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The Features of a Survey on the Export Decisions of Swedish Small and Medium-Sized Enterprises

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April 2017



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The features of a survey on the export decisions of Swedish small and medium- sized enterprises

Joakim Gullstrand[†]

4th April 2017

Abstract

This paper presents the features of a survey on Swedish firms' export decisions conducted in February 2015 focusing on a sample of 10,000 small and medium-sized enterprises. The survey was divided into two major sections. The first section targeted all firms and focused on firms' general situation (e.g. competition, type of co-operations, etc.). The second section focused on firms' export decisions and was only addressed to current, former and future exporters. Around 3,000 firms answered the questionnaire within a three-month period.

We show that the survey does not suffer from any non-response biases by investigating whether respondents differ from non-respondents, whether early respondents differ from late ones, and whether the respondents' answers can be validated with external and more objective information. We are therefore confident that the survey may be used to represent the total population of small and medium-sized enterprises in the Swedish manufacturing sector.

JEL classification: F10

Keywords: Swedish SMEs, Export decisions, Co-operation, Trade costs

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1 Introduction

The literature on international trade has changed dramatically in the last two decades as it has shifted away from a focus on countries and sectors towards the behaviour of heterogeneous firms in international trade.

This transformation of the research focus originated from an increased availability of new and detailed databases in the 1990s, which made it possible to drill down from sectors to firms in order to study export (and import) decisions (see [e.g.] Roberts and Tybout, 1997). These new databases led to an explosion of new stylized facts about firms and their export decisions (see [e.g.] Mayer and Ottaviano, 2008; Bernard, Redding and Schott, 2011; and Wagner, 2007, 2012) and they also spurred the development of new models that could explain these patterns Melitz, (2003) (see also the survey by Redding, 2011).

A well-established fact derived from these micro-datasets, originating from a large number of countries, is that few firms export and that the lion's share of the total export value is biased towards larger and more productive firms (see [e.g.] Gullstrand, Olofsdotter and Thede, 2016 and Mayer and Ottaviano, 2008). This pattern is in line with a situation where firms self-select for export, and the initial theoretical work in the literature on heterogeneous firms and trade focused on explaining such a selection process with the help of productivity differences and sunk costs of exporting. The theoretical work has since expanded rapidly so that heterogeneous firms in international trade are now anchored in, for example, the literature on comparative advantages, labour market frictions, networks, firm boundaries and multi-product firms. The empirical literature responded to, or worked in tandem with, the theoretical development by creating rich datasets incorporating multi-dimensional characteristics (e.g. firm, plant, employee, product, sales destination and purchase source), which were used to assess the new theoretical expansions.

A current trend in the empirical literature on heterogeneous firms in international trade is to open up firms' black box in order to expand our knowledge about their trade costs, organization of trade flows and linkages with other firms. The details gained from such a drilling-down exercise are highly policy-relevant since they will shed more light on the trade barriers that matter and how firms cope with these, as well as how trade and its effects are influenced by linkages between firms.

The aim of this paper is to discuss the features of a survey conducted in Sweden at the beginning of 2015, focusing on drilling down into firms to shed light on how they view different trade costs and how they are linked to the economy outside the firm. The survey focused on 10,000 small and medium-sized firms (defined as firms with at least one employee but fewer than 250) in the manufacturing sector. Around 30 per cent responded, a rather low response rate (but comparable with other surveys). We will show however that the answering firms mimic the population in many important aspects and that the probability to respond does not correlate with any important traits such as productivity, profit and investments. Hence we argue that the survey may be used to represent the population at large.

The paper is structured as follows. Section two presents the structure of the survey while section three discusses its format and the number of respondents. Section four focuses on the non-response analysis and section five briefly presents the questionnaire. The final section concludes.

2 Structure of the survey

The survey sample was drawn from a population defined with the help of Statistics Sweden's register database, called Structural Business Statistics, from 2012 (FEK2012), which covers all but financial registered enterprises in Sweden and includes a large number of firm characteristics (e.g. sales, number of employees, investment, etc.), which were used to specify the population of interest and to create strata. The population was defined with the following restrictions:

- Firms with less than 250 employees in 2012.
- Firms that were classified as manufacturing firms in 2012 (i.e. section C in Standard Industrial Classification, SNI07).
- Firms that were active in the autumn of 2014.
- Firms that had a turnover not less than 500,000 SEK (around 50,000 euros) and at least one employee in 2012.

We focused on small and medium-sized enterprises since this group is highly policy-relevant (which is highlighted e.g. in the export strategy of the Swedish government) while the knowledge about their view on trade and trade costs is limited. The focus on the manufacturing sector is due to its importance in total trade and the fact that we were able to link external registered trade data to each respondent. Since we only had register data from 2012 when the survey was

conducted, we used extra information from Statistics Sweden on whether the firm was active or not in the autumn of 2014 in order to exclude firms active in 2012 but not in 2014. Finally, we used a lower threshold for firm size (in sales and employees) to exclude “hobby” firms, which are to a large extent dormant or with a very erratic behaviour. The number of firms in the population after these conditions were applied was 19,208.

The population was thereafter stratified in important dimensions in relation to the questions of interest to ensure a high coverage in all strata. The following dimensions were applied:

- Industry 2012
 - a Food (food and beverage, i.e. SNI07 division 10)
 - b Machinery (machinery, i.e. SNI07 divisions 27 and 28)
 - c Others (all other industries in manufacturing)
- Firm size 2012
 - a Micro firms (19 employees)
 - b Small firms (1049 employees)
 - c Medium firms (50249 employees)
- Export 2012
 - a Exporter
 - b Non-exporter

The special interest in Food and Machinery is because we would like to ensure a good coverage of two industries similar in size in terms of the number of firms but with very different trade conditions. Food firms are highly integrated with the domestic agricultural production and less successful when it comes to exporting, forming around 2% of manufacturing exports in 2011. Machinery, on the other hand, is a global and highly successful export industry, which formed around 18% of total exports in 2011. All other industries were lumped together as Others. Stratification by export experience and firm size was used since it is a well-established fact from the trade literature that exporters are different from non-exporters and that firms’ performance (here approximated with the help of firm size) is an important driver behind firms’ decision when it comes to international linkages and how to organize their business.

The distribution of the population across these strata is presented in Table 1, which shows that around 40% of the population exported in 2012 and that the lion’s share of the firms were characterized as micro or small firms. The table also clearly shows that the propensity to export

Table 1: The total population of firms.

Export/size	Sector			Total
	Food	Machine	Others	
	No.	No.	No.	
Exporter-Micro	138	631	3,137	3,906
Exporter-Small	184	545	2,554	3,283
Exporter-Medium	88	228	819	1,135
Non-exporter-Micro	871	587	7,877	9,335
Non-exporter-Small	322	87	1,080	1,489
Non-exporter-Medium	14	5	41	60
Total	1,617	2,083	15,508	19,208

Note: Based on the register FEK2012.

increases with size, since 95% of the medium-sized firms exported while only around 30% of those defined as micro firms exported.

We decided to have a large sample size consisting of around half of the population (10,000 firms) due to two reasons. One was our wish to obtain precise estimates in a survey covering a broad set of questions (related to firms' decisions regarding exporting, co-operation, importing and competition) and without any good precedents to predict the outcome. We therefore assumed a high uncertainty in all questions, i.e. not more than 50% of the population was assumed to have a certain characteristic. The other reason for including half of the population was to mitigate problems associated with a small coverage, especially since our precedent for the response rate was around 2040% (based on earlier studies from Statistics Sweden).

For the distribution of the sample across strata, we decided to have a full coverage with a small population to avoid sampling errors (see Table 1). Hence we have a full coverage in all strata within Food and Machinery as well as for medium-sized firms in the Others group, which formed a sample of 4,560 firms. The rest of the sample (i.e. 5,460 firms) was distributed as presented in Table 2. In the case of firms classified as Other with less than 50 employees, we chose a proportional allocation of the sample so that it consisted of 5,000 exporting firms and 5,000 non-exporting firms. The reason for a slightly higher weight for exporters in the sample compared to the population (which was composed by around 40% of exporters) was the interest

Table 2: The sample of firms.

Export/size	Sector			Total
	Food	Machine	Others	
	No.	No.	No.	
Exporter-Micro	138	631	1,305	2,074
Exporter-Small	184	545	1,062	1,791
Exporter-Medium	88	228	819	1,135
Non-exporter-Micro	871	587	2,702	4,160
Non-exporter-Small	322	87	371	780
Non-exporter-Medium	14	5	41	60
Total	1,617	2,083	6,300	10,000

Source: Own calculations.

in analysing firms’ export decisions, which meant we did not want to risk too few respondents in these strata. Note, however, that the large sample size in all strata without full coverage ensures a small margin of error. The margin of error for the stratum “Other small and non-exporting firms”, with a confidence level of 95%, was as low as 4%, even if we assume that the examined characteristic only applies to 50% of the sample.

3 Data collection and respondents

The survey was constructed as a web survey and information on it and how to access it was sent out by Statistics Sweden in a secure mail to all firms in the sample, so that they received the letter on 2 February 2015. In addition to information about how to log in to the web survey, the letter also included background information about the survey as well as about the client behind it (i.e. Joakim Gullstrand at Lund University). This first letter was thereafter supplemented with two reminders. The first reminder was sent so that it reached all non-responding firms on 2 March 2015 while the second and final one reached non-responding firms on 16 March 2015. The survey was thereafter closed on 30 March 2015.

Statistics Sweden collected all data and the final number of respondents added up to 3,092, giving a response rate of 30.92%. This was in line with our expected response rate within the range of 20-40%, which in turn was based on the results of earlier surveys conducted by Statistics

Sweden and the literature on non-responses (see [e.g.] Fowler, 2014; Wright, 2015). The response rates across strata were all within the expected range, although (see Table 3) exporters, firms in Machinery and medium-sized firms were slightly more likely to respond compared to firms in the other strata.

When we take a closer look at the non-respondents (i.e. 6,908 firms), we may divide them into four different categories: (1) 6,783 firms did not respond (or log in to the survey); (2) 20 firms were not reached due to postal returns (e.g. due to relocation or close-down); (3) 44 firms declined to participate; and (4) 61 firms did not respond due to over-coverage (i.e. firms that were not part of the population due to classification errors). In terms of the partial response rate across questions for those who participated, we find a very high rate of completion. That is, 9599% of all questions were completed.

If we consider the timing of firms' responses, the number of days before they responded was on average very similar across strata. The average number of days was around 19 (see Table 3) while the shortest and the longest response times were 1 and 55 days respectively. Most firms responded however before the first reminder (around 60%) independent of their size and export activity. Around 24% and 15% answered after the first and the second reminder respectively (see Table 5). Figure 1 presents the distributions of the answer wait in days: although most firms responded before the first reminder we do find that the number of responses surged after each reminder.

A potential problem with a low response rate is the possibility of a non-response bias, which occurs if the respondents are systematically different from the population. A low response rate will however not necessarily lead to a bias since it depends on the nature of those not responding (see Groves, 2006), and Wright, (2015) showed that even surveys with "response rates as low as 10 percent may produce highly accurate estimates". We therefore performed a non-response analysis, which is presented in the next section.

4 Non-response analysis

An often-used approach to analyse the possibility of a non-response bias has been to investigate the rate of non-responses (Wagner, 2012) or to investigate irregularities across different sub-

Table 3: Response rates.

Export/size	Sector			Total
	Food	Machine	Others	
	Mean	Mean	Mean	
Exporter-Micro	0.2899	0.3661	0.3188	0.3312
Exporter-Small	0.3641	0.4018	0.3964	0.3948
Exporter-Medium	0.3636	0.4254	0.4066	0.4070
Non-exporter-Micro	0.2216	0.2913	0.2328	0.2387
Non-exporter-Small	0.2422	0.2759	0.3261	0.2859
Non-exporter-Medium	0.2857	0.4000	0.3415	0.3333

Source: Own calculations.

Table 4: No. of days before response.

Export/size	Mean	Min	Max
	answer length in days	answer length in days	answer length in days
Exporter-Micro	18.6	1.0	54.0
Exporter-Small	18.1	1.0	53.0
Exporter-Medium	20.4	1.0	55.0
Non-exporter-Micro	19.9	1.0	55.0
Non-exporter-Small	19.3	2.0	52.0
Non-exporter-Medium	17.4	2.0	48.0

Source: Survey of 10 000 firms

groups. This survey, as discussed above, had a rather low response rate as well as some irregularities in the response rates across strata, since medium-sized exporters in Machinery were slightly more likely to answer. The stratum with the lowest response rate was non-exporting micro firms in the Food industry (22%), while that with the highest (42%) was medium-sized exporters in Machinery (see Table 3).

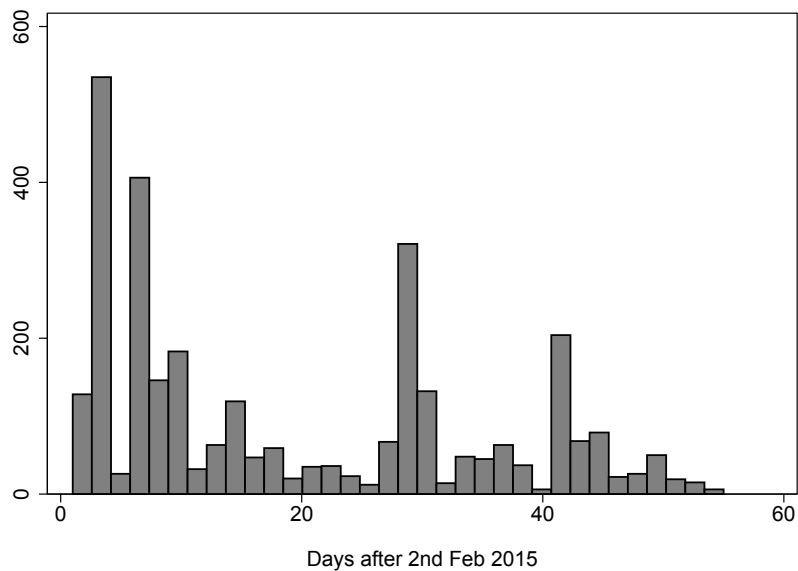
These differences are however not particularly informative when it comes to the possibility of a non-response bias (see Groves, 2006), and the focus on response rates has been challenged as a very poor predictor of the survey quality (Wright, 2015). A more accurate way to analyse the possibility of a non-response bias is to make use of relevant external variables (Groves, 2006) and thereafter investigate (1) whether respondents differ from non-respondents when it comes to

Table 5: Respondents and reminders.

Export/size	Reminders			Total
	No reminder	One reminder	Two reminders	
Exporter-Micro	61.3%	23.9%	14.8%	100.0%
Exporter-Small	63.5%	24.5%	12.0%	100.0%
Exporter-Medium	58.7%	25.8%	15.6%	100.0%
Non-exporter-Micro	58.5%	23.0%	18.5%	100.0%
Non-exporter-Small	61.4%	22.4%	16.1%	100.0%
Non-exporter-Medium	65.0%	25.0%	10.0%	100.0%
Total	60.5%	23.9%	15.6%	100.0%

Source: Own calculations.

Figure 1: Histogram for the number of days until response.



important characteristics, (2) whether early respondents differ from late ones, or (3) whether the answers of respondents are in line with information from external databases.

We therefore make use of the possibility to link surveyed firms to an external database with a large set of information about *inter alia* sales, wages, costs of raw materials, investments, assets, exports and imports. We thereafter investigate whether respondents systematically differ from the population at large. The question is whether, as Fowler, (2014) underscores, a non-response “is related to the estimates the survey is designed to make”. Since the survey was constructed to investigate how firms view trade we lean on the literature on firm-level trade, using the seminal work of Melitz, (2003) as a starting point. Hence we expect that exporters perform better and that they self-select for exporting, which has been supported by numerous empirical studies (see Gullstrand, Olofsdotter and Thede, 2016; Wagner, 2007, 2012). The literature on heterogeneous firms in international trade therefore suggests that firm performance is the major underlying factor behind firms’ export decisions and that firms invest to become exporters. Hence we investigate the potential of non-response bias by comparing respondents and non-respondents in relation to:

- Total Factor Productivity (TFP).
- Profit (operating profit).
- Investments (total investments in machines, equipment and buildings).

Firm-level TFP and Profit capture performance differences while Investments captures the idea that firms build up their capacity (self-select) for exporting. The TFP is measured as a production-function residual (using sales as output while firm-level inputs consist of assets of machines and buildings, workforce and costs of raw materials). The operating profit is defined as total revenue less total cost.

We first investigated whether we could find any differences across non-respondents and respondents using ordinary means, and the results are presented in Table 6. This comparison shows no big difference between the two groups although responding firms seem to invest more. All differences between respondents and non-respondents disappear however when we also consider the underlying stratification of the sample. This is done by a regression of the variable of interest on a binary indicator (taking the value of one if the firm responded) and fixed strata effects (see Table 7). Similar results are found when we reverse the specification in order to investigate a potential selection effect. That is, we regress the binary indicator of response

Table 6: Non-response bias analysis, mean differences.

VARIABLES	(1)	(2)	(3)	(4)
	Non-response N	mean	Response N	mean
Total Factor Productivity	6,908	-0.00169	3,092	0.00378
Result (accounting)	6,908	-0.00222	3,092	0.00495
Investments	6,908	-0.0154	3,092	0.0344*

Note: All variables are standardized. Mean differences are tested by a Wald test between the mean of respondents and non-respondents. * Indicates a significant difference on a 5 % level.

(using a Probit model) on TFP, Profit and Investments using different fixed effects (industry level, strata or none). The results are the same: the probability of responding is not correlated with these characteristics independent of the specification. We also experimented with a lag structure for firm investments, but the result is robust to this change in the specification. Hence we conclude that there is no systematic difference between responding and non-responding firms.

The next step is to investigate whether respondents differ from each other depending on how long it took before they answered. The reason for this is that firms' interest in the survey may be reflected in when they responded, which may lead to a systematic difference between firms depending on their response time. We therefore regressed the firm-level variables (TFP, Profit and Investments), one at a time, on the number of reminders sent to each firm before they answered (controlling for strata fixed effects). The estimates were insignificant in all regressions.¹ In order to investigate the robustness of these results, we used the number of days from the start of the survey until the firm completed the questionnaire, and also these results were insignificant. In other words, we do not find any systematic difference between firms that responded early and those which responded late when it comes to important characteristics such as TFP, Profit and Investments.

Finally, we tried to validate the responses by comparing answers from the survey on firms' profitability with external information. The question used in the survey for this validation analysis was the following one:

¹The results are not presented but they are available upon request.

Table 7: Non-response bias analysis, characteristics.

VARIABLES	(1) Investments	(2) TFP	(3) Result (accounting)
Respondents	-0.00772 (0.712)	-0.00474 (0.624)	-0.0256 (0.236)
Constant	-0.137 (2.95e-05)	-0.0420 (0.00554)	-0.101 (0.00289)
Observations	10,000	10,000	10,000
R-squared	0.087	0.012	0.026
FE strata	YES	YES	YES

Note: Based OLS with strata fixed effects. P-value in parentheses. All variables are standardized.

Table 8: Non-response bias analysis, selection.

VARIABLES	(1) Respondents	(2) Respondents	(3) Respondents
Total Factor Productivity	0.0324 (0.504)	0.0303 (0.531)	-0.0190 (0.704)
Result (accounting)	0.000153 (0.994)	0.00877 (0.672)	-0.0253 (0.211)
Investments	0.0354 (0.279)	0.0500 (0.175)	-0.0113 (0.595)
Constant	-0.868 (0.000202)	-0.804 (0)	-1.262 (0)
Observations	9,873	10,000	10,000
FE industry	YES	NO	
FE strata			YES

Note: Based on a Probit regression and 4-digit industry effects when applied. P-value in parentheses. All variables are standardized.

- How did the firm’s profitability during 2013-2014 compare to your expectations? (Much worse, worse, on a par, better or much better.)

The external information used as a comparison was firms’ profit based on accountancy information (defined as total revenue less total costs for 2013, which we thereafter related to the number of employees to mitigate scale effects). Since we assume that firms compare their own outcome with other firms, we standardized the profitability variable. Hence, if a firm answered that the outcome was much worse than expected, we expected the standardized profit to be negative (worse than the average firm).

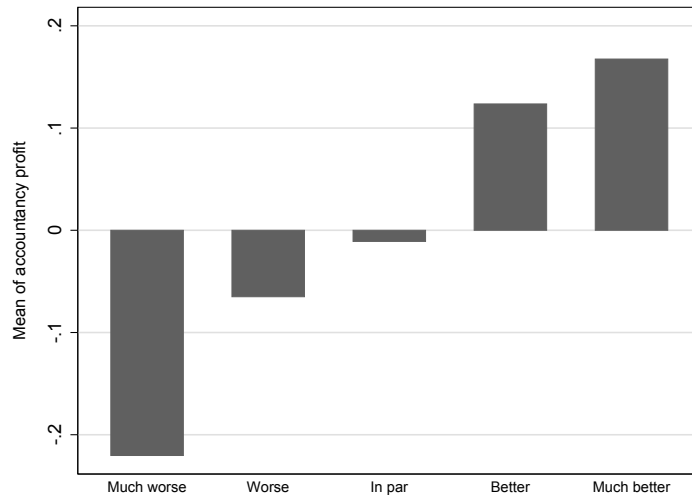
When we compared the means of the standardized profitability variable between groups of firms based on their own evaluation of the firm’s profitability, we found a strong correlation between the firms’ own evaluation and the one based on external information. The result is found in Figure 2, and it shows clearly that the standardized external evaluation of the firm’s profitability is on a par with the respondents’ own evaluation. In order to investigate the robustness of this result, we regressed the answers from the survey on the profit variable using a Poisson specification (since firms ranked themselves from 1 to 5) with strata fixed effects. The result was in line with the simple means across groups reflected in Figure 2, and a one-unit-higher profitability increased the log differences of firms’ own evaluation by around 0.02 units.² Hence we may conclude that the respondents’ answers, at least when it comes to profitability, are in line with external and more objective information.

5 The questionnaire

The web survey consisted of two sections. The first had 15 questions, which were put to all firms independent of whether they exported or not. The second section consisted of an additional 15 questions on issues related to firms’ export experiences and decisions, and these were put to firms that exported between 2013 and 2014, firms that exported before 2013, and non-exporters expressing a will to export in the near future. Since the experience from and the timing of exporting differed between these three types of exporters, the questions were slightly altered to fit these different situations. The number of respondents for these three types of exporters was

²The results are not presented but are available upon request. In addition to the external profitability variable, we also used the firms’ total factor productivity of 2013 and the result was very similar.

Figure 2: Comparing external profit information with own evaluation of firm profitability.



1,719, 75 and 77 respectively.

Although the details of the questionnaire and the discussion of the results are beyond the scope of this paper, Tables 9 and 10 present the questions in a condensed format since all questions have been translated from Swedish and since the original questions were more elaborated or explanatory to avoid misinterpretations. Table 9 presents the questions put to all firms while Table 10 presents the questions put to exporting firms (current, former or future).

6 Conclusions

The aim of this paper was to briefly present the features of a survey on Swedish firms' export decisions. The survey took place in February 2015 and it focused on a sample of 10,000 small and medium-sized enterprises. The survey was conducted as a web survey and it was divided into two major sections. One focused on more general questions targeting all firms while the other focused on current, former and future exporters.

Around 3,000 firms answered the questionnaire within a three-month period (i.e. a response rate of 30%). In order to evaluate whether the survey suffered from any non-response bias, we investigated (1) whether respondents differed systematically from non-respondents in important variables, (2) whether respondents answering quickly differed from those answering slowly, and (3) whether respondents' answers were in line with more objective external information. The

Table 9: The questionnaire.

General questions to all firms	
Type of question:	Type of answer:
Is the respondent the owner	Y/N
Major activity	Multiple choice
Number of products	Multiple choice
Part of firm abroad, and which part if yes	Multiple choice
Sales to local market (i.e. in the proximity of its location) as a share in total	Multiple choice
Competition dynamics	Multiple choice
How to meet competition	Multiple choice
Location of major input sources	Multiple choice
Co-operation with other firms in different regions	Y/N (for local, rest of Sweden, rest of Nordic, rest of Europe and rest of the world)
The two most important types of co-operation	Multiple choice plus free text
Sustainability certifications	Y/N
Why are sustainability issues important	Multiple choice plus free text
Profit compared to expectations	Multiple choice
Increased/decreased efforts in improving products, production or marketing	Multiple choice
Knowledge and interaction with Business Sweden (export promotion organization)	Multiple choice
Exported 2013/2014 or not	Y/N
If not, exported before or intend to export in the future	Y/N

Table 10: The questionnaire.

Questions to exporters (current, former and future)	
Type of question:	Type of answer:
How important is exporting for firm survival	Multiple choices
The activity of the most important customer	Multiple choices
How important is proximity to airports, harbours, train stations or road networks	Multiple choice
The mode of contact with customers abroad	Multiple choices
Export financing	Multiple choices
Important factors behind choosing the export market (e.g. other Swedish firms, cultural similarities, closeness, legal framework and currency stability)	Multiple choices
The most important export costs (e.g. searching, contracting and marketing)	Multiple choice
Is it likely that export costs decrease/increase if another export destination is added	Multiple choice
The importance of different delivery costs (customs, insurance, currency and transport)	Multiple choices
The two most important assets for exporting	Multiple choices plus free text
Expected export development within three years	Multiple choice
Ways to expand exports in the future	Multiple choices plus free text
Competition on the export market compared to the domestic one	Multiple choices
Currencies used for export prices	Multiple choices plus free text

results from all these tests suggest that the survey does not suffer from any non-response bias. We are therefore confident that the estimates from this survey are a good representation of the total population.

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