Feasibility study export and productivity

Zoetermeer, 2012
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1 Introduction

For quite some time, the relation between productivity and export has been an important subject for discussion among policymakers and scientific researchers. Overall it is known that exporters on average are more productive than non exporters, but there are some uncertainties about the causality of this relationship.

Some researchers have suggested that productivity is one of the main drivers for starting with export activities while others suggest that export itself makes enterprises more productive.

The results on export and productivity studies can be biased in favour of larger enterprises. There is a possibility that the results differ by company size-classes. It can be the case, for example, that learning effects of export are larger for SME-enterprises than for larger enterprises.

In this feasibility study an inventory will be made about the possibilities for investigating the relationship between export and productivity among small and medium sized enterprises (SMEs) in the Netherlands.

The study is divided in three activities, followed by conclusions:

1 Literature study
2 Methodological analysis
3 Overview of available databases
4 Conclusions and recommendations for future research
2 Literature study

2.1 Introduction

This chapter deals with some of the literature on the relation between firm productivity and export: the chicken and egg problem of superior productivity boosting expansion to foreign markets, or exports boosting productivity. In paragraphs 2.2 and 2.3 this topic is discussed, followed by direct investment as an alternative for exports (2.4), the role of organisational culture (2.5), and of government (2.6).

Most of the literature on firm characteristics explaining why some are exporting and others not indicates that good firms become exporters and that the existence of trade costs induces only the most productive firms to self-select into export markets. The selection is driven by the existence of trade costs, which only the most productive firms can absorb while still remaining profitable. Greenaway, Girma and Kneller (2004) consider the trade costs as sunk costs. They state that entry costs associated with for example market research, product modification, compliance and so on mean that profit-maximizing firms will enter export markets only if the present value of their profits exceeds the fixed costs of entry. As a result, when trade cost fall, industry productivity rises both because low-productivity, non-exporting firms exit and because high-productivity firms are able to expand through exporting. The most productive non-exporters begin to export, and current exporters, which are the high-productivity firms, expand their foreign sales (Bernard, Jensen and Schott, 2006; Greenaway and Kneller, 2007; Wagner, 2007). However, a positive shock may not necessarily induce entry of firms in export markets, if the increase in current profits cannot cover the entry costs (Lopéz, 2005).

2.2 Firm characteristics before exports start

Several researchers indicate that future exporters already have most of the desirable characteristics several years before they enter the export market. In addition, firms that become exporters grow faster, in terms of shipment and employment, than future non-exporters in the few years before they start exporting (Bernard and Jensen, 1999; Delgado, Fariñas and Ruano, 2002; Greenaway, Girma and Kneller, 2004; Lopéz, 2005; Kox and Rojas-Romagosa, 2010).

Considering a model of the decision to export ex-ante success increases the probability of exporting. Several years before exporting there may be no differences between future exporters and future non-exporters. During the time leading up to the first foreign sale, however, future exporters should be improving their performance relative to firms that will not export. Besides growing faster in the years prior to entry, exporters are larger, more productive and pay higher wages (Bernard and Jensen, 1999). A CBS\textsuperscript{1} study confirms these results and adds superior innovativity, a more flexible work force and a larger share of turnover spent on marketing and sales to the characteristics

\textsuperscript{1} Statistics Netherlands
differentiating between exporting and non-exporting firms in the period before exports started.

It is possible that the self-selection of firms into the export markets could be explained by firms making conscious decisions to increase productivity with the international market in mind. This may occur if, for example, the goods that are produced for the export markets in developing countries are of a higher quality than the analogous goods made for the domestic market; therefore, firms that want to produce for the more demanding international markets have to introduce new technologies, usually developed in industrial countries, to produce high-quality goods. The introduction of these new technologies raises firm-level productivity by raising the value of the output. Under this hypothesis, firms make investments to produce higher quality goods with the purpose of capturing the potentially higher returns available in the international markets (Lopéz, 2005). Most researchers simply argue that exporters start to differentiate themselves from non-exporters several years before they actually start exporting, Lopéz (2005) illustrates this more specific, with the argument that the introduction of new technologies does not guarantee that productivity increases instantaneously. Most likely, a long process of learning and mastery may be required to reach high levels of productivity. Moreover, this mastery and learning might typically require a stream of investments over time.

2.3 Firm characteristics after exports started

Exporting firms can have a positive effect on their home country, but exporting can also help firms obtain new insights for their home market. Lopéz (2005) describes the fact that exporting firms can generate knowledge about technologies and foreign markets that could be used by other exporters and non-exporters. Lopéz further argues that in addition exporters tend to adopt efficient and competitive management styles and training of a higher quality of labour which may benefit other sectors. In other words, exports may cause positive externalities and technological spillovers within the exporting sector and on non-exporter sectors.

Where the effects described above are mainly beneficial for the home country of the exporting firm, the exporting firm itself also gains from becoming an exporter. Firms can benefit from technical expertise of foreign buyers. Especially in less developed economies overseas buyers may share knowledge of the latest design specifications and production techniques that might otherwise be unobtainable (Chuang, 1998; Blalock and Gertler, 2004). This learning by exporting might be more relevant for firms from less developed countries who start exporting than for companies from technologically advanced countries.

When looking specifically at young firms post-entry productivity growth is greater for young exporters than for young domestic firms which are not active exporters. Furthermore, for these groups of young firms the initial differences in the productivity level increase after entry, making the gap between the more productive now exporting company and the domestic firm even greater (Delgado, Fariñas and Ruano, 2002).

1 CBS study on behalf of the Dutch ministry of Economic Affairs, 2009 (not published).
Lopéz (2005) argues that firms may have an incentive to remain active in export markets after they started exporting as sunk costs may induce firms to continue operating in export markets when there is a negative shock, in order to avoid paying the entry costs again.

2.4 Exporting or foreign direct investments?

The most productive companies can become exporters, but they could also choose to do foreign direct investments (FDI). Greenaway and Kneller (2007) explain that at the simplest level, exports and FDI are substitute channels for firms globalising. The conditions for foreign production become more favourable relative to exporting as the size of the foreign market increases and costs of exporting increase; and less favourable as costs of setting up foreign production grow.

Sunk costs of exporting are typically thought to include fixed costs of research into product compliance, distribution networks, advertising and so on. Goods exported are also subject to transportation costs. The fixed costs of FDI are the duplication of costs in establishing domestic production facilities. They are assumed to be greater than those of exporting, FDI eliminates variable transport costs, but involves higher fixed costs. Heterogeneous productivity then ensures self-selection. Only the most productive firms become multinationals; firms whose productivity falls in an intermediate range export and the least productive only sell domestically (Greenaway and Kneller, 2007).

2.5 Organisational culture

Cavusgil (1984) discusses organisational characteristics associated with export activity. According to Cavusgil variations in export activity can be explained, to a significant extent, by organisational and management characteristics. Expansion of export activity among firms is related to: management’s expectations concerning the effect exporting will have on the firm’s growth, market development, and profits; technology orientation of the firm; management attitudes towards risk-taking and desire to develop new markets; an the extent of resource allocation to exporting. There seems to be an empirical relationship between export activity on one hand, and managerial aspirations and expectations on the other. The latter characteristics appear to be the best predictors of export activity in the firm (Cavusgil, 1984).

Dosoglu-Guner (2001) found that adhocracy culture leads to favorable export decisions. Firms with such organisational culture may have the highest potential to become regular exporters due to their external orientation. Since these firms may undertake some exploration of export activities, they may be in a great need to obtain information on how and where to start exporting business. While companies seem to self-select into becoming exporters by the fact that the most productive firms can overcome the trade costs, Lopéz (2005) argues that firms by their internal orientation do decide themselves if they want to become exporter or remain domestically oriented. Lopéz (2005) further argues that this decision is made independently from the productivity level of the firm. This decision requires a company to become more productive to overcome the trade-
2.6 Government’s role in promoting small firm exports

Burpitt and Rondinelli (1998) found that government programs seeking to promote export by small firms must provide assistance that helps them reduce economic uncertainties and risks. They further argue that to succeed, these programs must also shape perceptions of exporting as a learning opportunity that can lead to better economic performance in the future.

Burpitt and Rondinelli (1998) found that many respondents of domestic firms indicated that they simply did not know how to begin the process of exporting their services abroad, lacking knowledge of where to get information, or thought that the transaction costs of seeking information and trade leads were too high for their companies. Many respondents claimed that the access costs were too high, or that they did not have the resources (time and money) to do the extensive follow-up necessary to turn foreign trade leads generated by the government into sales. Thus, although governments can assist firms to become aware of the possibility to export, the company itself has to be productive enough to afford the trade costs in order to be able to get involved in exporting. If a government wants to stimulate firms by handing them trade leads, they also have to assist firms to setup a plan to become more productive and efficient.

Also for learning by exporting the government can play an important role. Chuang (1998) indicates that governments could do this in several possible ways. They can promote trade with technologically advanced countries from which domestic companies can learn. Furthermore they can relax trade restrictions to allow export-driven imports of sophisticated capital goods, thus expanding access to new technology and intensifying the learning process. Next they can promote technology transfer and attract direct foreign investment and multinational enterprises on the production of goods with greater learning characteristics aimed at the global market. Furthermore, governments can also help in providing a better environment for technology diffusion among firms and industries. Finally, they can encourage investment in human capital, since a better-educated labor force absorbs new information faster and applies unfamiliar inputs or processes more effectively.

2.7 Main findings

The evidence of the literature study shows that trade costs induce self-selection of exporters and non-exporters, with productivity making the difference: foreign market entry requires superior productivity so the costs of market research, product modification, etcetera can be absorbed. Once started, exports enhance productivity as well, as new insights are obtained in foreign markets. Management’s attitudes toward taking risks and expectations of the return on export investments are relevant, but productivity is still a precondition in case of a go-no go decision. Enhancing productivity is therefore often a vital part of export promotion programmes. This seems to be especially relevant for SMEs, as management attitudes are more influential in small firms’ decisions.
Government programs promoting small firm exports should assist them in assessing their productivity and planning improvement if necessary, in addition to providing information and trade leads.
3 Methodological analysis

3.1 Introduction
This chapter gives a brief overview of the type of data and methods that have been used in prior studies for analysing the relation between export and productivity.

3.2 Data and methods used in prior studies
Most prior studies use large data bases taking plant level data for multiple years (panel data), often including only manufacturing firms and excluding smaller firms. Databases used in prior studies include, for example, the Longitudinal Research Database of the Bureau of Census for the US using all plants in the Census Manufactures; the Annual Survey of Manufactures for the US; the Budan Pusat Statistik (BPS) containing data of manufacturing plants in Indonesia and the ESEE database of spanish manufacturing firms.

Examples of methods used in prior studies are:
1. Multiple regression analysis: To estimate whether firms decide to export or not multiple regression analysis is commonly used. The decision to export or export intensity is then the dependent variable and some measure of productivity is the main independent variable. In this case it is also recommended to include a lagged dependent variable (e.g. export in the prior year and export two years earlier) as independent variable, as past export behavior may shape future export decisions. Other studies focus on explaining productivity and for example take productivity change as the dependent variable, measured by the average annual five year change in the Total Factor Productivity. Firm output growth has also been used as the dependent variable. In these studies export is the main independent variable and can include different time lags (e.g. export last year and in the two previous years) in order to trace time lag effects. To account for the panel data structure both fixed effects and random effects regressions have been used.
2. Pooled regression analysis: This has been used to estimate production functions using plant level data. Log output is then explained by at least (log) capital, (log) labor, (log) materials.
3. Kolmogorov-Smirnov test statistics for one and two sided tests: This has been used for testing exporters’ and non-exporters’ productivity differences.

3.3 Conclusion
The available studies on the subject do not permit conclusions as for one best method in analysing the relation between export and productivity: usually methods are selected that best fit the available data. So the data come first, methodology is a derivative. In addition, SME data are often incomplete or not available at all.
4 Overview of available databases

4.1 Introduction
This chapter provides an overview of possible databases to study the relationship between export and productivity, also taking into account a database’s usefulness for studying this relation among SMEs in the Netherlands.

4.2 International databases in which the Netherlands is included

4.2.1 EU KLEMS Growth and Productivity Accounts
KLEMS is a database of variables registered on a country level for the 27 member countries\(^1\). As firm (micro) data are not available, this database is not usefull considering the objective of the study dealt with here.

**Variables included in the database are:**

**Values**
- Gross output at current basic prices (in millions of Euros)
- Intermediate inputs at current purchasers’ prices (in millions of Euros)
- Gross value added at current basic prices (in millions of Euros)
- Compensation of employees (in millions of Euros)
- Number of persons engaged (thousands)
- Number of employees (thousands)
- Total hours worked by persons engaged (millions)
- Total hours worked by employees (millions)

**Prices**
- Gross output, price indices, 1995 = 100
- Intermediate inputs, price indices, 1995 = 100
- Gross value added, price indices, 1995 = 100

**Volumes**

\(^1\) KLEMS aims to create a database on measures of economic growth, productivity, employment creation, capital formation and technological change at the industry level for all European Union member states from 1970 onwards. This work will provide an important input to policy evaluation, in particular for the assessment of the goals concerning competitiveness and economic growth potential as established by the Lisbon and Barcelona summit goals. The database should facilitate the sustainable production of high quality statistics using the methodologies of national accounts and input-output analysis. The input measures will include various categories of capital, labour, energy, material and service inputs. Productivity measures will be developed, in particular with growth accounting techniques. Several measures on knowledge creation will also be constructed. Substantial methodological and data research on these measures will be carried out to improve international comparability. There will be ample attention for the development of a flexible database structure, and for the progressive implementation of the database in official statistics over the course of the project. The database will be used for analytical and policy-related purposes, in particular by studying the relationship between skill formation, technological progress and innovation on the one hand, and productivity, on the other. To facilitate this type of analysis a link will also be sought with existing micro (firm level) databases. The balance in academic, statistical and policy input in this project is realised by the participation of 15 organisations from across the EU, representing a mix of academic institutions and national economic policy research institutes and with the support from various statistical offices and the OECD. See [http://www.euklems.net/](http://www.euklems.net/). KLEMS was managed at Groningen University, The Netherlands.
Gross output, volume indices, 1995 = 100
Intermediate inputs, volume indices, 1995 = 100
Gross value added, volume indices, 1995 = 100
Gross value added per hour worked, volume indices, 1995 = 100

Growth accounting
Labour compensation (in millions of Euros)
Capital compensation (in millions of Euros)
Labour services, volume indices, 1995 = 100
Capital services, volume indices, 1995 = 100
Growth rate of value added volume (% per year)

4.2.2 OECD Statistics

To OECD statistics the same applies as to the (EU) KLEMS database: only variables on a country level are available. In addition, it is not clear whether international trade figures (import / export / trade balance) can be related to productivity figures\(^1\). Conclusion: not usefull for this study’s objective.

4.2.3 EuroStat

EuroStat’s data navigation tree suggests no firm data are available, and no productivity figures as well\(^2\).

4.2.4 World Bank

World Bank’s figures on economic policy and external debt include the variables hereafter, but productivity is not included (apart from GDP per person employed)\(^3\):

- Agriculture, value added (% of GDP)
- Cash surplus/deficit (% of GDP)
- Central government debt, total (% of GDP)
- Current account balance (BoP, current US$)
- Exports of goods and services (% of GDP)
- External debt stocks, private nonguaranteed (PNG) (DOD, current US$)
- External debt stocks, public and publicly guaranteed (PPG) (DOD, current US$)
- External debt stocks, short-term (DOD, current US$)
- External debt stocks, total (DOD, current US$)
- Foreign direct investment, net inflows (BoP, current US$)
- GDP (current US$)
- GDP growth (annual %)
- GDP per capita (current US$)
- GNI, Atlas method (current US$)
- GNI per capita, Atlas method (current US$)
- GNI per capita, PPP (current international $)
- GNI, PPP (current international $)
- Grants, excluding technical cooperation (current US$)
- Gross capital formation ( % of GDP)
- Gross savings (% of GDP)
- IBRD loans and IDA credits (DOD, current US$)


Imports of goods and services (% of GDP)
Industry, value added (% of GDP)
Inflation, consumer prices (annual %)
Inflation, GDP deflator (annual %)
Net flows on external debt, long-term (NFL, current US$)
Net flows on external debt, total (NFL, current US$)
Net ODA received (% of GNI)
Net ODA received per capita (current US$)
Net official development assistance and official aid (current US$)
Net official development assistance received (current US$)
Portfolio investment, equity (BoP, current US$)
Revenue, excluding grants (% of GDP)
Royalty and license fees, payments (BoP, current US$)
Royalty and license fees, receipts (BoP, current US$)
Services, etc., value added (% of GDP)
Technical cooperation grants (current US$)
Total debt service (% of exports of goods, services and income)
Total reserves (includes gold, current US$)
Trade in services (% of GDP)
Use of IMF credit (DOD, current US$)
Workers' remittances and compensation of employees, received (current US$)

4.2.5 ESDS International

ESDS International provides web based access to a range of macro and micro international datasets, including OECD, EuroStat and EuroStat already mentioned. The added value considering this study’s objective seems to be very limited.

4.2.6 Community Innovation Surveys (CIS)

The Community Innovation Surveys (CIS) are a series of surveys executed by national statistical offices throughout the European Union and in Norway and Iceland.

The harmonized surveys are designed to give information on the innovativeness of different sectors and regions. Data from these surveys are used for the annual European Innovation Scoreboard and for academic research on innovation, with over 200 papers using the CIS data published. Productivity and exports are not included, but resulting micro-datasets can be accessed by researchers at the premises of Eurostat in Luxembourg (SAFE Center). Eurostat also provides access to the EU-wide dataset for selected countries. Using Dutch CIS microdata and possibly linking them to other data might add to the analysis of exports and export-related firm characteristics.

National statistical offices carry out the survey according to the EU-wide definitions of the Oslo Manual. They generally take a sample from all establishments, stratifying the sample by sector, establishment size and possibly region. For the size classes, a portion of all establishments below a certain size threshold is selected, but in most countries all large establishments receive a questionnaire. The survey is conducted at the enterprise level. Firms that

1 See http://www.esds.ac.uk/international/access/access.asp.

2 OECD Proposed Guidelines for collecting and interpreting data on technological innovation.
organise their business activities into separate legally defined units can therefore be sampled several times.

The Community Innovation Surveys are the main data source for measuring innovation in Europe. Aggregated data are disseminated on the Eurostat webpage under CIS data. The tables cover the basic information of the enterprise, product and process innovation, innovation activity and expenditure, effects of innovation, innovation co-operation, public finding of innovation, source of information for innovation patents, etc.

4.3 (Dutch) National databases

4.3.1 EIM SME policy panel
The EIM SME policy panel consists of 2.000 SMEs (less than 100 employed) in private business, with the exception of agriculture and free professions. The panel provides core figures on business characteristics and performance annually (employment, turnover, etcetera; also including exports and innovation), and in addition answers a variety of ad-hoc business related and topical questions up to four times per year. It could be worthwhile to combine data of the EIM SME policy panel with CBS data: this will enable a comparison of the results for small firms based on different sources of data.

4.3.2 CBS Production Statistics (PS)
The annual Production Statistics are CBS firm statistics (questionnaire) reported per branche of industry, and providing information on costs and returns, and on raw materials and commodities purchased. All firms employing 20 and more are included, complemented with a sample of the smaller firms below that size. PS data are available to external researchers (CEREM = CEntre for Research on Economic Micro-data).

4.3.3 Amadeus
AMADEUS contains standardized annual reports (with a ten year history), consolidated and not consolidated, financial ratios, activity codes (NACE, SIC), and ownership structure of about ten million European businesses (Eastern Europe included). A standardized annual report contains over 20 balance sheet, and over 20 profit and loss account values, plus descriptive information. Amadeus is only available at Bureau van Dijk (Netherlands) and partners.

4.3.4 ERBO
Finally, Dutch Chambers of Commerce ERBO survey data are available for the period 1992-2007, including the amount exported per industry. Value added is not included, but turnover per person could be used as a proxy.

4.4 Conclusion
Using a combination of available data seems to be the most promising strategy for further analysis of the relation between export and productivity among SMEs. CBS’ PS data (production statistics), CIS (innovation) data and EIM SME data are

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the primary sources to be addressed. Getting permission to link PS to CIS data is an essential first step.
5 Conclusions and recommendations

Literature
Available literature on the subject suggests trade costs induce self-selection of exporters and non-exporters, with productivity making the difference. The costs of market research, product modification, etcetera at entering a foreign market, can only be absorbed by firms with superior productivity. On the other hand, foreign market entry reinforces productivity by producing new insights. With productivity being a precondition for a GO decision, management’s attitudes toward taking risks and expectations of the return on export investments are relevant as well, especially for SMEs: management attitudes are more influential in small firms’ decisions.

Follow-up
A study addressing internationalization and productivity with SMEs should therefore include management’s attitudes, in addition to firm characteristics such as exports and imports, FDI, and innovation. This requires combining different sets of microdata. Datasets qualifying for such a study are PS and CIS (CBS), and EIM’s SME Policy Panel. For this admission to CBS’ CEntre for Research on Economic Micro-data (CEREM) is required, and permission to use CIS-data.

Methodology
As for methods to be used in analyzing the relation between export and productivity the outcome of the analysis is inconclusive: there is not one best method of analyzing this relation, as usually methods best fitting the data used are selected. SMEs are often not included or fully covered in prior studies.
6 References

- Genee, S. and F. Fortanier, project Internationaliseren en Productiviteit (Internationalization and Productivity), CBS 2010, consisting of three separate studies: 1. Statistical analysis (on characteristics of exporters and non-exporters), 2. Dynamic analysis (on characteristics of and differences between starting exporters and non-exporters), 3. Regression analysis (on differences between starting exporters and comparable firms not exporting). For the analyses several CBS microdatasets were used, a.o. PS and CIS. Publication not available (yet).