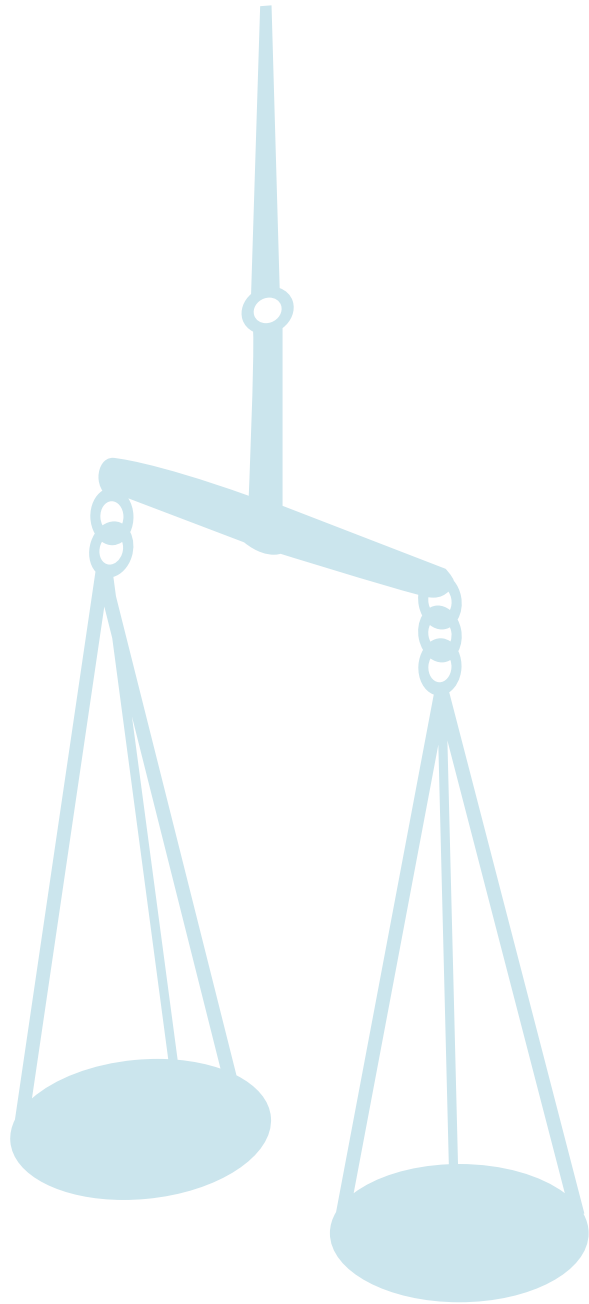


International
sourcing and
employment
effects –
a micro
data linking
approach

8



International sourcing and employment effects – a micro data linking approach

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This study finds that employment growth in domestic enterprises decreases as a result of international sourcing while wage growth increases, indicating that lower paid jobs are more prone to international sourcing. This is confirmed by the data that show a diminishing share of low paid workers in enterprises involved in international sourcing, while this share increases, albeit slightly, in enterprises that were not involved in international sourcing in the 2001–2006 reference period. At the same time, enterprises that sourced internationally show an increase in the share of high paid workers, while enterprises in the control group display a decrease.

8.1 Introduction

In recent years innovations in transportation and communications technology launched a new stage in the internationalisation of the global economy. While international trade – until then – mainly involved the export and import of complete goods, it now increasingly entails trade in tasks. Production processes are being split into separate activities, each of which is localised in – from a business economic perspective – the most appropriate place in the world. Activities that need cheap labour are localised in places where there is a sufficient supply of cheap labour. In recent decades we have seen a shift in these parts of the value chain from industrialised economies to developing economies in Eastern Europe and South-East Asia. Activities such as R&D and product design, which require high-skilled labour, are performed at those locations where there is a sufficient supply of high-skilled workers. It is no longer obvious for these activities to be bound to western industrialised economies, since developing economies have displayed a considerable increase in numbers of motivated and well-educated young people. Not only access to labour, but environmental, infrastructural, political or fiscal motives also play a role in restructuring the value chain. This leads in receiving countries to more welfare, increasing consumption levels, and new market opportunities, adding access to markets as another motive for moving activities abroad (sales and distribution). These developments lead to structural changes in our economy. However, industrial transformation is nothing new. It is inherent to economic development. Technological innovations continuously change enterprises, their organisational structure and the way they generate income.

Nevertheless, the impact of relocation on the labour market is now one of the major issues of concern for policymakers and public opinion. In particular, the rapid and permanent restructuring of multinational enterprises arouses uncertainty about the domestic labour market and welfare standards. This uncertainty leads to fear and worry among the public at large, not in the least as a result of extensive media attention to anecdotal

evidence of enterprises moving activities abroad. International sourcing therefore has a negative image among the public at large. The lack of statistics about this phenomenon does not improve the situation and neither does it enhance the quality of public debate about international sourcing and its effects on domestic welfare. So the need for facts, i.e. statistics, among academics, policymakers and the public at large about the globalising economy and its impact is apparent and pressing. The domestic-focused nature of national statistics means it is exceedingly difficult to measure the cross-border behaviour of economic actors. In this study we combine several data sources on enterprise level in order to assess the impact of international sourcing on labour volume, wages, and labour composition.

Section 8.2 gives a brief overview of the current academic debate on international sourcing and its effects on labour volume and domestic wages. Section 8.3 explains the terminology and definitions and elaborates on the methodologies applied for analysing the effects of international sourcing on enterprise level. In 8.4 we provide an overview of the linked micro data and present the results of statistical analyses. This chapter concludes in 8.5 with a discussion of the results and suggestions for further research.

8.2 Literature review on international sourcing

One indicator for the increased fragmentation of value chains over the world and hence the rise in offshoring is the increase of international trade in intermediate goods (Sturgeon & Gereffi, 2009). The trade in intermediate goods has shown a steep increase since the mid-1990s, indicating that final products are increasingly composed of parts that are made in different locations throughout the world. Hijzen et al. (2010) argue that the rise in offshoring has been an important factor behind the growth of total world trade. Several studies have used figures on trade in intermediate goods as a proxy for offshoring and global value chains. However, difficulties and ambiguity arise when defining intermediate goods, since some products could be goods for both intermediate and final consumption.

Offshoring is a phenomenon that entails the organisational and technological ability to relocate specific tasks and coordinate a geographically dispersed network of activities. It decouples the linkages between economic value creation and geographic location (Levy, 2005). Levy argues that offshoring is not just a macro-economic phenomenon

driven by new telecommunication technologies and falling costs, but that it also is closely related to the development of enterprise-level organisation and managerial capabilities to coordinate geographically dispersed networks of tasks and productive activities (Levy, 2005). Particularly multinational enterprises display an increasing organisational and technological capacity to separate and coordinate a network of contractors performing an intricate set of activities (Levy, 2005). The fragmentation of production offers enterprises benefits through the improvement of the primary production factors by allowing enterprises to specialise in the activities they perform well. This reflects the Ricardean model of comparative advantage. According to Mankiw and Swagel (2006), offshoring is 'only the latest manifestation of the gains from trade that economists have talked about at least since Adam Smith'. Mankiw and Swagel argue that offshoring can lead to welfare gains in the aggregate, just as trade. However, when referring to the academic literature on international economics we also know that trade produces winners and losers and increases inequalities in income distribution. So who are the winners and who are the losers in the international sourcing story?

Agrawal and Farrel (2003) argue that 'companies move their business services offshore because they can make more money – which means that wealth is created for the US as well as for the country receiving the jobs.' This indicates that enterprises will profit from sourcing internationally, but it says nothing about the gains (or losses) of the other actors involved. In this respect, Levy (2005) states that the creation of global labour markets for specific skill groups shifts the balance of market power among enterprises, workers and countries and reduces the bargaining power of workers in relation to their employers. So while enterprises (i.e. shareholders) make more profit after sourcing, employees in the home country may not benefit. Saving labour costs in industrialised economies by moving jobs from expensive to cheap labour countries simply transfers income from workers in the domestic country to workers abroad and to shareholders in the offshoring enterprise (Levy, 2005). This is primarily a short-term effect and raises the question: what happens with domestic workers in the medium and long term?

Most attention of policymakers and the public at large seems to concentrate on the employment effects of international sourcing. The wave of media attention to offshoring has focused on a widespread concern that this phenomenon is threatening a wide range of jobs in western industrialised economies (Bernstein, 2004; Swann, 2004; Levy, 2005). According to Levy (2005), real income in industrialised countries could increase if those people displaced by offshoring are able to shift to more productive employment. Several studies bear out the short-term negative employment effects of international sourcing. However, medium and long-term effects are difficult to monitor.

Sethupathy (2011) describes the results of a micro data analysis and finds no evidence that international sourcing has an effect on employment. However, he finds that operating

profits per domestic worker (profitability) and average domestic wages rose (more for treatment than for control enterprises) at offshoring enterprises between 1993 and 1997. According to Sethupathy, increased productivity generates higher wages. Offshoring is comparable to the introduction of a new technology that enterprises acquire by paying some initial costs (R&D, licence, machinery etc.). This kind of technology would replace workers, but would make the enterprise as a whole more productive by lowering its marginal costs of production. This yields a competitive advantage for the offshoring enterprises resulting in higher profits. Assuming that profitability is tied to wages, average wages would rise in offshoring enterprises. Grossman (2006) also compares offshoring activities with technological progress. He identifies a productivity effect of offshoring that leads to factor-cost savings, just as new technologies do. In contrast, Feenstra and Hanson (1996) argue that higher wages are the result of a labour composition effect, i.e. that offshoring of lower skilled work leads to a higher average skill in the remaining work in the domestic enterprise, assuming that job skill level correlates with wage.

In this study we attempt to contribute towards the discussion about the effects of international sourcing on domestic employment and wages by linking several statistical sources on enterprise level. We want to establish what happens with employment in enterprises that move activities abroad. Do jobs disappear? And which jobs are prone to international sourcing? What are the effects on wages in the enterprises involved? Does international sourcing lead to a shift in composition of the labour force?

8.3 Concepts and methodology

Concept of international sourcing

One of the complicated aspects of measuring international sourcing is the existence of different terms and definitions: sourcing, outsourcing, international sourcing, international outsourcing, offshoring, relocation, restructuring etc. In this study we apply the term international sourcing; see box for the definition¹⁾. The word 'movement' indicates a dynamic event; we talk about changes in the structure of an enterprise. The business function is a new type of unit in the statistical world. It was originally based on Michael Porter's generic business functions and the empirical findings from the EMERGENE project

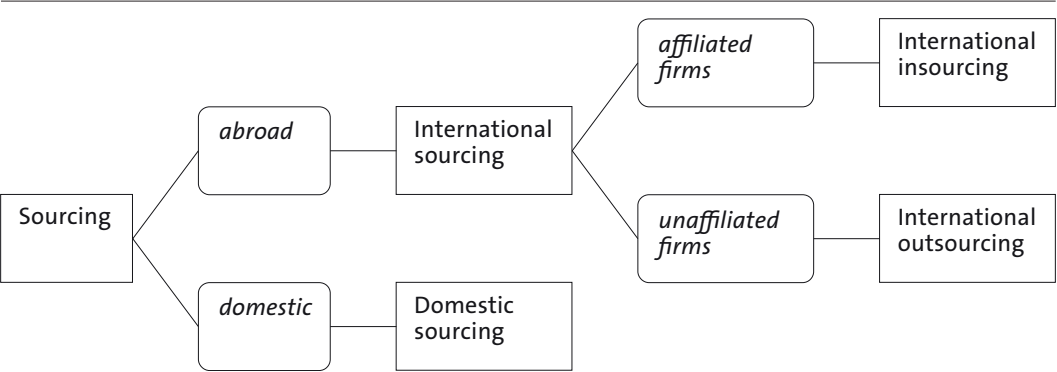
¹⁾ This definition is adopted from Eurostat studies about international sourcing and global value chains.

(Huws, 2003). It refers to the different types of activities that enterprises perform. Each enterprise has core and support functions. A core function incorporates the production of final goods or services for the market. Support functions are carried out in order to permit or facilitate the core business. Examples of support functions include ICT, marketing, (after) sales, distribution and logistics, administration, management, engineering and R&D. The business functions concept is closely related to enterprises' way of working, which makes it easy for respondents to understand. The resident enterprise is the respondent located in the home country, which may have sourced business functions. We only consider business functions that are moved abroad. The schedule in 8.3.1 shows the different types of sourcing. In this chapter we limit our scope to international sourcing, both to affiliated and unaffiliated enterprises. International sourcing is often referred to as offshoring in the literature. International insourcing is sometimes called intra-firm offshoring and international outsourcing could be called arm's-length offshoring.

International sourcing is referred to as the total or partial **movement** of (core or support) **business functions** currently performed in-house or currently domestically sourced by the

resident enterprise to either non-affiliated (external suppliers) or affiliated enterprises located **abroad**.

8.3.1 Different types of sourcing



Micro data linking approach

Some contributions to the academic literature in this field apply a macro-economic approach, based on national accounting. However, the aggregated level of these figures (or the lack of detail) renders this approach ambiguous since the causal effect of international sourcing is hard to identify. The effects of international sourcing on macro-level may be counteracted by trends in the opposite direction or reinforced by other trends (e.g. the 2008 economic crisis) in the same direction.

This research will contribute to the need for statistical evidence through a new approach. We link data on enterprise level from a survey²⁾ on international sourcing conducted in 2007 with data on employee level from administrative registers in the Netherlands. The linked dataset contains information on the characteristics of more than eight million employees in the Netherlands, including the identification code of their employer, which makes it possible to link employee characteristics to enterprise characteristics. In this study we use aggregated employee data for the 1000 responding enterprises in the 2007 International Sourcing survey, of which 156 sourced internationally in the 2001 – 2006 period. Labour volume and average annual wage are the main variables of interest in this study. Further, the linked micro dataset is enriched with enterprise data from several statistical sources. Structural Business Statistics provide input for a variable that controls for enterprise size (based on turnover). Statistics on international trade in goods are added to control for export behaviour. The general business register provides information on the activity of the enterprise, based on the NACE classification. Variables are available for the time series 2001 – 2008 and on some occasions the year 2000 is also available.

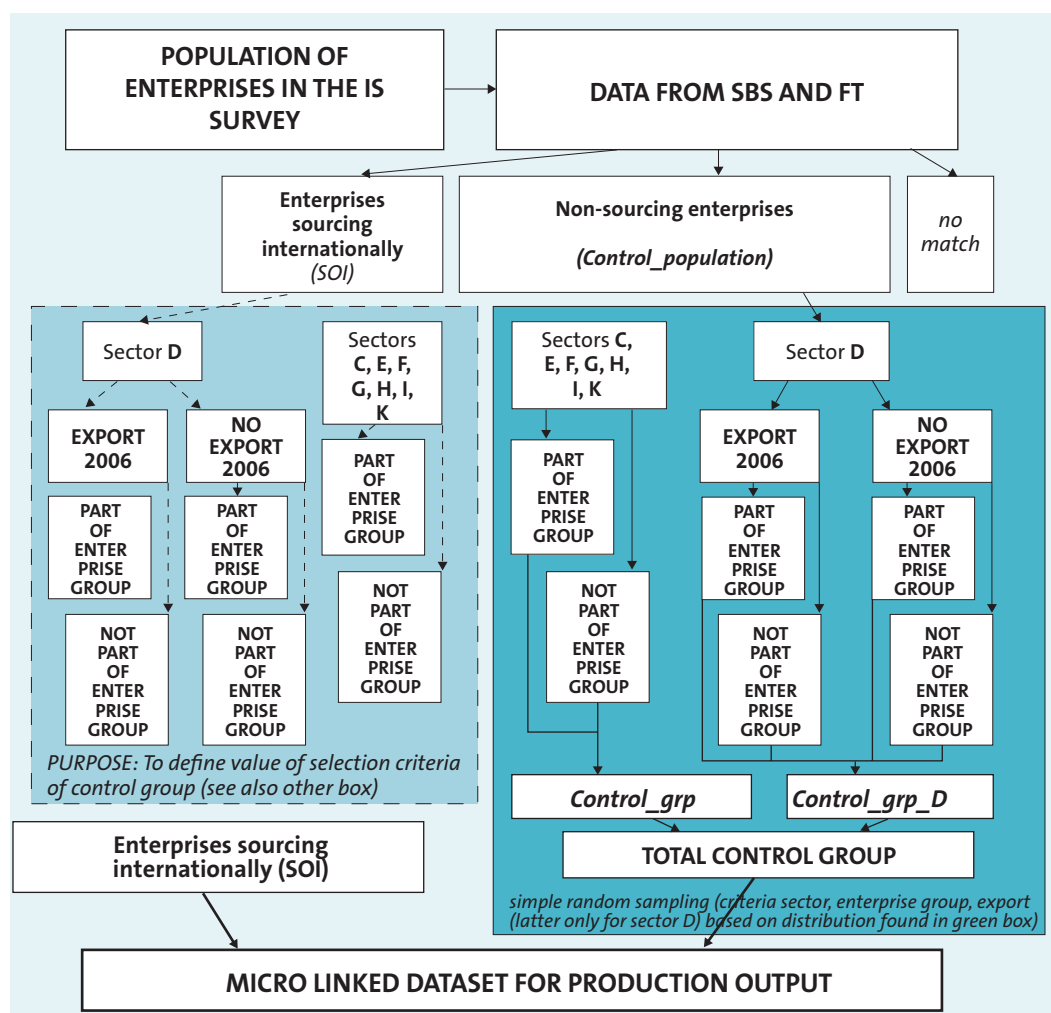
Grouping design

The principle methodological approach in this study is based on a grouping design of one group containing enterprises that sourced internationally (in 2001 – 2006) and a comparable control group with enterprises that did not source internationally in the reference period. We expected, and found, that enterprises active in the manufacturing sector tend to source internationally more often than enterprises in other sectors. Further, we found that there is a correlation between exporting enterprises and enterprises in the manufacturing sector that sourced internationally. Furthermore, being a member of an enterprise group correlates with enterprises that source internationally. We therefore took account of these indicators when selecting the control group. In schedule 8.3.2³⁾ we show how we constructed the two groups. The group with enterprises sourcing internationally contains 156 enterprises. Via a random selection procedure, a control group of equal size was extracted from enterprises in the sample that did not source internationally. This yields two groups that are comparable on several control variables, but differ on the binary international sourcing variable. Graphical presentations and statistical tests can now be applied to describe the effects of international sourcing on the variables of interest.

²⁾ See the joint publication of results by Statistics Netherlands, Statistics Denmark, Statistics Finland, Statistics Norway and Statistics Sweden (2008).

³⁾ Sector C (Mining and quarrying), sector D (Manufacturing), sector E (Electricity, gas and water supply), sector F (Construction), sector G (Wholesale and retail trade), sector H (Hotels and restaurants), sector I (Transport, storage and communication), sector K (Real estate, renting and business activities).

8.3.2 Schedule of grouping design



Regression analysis

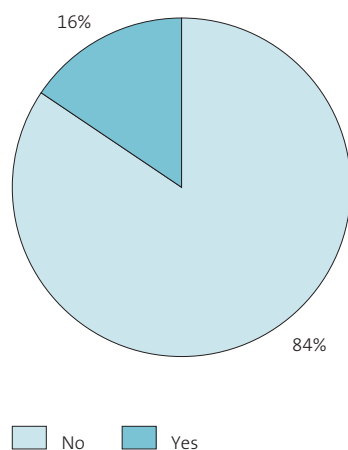
The second approach involves applying ordinary least square regression analyses on the complete sample of the survey, where the binary variable international sourcing (0 = no, 1 = yes) is the explanatory variable in the models. Since we want to test and explain the effect of international sourcing on employment, we take labour volume and wage as dependent variables (in separate models). Further, an indicator for skill-biased technical change is constructed to analyse the effect of international sourcing on the enterprises' labour

composition. The control group described above is not needed for regression analysis since the regression models control for variables that may influence the dependent variables. We use all the observations from the international sourcing survey in the regression models.

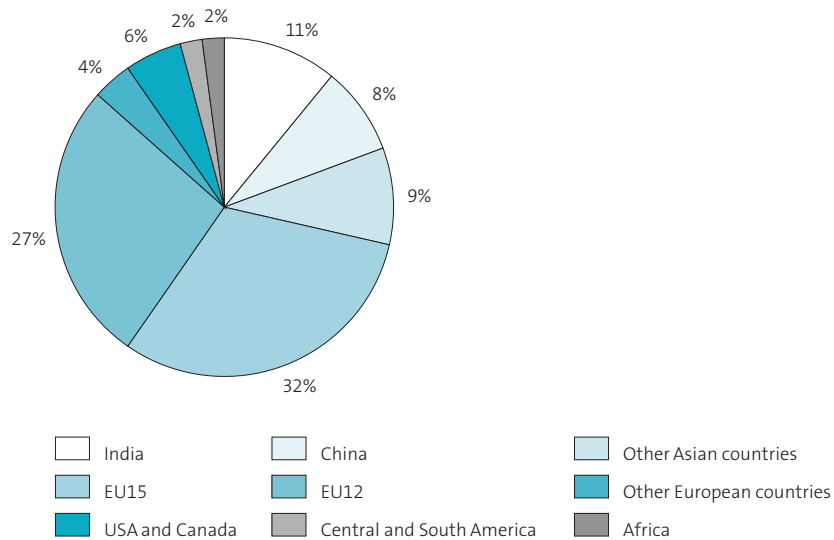
International sourcing in 2001–2006

The population of this study is limited to enterprises active in the Dutch non-financial sectors, with over 100 employees. The results of the 2007 International Sourcing survey show that 16 percent of the enterprises in the sample sourced internationally (core or support business function) in the 2001–2006 period. For the enterprises that indicated that they sourced activities internationally we only know that it took place in this reference period; no information is available about the year of sourcing. Sixty-three percent of all sourcing events had a European destination; 28 percent of the enterprises sourced to Asia, where India and China are the most popular countries. One important remark is that we know nothing about the sourcing behaviour of the enterprises in the sample before and after the 2001–2006 period. So the effects of sourcing activities outside this reference period may interfere with the results in this study.

8.3.3 Enterprises having sourced business functions internationally in 2001-2006



8.3.4 Destinations of international sourcing in 2001-2006

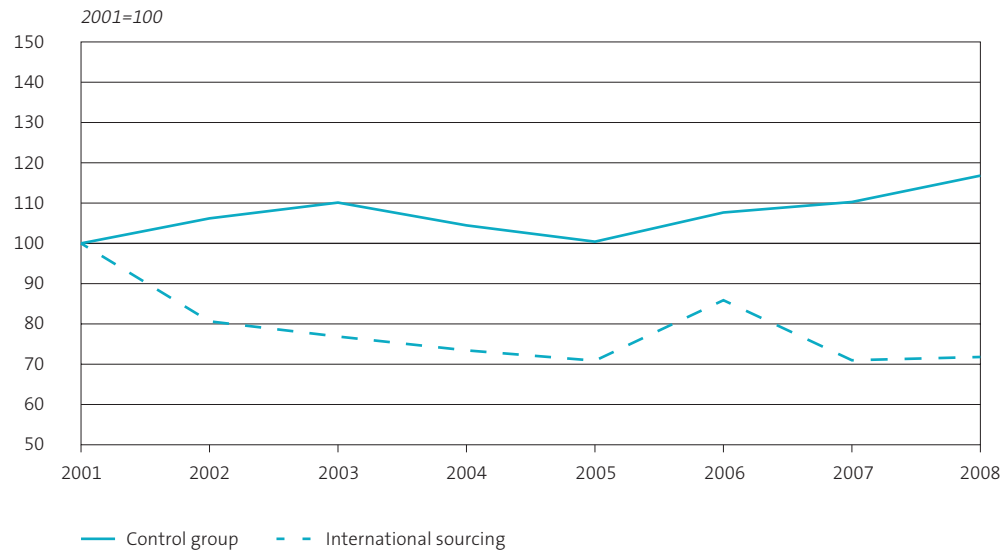


8.4 Labour market effects of international sourcing

Labour volume

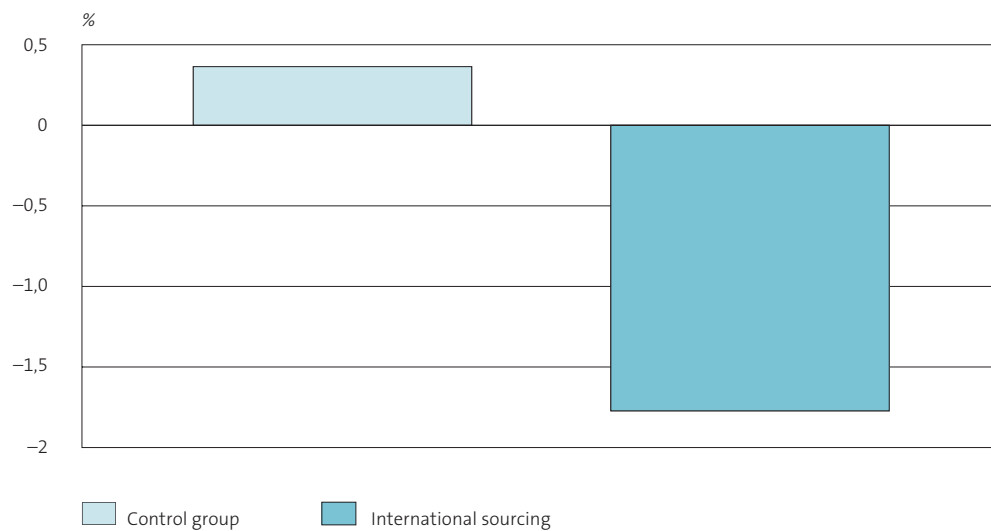
The indexed figures in 8.4.1 – based on mean values – indicate that labour volume decreases for enterprises involved in international sourcing, while it increases for the control group of enterprises not involved in international sourcing. Bear in mind that the population in this study is defined as non-financial enterprises in the Netherlands with over 100 employees (in the reference year 2007). Although, unsurprisingly and in line with our expectations, this figure seems to confirm that international sourcing has a negative effect on employment in the enterprises investigated in the period under study.

8.4.1 Index based on mean values of labour volume (FTE)



The average annual growth rates for the 'international sourcing' group are clearly lower than the growth rates for the control group, as can be seen in 8.4.2.

8.4.2 Average annual growth of labour volume



The ordinary least square (OLS) regression model has the average annual growth of labour volume between 2002 and 2007 as dependent variable and the dummy variable *International sourcing* as the explanatory variable, in addition to several control variables: *Enterprise group (yes/no)*, sector based on NACE classification (Manufacturing, Services or Other), and *Turnover* (average turnover in 2001–2007). Controlling for these factors, the regression analysis confirms that international sourcing has a negative effect on the growth of domestic labour volume. The models in 8.4.3 show that coefficients for the dummy variable *International sourcing* are negative with a p-value lower than the 1-percent significance level. The coefficients are stable at minus three percent. This indicates that labour volume growth was three percentage points a year lower in the 2001–2007 period in enterprises that source internationally compared with enterprises that did not source internationally. This table also shows that domestic labour volume growth is declining in enterprises active in the manufacturing sector, compared with enterprises in the services or other sectors.

8.4.3 Ordinary least squares regression models (dependent variable: labour volume growth 2001–2007)

	Regression models				
	(1)	(2)	(3)	(4)	(5)
Constant	0.063 (0.055)	0.054 (0.055)	0.084 (0.055)	0.078 (0.055)	0.016 *** (0.004)
International sourcing (ref. no international sourcing)	–0.027 *** (0.009)	–0.025 *** (0.009)	–0.029 *** (0.009)	–0.027 *** (0.009)	–0.029 *** (0.009)
Enterprise group (ref. no member of enterprise group)	0.013 (0.008)		0.008 (0.008)		
Sector of activity (ref. services sector)					
Manufacturing sector	–0.034 *** (0.007)	–0.033 *** (0.007)			
Other sector	–0.016 (0.014)	–0.015 (0.014)			
Turnover	–0.002 (0.003)	–0.001 (0.003)	–0.004 (0.003)	–0.004 (0.003)	
N	611	611	611	611	611
R Square	0.056	0.052	0.021	0.019	0.017

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

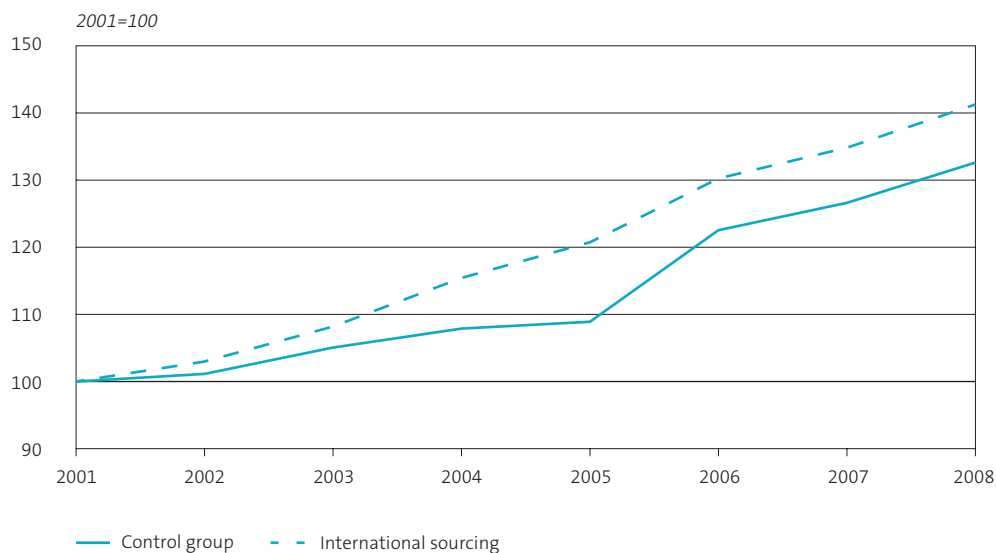
International sourcing has a negative impact on domestic labour volume growth

The R-square for this model is low, which indicates that we have to be careful when drawing conclusions from the data. However, it is clear that employment growth is affected by several micro, meso and macro economic phenomena and that international sourcing is just one of them. So we do not expect a high R-square.

Wages

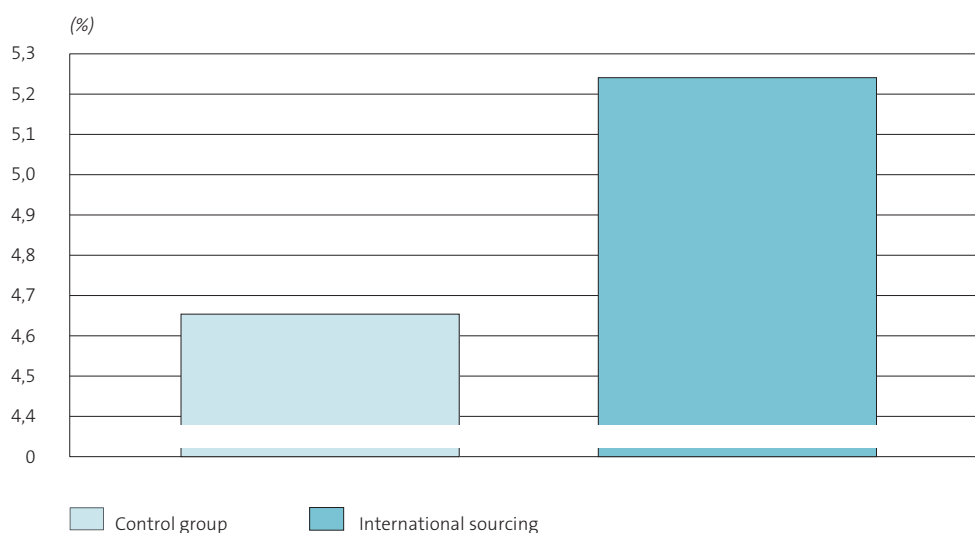
In addition to the labour volume effect of international sourcing, we are also interested in the impact on wages. Several studies – as described in the literature overview above – find significant effects of international sourcing on domestic wages. Graph 8.4.5 shows higher growth rates of average annual fiscal wage per full-time-equivalent for enterprises that have sourced activities internationally than for enterprises in the control group. However, relative differences between the two groups are not as large as for the labour volume indicator.

8.4.5 Index based on mean values of average fiscal wage



The average yearly wage growth rates per full time equivalent (FTE) in 8.4.6 also indicate that enterprises that have sourced activities internationally experience higher wage growth than enterprises in the control group.

8.4.6 Annual growth of average fiscal wage



The OLS models in 8.4.7 explain the effect of international sourcing on annual fiscal wage growth, controlling for the same variables as in the model on labour volume.

8.4.7 Ordinary least squares regression models (dependent variable: average annual fiscal wage growth 2001–2007)

	Regression models				
	(1)	(2)	(3)	(4)	(5)
Constant	0.012 (0.017)	0.010 (0.017)	0.010 (0.017)	0.008 (0.016)	0.041 * (0.001)
International sourcing (ref. no international sourcing)	0.005 * (0.003)	0.006 ** (0.003)	0.005 * (0.003)	0.006 ** (0.003)	0.006 ** (0.003)
Enterprise group (ref. no member of enterprise group)	0.005 (0.003)		0.005 * (0.003)		
Sector of activity (ref. services sector)					
Manufacturing sector	0.003 (0.002)	0.003 (0.002)			
Other sectors	0.002 (0.005)	0.002 (0.005)			
Turnover	0.001 (0.001)	0.002 * (0.001)	0.002 (0.001)	0.001 ** (0.001)	
N	471	471	471	471	517
R Square	0.032	0.026	0.029	0.023	0.010

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

It appears that the average wage per full-time-equivalent increases as a result of international sourcing. The different models give coefficients for the international sourcing variable with a positive value of 0.6 percent. So in the 2001–2007 period, average fiscal wage growth was 0.6 percentage point per year higher in enterprises that sourced internationally compared with enterprises that did not source internationally. This might indicate that lower paid jobs disappear as a result of international sourcing and higher paid jobs remain, increasing the average wage in the enterprise. Another explanation for the wage rise – according to the literature – may be that international sourcing leads to productivity gains and hence to higher profitability. Profitability is assumed to be tied to average wages paid in the respective enterprise.

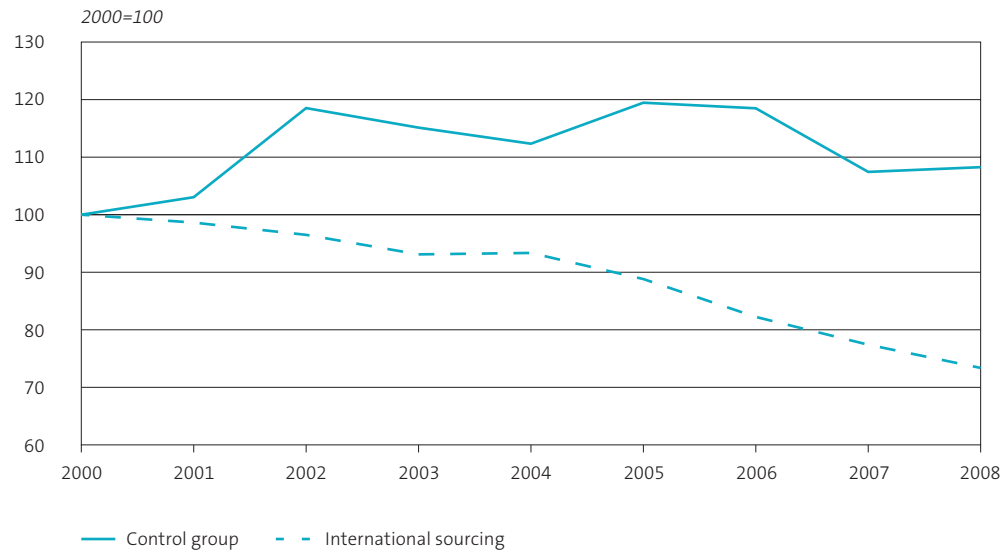
Average fiscal wage per full-time-equivalent increases as a result of international sourcing

Labour composition

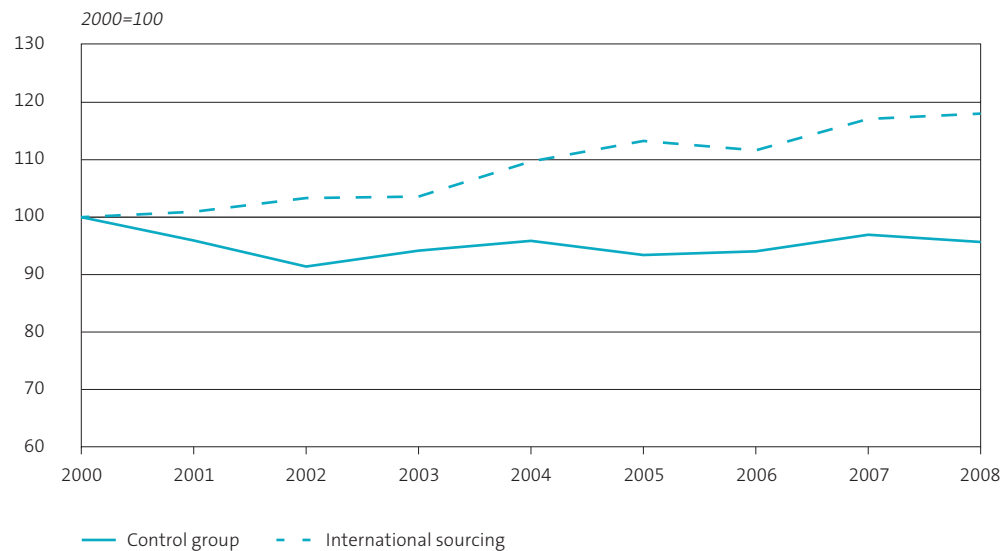
The analyses of the labour volume development and domestic wage development seem to confirm our expectations – and results found in other studies as described in the literature – that international sourcing has a negative impact on domestic employment growth in the enterprises involved and a positive impact on average wages. These findings could indicate that lower than average paid jobs are sourced internationally relatively more. This is in line with findings in the literature that assume a correlation between the average skill of a job and the salary paid. So according to this theory, low-skill jobs are more prone to international sourcing than high-skill jobs.

Graph 8.4.9 shows that the share of low paid people declines in the international sourcing group, while it increases for the control group. At the same time, according to 8.4.10, the share of high paid people increases in the enterprises involved in international sourcing, while it decreases in the control group. Low paid people are defined as the lowest 30 percentiles in the wage distribution for each individual enterprise; high paid people are defined as the upper 30 percentiles.

8.4.9 Share of low paid persons of total employed persons



8.4.10 Share of high paid persons of total employed persons



So the figures on labour volume, wages and shares of low and high paid employed people seem to confirm that employment declines as a result of international sourcing. The

average wage increases could be explained by a labour composition effect: lower paid jobs are more prone to be sourced internationally than higher paid jobs, so the higher paid jobs remain behind and the average wage increases. In order to test this labour composition effect we construct an indicator for skill-biased technical change by dividing the absolute growth of the share of high-paid people between 2002 and 2007 by the absolute growth of the share of low-paid people in the same period. The linear regression model in 8.4.11 confirms that the ratio between high and low paid people changes as a result of international sourcing. We find positive and stable coefficients for the international sourcing indicator with p-values lower than the 5-percent significance level, indicating that international sourcing leads to a labour composition shift towards higher skilled jobs.

8.4.11 Ordinary least squares regression models (dependent variable: skill-biased technical change 2002–2007)

	Regression models				
	(1)	(2)	(3)	(4)	(5)
Constant	2.597 (10.524)	2.265 (10.474)	3.182 (10.458)	2.846 (10.400)	1.217 (1.543)
International sourcing (ref. no international sourcing)	4.303 ** (1.742)	4.410 *** (1.714)	4.191 ** (1.731)	4.294 ** (1.701)	–3.288 (3.693)
Enterprise group (ref. no member of enterprise group)	0.570 (1.633)		0.536 (1.626)		
Sector of activity (ref. services sector)					
Manufacturing sector	–0.506 (1.411)	–0.468 (1.405)			
Other sectors	1.081 (2.776)	1.117 (2.772)			
Turnover	–0.930 (0.617)	0.052 (0.605)	–0.136 (0.609)	–0.094 (0.595)	
N	606	606	606	606	721
R Square	0.011	0.011	0.011	0.011	0.001

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

8.5 Discussion of results and implications for future research

This study provides evidence that employment growth in domestic enterprises decreases as a result of international sourcing and that wages increase, suggesting that lower paid (and lower skilled) jobs are more prone to international sourcing. This is confirmed by the observation that the share of low paid workers decreases in enterprises involved in international sourcing, while it increases, albeit slightly, in enterprises that were not involved in international sourcing in the 2001–2006 reference period. At the same time, international sourcing enterprises show an increase in the share of high paid workers, while enterprises in the control group show a decrease. We find evidence for skill-biased technical change towards higher skilled jobs. The reason for the wage rise after international sourcing seems to be the changing labour composition, possibly interwoven with a wage rise as a result of increased productivity and hence higher competitive advantage and operating profits.

These short-term enterprise level effects indicate that domestic workers (in particular low-skilled) in these enterprises seem to be experiencing negative effects from international sourcing. The medium and long-term effects of international sourcing on meso and macro levels have not yet been studied, but are very important for assessing the net effects of international sourcing on a country's economy and labour market. Enterprises may benefit shortly after moving business functions abroad, but they might suffer from international sourcing in the medium and long term, rescinding the short-term cost savings, for example as a result of a lack of control over the overseas activities, increasing wages abroad, lower than expected quality of production or service. The negative effects for domestic workers who lose their jobs as a result of international sourcing and for the economy as a whole may not be so negative in the medium and long term, when the low-skilled workers who lost their jobs find employment elsewhere soon after being laid off. In addition, the higher competitiveness and profitability as a result of increased productivity could stir enterprises that sourced internationally to initiate more productivity-boosting activities, such as export and R&D (CBS, 2010c). This could further enhance the enterprise's performance and may lead it to expanding its domestic employment, thereby cancelling the short-term employment reduction. So in order to assess the effects of international sourcing for the whole economy, all gains and losses have to be compared. Further research is needed in order to reveal the full picture of the complex dynamics in global value chains.