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LITHUANIAN EXPORTERS IN THE FINANCIAL CRISIS

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Abstract. *Using Enterprise Survey data covering the period 2001–2011, the paper investigates the export behavior of Lithuanian firms and changes herein before, during and after the financial crisis.*

The primary objective is to investigate if there are changes in export behavior such as frequency, intensity, value and structure, hence focus lies on the results obtained with the standard enterprise survey data that is annual and collected before and after the crisis. The findings show that in a quantitative perspective the financial crisis has only a marginal impact on the long run exporting behavior of Lithuanian firms. There are no significant changes in number of exporters and exported percentage and only a small but negative effect on exported value when using simple ANOVA (F-test) analysis or more advanced regression analysis for repeated cross sections and panel data. The impact of the crisis falls more on the qualitative aspects of exporters from Lithuania. Generally do exporters, though affected by the crisis, outperform local market oriented firms in and over the crisis on factors such as productivity, sales growth and quality.

Complementary evidence from the more ad-hoc and short-term focused financial crisis surveys corroborates the findings from the standard enterprise surveys. In every aspect investigated did exporters perform at least as well and often much better than firms catering solely to the local market. The financial crisis survey data reveals that exporters had higher capacity utilization, lower levels of indebtedness and recovered generally faster than other firms from the crisis.

For the methodology, we conclude with this paper that the usage of repeated cross sections from the standard enterprise surveys is the best way to investigate our research questions. This owes to the large drop in number of observations in the panel dataset published by the World Bank, making those results overtly vulnerable to outliers in the sample and unobservable attrition factors. The financial crisis survey data is mainly useful towards understanding short run adjustments and financial aspects of the crisis, while structural aspects and exporting behavior is better covered with the standard surveys. The main methodology problem of using less than population data (making it sensitive to survey sampling routines) to investigate exporting behavior in general concerns the enormous skewedness that exists within the population of exporting firms. This owes to the phenomena that in most countries a handful of (multinational and locally owned) firms account for more than 50% of total exports. This is also increasingly true for a country such as Lithuania as the transition towards a market and open economy has progressed.

Keywords: *Exporting behavior, financial crisis, firm-level data, enterprise surveys, repeated cross sections, panel data.*

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1. Introduction

The paper investigates what happens to the general performance of exporters in Lithuania over the course of the financial crisis. Given very limited firm-level data availability for longitudinal panels in the new member states, transition countries and emerging markets in general, this is an interesting question to try to answer using in-depth survey firm-level data made systematically available through the Word Bank's enterprise surveys.

Prior research has mainly focused on the short-run behavior of aggregate exports and imports during the last two Quarters of 2007 and the first two Quarters of 2008 (Anderton and Tewolde, 2011). This evidence suggests that the crisis led to an aggravated trade recession (see also Figure 1.1 below for the particular case of Lithuania) and that trade contagion was so vast due to the high level of interdependencies between exports and imports in global value chains. Firm-level evidence also suggests that in particular short-run arms-length trade relationships downward spiraled due to the crisis (Cattaneo, Gereffi and Staritz, 2010, Kolasa et al, 2010). Less evidence is available on the longer-run trade repercussions of the crisis. However, a number of papers have used financial crisis as an event type of study towards more general purposes such as the study of the longer-term or structural consequences of a systematic or synchronized event across countries (Berman, 2009).

Our research take a character similar to the latter type of research, even though the present study only makes up currently that of understanding structural changes in export behavior of the single country case of Lithuania. The basic research questions posed in this paper are therefore as follows:

- Did the financial crisis cause an increase or decrease in the number of exporters?
- Did exporters increase or decrease their export levels in relative (percentage) and absolute (value) terms?
- Did the financial crisis lead to a change in the characteristics (such as size, sector, sales growth and ownership) of the average exporting firm in Lithuania, and if so, what has been the direction of change in the population of exporters relative to non-exporters?
- Did exporters fare overall better or worse than other non-exporting firms in the financial crisis?

With the reinstitution of the independence of Lithuania the national currency (Litas) was introduced and a fixed exchange rate system was chosen in its strictest form using the Currency Board Arrangement (Egert, Halpern and MacDonald, 2006). Hence from the onset exchange rate policy was not envisioned as an instrument to stimulate exports. Lithuanian businesses have demonstrated the capacity to adjust in the midst of crisis events such as the Russian financial crisis in 1997 and the Global Financial Crisis in 2007-08. As for many other now former socialist countries exports only played a subordinate role in the system of material balances and planning. Whereas now exports con-

stitute at least half of the growth impetus for the Lithuanian economy. Since Lithuania is an important hub for processing trade in interconnected value chains between East and West (e.g. more than 40% of exports are in the form of imports being re-exported), the Crisis of 2007-08 led to a sharp decline in international trade from a macroeconomic perspective. See also Figure 1.1.

Hence the Lithuanian case of extreme vulnerability to crisis type of events matched

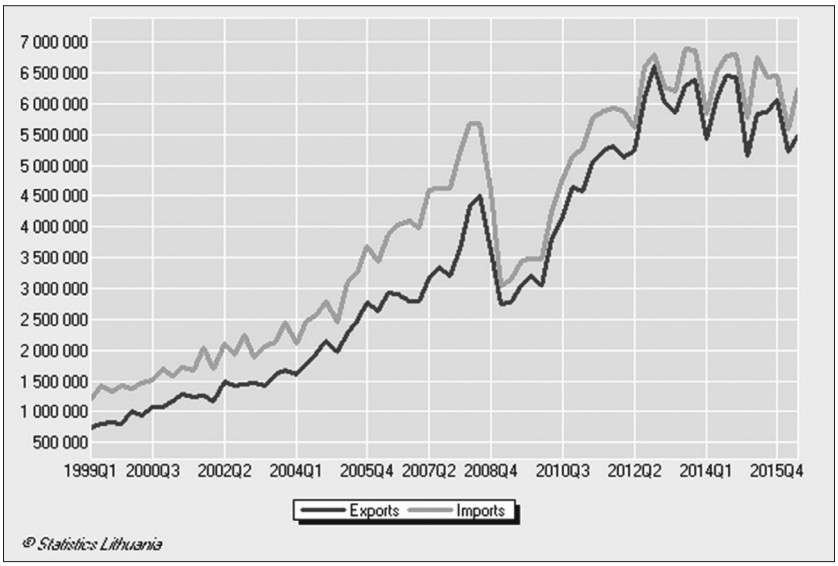

Figure 1.1. **Value of total exports and imports, Lithuania, 1999Q1–2016Q2 (thous. Euros, seasonally adjusted).**

Source: Statistics Lithuania using http://db1.stat.gov.lt/statbank/ on August 29, 2016.

with the quite fast and impressive recovery of the export sector as demonstrated in this paper, suggest that the importance of horizontal policies such as exchange rate policies for export performance cannot be emphasized enough.

Section 2 opens the paper by reviewing existing research on the above identified research questions for Lithuania. We also reference similar studies for other EU Member States when studies are available demonstrating a relationship between the Global Financial Crisis and export performance. Finally do we also in the review briefly consult literature that methodologically take antecedence to the present research. Section 3 introduces the World Bank datasets that all have in common that they are collected using firm-level survey instruments and contain information about firm-level export behavior. Section 3 also presents descriptive data for the study variables. The main statistical results of the study are reported in Section 4. Section 5 is a relatively short section drawing on the special financial crisis surveys. Section 6 concludes the paper.

2. Literature review and policy background

There is a vast literature on exporting behavior at the firm-level starting in particular from Bernard and Jensen (2004) and Bernard et al (2007) for the more economics oriented literature. Recently a number of papers were published combining firm-level data on export performance with country level variables such as exchange rates and other institutional variables (see e.g. Levchenko, 2007 or Weng and Lee, 2013, Li Puma et al, 2013). Prior to Bernard and Jensen (2004) most of the literature on exporting at the firm-level has focused on managerial factors in marketing studies (see e.g. Aaby and Slater, 1989, Cavusgil, 1984, Katsikeas, Leonidou and Morgan, 2000, Knight and Cavusgil, 2004) or firm-level productivity in economics (see e.g. Hallward-Driemeier, Iarossi and Sokoloff, 2002, Wagner, 2007, Kasahar and Lapham, 2013).

The above mentioned increase in research on institutions as a common national ground for exporting behavior takes its basis in the present day focus on horizontal industrial policies (over the vertical industrial policies of the past). At the same time has there been a renewed interest in the topic of synchronized responses in the exporting behavior of firms from the same country or locality (see Berman, 2009, Sinani and Hobdari, 2010). This renewed interest may owe in great part to the Global Financial Crisis again making such type of event study feasible with contemporary datasets. The Bank of Lithuania has commissioned several studies of this nature (LB, 2013). The conclusions reached are that Lithuania's exports recovered relatively quickly from the crisis for two main reasons. First of all has Lithuania achieved a relatively high rate of product diversification and depends not overtly on particular activities for main exports. At the same time are most of the exports concentrated in traditional manufacturing industries that are not difficult to re-market in new countries when facing a demand shock. Therefore, while export market diversification traditionally has been lower (e.g. 20% of exports go to Russia), the Global Financial Crisis prompted exporting companies to start seeking new markets as outlet for their existing products. In somewhat contradiction to these conclusions some studies suggest (see e.g. Jurgelis, 2012) that up to 78% of exports are accounted for by the ten largest exporting firms in Lithuania. Hence the firm concentration ratio is relatively high but this is far from unique to the case of Lithuania (Mayer and Ottaviano, 1998). Large firms such as multinational companies of the 1990s and 2000s are often less diversified in terms of their product portfolios but act specifically as market diversifying devices. Hence with a group of large firms that are not sectorally too concentrated and yet flexible enough to diversify geographically Lithuania was able to recover relatively quickly from the great trade collapse associated with the crisis.

Many of the more widely published and cited studies on exports and the crisis take a financial character. These are often short-term in their horizon as to the response time and thus typically constitute a 'here and now' analysis of the reaction pattern to a crisis event (see for example Claessens, Tong and Wei, 2012, Bricongne et al, 2012 and Kolasa

et al, 2010). Oppositely are there relatively few papers being published that take a longer term or more structural perspective on exporting behavior following in the backwaters of financial crisis events (see e.g. Guichard and Rusticelli, 2010). This may in part owe to the natural lag time involved of waiting for these changes to take effect in the data. Similarly has there been surprisingly few studies among the EU Member States on firm-level exporting behavior following the introduction of the Euro (see e.g. Berthou and Fontagné, 2008 and Josifidis, Allegret and Beker Pucar, 2009). Such studies are of high salience to the New Member States and especially those that are still waiting to introduce the Euro (such as Poland) or to follow up on the recent introduction of the Euro (such as Slovakia, Lithuania and Greece). They can for example help to inform policy-makers on the importance of not giving in to the short-term pains that policy reform may have on the economy and not overlooking important longer-term gains for economic development of these same policy reforms. As mentioned in the introduction Lithuania is an important case to study, as exporters here are perhaps among the new winners or beneficiaries of all the present changes in the European and Global economy. The Global Financial Crisis counts as an important part of the new realities with recent events showing us that such synchronized and in great part policy or political economy orchestrated type of events are more likely to recur in the future.

3. Description of the data and methodology

The data comes from the World Bank Enterprise Surveys (www.enterprisesurveys.org).

We answer the above questions in this paper using the following types of downloadable, constructed and reconstructed datasets:

- Repeated cross-sections for different time periods (2001, 2004, 2007 and 2011)
- A set of balanced but smaller panels (covering the time intervals of 2001-2007 and 2007-2011)
- An ad-hoc complementary dataset collected with the financial crisis surveys also from the World Bank (conducted in 2009 and 2010 in Lithuania, covering fiscal years 2007, 2008, 2009 and 2010)

One of the advantages of the surveys lies in the repetitive nature of data collection for the same countries over consecutive years. For Lithuania survey data is available for the fiscal years of 2001, 2004, 2007 and 2011. In addition, the World Bank conducted a number of extraordinary surveys quite immediately during and after the Global Financial Crisis of 2007-2008 (called financial crisis surveys). However, the data collected with the latter surveys are not directly compatible with the firm-level data of the more general character enterprise surveys. For example, the financial crisis surveys do not necessarily result in annual data, but often rather produces monthly data and changes herein (hence short-term in nature and focus). We therefore analyze in a last and separate section the data collected with the financial crisis surveys and do not mention that dataset further in this section 3 on general methodology pertinent to the standardized enterprise survey dataset.

The data availability is suitable to investigate our research questions, but also noting that the data coverage is before and after the crisis rather than during the crisis years. This data therefore meets well our wish to investigate and understand the repercussions of the Global Financial Crisis on the longer term exporting behavior of Lithuanian firms. In addition to the repeated cross-sections over the period 2001-2011 that amounts to a totality of 951 firm-level observations for Lithuania, the World Bank also publishes in annotation to these datasets a set of more limited panel datasets. Here we try to cover both aspects of the dataset, exploring whether the repeated cross-sections, the panel data or both in combination can shed light on the research questions.

The advantage of the repeated cross sections is that in principle we can draw on a quite large sample of firms each year the survey is undertaken. Hereby we are able to track changes among the surveyed population of firms such as for example the type of firms entering and exiting the pool of exporter firms over time. The same would be true for the panel dataset, if the sampled population of firms were at least as large as the average of the repeated cross-section by year. Owing to attrition factors that are unknown, the sample size falls typically to one quarter or less of the original cross section sample size. In addition, the panels made available have a break around the years 2005-2007 due to a shift in survey methodology in the mid-2000s at the World Bank. Only after the mid-2000s do all surveys adhere to the global methodology practice (see also the Appendix – Table A1). This means that the panels connect back in time from 2007 and forward in time from 2007. Yet no firm panels exist throughout the period of study (2001-2011). These factors therefore place quite severe limitations on the normal advantages of using the panel datasets (such as controlling for unobserved firm-level characteristics and knowing that we are dealing with the exact same sample over time[1]) over the repeated cross sections in this particular case.

Table 3.1 reports the descriptive statistics for the repeated cross sections (of which the panels are a sub-population). The study variables are mentioned by name in the first column and as they appear in subsequent tables. The second and third columns report the mean and standard deviation respectively for each variable. The fourth column explains the unit of measurement for each variable. Finally, the last two columns give reference to the coding of the variables in the original datasets as downloaded from the website of the Enterprise Surveys. The variables selected result from a compromise between salience (e.g. based on the preceding literature review and the objectives of the analysis at hand) and availability. Some variables of firm characteristics could have been very relevant

[1] The World Bank uses a stratified sampling scheme. The Appendix gives detailed information of the sampling scheme used. As we pool the survey data from several years (called repeated cross-sections in the paper) it is not possible to apply the sampling weights. However, this may have minor implications for our conclusions. The most important factor about the stratification scheme for the validity of using repeated cross-sections in a time comparative perspective is that the same stratification scheme is adopted for each cross-section, in other words the sampling routines stay constant over time.

to adopt as covariates. However, if availability is limited it would lead to unwarranted sacrifice of observations. One example is the variable sector-specific management experience that was excluded from the final results. The study omits any variable that would lead to a systematic deselection of whole years or intervals of years from the analysis.

TABLE 3.1. **Study variables, mean and standard deviation, measurement and sources for the full Lithuania sample of repeated cross sections**

Variable	Mean	SD	Measurement	2007–2011 Data source	2001–2007 Data source
Age	13	14	Fiscal year of survey minus year of birth (first year of operation)	b5	b5
Dom. owned	0.89	0.39	A dummy taking the value of 1 when the majority owner is domestic	b2a	b2a
Employment	84	330	Number of full time employees	l1	l1
Experience	14.5	8.5	Top manager's years of experience in sector	b7	b7
Exported value	2,794	15,998	Value of exports in th. Litas	d2, d3c	d2, d3c, ECAd8a
Exporter	0.31	0.46	A dummy taking the value of 1 when the firm is an exporter	d3c	d3c
Export %	13.3	28.6	Percentage of exports in total sales	d3c	d3c
Foreign owned	0.12	0.32	A dummy taking the value of 1 when there is a foreign owner involved	b2b	b2b
Group	0.08	0.27	A dummy taking the value of 1 when the firm belongs to a group of firms	a7	a7
ISIC	-	-	4-digit industry classification	ISIC	d1a2
Quality cert.	0.18	0.39	A dummy taking the value of 1 when the firm holds an internationally recognized quality certificate	b8	b8
Sales	10,878	71,232	Annual total sales in th. Litas	d2	d2
Sales growth	0.57	2.18	Average sales growth over the fiscal year and the year preceding that	n3, d2	n3, d2
Sector	-	-	Main sector the firm belongs to: Administration, Construction, Manufacturing, Tourism, Trade, Transport	a4b	a4b
Size category	-	-	A factor variable for 1=small (<20 employees) 466 firms, 2=medium (20-99 employees) 293 firms, 3=large (>100 employees) 190 firms.	a6b	size
State owned			Dummy for firms where there is any amount of state ownership involved	b2c	b2c
Year	-	-	Fiscal year of the survey 2001: 200 firms, 2004: 205 firms 2007: 276 firms, 2011: 270 firms	See 'Data Details' file from WB	
Years to export	4.1	8.2	The year the firm started	d8, b5	d8, b5
			exporting minus year of birth		

Source: The data was downloaded from www.enterprisesurveys.org in the month of March, 2016.

4. Statistical results

Here is reported the results of the statistical analysis. First focus is on the results with the repeated cross-sections, followed by a shorter section that relates specifically to the same results when only using the paneled part of the dataset (e.g. where we are able to follow the same firms over a period of more than a single year).

4.1. Repeated cross-sections

Table 4.1.1 reports some of the main results of this study. In the upper part of the table is reported the main characteristics of the sampled Lithuanian exporters in terms of their frequency (3rd column), the relative importance of exporting in the total sales of the exporting part of the sample (4th column) and last not least the average total value of exports of the sampled exporting firms (5th column). The last row in Table 4.1.1 reports the F-test statistics of comparing the sampled firms over time on their three fundamental exporting characteristics.

TABLE 4.1.1. **Equality of means test, exporting behavior, repeated cross sections, 2001–2011**

	Sample	Exporter (% of sample)	Exports in % of sales	Exported value (th. Litas)
2001	200	28	34	2,030
2004	205	32	37	1,732
2007	276	33	47	14,411
2011	270	29	49	13,844
Equality of means test F-test	N=951	0.70	2.15*	4.50***

Notes: The table shows the averages for active exporters.

The F-test shows that over the period of the financial crisis there is no significant difference in the frequency of exporting among Lithuanian firms. In terms of the relative and absolute importance of exporting activities to Lithuanian firms over the 2000s, the general trend is formed by Lithuania's transition and privatization process including a major reorientation of local firms towards export markets. There is some difference in the relative importance of exporting, however, not so much due to the crisis but more due to general trend growth in Lithuanian exports over the period of study. The financial crisis also marks a levelling off in this trend growth even though the crisis has not led to a complete reversal of the previous trend. Looking at the absolute exported value in local currency (Litas) there has been a minor but levelling off effect of the crisis on trend growth in the value of exports. Not accounting for inflation (which is still modest at around 1-2% annually over the period of study up until the Global Financial Crisis where the inflation rate soured at 10%, OECD, 2016), the preceding trend growth in the absolute value of exports was very large in Lithuania up until the financial crisis. Due to the relatively high inflation rates in 2007-2009 therefore the fall back in real exported value

is somewhat higher (with around 15%) than our calculations would suggest (because the data is quoted in current Litas).

The following table – Table 4.1.2 – shows that there are some significant differences in the characteristics of exporters and non-exporters. Those differences tended to grow or in some cases reverse over the crisis. While both groups of firms saw a significant decline in their employment and sales over the course of the crisis, the adjustment was relatively stronger in terms of employment numbers for exporters suggesting that they had to improve their productivity significantly to survive the crisis. At the same time did the gap in activities that distinguish local market oriented firms from export active firms grow, as Lithuania strengthened its comparative advantage in manufacturing activities on foreign markets. In particular do exporters appear to be better off in terms of market potential (sales growth) after the crisis compared to firms that solely focus on the Lithuanian market. The financial crisis did not appear to downgrade exporters in terms of group membership (not shown) and quality certification. Privatization of productive activity in general and also an increasing trend towards 'domestification' of ownership in an international activity such as exports (e.g. away from overtly strong reliance on foreign owned firms for exporting) is a continuous trend in Lithuania that was not reversed by the financial crisis. Controlling for these differences in characteristics, the regression results confirm that there was no statistical difference in the number of exporters before and after the crisis.

TABLE 4.1.2. **Equality of means test, general performance and characteristics – exporters vs. non-exporters, repeated cross sections, 2001–2011**

	Year	Employment (persons)	Sales (th. Litas)	Sales growth (%)	Manu-facturers (%)	Domestic (private, %)	Quality cert. (%)
Non-exporters	2001	72	1,007	4	14	53	7
	2004	63	2,319	8	15	82	12
	2007	59	9,729	159	24	95	17
	2011	27	6,244	50	27	95	13
Exporters	2001	161	3,499	33	43	64	24
	2004	116	5,580	17	42	63	22
	2007	232	49,165	86	62	83	35
	2011	86	23,265	78	70	90	37
Equality of means F-test		4.20***	4.61***	3.13**	30.86***	24.12***	8.23***

The crisis did not have a large impact on the other studied aspects of exporting behavior ex-post the crisis (e.g. the 2011 year dummy is not significant in any of the first 3 columns in Table 4.1.3). The Tobit regressions (which combine in one analysis the information from Table 4.1.3 of columns 1 and 2 and columns 1 and 3 respectively) reported in the Appendix Table A2 also confirms these findings[2].

[2] These adopt a slightly more advanced econometric approach to the data whereby it is possible to take into account the left censoring (or the 0/1 of the simple exporter status variable) of the export percentage and exported values when adopted as dependent variables with the regressions.

TABLE 4.1.3. **Regression results, exporting behavior controlling for general characteristics, repeated cross sections, 2001–2011, OLS regressions**

Equation number	1a.1	1a.2	1a.3	1a.4
Dependent variable: Estimation method:	**Exporter=1/0 OLS**	**Export % OLS**	**Exported Value OLS**	**Sales/Employment OLS**
Exporter (1/0)	-	-	-	0.3293***
				(0.0776)
Log Age (years)	0.0052	0.3413	0.1951	-0.0082
	(0.0181)	(1.1082)	(0.2418)	(0.0425)
Foreign Owned (1/0)	0.2108***	19.8153***	3.0755***	0.2000*
	(0.0435)	(2.6628)	(0.5881)	(0.1011)
State Owned (1/0)	-0.1202*	-7.0113*	-1.5193*	-0.0500
	(0.0567)	(3.4724)	(0.7485)	(0.1293)
Quality Certificate (1/0)	0.0976*	1.0470	1.4581**	0.2517**
	(0.0387)	(2.3722)	(0.5207)	(0.0900)
Size: Medium (20-99 emp.)	0.1863***	7.7856***	2.5165***	0.0827
	(0.0320)	(1.9595)	(0.4269)	(0.0752)
Size: Large (>100 emp.)	0.2729***	13.7061***	4.6141***	0.1372
	(0.0402)	(2.4632)	(0.5376)	(0.0955)
2004	0.0169	2.4439	0.3477	0.8835***
	(0.0408)	(2.4995)	(0.5416)	(0.0938)
2007	-0.0390	3.4342	0.0833	2.1246***
	(0.0404)	(2.4741)	(0.5366)	(0.0920)
2011	-0.0353	4.5061	0.1267	1.9439***
	(0.0423)	(2.5940)	(0.5624)	(0.0977)
Construction†	-0.2143***	-7.6080*	-2.7453**	0.2393
	(0.0633)	(3.8759)	(0.8408)	(0.1470)
Manufacturing	0.2431***	16.9176***	3.6008***	0.1065
	(0.0572)	(3.5040)	(0.7628)	(0.1336)
Tourism	-0.1926**	-4.7846	-2.1259*	-0.0841
	(0.0686)	(4.2060)	(0.9118)	(0.1633)
Trade	-0.0161	-4.3162	-0.0442	0.6945***
	(0.0566)	(3.4692)	(0.7532)	(0.1314)
Transport	0.2178***	23.0050***	3.2275***	0.4457**
	(0.0657)	(4.0278)	(0.8786)	(0.1521)
Constant	0.1208	-1.9927	0.3636	8.9219***
	(0.0663)	(4.0613)	(0.8856)	(0.1540)
N	880	880	860	791
r^2	0.28	0.30	0.32	0.56

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
† The omitted sector dummy is administration

In addition to these regressions we also ran a regression seeking to explain an approximation to productivity (although a very poor one since we do not have access to value added data for Lithuanian firms and can only observe their aggregate sales levels) as reported in the last column of Table 4.1.3. This result is interesting and supports the previous observations from the more descriptive analysis. Lithuanian exporters are consistently more productive relative to their non-exporter counterparts both before and during the crisis. The results also show that productivity topped in 2007 and declined only modestly in 2011 relative to 2007 (note that the reported coefficients should be read as deviations from the omitted year dummy which is 2001, e.g. productivity improved consistently in 2004 and 2007 over 2001 and dropped only a little bit in 2011 across all firms). Note also that in real terms the drop is somewhat larger as the sales figures reported here are nominal and hence not corrected for inflation[3].

4.2 Panel data results

The same questions were re-investigated only using the panel dataset. This dataset is a sub-population to the repeated cross-sections. To make it into the panel dataset a firm must have been interviewed at least twice and with consecutive surveys over the course of the four interview years. The results from using the panels are reproduced in Tables 4.2.1 and 4.2.2 and in the Appendix Tables A3.A-A3.C. Since the panels lead to such a significant reduction in sample size our main motivation to adopt them and investigate them in this paper is purely methodological as we wish to know if there are any major changes to the conclusions reached from using the repeated cross sections. For example, panel data gives access to control for unobserved firm-level characteristics. In the regressions reported in the Appendix we can also see that these unobserved factors are strongly correlated with the covariates that we are able to control for with the repeated cross sections, as these covariates lose their explanatory power and especially when adopted in the within estimations (fixed effect regressions). There are few changes to the previous conclusions from only using the paneled segment of the repeated cross sections. Again do we find in Table 4.2.1 that there are few quantitative differences to exporting behavior over time in Lithuania and in particular for the year right before and after the financial crisis. Again is there a rapid growth in the exported value of an average firm in the early 2000s and it is mainly on this variable that Lithuanian firms do experience a drop when comparing the exported values right before and after the crisis.

[3] Since the early transition years Lithuania has had a low inflation rate, however, it went up to the 2-digit level during the financial crisis in 2008 according to the annual CPI index published by the OECD (OECD, 2016).

TABLE 4.2.1. **Equality of means test, panel data, 2001–2011**

Variable	Sample	Exporter (% of sample)	Exports in % of sales	Exported value (th. Litas)
2001	57	25	29	1,967
2004	91	26	39	3,076
2007	45	29	46	9,633
2011	45	36	38	7,833
Equality of mean F-test	N=238	0.65	0.53	2.11*

Notes: The table shows the averages for active exporters.

The results in Table 4.2.2 are generally consistent with those reported in Table 4.1.2 even though there is a tendency for the statistical difference across the groups in the ANOVA analysis to drop in the panel dataset.

TABLE 4.2.2. **Equality of means test, general performance and characteristics – exporters vs. non-exporters, panel data, 2001–2011**

	Year	Employment (persons)	Sales (th. Litas)	Sales growth (%)	Manu-facturers (%)	Domestic (private, %)	Quality cert. (%)
Non-exporters	2001	76	914	7	16	44	7
	2004	89	3,651	11	19	78	13
	2007	45	5,813	150	28	94	9
	2011	31	4,185	3	18	100	22
Exporters	2001	156	3,478	40	43	71	29
	2004	108	5,396	16	50	63	29
	2007	85	18,333	50	54	77	54
	2011	66	10,651	28	75	88	44
Equality of means F-test		1.16	4.80***	3.78***	5.50***	6.66***	3.94***

For example, while there is the same general depressing tendency in both groups of firms on average sales growth rates over the financial crisis, the decline is now steeper and the difference somewhat smaller when using the panel data. But these differences could be caused alone by the reduction in sample size when moving from the repeated cross sections to the panel and also due to the interference of unobserved attrition factors in the paneled data with the general stratification scheme (see also Appendix Table A1) in each annual cross section. Hence we find for this particular type of dataset very few disadvantages from not using the panel data and very few advantages from using it.

5. Complementary results from the financial crisis surveys

As mentioned above the ad-hoc and more short-term perspective offered by the complementary financial crisis surveys that were conducted in Lithuania in 2009 and 2010 offer additional evidence. However, without the inclusion of many of the important control

variables that the more standardized surveys offer. Hence this data is less useful towards conducting regression analysis that requires a reasonable number of control variables (and especially when adopted as a repeated cross-section which is the approach we advocate in this paper given the nature of the data). Here in this short section we mainly present what we found was the most interesting complementary evidence emerging from these ad-hoc surveys toward answering the research questions.

TABLE 5.1. **What was the main effect of the financial crisis on this establishment? Results for exporters vs. non-exporters in Lithuania (from the 2009 Financial Crisis Survey conducted in Lithuania)**

	Exporters (%) N=55	Non-exporters (%) N=163
Don't know	2	1
Increased debts	4	7
Increased costs	6	7
Reduced access to credit	7	7
Drop in demand	69	71
Other	13	7

In the first survey (from 2009) are the firms confronted with the question, how they are affected by the financial crisis and can answer this question using the categories shown with Table 5.1. According to this data the impact of the financial crisis at the firm-level is not a great mystery and is driven mostly by a collapse of markets from the demand side. There is no significant difference across exporters and non-exporters as to how the financial crisis is perceived to have affected their firms. However, some deeper and richer evidence on the generally better performance and speedier recovery of exporters is also available from the financial crisis surveys. This evidence only corroborates what we already found in Section 4, but on a number of important and complementary variables, such as short-term sales adjustment cycles on a monthly year-on-year basis. In addition was information collected on capacity utilization and indebtedness with the financial crisis surveys. We merged the two survey results for Lithuania and plucked out the most interesting variables with a high answer percentage, here presenting the main results of that exercise in a concise way with Table 5.2.

According to Table 5.2, while exporters as non-exporters experienced equally significant drops in demand-levels (also consistent with the qualitative responses reported in Table 5.1), the recovery out of the crisis was much speedier for exporters. The exporters were able to keep their capacity utilization levels at or above 50% throughout the crisis. Finally, does the evidence from these surveys on levels of indebtedness also demonstrate that exporters maintained their debt at a modest level compared with the non-exporters. Whereas the local market oriented firms experienced a sudden and quite severe increase in their level of indebtedness because of the crisis (even though the difference here is not statistically significant across the exporter and non-exporter groups of firms most likely due to the opposite tendency in the two groups over time).

TABLE 5.2. **Equality of means test – exporters vs. non-exporters, repeated cross sections from the 2009, 2010 financial crisis survey data**

	Year	Employment (persons)	Sales (th. Litas)	Sales growth (%)†	Capacity utilization (%)	Indebtedness (debt in % of sales)
Non-exporters	2009	55	18,823	-37	53	11
	2010	57	12,396	-29	47	66
Exporters	2009	104	25,393	-27	61	26
	2010	276	71,849	-3	61	16
Equality of means F-test		5.58***	3.53**	10.56***	4.73***	0.64

Notes: † Monthly year-on-year sales growth in percentage.

6. Discussion and conclusion

The paper investigates the performance and behavior of Lithuanian exporters over the course of the 2007-08 Global Financial Crisis. Relying on secondary datasets published through the World Bank's Enterprise Surveys we use the repeated cross sections available over the full period of study 2001-2011. The exact survey years (2001, 2004, 2007, 2011) are fixed beforehand and not decided by the researchers. Hence we draw on complementary data from the ad hoc surveys conducted by the World Bank in Lithuania in 2009 and 2010 respectively to be able to better cover what happens with exporters and non-exporters closer to the event studied. However, the standardized, repetitive surveys along with the annual data collected suit well with the general purpose of the study with their focus on the longer-term repercussions of the crisis on exporting behavior. Specifically do we wish to investigate how the crisis affected the frequency of exporters and relatedly the absolute and relative value position of Lithuanian exporters. Here the results show that there were surprisingly very few long-term effects of the crisis on such quantitative aspects of exporting. From the data available it is clear that the crisis years mark a structural break with a long period of trend growth in the history of exports in Lithuania and in particular for the absolute value of such exports due to the quite high growth rates experienced over the 1990s and early 2000s in Lithuania. However, the frequency of exporters and the relative importance of exports to the economy are only modestly or not impacted at all from the crisis when taking a longer-term perspective to the event. In the shorter term there is some correction to the average absolute value of exports per firm explained by the steep decline in demand. The demand shock is experienced quite uniformly across all producers according to the complementary data collected with the financial crisis surveys. Oppositely do we find that the crisis years are marked by a change in the characteristics of exporters. We conclude this is the outcome of the firms' combined ability and necessity to reorient and switch to new types of geographical markets. This result also comes about best in the data by comparing exporters with non-exporters as the benchmark. We observe here that while there is a tendency in the domestic part of the firm population to be negatively affected by the crisis on aspects such as quality, productivity and also sales growth. For some of these

more qualitative aspects of exports such as especially quality and productivity there is no negative impact recorded for the exporting part of the firm population in the course of the crisis. For other aspects such as sales growth, and also capacity utilization and indebtedness (the latter two are only covered with the financial crisis surveys that we analyze in Section 5 of the paper) all firms may have been negatively impacted by the great recession, and this is in particular true for failing demand or negative sales growth. Again lending strong evidence to the fact that for a country such as Lithuania the crisis is mainly felt in the form of a demand shock. In fact for these more qualitative aspects of exporting behavior it is found that the exporting firms recover much faster than other types of firms from the crisis. Hence surprisingly in the case of Lithuania those firms that on the surface of things should be more vulnerable proved to be those that were the most resilient. Perhaps this is an important finding towards understanding the fundamental benefits there are from engaging in trade and being specialized in one or a few products while catering to many markets rather than one. But also in slightly different ways than the classical and neoclassical economists teach us since they never focused on the role of individual international business firms.

The next step in the research is to investigate other similar and dissimilar cases to Lithuania. In particular paying attention to the gap and recovery gap between domestic and export orientated firms in the economies investigated, hoping that we will be able to find regularities between the de facto exchange rate regimes of those countries and how the two populations of firms in the selected cases fared over the course of the crisis. For this purpose our research showed that the most adequate approach towards continuing investigating this question is by using the full samples of repeated cross sections from the standardized enterprise surveys. But when also combining this approach with any complementary evidence available from the ad hoc financial crisis surveys it can help to observe important differences in responses of the firms closer to the eye of the storm and thereby also improve the overall validity of the study findings.

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TABLE A1: **Extract from the 'Data Details' file published on *www.enterprisesurveys.org***

Enterprise Surveys *http://www.enterprisesurveys.org*
Notes for Stratification Variables
The sampling methodology for Enterprise Surveys is stratified random sampling with replacement. In a simple random sample, all members of the population have the same probability of being selected and no weighting of the observations is necessary. In a stratified random sample, all population units are grouped within homogeneous groups and simple random samples are selected within each group. This method allows computing estimates for each of the strata with a specified level of precision while population estimates can also be estimated by properly weighting individual observations. The sampling weights take care of the varying probabilities of selection across different strata. Under certain conditions, estimates' precision under stratified random sampling will be higher than under simple random sampling (lower standard errors may result from the estimation procedure). The strata for Enterprise Surveys are firm size, business sector, and geographic region within a country. Firm size levels are 5-19 (small), 20-99 (medium), and 100+ employees (large-sized firms). Since in most economies, the majority of firms are small and medium-sized, Enterprise Surveys oversample large firms since larger firms tend to be engines of job creation. Sector breakdown is usually manufacturing, retail, and other services. For larger economies, specific manufacturing sub-sectors are selected as additional strata on the basis of employment, value-added, and total number of establishments figures. Geographic regions within a country are selected based on which cities/regions collectively contain the majority of economic activity. To understand what the strata were for a particular country's survey dataset, data users are encouraged to consult the raw data and the Implementation Notes. The sectoral breakdowns in this spreadsheet do not apply to all the survey datasets. For example for large economies such as Brazil, manufacturing sub-sectors such as food and textiles production were included as levels of stratification. For Brazil, there were twelve levels of stratification regarding business activity. Whereas for a small economy where an Indicator Survey is fielded, the sectoral stratification has only two levels- manufacturing and services.
Notes for Methodology
Most surveys were administered using the Enterprise Surveys methodology as outlined in the Methodology page, while some others did not strictly adhere to the Enterprise Surveys methodology. For example the universe under consideration may have consisted of only manufacturing firms or the questionnaire used may have been different from the standard global questionnaire. Data users should exercise caution when comparing raw data and point estimates between surveys that did and did not strictly adhere to the global Enterprise Survey methodology.
More details on the core instrument, the Sampling and Weighting information can be found in the website: *http://www.enterprisesurveys.org/Methodology/*

Table A2. **Regression results, exporting behavior controlling for general characteristics, repeated cross sections, 2001–2011, Tobit regressions**

Equation number	**1b.1**	**1b.2**
Dependent variable **Estimation method**	**Export %** **Tobit**	**Exported value** **Tobit**
Log Age (years)	-1.0582	0.0374
	(3.0194)	(0.7745)
Foreign Owned (1/0)	36.4223***	6.9030***
	(6.3171)	(1.6685)
State Owned (1/0)	-23.4849*	-4.8181
	(10.0924)	(2.4848)
Quality Certificate (1/0)	6.9237	3.1779*
	(5.9835)	(1.5382)
Size: Medium (20-99 emp.)	33.4900***	8.8447***
	(5.5723)	(1.4248)
Size: Large (>100 emp.)	45.6298***	12.3578***
	(6.6599)	(1.7068)
2004	5.0986	0.5201
	(6.9644)	(1.7605)
2007	2.8279	-0.7566
	(6.7565)	(1.7137)
2011	4.5758	-0.5876
	(7.1426)	(1.8089)
Construction†	-44.4202***	-12.0961***
	(12.8795)	(3.2300)
Manufacturing	38.3528***	8.4960***
	(9.8168)	(2.4865)
Tourism	-51.1680**	-16.4457***
	(16.6570)	(4.6279)
Trade	-9.1886	-0.2621
	(10.0923)	(2.5196)
Transport	50.3759***	9.0141**
	(10.7479)	(2.7447)
Constant	-61.5891***	-14.0883***
	(12.1037)	(3.0930)
Sigma Constant	50.1742*** (2.3575)	12.7817*** (0.6674)
Number of obs	880	860
Log Likelihood	-1,687	-1,250

Standard errors in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001
† The omitted sector dummy is administration

TABLE A3. A. **Regression results, exporting behavior (exporter status) controlling for general characteristics, panel data, 2001–2007+2007–2011, various methods**

Equation number	**2a.1**	**2a.2**	**2a.3**
Dependent variable **Estimation method**	**Exporter (1/0)** **OLS**	**Exporter (1/0)** **Random effect**	**Exporter (1/0)** **Fixed effect**
Log Age (years)	-0.0539	-0.0438	0.0796
	(0.0404)	(0.0383)	(0.0558)
Foreign Owned (1/0)	0.1708	0.1491	-0.0302
	(0.0971)	(0.0983)	(0.1368)
State Owned (1/0)	-0.0826	-0.0392	0.2048
	(0.0873)	(0.0919)	(0.1473)
Quality Cert. (1/0)	0.1967**	0.1626*	0.1014
	(0.0727)	(0.0701)	(0.1022)
Size: Medium (22-99 emp.)	0.2494***	0.2272**	0.1152
	(0.0665)	(0.0693)	(0.1134)
Size: Large (>100 emp.)	0.2218**	0.2205*	0.2485
	(0.0813)	(0.0864)	(0.1586)
2004	0.0034	0.0219	-0.0120
	(0.0700)	(0.0526)	(0.0562)
2007	-0.0921	-0.0581	-0.0843
	(0.0855)	(0.0838)	(0.0774)
2010	0.0450	0.0636	-
	(0.0936)	(0.0935)	.
Construction†	-0.1387	-0.0923	0.0543
	(0.1159)	(0.1092)	(0.4189)
Manufacturing	0.2962**	0.3100**	0.2658
	(0.1088)	(0.1161)	(0.3721)
Tourism	-0.0664	-0.0298	0.3107
	(0.1375)	(0.1131)	(0.3729)
Trade	0.1136	0.1226	0.3805
	(0.1063)	(0.1181)	(0.3733)
Transport	0.2219	0.2000	0.0454
	(0.1235)	(0.1506)	(0.4229)
Constant	0.1367	0.0900	-0.2412
	(0.1259)	(0.1278)	(0.3513)
Number of obs	226.0000	226.0000	226.0000
Number of firms		136.0000	136.0000
R^2	0.2961	-	0.1131
Log likelihood	-100.8205	-	-

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
† The omitted sector dummy is administration

Table A3.B. **Regression results, exporting behavior (export percentage) controlling for general characteristics, panel data, 2001–2007+2007–2011, various methods**

Equation number	**2b.1**	**2b.2**	**2b.3**	**2b.4**
Dependent variable **Estimation method**	**Export %** **OLS**	**Export %** **Random effect**	**Export %** **Fixed effect**	**Export %** **XT tobit**
Log Age (years)	-0.9148	-1.5056	1.9221	-9.1657
	(2.2945)	(1.9653)	(2.4424)	(7.1177)
Foreign Owned (1/0)	19.5368***	9.2199	-13.6466	22.8899
	(5.5144)	(8.7677)	(8.4879)	(13.7503)
State Owned (1/0)	-5.1591	-4.6720	8.0179	-19.0161
	(4.9597)	(4.6143)	(4.4390)	(15.6413)
Quality Certificate (1/0)	3.7478	4.5714	2.6835	19.0225
	(4.1284)	(4.0291)	(6.3466)	(10.2127)
Size: Medium (20-99 emp.)	8.8597*	8.5296*	1.7236	42.7106***
	(3.7793)	(3.6968)	(3.0232)	(11.8773)
Size: Large (>100 emp.)	14.5933**	12.4140*	5.6301	40.9265**
	(4.6171)	(5.4222)	(5.8060)	(14.1647)
2004	2.6936	1.3326	-1.5921	3.4431
	(3.9759)	(2.7349)	(2.6701)	(9.3413)
2007	2.9302	1.1341	1.3010	-4.8013
	(4.8600)	(4.7005)	(4.3857)	(13.5961)
2010	5.7963	2.7597	.	5.6807
	(5.3165)	(5.0337)	.	(14.4109)
Construction†	-7.3548	-4.5015	-5.0178	-20.1045
	(6.5861)	(2.8701)	(12.4338)	(29.9022)
Manufacturing	11.9537	13.7129**	-3.0099	53.3086*
	(6.1805)	(4.2067)	(6.2288)	(25.8976)
Tourism	-6.3876	-3.6464	-2.1296	-4.3259
	(7.8112)	(5.2795)	(5.1240)	(33.0750)
Trade	-3.6302	-1.6983	2.2853	19.1555
	(6.0411)	(2.8737)	(7.2398)	(25.7321)
Transport	17.1224*	13.9847	-3.9286	55.0276*
	(7.0163)	(8.5032)	(11.1328)	(27.4053)
Constant	0.1294	3.0107	6.2950	-64.9533*
	(7.1506)	(3.5792)	(6.4095)	(28.7033)
Sigma u constant	-	-	-	34.7922***
				(5.8836)
Sigma e constant	-	-	-	30.2297***
				(4.2117)
Number of obs	226.0000	226.0000	226.0000	226.0000
Number of firms		136.0000	136.0000	136.0000
R^2	0.3043		0.0691	
Log likelihood	-1013.8102	-	-775.8294	-380.7220

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
† The omitted sector dummy is administration

TABLE A3.C. **Regression results, exporting behavior (exported value) controlling for general characteristics, panel data, 2001-2007+2007-2011, various methods**

Equation number	**2c.1**	**2c.2**	**2c.3**	**2c.4**
Dependent variable **Estimation method**	**Exported v.** **OLS**	**Exported v.** **Random Effect**	**Exported v.** **Fixed Effect**	**Exported v.** **XT tobit**
Log Age (years)	-0.5481	-0.3069	1.4546	-1.6067
	(0.5273)	(0.4724)	(0.8753)	(1.9127)
Foreign Owned (1/0)	2.7452*	2.8459*	0.9653	7.5200
	(1.2955)	(1.1458)	(1.1510)	(3.8379)
State Owned (1/0)	-1.0830	-0.6900	2.2684	-3.7442
	(1.1342)	(1.1878)	(1.4615)	(4.0598)
Quality Certificate (1/0)	2.8860**	2.4274*	1.8566	6.5112*
	(0.9469)	(0.9539)	(1.4988)	(2.7125)
Size: Medium (20-99 emp.)	3.2678***	2.9836**	1.4751	11.4743***
	(0.8734)	(0.9243)	(1.6463)	(3.2321)
Size: Large (>100 emp.)	3.4528**	3.2676**	3.2381	9.5455*
	(1.0615)	(1.1555)	(2.1842)	(3.9338)
2004	0.1587	0.2587	-0.2667	0.0493
	(0.9108)	(0.6295)	(0.7511)	(2.3949)
2007	-0.6101	-0.2692	-0.9257	-2.4590
	(1.1172)	(1.1034)	(1.1359)	(3.6807)
2010	1.1121	1.1622	.	1.6075
	(1.2205)	(1.2268)	.	(3.8365)
Construction†	-1.9900	-1.3474	-1.8621	-4.8842
	(1.5058)	(1.2607)	(4.8593)	(7.6345)
Manufacturing	3.9920**	4.1420**	1.3935	14.0935*
	(1.4125)	(1.3403)	(4.0076)	(6.6267)
Tourism	-1.5738	-1.2181	2.7204	-8.0590
	(1.8176)	(1.2663)	(4.1748)	(10.1513)
Trade	1.1020	1.2116	3.3028	7.4978
	(1.3822)	(1.2973)	(4.0265)	(6.4982)
Transport	3.3316*	2.9632	-1.9760	12.7402
	(1.6043)	(1.9642)	(4.8411)	(7.1126)
Constant	1.0304	0.3314	-2.4738	-18.1705*
	(1.6370)	(1.4094)	(4.1373)	(7.5642)
Sigma u Constant				10.1622***
				(1.6827)
Sigma e Constant				7.4480***
				(1.1046)
Number of obs	223	223	223	223
Number of firms	-	135	135	135
R^2	0.3441	-	0.13	-
Log likelihood	-671.04	-	-474.50	-288.38

Standard errors in parentheses
* p < 0.05, ** p < 0.01, *** p < 0.001
† The omitted sector dummy is administration