**Comparing econometric and survey-based methodologies in measuring offshoring: The Danish experience**

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**Abstract**

Offshoring, understood as the geographical relocation of companies’ activities to another country, is a key feature of contemporary globalisation and has growing social, political and economic implications. However, the phenomenon remains rather poorly examined at aggregated macro levels such as the national or regional level. Most macro analyses are based on proxies and trade statistics with limitations. Drawing on unique Danish survey data this article demonstrates how survey data can provide important insights into the national scale and impacts of offshoring, including changes of employment, which are difficult to measure with other methods.

**Introduction**

With the ever-increasing division of labour and expanding global value chains, offshoring and outsourcing has received growing political as well as academic attention (Dicken, 2011; Feenstra, 2010; Huws, et al., 2009; Gereffi, 2014; Flecker, 2009). As manufacture and service production[[1]](#endnote-1) alike becomes geographically more defragmented and functionally integrated (Dicken, 2011), the ability of firms to outsource tasks and relocate production has expanded dramatically. This has been further enhanced by liberalisation of trade and an intensified search for lowering costs (Weil, 2014). This may have wide-ranging impacts on labour markets and national economies through job creation, skill composition, competitiveness and macro-economic performance (Marchington, et al., 2005; Flecker, et al., 2013). However, knowledge at macro levels, such as national or regional level, remains limited especially when it comes to the implications for employment, motives and broader implications for the economy.

The main reason for the limited macro data is the difficulty in providing reliable measurements of offshoring (Huws, 2009; Sturgeon, 2013). The majority of macro analyses of offshoring are based on econometric analyses that are conducted on highly aggregated data. This is problematic because it excludes important heterogeneity between sectors, which has been identified in case-study research. Another significant reason for measurement problems is that offshoring decisions are part of firm strategy, which is difficult to measure and the implications, not least for employment within the firm, are difficult to untangle from other restructuring factors that affect production decisions, such as for example changes in the market.

Since the employment outcomes of offshoring and outsourcing have been the subject of public concern it is a problem that the available data, despite some improvements, remain limited. However, the findings from a large scale Danish company survey have yielded promising insights. The aims of this article are firstly, to discuss the problems associated with current measures of offshoring and outsourcing[[2]](#endnote-2) strategies, but mainly the former. The second aim is to report the data from a Danish survey on firms’ offshoring and outsourcing in order to argue that there are significant gains in the survey-based approach, especially when combined with administrative company register data as is done here.

The article proceeds by defining some key phenomena and then proceeds to discuss the measurement problems at macro-level in current approaches, and econometric analysis in particular. Next advantages of the survey-based approach and the promising insights from the Danish survey are presented and discussed.

**Offshoring and outsourcing: definitional issues**

Offshoring and outsourcing are by no means new features of contemporary capitalism (Fröbel, et al., 1977; Dunning, 1977; Huws, 2009), but there is still often some confusion about these concepts and the associated terminology. Often ‘outsourcing’, ‘offshoring’, ‘international relocation’, ‘international fragmentation’, ‘relocation’ and ‘international sourcing’ and various other terms are used either synonymously or without any clear definition. The definition in Figure 1, on which some general consensus has emerged, provides some clarification. Outsourcing thus refers to a task being contracted out of a company either domestically or internationally. Offshoring refers to a *job, task or work process previously performed in the home-country being moved out of that country*. This can happen within the company or conglomerate (intra-firm trade/production; also called ‘in-house offshoring’) or by subcontracting to an external partner (‘offshore outsourcing’); in the following ‘offshoring’ is used to describe both the latter categories.

Table 1 about here

These categories are ideal types, and several mixtures exist such as joint ventures and other types of mixed ownership. Foreign direct investment (FDI) is a broader category, which may or may not involve the movement of production. FDI also encompasses genuine green-field production, where a new production is established. It could theoretically be argued that this new production might have been placed in the home country; however this effect is almost impossible (at least in aggregated data) to distinguish since the new production is not directly replacing any jobs. Hence this complexity further complicates measuring offshoring, and in particular the employment effects can be very difficult to sort out.

Offshoring is typically seen by neo-classical economists as an extension of Ricardian comparative advantages, where each country performs the task in which it has the best *relative* outcome. These tasks now include even smaller segments or ‘tasks’ related to the productive process (Grossman & Rossi-Hansberg, 2008). However, moving beyond text-book economics, the offshoring decision is much more complex and dynamic than the basic ‘make or buy’ choice in classical trade theory (Jensen & Pedersen, 2011; Milberg & Winkler, 2013; Dunning, 1977). Many factors can influence the decision to offshore as well as outsource, although in most cases cost reduction, mainly in wages, is paramount (Weil, 2014). Other important factors for offshoring may include access to markets, highly qualified labour, production clusters and natural resources, but also institutional settings such as labour-market, environmental and other governmental regulation, as well as idiosyncratic corporate strategies. Competitive advantages of industrial clusters, institutional competitiveness and the immobility of many competences on the other hand restricts the companies’ decisions to relocate (Dicken, 2011). Survey-based analysis can contribute to uncovering the motives that underpin the offshoring or outsourcing decision in a way that analysis based on input/output data is unable to do.

**Problems with the measurement of offshoring and the problematic econometric analyses**

Many case studies have scrutinized offshoring at firm and industry levels at both the national and the cross-national sector level, emphasising important issues such as changing power relations, governance, employment implications, export performance and others (see e.g. Huws, et al., 2009; Haakonsson, 2009; Chiappini, 2012; Flecker, et al., 2013; Gomez, et al., 2013; Huws & Flecker, 2004; Hansen, 2014). However, at the aggregate level insights are much more limited. A main reason few studies have dealt with the numerical implications of offshoring at the macro level is the problem of measuring offshoring in a meaningful way (Huws, 2009; Sturgeon, 2013), since it can be highly complex, and employment effects, in particular are hard to identify. This reflects a more general problem of measuring economic globalisation, which results in a lack of solid macro data (Sturgeon & Gereffi, 2009; Sturgeon, et al., 2013).

Different academic disciplines have ventured into investigating the impacts of offshoring more comprehensively at the macro level. These include economic geography and business studies, but management studies (see Pedersen, et al., 2013) and economics in particular (see for example. Feenstra, 2010 and Crinó, 2009; Stehrer, et al., 2012 for overviews). Academic attention on the other hand has been more modest within political science and sociology - despite the potentially wide-ranging implications. Most studies trying to investigate the macro outcomes of offshoring have been within economics, mainly econometric analyses building on already available trade statistics. Although helpful insights have been obtained from these analyses, an incomplete and uncertain picture remains.

In the econometric literature offshoring has traditionally been measured by using input/output data from already existing trade statistics, and typically applying sector-wise imported inputs to production as a proxy for offshoring. Offshoring is, however far too complex to be adequately measured in trade statistics using foreign inputs to production as a proxy (Castellani, et al., 2013; Sturgeon, et al., 2013) and the trade statistics data also face problems with the quality of data, especially when comparing across many countries (Sturgeon, et al., 2013). The level of measurement is too aggregated, and we have seen highly differential results from complex econometric analyses using the same data sets and techniques (Stehrer, et al., 2012).

The lack of detailed sector-based input-output data means that most econometric analyses make a proportionality assumption, that is, all sectors are ‘assumed to import each material and service in the same proportion as its economy-wide use’ (Winkler & Milberg, 2012: 40). This assumption can have significant impacts on research results, even altering findings on offshoring’s effect on labour demand entirely. Winkler and Milberg (2012) demonstrate for German data (in which they can differentiate between domestic and imported inputs at the sector level) how the employment effects of service offshoring changes the outcome from positive or neutral to a negative one when the sector-based data are applied. Econometric analyses also ignores political-economic aspects such as labour-market segmentations, power asymmetry between buyers and suppliers, government regulations and corporate strategies as well as potential problems of unemployment, trade imbalances and financialization Miller & Winkler, 2010 and 2013.

In light of these major problems in the econometric literature and the limited statistical evidence, the survey approach has produced interesting and comprehensive research on offshoring that includes the motives for and the impacts on employment[[3]](#endnote-3). This is strengthened by combining survey-based results with case study research as well as administrative register-based data. This methodological approach of combining survey data with administrative register is still being refined, but has already provided interesting research results (e.g. Statistics Netherlands, 2011; Timmermans & Østergaard, 2014; Nielsen & Tilewska, 2011). However, the methodology is also more resource demanding than using already existing trade statistics

**Insights from survey data**

In the survey approach, firms are asked directly and specifically about their offshoring activities either using written questionnaires or interviews. This has the advantage of dealing explicitly with the measured phenomenon as opposed to statistical proxies. The survey approach gives researchers opportunities to inquire into various aspects of the offshoring decision, in particular the employment effect that is very difficult to assess with other methods, but also other important aspects such as motive and destination country. The potential pitfalls are the usual ones working with questionnaires: whether the respondent is the right person to answer the question in the first place, whether the respondent understands the question and has the knowledge to answer correctly and finally whether the respondent wants to give the correct information at all. However, a carefully designed survey should however provide solid data illuminating firm-level offshoring and employment implications (Sturgeon, 2013).

Only a few large-scale cross-national surveys on offshoring have been conducted, among them two seminal European surveys coordinated by Eurostat[[4]](#endnote-4). Other systematic surveys include a comparable, but somewhat smaller US survey (Brown, et al., 2014) and a Canadian survey (Boileau & Sydor, 2011), as well as the European Manufacturing Survey (cf. Dachs, et al., 2012), which includes only manufacturing companies. For the analysis in this article the unique and extended Danish version of the latest Eurostat survey is used.

The survey data used in this article was gathered by Statistics Denmark as the extended Danish section of the 2009–11 Eurostat survey on offshoring carried out in 2012 (see Eurostat, 2016). Since answering the questionnaire was compulsory (by law) for Danish firms, the data set basically covers the entire population of relevant firms and not just a sample of the firms, which makes it exceptional internationally. The response rate was 97 per cent in the *entire* population of Danish companies with more than fifty employees in the private business economy and 96 per cent for companies with 20–49 employees (covering manufacturing and business services). In order to include data from the few non-respondent companies these have been imputed by Statistics Denmark based on a modelling technique of similar companies. This provided us with a unique data set consisting of *all* Danish companies with more than twenty employees, in all sectors where theoretically offshoring could be expected to take place.

In the questionnaire the firms were asked about their offshoring activities between 2009 and 2011. The survey took a business function approach (see Huws, 2009; Sturgeon, et al., 2013) whereby the firms’ economic activities were divided into core activities and support functions like marketing, research and development. Often business functions rather than job functions are offshored, with firms often reconfiguring activities in the offshoring process (Rangan & Schumacher, 2013; Sturgeon, et al., 2013). Key issues investigated in the survey were: how many jobs were offshored, to what country, whether to an external partner or a subsidiary firm, what motivations and barriers existed, whether any domestic jobs were created in the offshoring process, whether the firm was part of a corporate group (as head or subsidiary), as well as a range of other significant aspects of the offshoring and international relocation process (the questionnaire had around 140 questions). All answers were then combined into a large data set.

This data was then been combined with micro panel data from administrative registers covering the entire population of firms (with over twenty employees) and their employees. The Danish administrative register data encompasses all individuals and firms and includes numerous variables, so this matched data set enables some unique insights into the connection between firms’ characteristic and the outcome of their offshoring decisions (see also Refslund & Andersen, 2014). The firm data include turnover, industry, export, employee and wage structure, as well as information on employees’ educational level and union density[[5]](#endnote-5).

The data only covers offshoring occurring between 2009 and 2011 and gives no information about previous offshoring trends, and the administrative register data only has information for a few years after 2009–11. Future research may fruitfully investigate the longitudinal consequences of offshoring by comparing employment, productivity development and growth rates among offshoring and non-offshoring firms, as has been done with the 2001–06 Eurostat survey data set (Timmermans & Østergaard, 2014; Nielsen & Tilewska, 2011).

**Offshoring and the domestic economy: evidence from Danish survey data**

Some generalised findings on offshoring are confirmed by the Danish data. Obviously there are differences in economic internationalisation between countries, in particular between a small open economy like Denmark, with higher levels of offshoring than large countries like Germany and France in which a subcontractor or subsidiary can more easily be found domestically (Eurostat, 2016).

Offshoring still mainly takes place in manufacturing industries (Eurostat, 2016), but the offshoring of service tasks is rapidly growing (Huws, et al., 2004; Flecker, et al., 2013). Another consistent finding is that the paramount motive for offshoring is the reduction of labour costs and other cost (see Refslund & Andersen, 2014: 34-37). In the Danish survey, 78.5 per cent of the offshoring firms said that cost reduction was either important or very important for the offshoring decision. The importance of the cost motive did decline (although only slightly), in Denmark as well as several other countries, between the two Eurostat surveys, reflecting that most of the gains from cost-efficiency-seeking offshoring may already have been realised.

The results confirm that offshoring mainly occurs in larger companies, which can more easily offshore either some operations or specific business functions and more often are multinational firms (Eurostat, 2016). The offshoring firms had an average size of 287 employees compared with 138 employees for non-offshoring firms. However the inclusion of small- and medium-sized companies (SMEs) in the Danish survey shows that their involvement in the international economy is growing (Rangan & Schumacher, 2013). Danish SMEs (20–49 employees) accounted for 11.5 per cent of the offshored jobs, and when SMEs with 50–99 employees were included the share rose to 23.8 per cent. Offshoring is becoming increasingly feasible for smaller firms through the relocation of smaller fragments of production, or support functions. The Eurostat-survey had a threshold of 100 employees, which could mean (if Danish figures are comparable) that the Eurostat-survey underestimates the overall job loss by as much as one-quarter.

Overall, 16.9 per cent of Danish companies engaged in offshoring between 2009 and 2011, which confirms that Danish firms are among the most internationally engaged in Europe (Eurostat, 2016). The survey also has data on domestic outsourcing, which is almost completely lacking internationally (Sturgeon, 2013: 31). The data showed that 25 per cent of firms had outsourced, which indicates that outsourcing is still more common than offshoring. As shown in Figure 1, 5.8 per cent of the Danish firms engaged in both outsourcing and offshoring.

Figure 1 about here

While the survey data shows that offshoring is significant, it also shows that the job effects are modest compared to other causes of job reductions (see Refslund & Andersen, 2014 for an overview). The firms were asked specifically how many jobs they had moved offshore; altogether Danish firms reported that 19,045 jobs were offshored between 2009 and 2011. This equals 6,350 jobs per year, which can be said to have a minor impact in a labour market with more than 2.7 million employees; around 1.6 million employees are in the private sector, where offshoring largely took place. The companies that offshored moved 25 jobs on average. There were disparities in terms of the impact on employment; 7 per cent of the firms offshored without any job reductions, 63 per cent moved ten or fewer jobs, while one company on the other hand offshored 800 jobs. At European level the Eurostat survey shows 83,000 jobs were lost between 2009 and 2011 in the eleven countries included in the survey (Eurostat, 2016). There could, however, be significant indirect employment effects such as accompanying service-job losses. Of the Danish jobs lost 26 per cent were highly-skilled jobs (requiring tertiary education). The survey did not specify the educational level of the remaining jobs lost. The negative employment implications are high on the public agenda, but offshoring is a two-way street that includes jobs offshored from other countries to Denmark. However, only 1.7 per cent of the firms had moved production to Denmark. There were 1,459 jobs created (for example in logistics and management) by the outward offshoring processes, compared to the 19,045 jobs lost. Of the jobs created 44 per cent were highly-skilled, therefore the jobs created required high levels of skill compared with the jobs lost.

While offshoring is very often closely associated with de-industrialisation, in the data the correlation is more blurred. However, the findings cannot be generalised to other time periods because the economic crisis in 2009-2011 represents a very distinct set of circumstances. Offshoring accounted for 12,043 jobs lost in manufacturing between 2009 and 2011, but in the same period Danish manufacturing saw a decline of almost 70,000 jobs[[6]](#endnote-6), so offshoring accounts for 17 per cent of the job loss in the period. Often the decline in EU15 manufacturing employment has been associated with increasing employment in the EU12[[7]](#endnote-7). However this was true only before the crisis (Eurofound, 2013: 50), since 2008 manufacturing employment declined by 11–12 per cent in EU15 *as well* *as* in EU12[[8]](#endnote-8).

Table 2 about here

Table 2 compares the changes in employment in offshoring and non-offshoring firms. In firms with job growth the difference is small, while firms that were offshoring had a significantly higher tendency to reduce overall jobs. This indicates that offshoring may have a direct job impact in the firms. Despite the growing importance of service offshoring, manufacturing companies still offshore more often (21 per cent) than service companies (16 per cent), and the overwhelming majority of the job losses (63.2 per cent) occur in manufacturing with only 34.3 per cent in services.

Analyses of offshoring are often based on highly aggregated industry level since the data do not allow more refined analysis, but the survey data can be broken down to the most advanced NACE-industry codes. At a sectoral level (36 industry groups) most jobs were lost due to offshoring in machinery and equipment manufacturing (3164 jobs/16.6 per cent of all jobs lost) and IT and other information services (2488 jobs/13.3 per cent). Table 3 shows offshoring by sector and indicates that this was most frequent in computer programming activities, which confirms the growing importance of IT and business services offshoring (Huws, et al., 2004; Gomez, et al., 2013).

Table 3 about here

With regard to geographical changes the most common offshoring destinations are inter-regional and other high-wage countries (Brown, et al., 2014; Eurostat, 2016), and more than 60 per cent of Danish offshoring takes place within Europe as shown in Figure 2. As the EU15 is the most frequent destination, this suggests that proximity is still important and that a decision to offshore will be taken for reasons other than to lower wage costs (Huws, et al., 2009; Jensen & Pedersen, 2011). Companies most often offshore support functions (like logistics or IT) rather than core functions, and they typically offshore within the firm to subsidiaries abroad (in-house offshoring), whereas offshore outsourcing (to external partners) is more rare (Eurostat, 2016). Offshoring core tasks, which comprised 36 per cent of all offshoring and typically emphasizes cost reductions, are still mainly relocated to low-wage countries. The EU12 receives 30 per cent of the core tasks and China 18 per cent, while only 18 per cent were moved to EU15.

Figure 2 about here

A unique possibility in the matched Danish survey data is to analyse the correlation between firms’ unionisation rates and the use of offshoring. Somewhat surprisingly unionisation had no significant impact on the offshoring rate (cf. Lommerud, et al., 2009). The offshoring firms had a unionisation rate of 56 per cent compared to 58 per cent for the non-offshoring firms (the impact was insignificant in statistical analysis). Further detailed analysis shows that companies who engage in outsourcing and are members or head of an enterprise group have a greater propensity to offshore, as do firms that have subsidiaries abroad or use international suppliers. This could reflect that firms that already have experience with externalising production and operating abroad have easier access to offshoring (cf. Refslund & Andersen, 2014).

**Conclusion**

Despite the growing importance of the fragmentation of production through offshoring and outsourcing and the increasing impact on national economies, knowledge of the implications at aggregated levels remain limited. There are significant problems with measuring the employment effects and much current research has been based on highly aggregated and somewhat uncertain trade statistics in econometric analyses, which makes several problematic assumptions and is based on proxies of offshoring. Also knowledge on motives for offshoring decisions remains limited. Based on the Danish experience this article demonstrates that important and detailed information can be obtained from a survey-based methodology, especially when these results are combined with administrative data sources on firm characteristics, which are, at least in the Danish case, very comprehensive. In future studies these results should be compared with results based on trade statistics to investigate the difference between the two approaches.

Since it was compulsory by law to answer the Danish survey the data is very comprehensive and with a reply rate of 96-97 per cent it covers all companies with more than twenty employees. This secured a high level of responses and may not be transferable to other countries, or at least reduce the response rate where a reply is not compulsory. It thus provides some unique insights into firms’ internationalisation. The data shows how the numerical impact of offshoring is modest, at least when it comes to employment, with other factors being far more important in explaining job destruction. The survey also shows that cost-driven offshoring is still the most dominant, although not the only, motive with 78.5 per cent of all offshoring firms emphasising cost reductions as an important motive. To conclude the survey-based methodology has provided some very interesting and rich results with high validity, however the methodology is resource demanding, which may restrict future application.

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**Notes**

1. Here I in general refer to production of both goods and services, which are becoming more integrated. [↑](#endnote-ref-1)
2. I mainly emphasise offshoring here, but many of the issues also applies for outsourcing decisions and the Danish survey data includes information on outsourcing as well. However I will only use the term offshoring unless explicitly dealing with outsourcing. [↑](#endnote-ref-2)
3. For a more extensive discussion of the measurement problems and discussion of alternative measures like the number of workers participating in trade-replacement programs and media reports, see Refslund & Andersen (2014). [↑](#endnote-ref-3)
4. See Statistics Denmark (2008) for a summary of the first survey covering 2001–06 and Eurostat (2016) for the second survey covering 2009–11. [↑](#endnote-ref-4)
5. For further analyses using the matched data set see Refslund and Andersen (2014). [↑](#endnote-ref-5)
6. Statistics Denmark (RAS11). [↑](#endnote-ref-6)
7. The EU15 countries are Belgium, Finland, United Kingdom, France, Greece, the Netherlands, Ireland, Italy, Luxembourg, Portugal, Spain, Sweden, Denmark, Germany and Austria. The EU12 countries are Bulgaria, Cyprus, Estonia, Lithuania, Latvia, Malta, Poland, Romania, Slovakia, Slovenia, Czech Republic and Hungary. [↑](#endnote-ref-7)
8. Author's own calculations on Eurostat/SBS-data.

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