	0.19 ***		4%
34	0.23 ***	0.24 ***		4%
35	0.31 ***	0.32 ***		4%
36	0.39 ***	0.40 ***		3%
37	0.37 ***	0.39 ***		3%
38	0.37 ***	0.38 ***		2%
39	0.40 ***	0.41 ***		2%
40	0.51 ***			2%
41	0.52 ***			2%
42	0.62 ***			2%
43	0.58 ***			1%
44	0.65 ***			1%
45	0.66 ***			1%
46	0.71 ***			1%
47	0.77 ***			1%
48	0.82 ***			1%
49	0.74 ***			1%
_cons	11.07 ***	11.03 ***	10.93 ***	
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N	23,540	20,654	11,619	
r2	0.374	0.286	0.127	

Nominal full-time wage in first year. Partial spells are recalculated to represent a 12-month period. No correction for inflation.

Table C.3   Regression output from quantile regressions and OLS

	qreg05	qreg10	qreg15	qreg20	qreg25	qreg50	OLS
Female	-0.002	0.001	0.004	0.005	0.000	-0.014	-0.028 ***
Official partner	0.024 *	0.026 **	0.028 ***	0.027 ***	0.026 ***	0.052 ***	0.061 ***
Household partner	0.033 ***	0.027 ***	0.022 **	0.021 ***	0.023 ***	0.022 **	0.024 ***
Children	0.021 *	0.027 **	0.038 ***	0.036 ***	0.042 ***	0.055 ***	0.061 ***
FTE <.80	-0.207 ***	-0.080 ***	0.035	0.042 *	0.077 ***	0.168 ***	0.148 ***
Small firm	-0.015	-0.029 ***	-0.044 ***	-0.046 ***	-0.049 ***	-0.051 ***	-0.061 ***
Temporary contract	-0.046 ***	-0.058 ***	-0.073 ***	-0.081 ***	-0.091 ***	-0.133 ***	-0.126 ***
2005	1.323 ***	1.409 ***	1.430 ***	1.432 ***	1.450 ***	1.445 ***	-0.037
2006	1.317 ***	1.349 ***	1.368 ***	1.391 ***	1.391 ***	1.397 ***	0.045 ***
2007	1.017 ***	1.058 ***	1.093 ***	1.097 ***	1.091 ***	1.082 ***	-0.018
2008	0.761 ***	0.785 ***	0.798 ***	0.802 ***	0.795 ***	0.808 ***	-0.015
2009	0.415 ***	0.446 ***	0.446 ***	0.445 ***	0.438 ***	0.412 ***	-0.078 ***
2010	0.200 ***	0.221 ***	0.223 ***	0.224 ***	0.209 ***	0.190 ***	-0.051 ***
2011	0.129 ***	0.164 ***	0.162 ***	0.153 ***	0.142 ***	0.127 ***	ref
2012	ref.	ref.	ref.	ref.	ref.	ref.	-0.009
sector (ref=business services)							
Manufacturing (A-F)	0.056 ***	0.100 ***	0.101 ***	0.104 ***	0.119 ***	0.118 ***	0.085 ***
Trade, restaurants	0.027 *	0.043 ***	0.073 ***	0.082 ***	0.094 ***	0.110 ***	0.094 ***
Transport, communication	-0.055 ***	-0.034 ***	-0.022 **	-0.024 ***	-0.030 ***	-0.115 ***	-0.171 ***
Financial services	0.110 ***	0.108 ***	0.107 ***	0.088 ***	0.088 ***	0.035 **	0.044 ***
Other services (RS)	-0.189 ***	-0.126 ***	-0.146 ***	-0.175 ***	-0.200 ***	-0.252 ***	-0.297 ***
Employment agencies	0.063 ***	0.064 ***	0.072 ***	0.061 ***	0.047 ***	0.025	0.003
Health	-0.160 ***	-0.154 ***	-0.180 ***	-0.169 ***	-0.186 ***	-0.258 ***	-0.272 ***
region (ref = North Holland)							
Northern Netherlands	0.032	0.017	0.024	0.022	0.036 **	0.162 ***	0.083 ***
Eastern Netherlands	-0.063 ***	-0.086 ***	-0.112 ***	-0.126 ***	-0.140 ***	-0.136 ***	-0.171 ***
Utrecht	-0.715 ***	-0.411 ***	-0.248 ***	-0.169 ***	-0.147 ***	-0.124 ***	-0.189 ***
South-Holland	-0.025 **	-0.024 **	-0.028 ***	-0.025 ***	-0.022 ***	0.005	0.018 **
North-Brabant	-0.035 **	-0.034 **	-0.035 ***	-0.028 **	-0.029 ***	-0.063 ***	-0.095 ***
Southern Netherlands	-0.149 ***	-0.115 ***	-0.117 ***	-0.090 ***	-0.093 ***	-0.047 **	-0.082 ***
nationality (ref = American/Pacific)							
EEA	-0.056 ***	-0.088 ***	-0.109 ***	-0.121 ***	-0.135 ***	-0.222 ***	-0.232 ***
Africa	-0.010	-0.034 *	-0.046 ***	-0.056 ***	-0.068 ***	-0.099 ***	-0.093 ***
Asia	-0.072 ***	-0.080 ***	-0.097 ***	-0.102 ***	-0.110 ***	-0.178 ***	-0.185 ***
rest Europe	-0.045 ***	-0.075 ***	-0.098 ***	-0.105 ***	-0.113 ***	-0.197 ***	-0.195 ***
age_jstart29	**0.021 *****	**0.023 *****	**0.023 *****	**0.026 *****	**0.027 *****	**0.032 *****	**0.040 *****
d_highcrit	**0.116 *****	**0.116 *****	**0.086 *****	**0.054 *****	**0.041 *****	**0.017**	**0.032 ****
d_highcrit* age_jstart29	-0.004	-0.007	-0.003	-0.001	0.001	0.016 ***	*0.001*
_cons	10.277 ***	10.367 ***	10.458 ***	10.533 ***	10.604 ***	10.917 ***	11.025 ***
N	20650	20650	20650	20650	20650	20650	**20654**
d_age_22	0.097 *	0.107 **	0.093 **	0.094 **	0.077 **	0.158 ***	0.198 ***
d_age_23	0.054	0.070 **	0.081 ***	0.099 ***	0.093 ***	0.110 ***	0.149 ***
d_age_24	0.037	0.052 *	0.053 **	0.052 **	0.049 **	0.051 **	0.086 ***
d_age_25	0.028	0.027	0.032 *	0.036 **	0.035 **	0.025	0.057 ***

Partners' labour market status

Table C.4   Background characteristics of the research population, "migrant couples"

	Number of subjects		Average value	
	First spell	Last spell	First spell	Last spell
Female (migrant)	8445	8445	14%	14%
Female (partner)	8445	8445	86%	86%
Age migrant max. 24	8445	8445	1%	0%
Age migrant 25-29 (	8445	8445	25%	12%
Age migrant 30-34 (	8445	8445	32%	33%
Age migrant 35-39 (	8445	8445	21%	26%
Age migrant 40-44 (	8445	8445	11%	14%
Age migrant 45-49 (	8445	8445	5%	8%
Age migrant 50-54 (	8445	8445	3%	4%
Age migrant 55-59 (	8445	8445	1%	2%
Age migrant 60+ (	8445	8445	0%	1%
Age partner max. 24	8445	8445	7%	2%
Age partner 25-29 (	8445	8445	32%	22%
Age partner 30-34 (	8445	8445	27%	31%
Age partner 35-39 (	8445	8445	17%	20%
Age partner 40-44 (	8445	8445	9%	12%
Age partner 45-49 (	8445	8445	5%	6%
Age partner 50-54 (	8445	8445	3%	3%
Age partner 55-59	8445	8445	1%	2%
Age partner 60+)	8445	8445	0%	1%
Sector migrant Manufacturing	8445	8445	11%	11%
Sector migrant Wholesale, retail, catering	8445	8445	18%	16%
Sector migrant Transport, communication	8445	8445	4%	4%
Sector migrant Financial Services	8445	8445	6%	6%
Sector migrant Other services	8445	8445	1%	1%
Sector migrant Education	8445	8445	9%	7%
Sector migrant Health	8445	8445	2%	1%
Sector migrant PrEA's	8445	8445	3%	2%
Sector migrant Business services	8445	8445	47%	40%
Migrant has no job (in the Netherlands)	8445	8445	0%	13%
Sector partner Manufacturing (tov business services)	743	1541	8%	9%
Sector partner Wholesale, retail, catering	743	1541	12%	15%
Sector partner Transport, communication	743	1541	3%	5%
Sector partner Financial Services	743	1541	7%	7%
Sector partner Other services	743	1541	2%	3%
Sector partner Education	743	1541	15%	15%
Sector partner Health	743	1541	4%	5%
Sector partner PrEA's	743	1541	6%	5%
Sector partner Business services	743	1541	42%	36%
Partner has no job (in the Netherlands)	8445	8445	91%	82%

Source: SEO calculations, based on CBS microdata.

Table C.4   continued

	Number of subjects		Average value	
	First spell	Last spell	First spell	Last spell
Firm size migrant 0-9	8445	8445	10%	8%
Firm size migrant 10-99	8445	8445	21%	18%
Firm size migrant 100+ employee	8445	8445	69%	61%
Firm size partner 0-9	743	1541	9%	9%
Firm size partner 10-99	743	1541	20%	22%
Firm size partner 100+ employees	743	1541	71%	69%
Fixed term contract migrant	8445	8445	29%	27%
Fixed term contract partner	743	1541	29%	40%
Dutch	8445	8445	0%	1%
EU nationals	8445	8445	4%	4%
Africans	8445	8445	6%	6%
Americans/Oceanians	8445	8445	24%	24%
Other Europeans (non-EU)	8445	8445	9%	9%
Asians	8445	8445	56%	56%
Partners: Dutch	8445	8445	3%	4%
Partners: EU nationals	8445	8445	7%	7%
Partners: Africans	8445	8445	5%	5%
Partners: Americans and Oceanians	8445	8445	20%	20%
Partners Other Europeans (non-EU nationals)	8445	8445	9%	9%
Partner Asian	8445	8445	55%	55%
Region Eastern Netherlands	8445	8445	5%	6%
Region Utrecht	8445	8445	4%	4%
Region North Holland	8445	8445	47%	43%
Region South Holland	8445	8445	29%	30%
Region North Brabant	8445	8445	10%	11%
Region Zeeland/Limburg	8445	8445	3%	3%
Region Northern Netherlands	8445	8445	2%	2%
Partner living in the Netherlands	8445	8445	64%	91%
Age youngest child under 1 year old	8445	8445	10%	10%
Age youngest child 1 year old	8445	8445	9%	10%
Age youngest child 2-3 years old	8445	8445	12%	15%
Age youngest child 4-6 years old	8445	8445	10%	13%
Age youngest child 7-12 years old	8445	8445	8%	11%
Age youngest child 13-18 years old	8445	8445	3%	4%
No children	8445	8445	48%	37%
1 child (until 18) living at home	8445	8445	30%	36%
2 children (until 18) living at home	8445	8445	18%	22%
3+ children living at home	8445	8445	4%	5%

Source: SEO calculations, based on CBS microdata.

Table C.4   continued

	Number of subjects		Average value	
	First spell	Last spell	First spell	Last spell
Year of immigration 2005	8445	8445	3%	3%
Year of immigration 2006	8445	8445	7%	7%
Year of immigration 2007	8445	8445	12%	12%
Year of immigration 2008	8445	8445	18%	18%
Year of immigration 2009	8445	8445	12%	12%
Year of immigration 2010	8445	8445	14%	14%
Year of immigration 2011	8445	8445	18%	18%
Year of immigration 2012	8445	8445	17%	17%
Log (vacancies/unemployment)	8445	8445	-0.288	-0.798
Percentage migrated			0,0%	39,0%
including: percentage of administrative removals			0,0%	3,4%
Elapsed duration (stay in the Netherlands) in days				846,7

Source: SEO calculations, based on CBS microdata.

Students' work experience

Table C.5   Number of foreign graduates from tertiary education in the Netherlands

	EU graduates				Non-EU graduates		
	not migrated (end of 2013)	migrated	Total		not migrated (end of 2013)	migrated	Total
2008	493	1,559	2,052		925	1,691	2,616
2009	616	1,792	2,408		958	1,714	2,672
2010	839	2,082	2,921		1,118	1,766	2,884
2011	1,285	2,517	3,802		1,351	1,728	3,079
2012	2,014	2,964	4,978		1,595	1,618	3,213

Source: SEO calculations, based on microdata CBS.

Table C.6   Averages of research population

	EU graduates	Non-EU graduates
Female	60%	55%
Age (3 months before graduation)	25.5	26.2
Year of graduation 2008	13%	18%
Year of graduation 2009	15%	18%
Year of graduation 2010	18%	20%
Year of graduation 2011	24%	21%
Year of graduation 2012	31%	22%
Years in the Netherlands (3 months before graduation)	1.8	2.0
Region Eastern Netherlands	14%	20%
Region Utrecht	7%	5%
Region North Holland	24%	18%
Region South Holland	25%	29%
Region North Brabant	9%	14%
Region Zeeland/Limburg	13%	4%
Region Northern Netherlands	9%	9%
Teachers (B)	1%	1%
Arts & social (B)	15%	6%
Economics (B)	8%	14%
Legal (B)	1%	1%
Science (B)	1%	2%
Engineering (B)	2%	3%
Agriculture (B)	3%	2%
Health (B)	4%	1%
Logistics, tourism (B)	5%	3%
Teachers (M)	1%	0%
Arts & social (M)	21%	14%
Economics (M)	16%	15%
Legal (M)	8%	6%
Science (M)	4%	5%
Engineering (M)	6%	17%
Agriculture (M)	3%	5%
Health (M)	3%	5%
Logistics (M)	0%	1%
No work experience	0.1	0.1
Only non-relevant work experience	1.1	0.7
Relevant work experience	15%	25%
Log (vacancies/unemployment)	-0.436	-0.353
Dutch nationals	0%	0%
Central & Eastern Europeans (EU)	27%	0%
South-Europeans (EU)	18%	0%
Other EU nationals	54%	0%
Africans	0%	9%
Americans/Australians	0%	18%
Other non-EU Europeans	0%	13%
Asians	0%	60%

Averages at start of analysis, 3 months before graduation.
Source: SEO calculations, based on microdata CBS.

seo economisch onderzoek