Margins of Trade: CEE Firms Before, During and After the Turmoil

Kamil Galuščák (CNB), Jan Hagemejer (NBP),
Tibor Lalinský (NBS), Ivan Sutóris (CNB)

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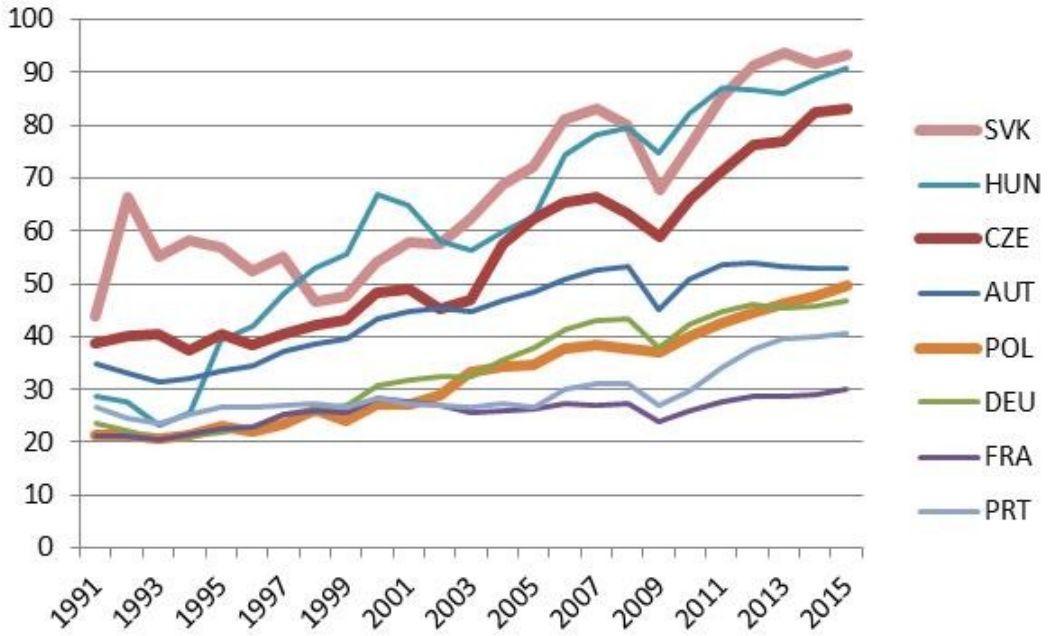
Introduction

Exports of goods and services (% of GDP)

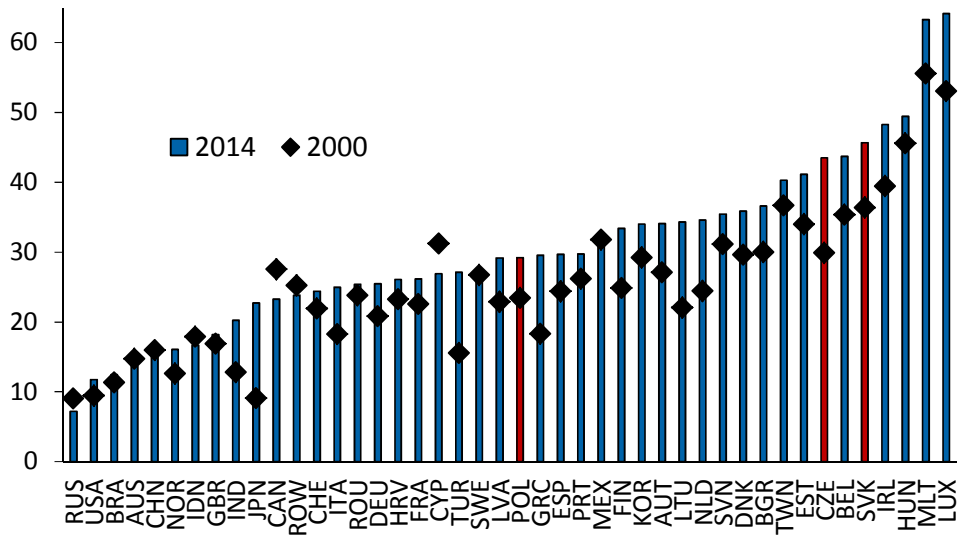


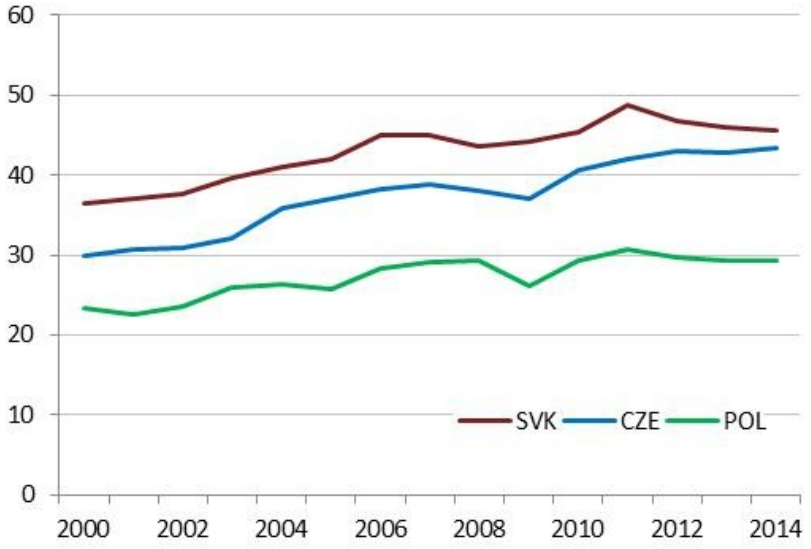
Source: World Bank

- Increasing openness of CEE economies

Introduction

Foreign value added in exports of goods and services (percentage of total exports)





Source: Estimates based on WIOD database

- Slovakia and Czech Republic are strongly engaged in value chains

Introduction – Previous literature

- Importance of firms' extensive margins in explaining the dynamics of trade
- Emerging economies diversify their product portfolio as they catch up with advanced economies
  - Imbs and Wacziarg (2003) study the evolution of sectoral concentration along the per-capita income development path
- Understanding the adjustment of current account imbalances
  - Corsetti et al. (2013) revisit the relationship between current account imbalances and exchange rate adjustment (Obstfeld and Rogoff, 2005)
  - The expansion of varietes (extensive margin) need not be associated with terms of trade deterioration as consumers love new varietes (Krugman, 1989)

Introduction – Previous literature

- Growing importance of value chains, manifesting itself i.a. in a high proportion of imported intermediate goods in the export value of goods
  - Beltramello et al. (2012) find that most of the 2007-2009 trade collapse occurred at the intensive margin, being much larger in intermediates
  - Altomonte et al. (2012): intra-group French trade in intermediates exhibited a faster drop followed by a faster recovery that the arm's length trade in 2007-2009 (bullwhip effect) as multinational firms better optimise inventories and do not suffer from large information asymmetries

Introduction – Previous literature

- The previous literature yields mixed results on the significance of margins
  - Bricongne et al. (2012): net extensive margin explains 55% of the French export dynamics in 2000-2007 and 11% in 2008-2009
  - Amador and Opromolla (2013): both margins are important in explaining the year-on-year variation in Portuguese export
  - Beltramello et al. (2012): extensive margin accounts for about 60% of total export growth in 1995-2007 (39 countries since 1995); higher extensive margin for CEE economies
  - Silgoner et al. (2013): extensive margin of CESEE-10 countries accounts for less than 10% of export growth in 2003-2005
- Wagner (2016) surveys empirical studies using transaction level data

Introduction - What we do

- Investigate margins of trade in CZ, SK and PL before, during and after the 2008-2009 crisis, using comparable firm transaction-level datasets and the same methodology
  - We expect extensive margins making a significant contribution to export growth
- We examine determinants of elementary mid-point export growth rates
  - Mid-point growth rates account for both intensive and extensive margins
  - Destinations, product groups (capital, intermediate, consumption, cars, other), firm size, import intensity (proxy for international production linkages)
  - Focus on periods during the crisis and immediate post-crisis recovery until the end of 2011
- We extend Galuscak and Sutoris (CNB WP 12/2016) to a panel setup and cross-country comparison

Methodology

- Following Bricongne et al. (2012), we use quarterly data on exports by firm, destination and product in 2005-2015 to compute mid-point growth rates

$$g_{ickt} = \frac{x_{ickt} - x_{ick(t-4)}}{\frac{1}{2}(x_{ickt} + x_{ick(t-4)})}$$

- We define weights as

$$w_{ickt} = \frac{x_{ickt} + x_{ick(t-4)}}{\sum_c \sum_i \sum_k x_{ickt} + \sum_c \sum_i \sum_k x_{ick(t-4)}}$$

- Total value of exports is

$$G_t = \sum_c \sum_i \sum_k g_{ickt} w_{ickt}.$$

Methodology

- We define extensive margins:
  - Firm extensive
  - Country extensive
  - Product extensive
- Intensive margin is the contribution of the continuing firm-destination-product export relationships
- Biases are discussed in Bricongne et al. (2012) and in Berthou and Vicard (2013)

Methodology

- We compute gross and net margins
- Next, we apply shift-share decomposition to investigate the impact of specific factors on elementary mid-point growth rates
  - We estimate a weighted regression in a panel setup with firm and time fixed effects
  - We regress growth rates on dummies for destinations, product groups, firm size and import intensity. Each dummy is interacted with a period dummy (during the crisis, after the crisis)

Data

- We use quarterly datasets of individual firms exporting goods in 2005-2015 by products and destinations (Intrastat, Extrastat)
- We define extensive margin as exports not exceeding the reporting threshold in the preceding or next year
- We aggregate HS6 products into the System of National Accounts categories: capital goods, intermediate goods, consumption goods, passenger motor cars, other goods
- Destinations are DE, SK/PL/CZ, rest of euro area (RoEA), rest of EU (RoEU), rest of the world (ROW)
- We define firm size by HS2 product class in each period
- We investigate the role of production linkages using the intermediate goods import intensity of exports as a proxy for participation in global value chains

Data

- We address several measurement issues
  - Increasing thresholds for intra-EU export
    - Exclude firms in those years in which their yearly exports are below the highest threshold
  - In CZ, firms are allowed to fill in joint reports on their exports since 2009
  - Cross-border flows vs. national accounts data
    - Exclude exports by non-resident firms as a robustness check

Data

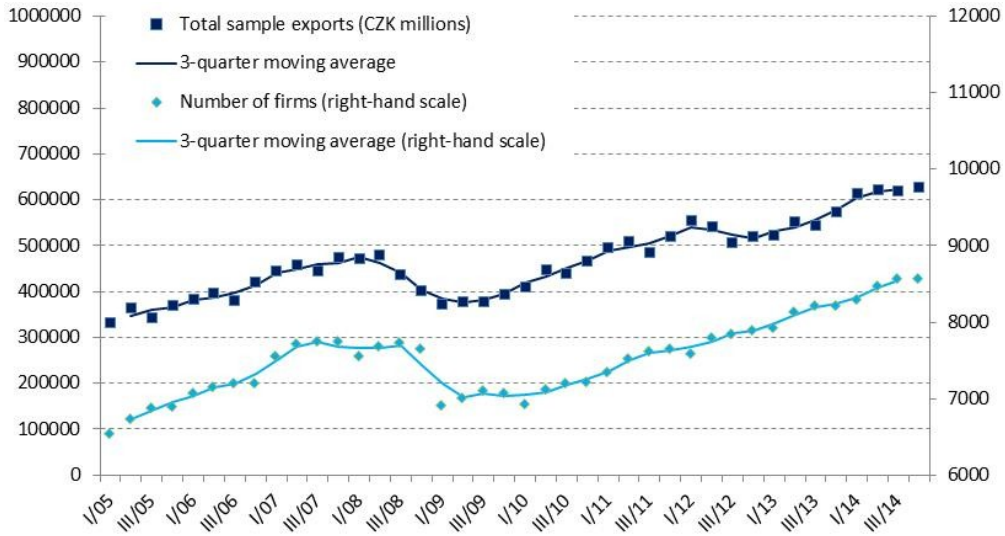
- Top destinations after the crisis (export shares):

	DE	RoEA	RoEU	ROW
CZ	30	22	26	22
SK	21	24	36	19
PL	25	26	20	29

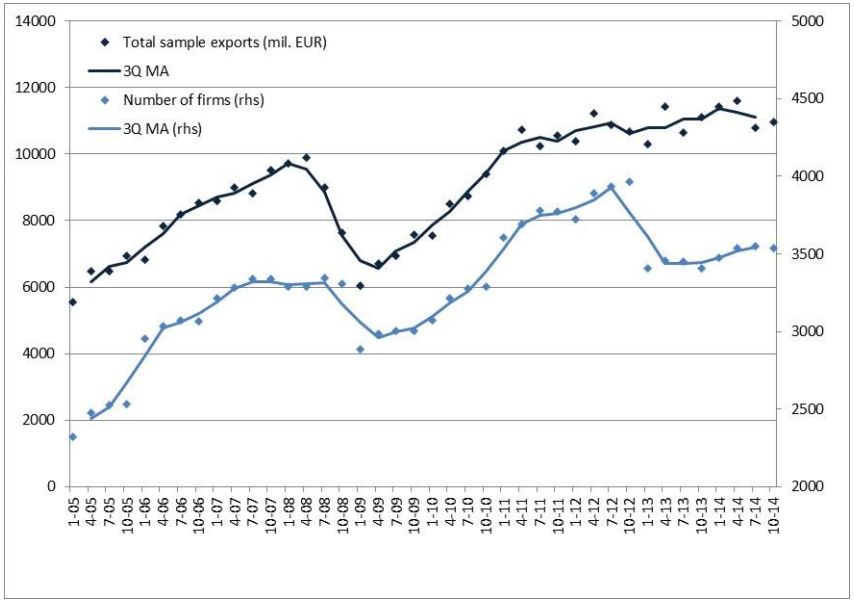
- About three quarters of exports are by the top 5% of exporters
- Share of exports to ROW increased after the crisis
- Exports of intermediate goods dominate (60% of exports in CZ, 53% in SK, 50% in PL)
- Share of exports by firms with high import intensity is higher after the crisis than before in CZ and SK

Data

CZ



SK

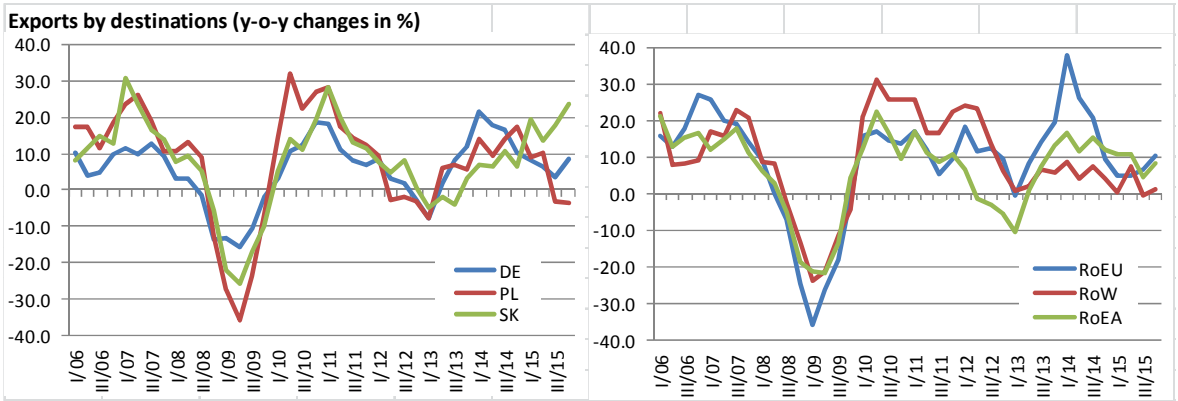


PL

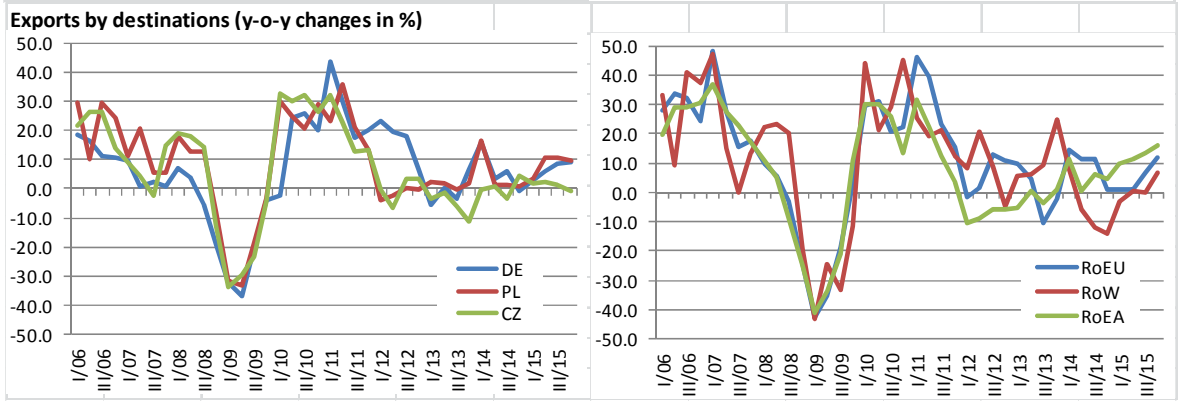
- Sample export value and the number of firms exporting

Data

CZ



SK



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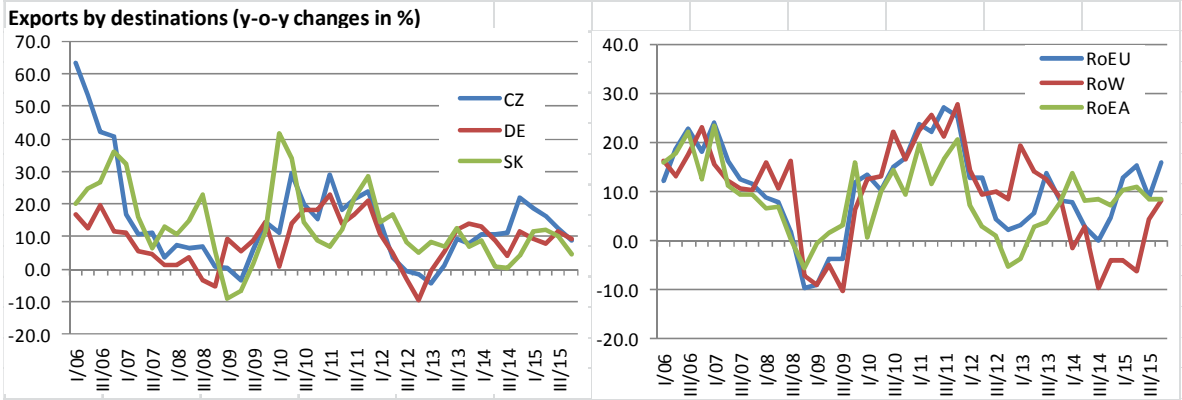
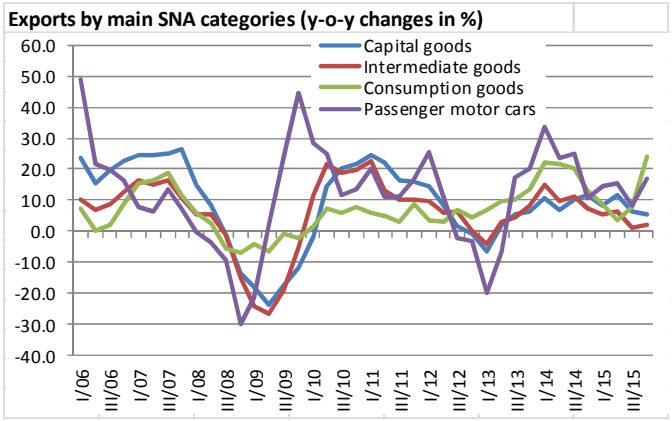


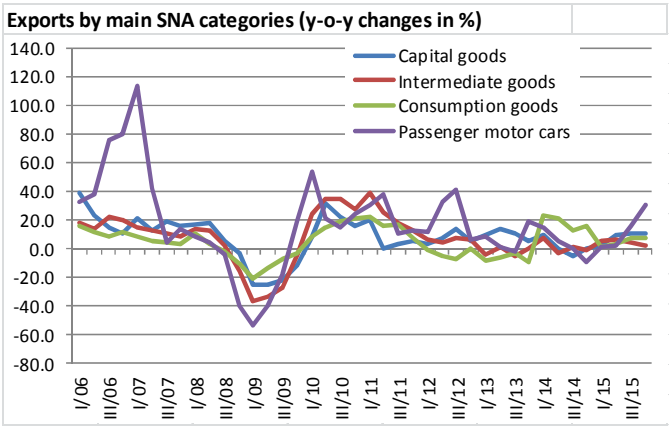
- The 2008-2009 crisis affected exports to all destinations

Data

CZ



SK



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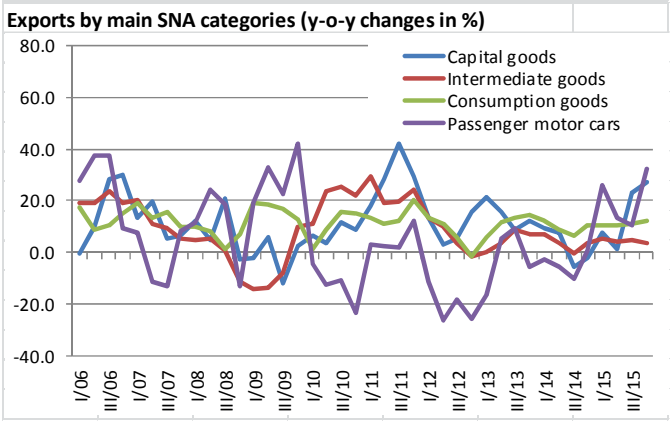
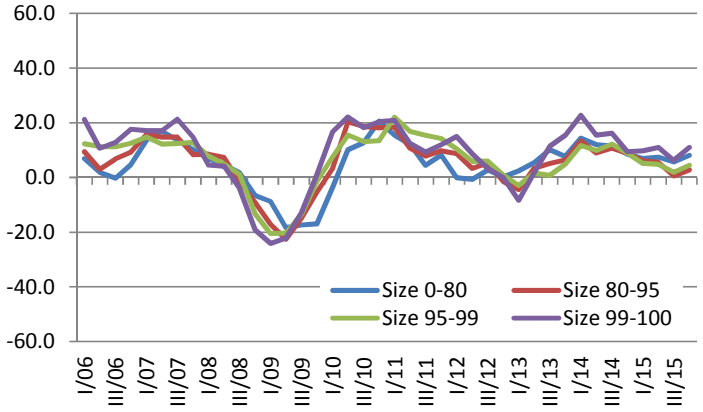


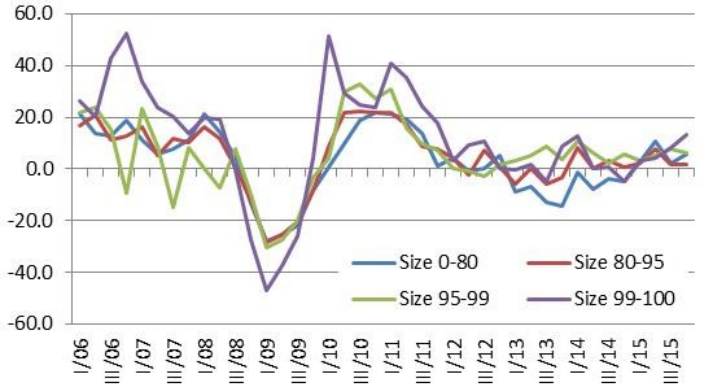
- Exports of intermediate and capital goods declined in 2008-2009, recovered quickly in 2010
- Exports of consumption goods declined only mildly in 2008-2009 (increased in PL)
- Export of cars affected by launching new products/factories

Data

CZ



SK



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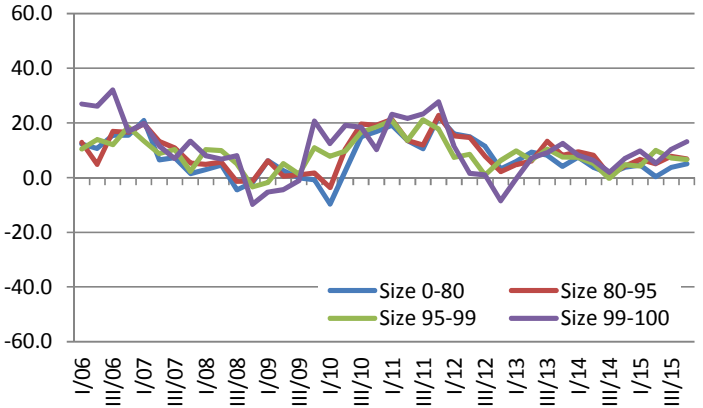
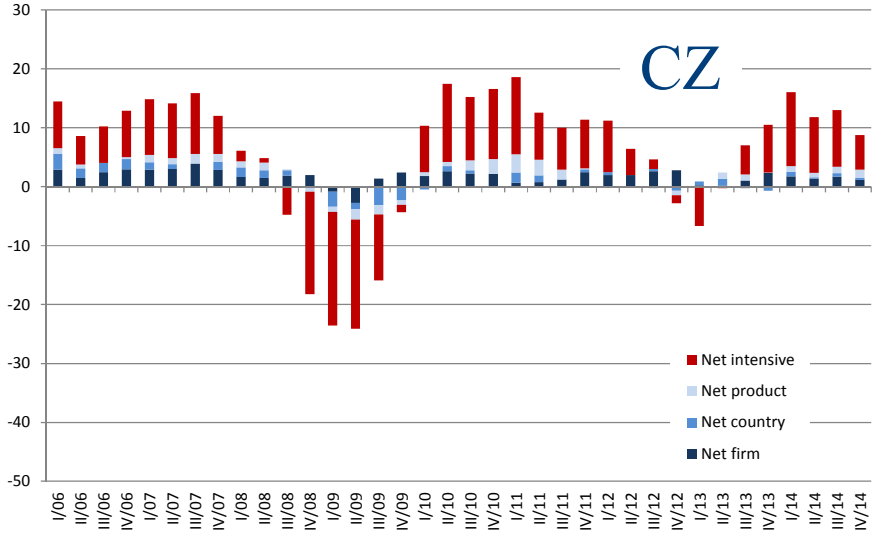
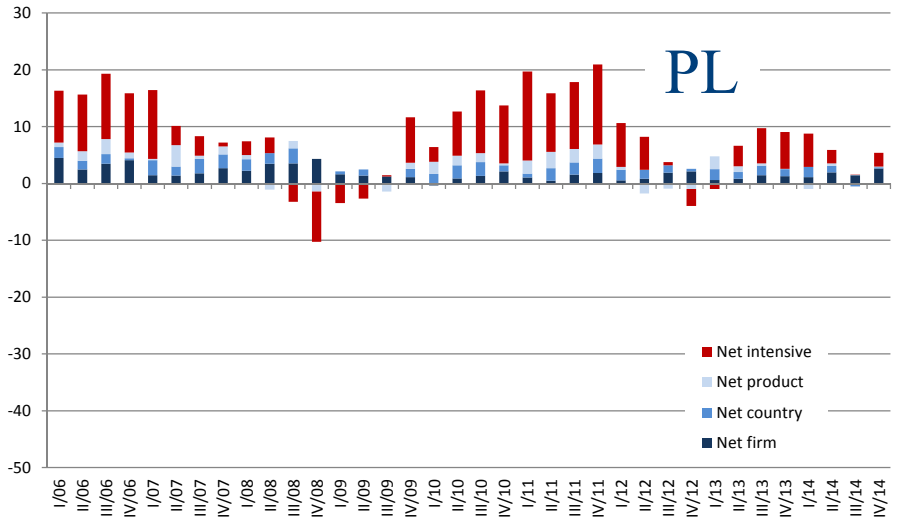


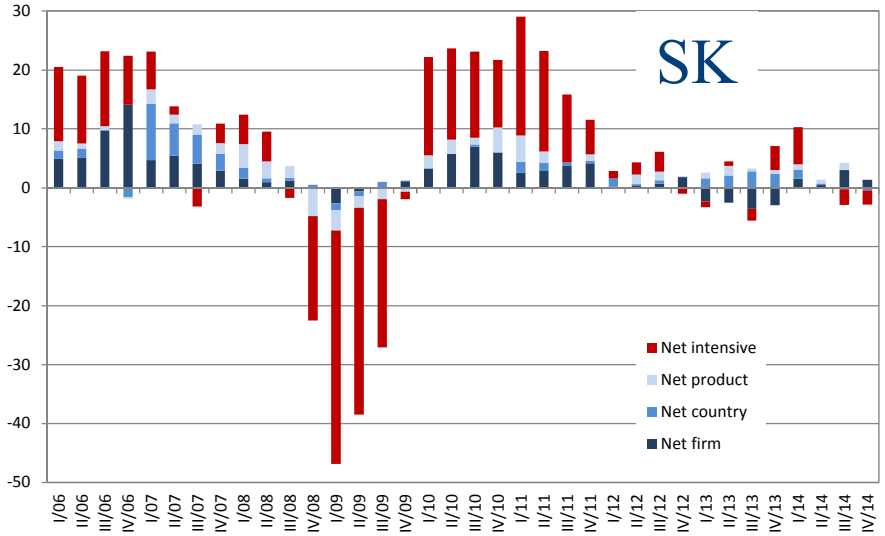
- Export growth is driven by large firms

Results

Contributions of net margins to mid-point growth rates







- Intensive margin explains most of the export growth, similar to the previous evidence for other countries
- The role of the extensive margin is smaller, but not negligible

Results

Contributions to mid-point growth rates and the share of net extensive margin, Czech exports

	size: all			size: 0-95%			size: 95-100%		
	2006-07	2008-09	2010-14	2006-07	2008-09	2010-14	2006-07	2008-09	2010-14
overall growth	12.8	-8.9	9.8	2.0	-4.3	1.0	10.8	-4.6	8.7
net intensive	7.8	-8.7	6.9	0.2	-3.9	-0.1	7.6	-4.8	7.0
net extensive	5.0	-0.2	2.9	1.7	-0.4	1.2	3.3	0.2	1.7
net firm	2.8	0.9	1.7	0.9	-0.1	0.7	1.9	1.0	0.9
net product	0.9	-0.4	0.9	0.3	-0.2	0.2	0.6	-0.2	0.8
net country	1.4	-0.7	0.3	0.5	-0.1	0.3	0.9	-0.6	0.1
net extensive to total (%)	39.3	2.1	29.7	88.3	10.0	112.5	30.4	-5.0	19.7

- In CZ, net extensive margin accounts for 39% of export growth in 2006-07 and 30% in 2010-14 (25% in 2010, 30% in 2011 and 25% in 2014)
  - Share of net extensive margin declined after the crisis
  - Extensive margin has a greater role among small firms
  - Net firm margin remained slightly positive in 2008-09
  - Much lower net country margin after the crisis

Results

Contributions to mid-point growth rates and the share of net extensive margin, Slovak exports

	size: all			size: 0-95%			size: 95-100%		
	2006-07	2008-09	2010-14	2006-07	2008-09	2010-14	2006-07	2008-09	2010-14
overall growth	17.3	-13.8	9.9	2.9	-4.5	0.7	14.5	-9.3	9.3
net intensive	6.7	-13.8	6.1	0.1	-4.0	-0.4	6.6	-9.8	6.4
net extensive	10.7	0.0	3.9	2.8	-0.5	1.0	7.9	0.5	2.9
net firm	6.4	0.2	1.7	2.4	-0.2	0.6	4.0	0.5	1.1
net product	1.3	-0.5	1.4	0.3	-0.1	0.2	1.0	-0.4	1.1
net country	3.0	0.3	0.8	0.1	-0.1	0.2	2.9	0.4	0.7
net extensive to total (%)	61.6	-0.2	38.8	97.2	10.7	153.8	54.5	-5.5	30.7

- In SK, net extensive margin accounts for 62% of export growth in 2006-07 and 39% after the crisis
  - Higher contribution of extensive margin than in CZ
  - Other patterns are similar to CZ:
    - Share of net extensive margin declined after the crisis
    - Extensive margin has a greater role among small firms
    - Net firm margin remained slightly positive in 2008-09
    - Much lower net country margin after the crisis

Results

Contributions to mid-point growth rates and the share of net extensive margin, Polish exports

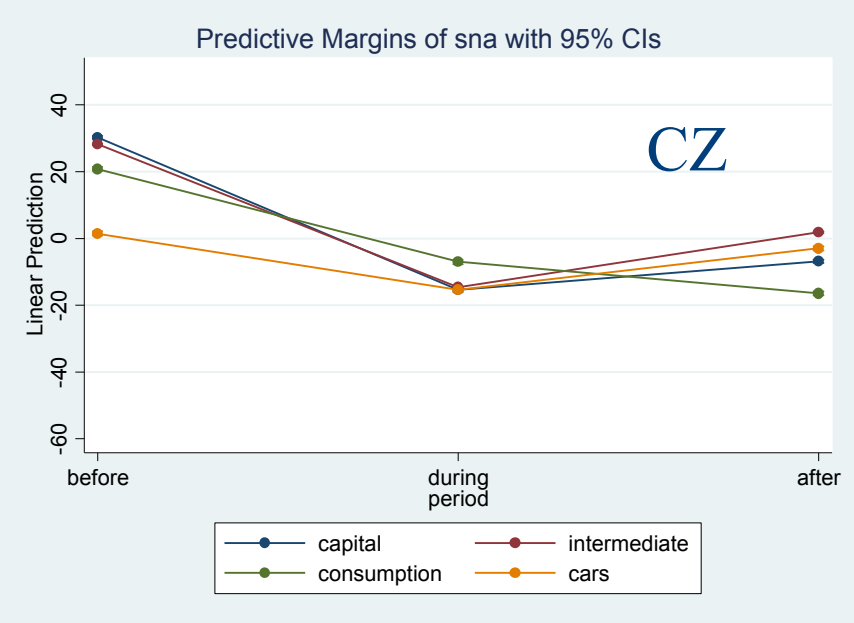
	size: all			size: 0-95%			size: 95-100%		
	2006-07	2008-09	2010-14	2006-07	2008-09	2010-14	2006-07	2008-09	2010-14
overall growth	13.7	2.9	9.6	2.6	-1.8	1.5	11.0	4.7	8.0
net intensive	7.6	-0.5	6.0	0.4	-2.6	-0.1	7.2	2.1	6.2
net extensive	6.1	3.4	3.5	2.3	0.8	1.7	3.8	2.7	1.9
net firm	2.7	2.4	1.3	1.4	0.6	1.0	1.3	1.8	0.3
net product	1.5	-0.1	0.8	0.2	0.0	0.2	1.3	-0.1	0.6
net country	1.8	1.1	1.4	0.6	0.2	0.4	1.2	1.0	1.0
net extensive to total (%)	44.5	118.5	36.9	86.7		109.2	34.3	56.4	23.2

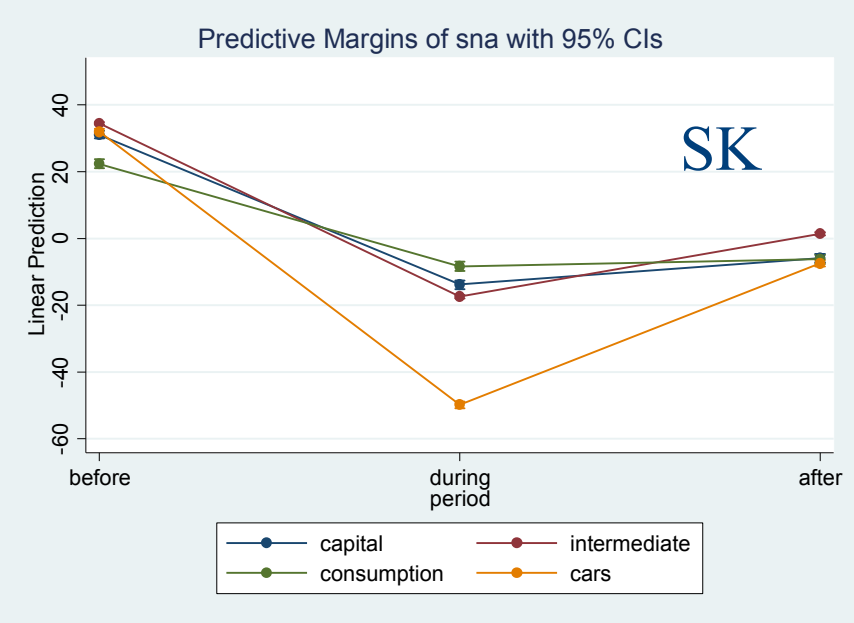
- In PL, net extensive margin accounts for 45% of export growth in 2006-07 and 37% after the crisis
  - Higher contribution of extensive margin than in CZ
  - Other patterns are similar to CZ:
    - Share of net extensive margin declined after the crisis
    - Extensive margin has a greater role among small firms
    - Net firm margin remained positive in 2008-09
    - But: a bit lower net country margin after the crisis

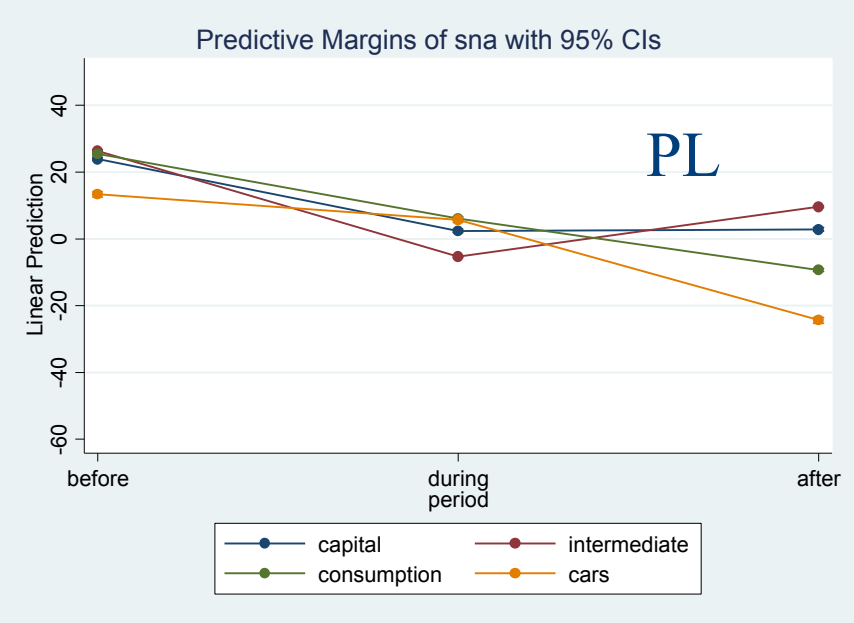
Results

- Next, we investigate elementary mid-point export growth rates
- Use firm and time fixed effects
- Crisis period is 3q2008 to 4q2009
- Focusing on immediate post-crisis recovery until 4q2011
- Results during vs before and after vs before the crisis

Results

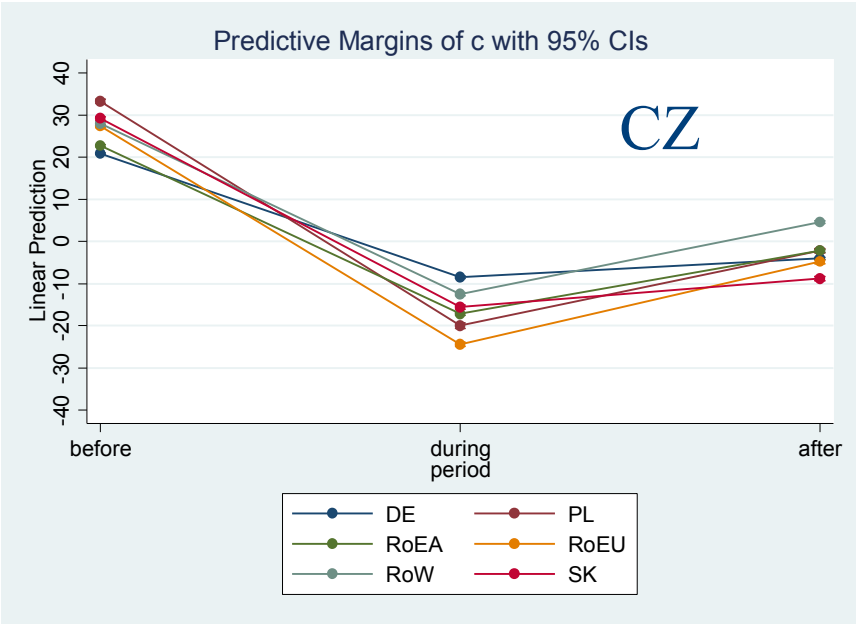


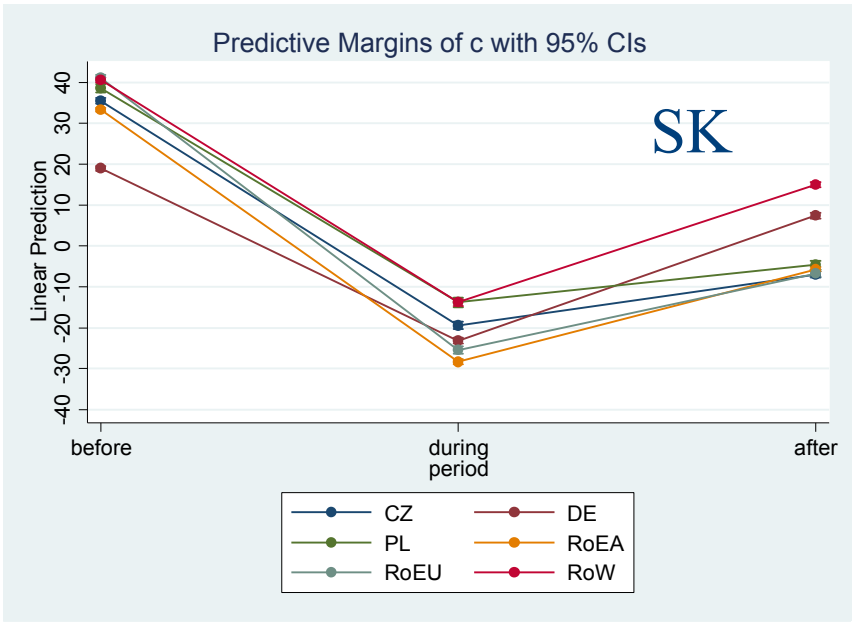


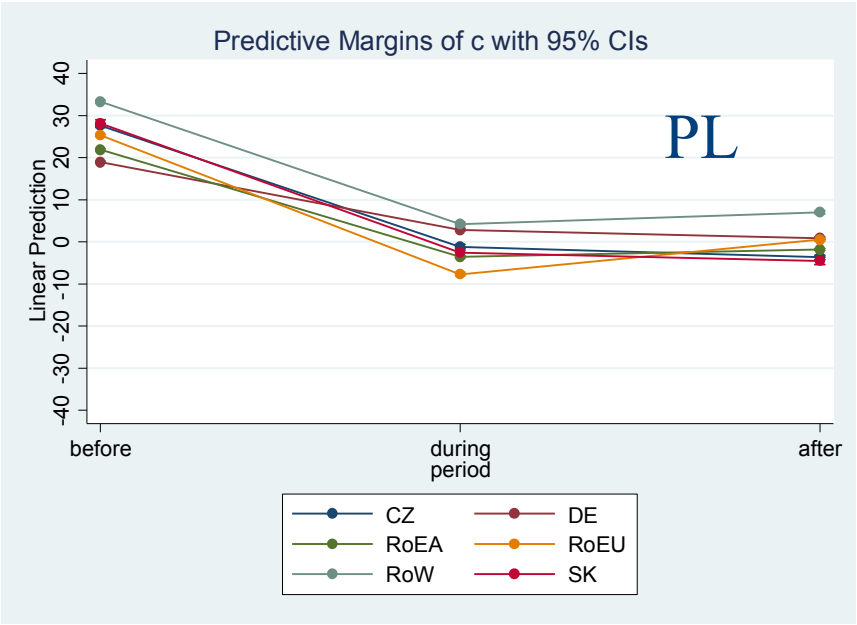


- Controlling for firm fixed effects, contribution of exports of intermediate goods was higher than of other product groups after the crisis (until 2011)

Results

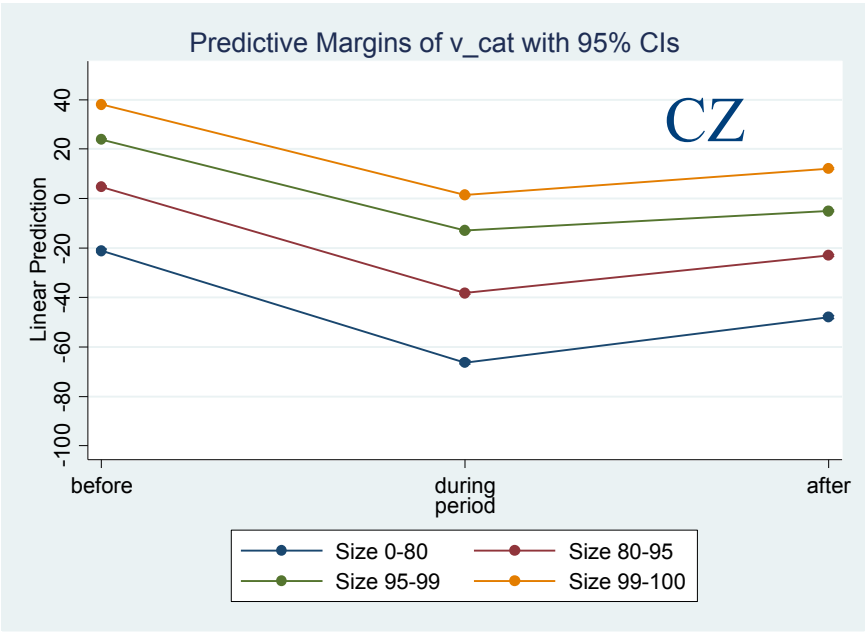


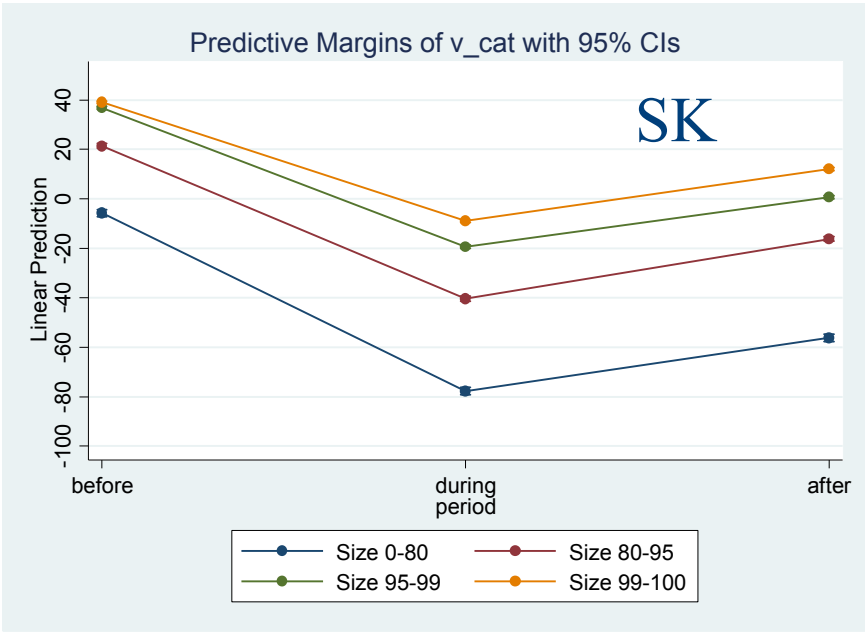


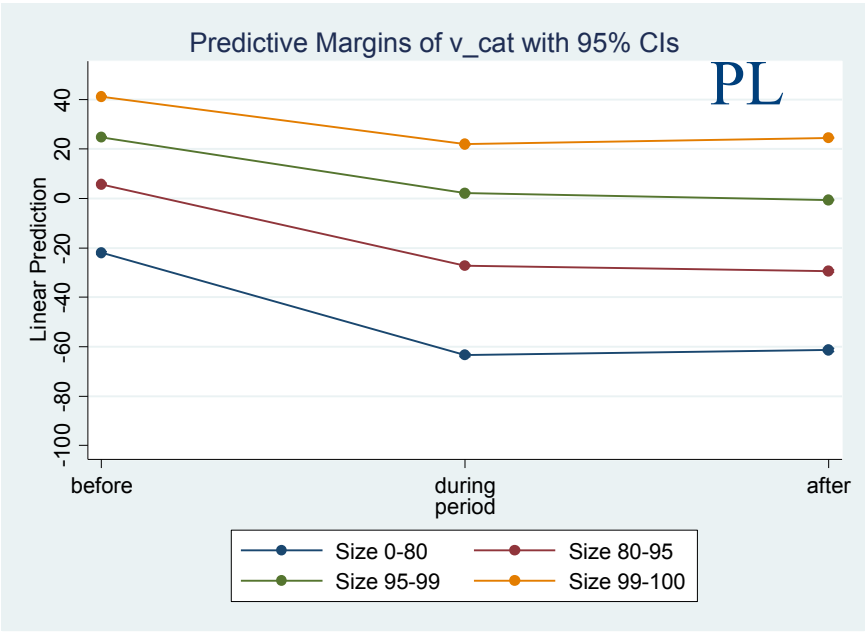


- Exports to Europe dropped relatively more during the crisis
- Exports to ROW more significant in post-crisis period

Results

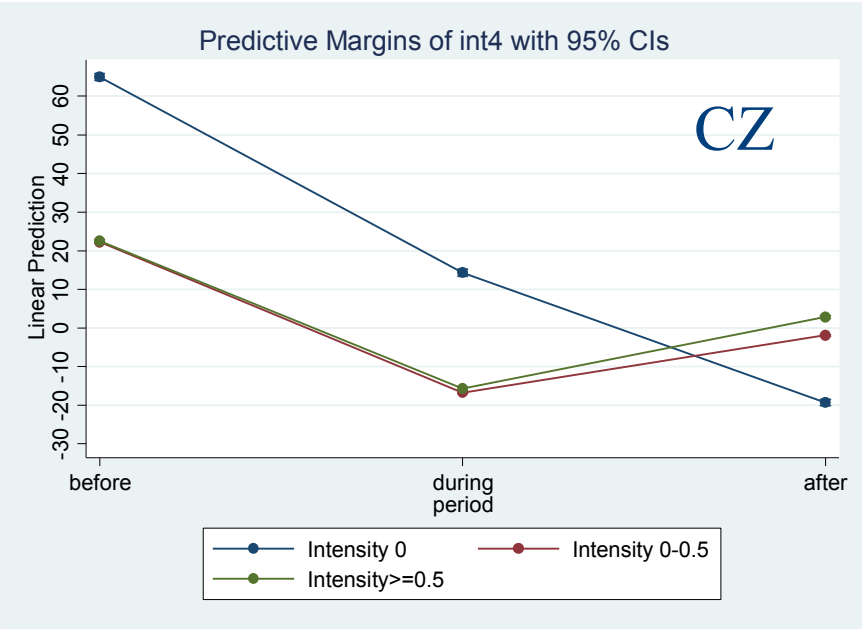


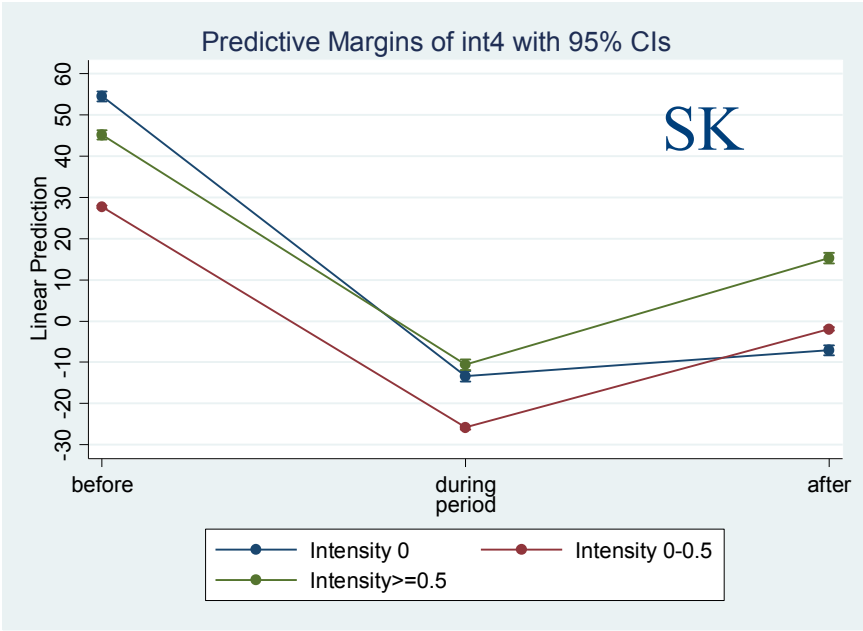


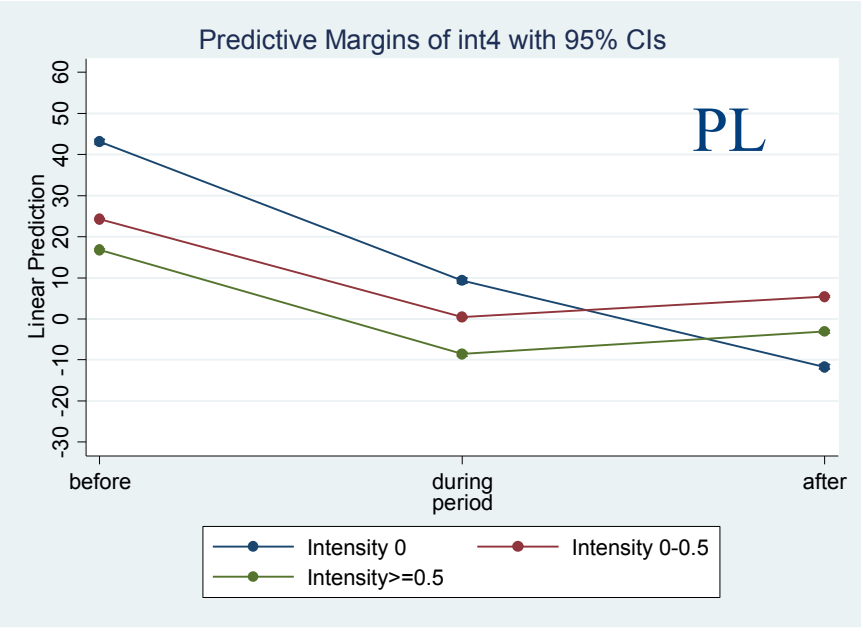


- Exports of small firms hit harder in the crisis

Results







- Except for PL, higher import intensity explains more in post-crisis export growth

Results

- Marginal effects are lower after than before the crisis
  - Compositional effects? (see results without firm fixed effects in Appendix A)
- Appendix B contains predicted effects
- We restrict the CZ sample to a balanced panel of active firms, see the results in Appendix C

Conclusions

- Preliminary results from a large project, making use of huge comparable transaction-level datasets
- Intensive margin explains most of the export growth
  - Trade collapse mostly through the intensive margin
- The share of extensive margin is higher in SK and PL than in CZ
- The contribution of extensive margin declined after the crisis in all three countries
  - Lower rate of convergence?
  - Slower pace of GVC integration?
- Results from a shift-share analysis are consistent the with presence of value chains

Thank you for your attention

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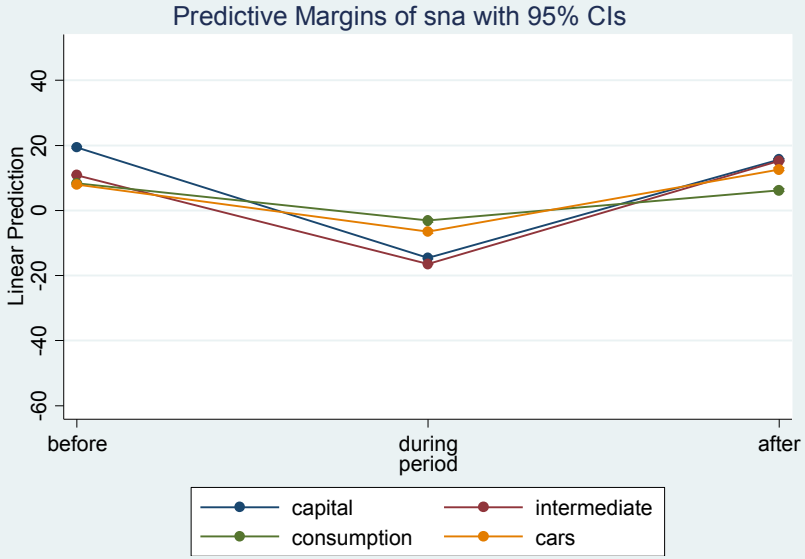
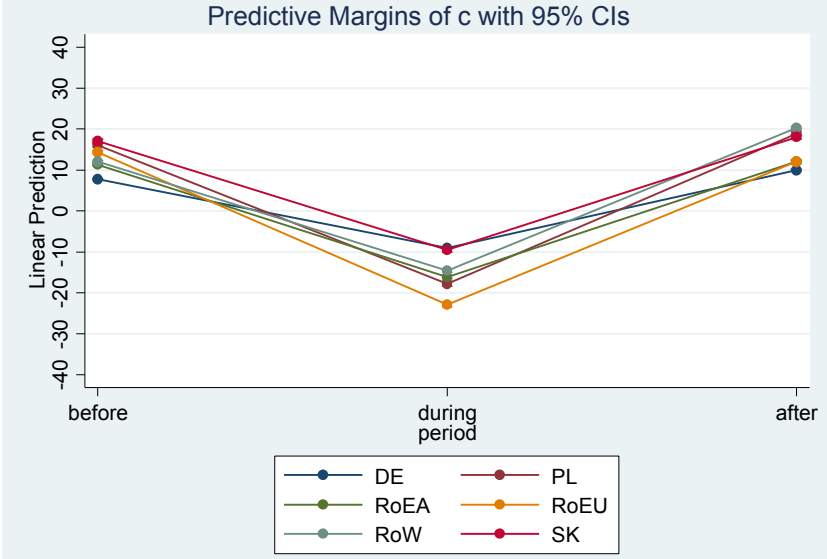
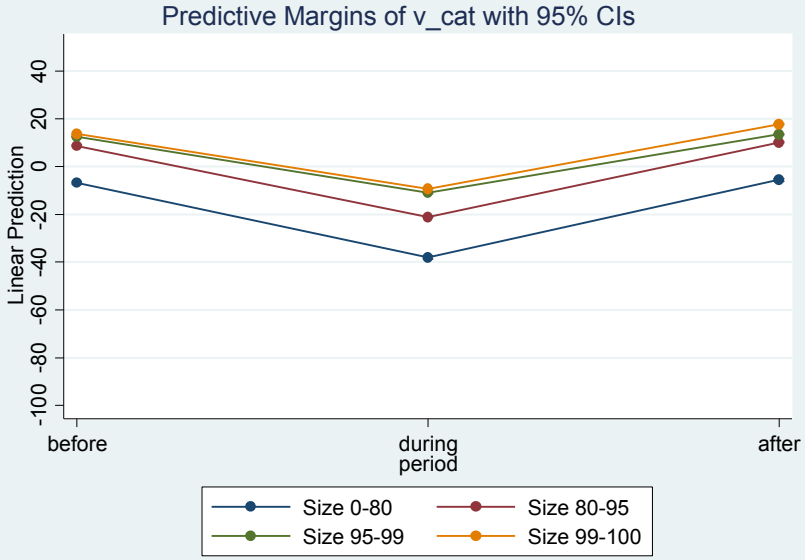
Kamil Galuščák
Adviser to the Board
kamil.galuscak@cnb.cz

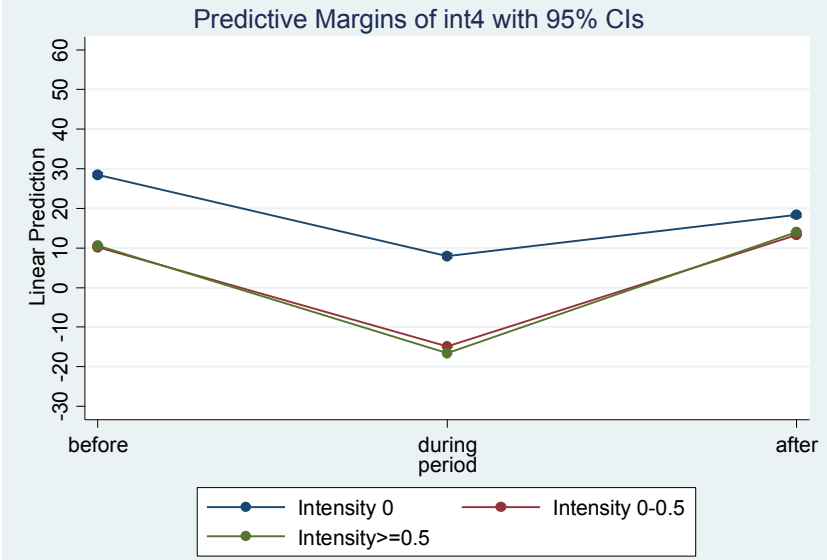
Appendix A: No firm fixed effects

CZ, no firm fixed effects



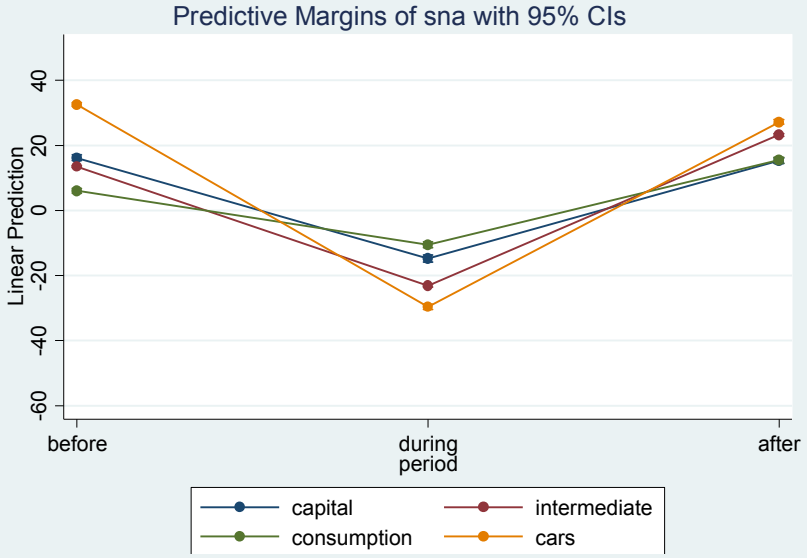


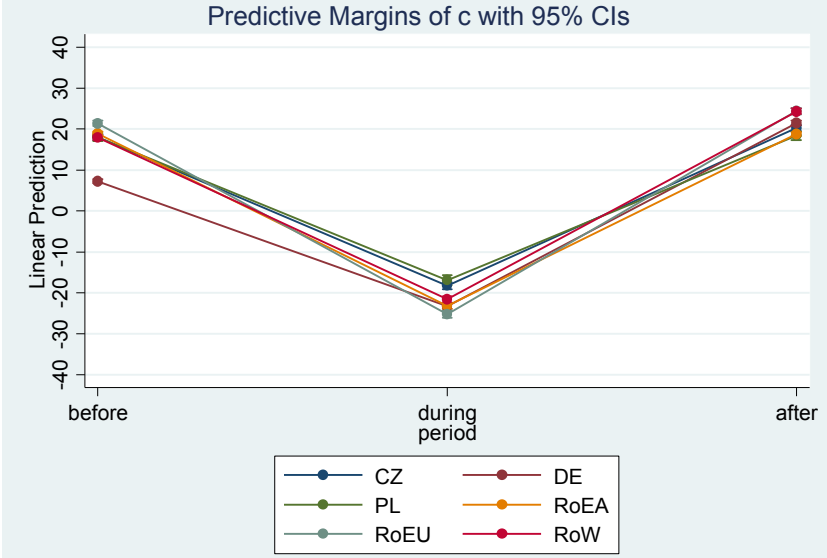


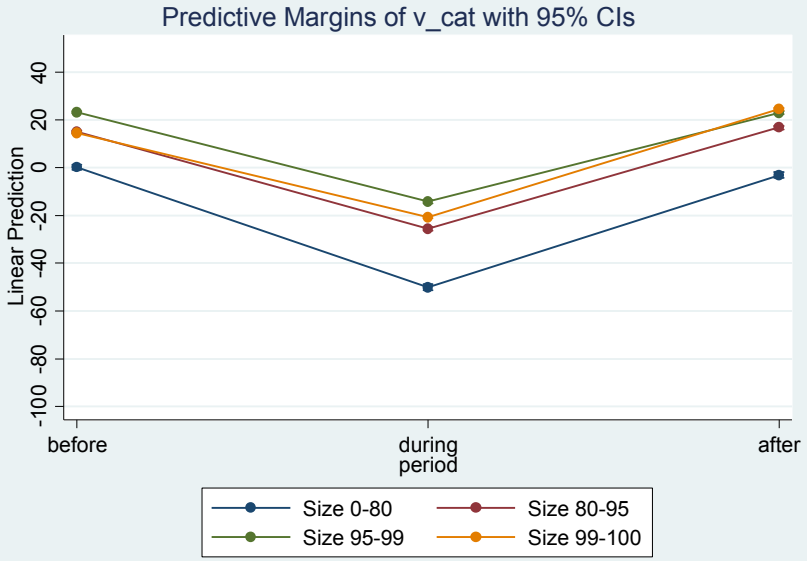


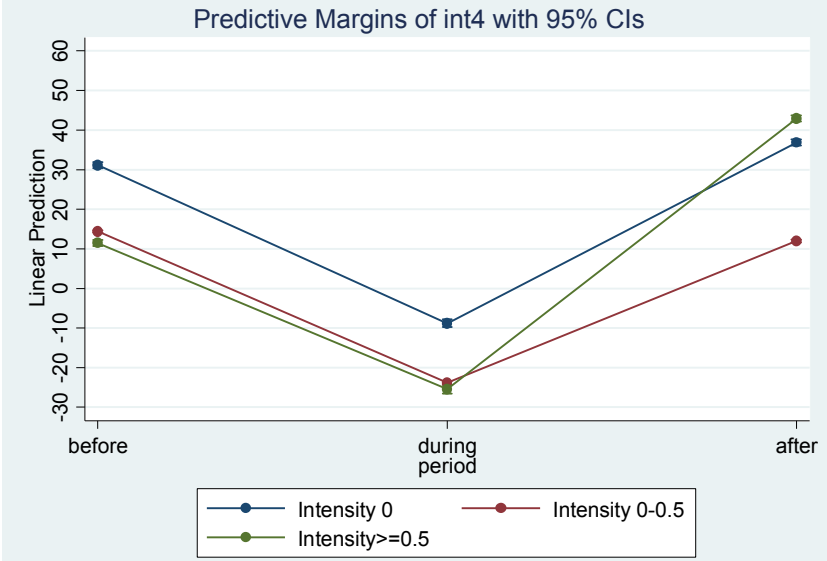
Appendix A: No firm fixed effects

SK, no firm fixed effects



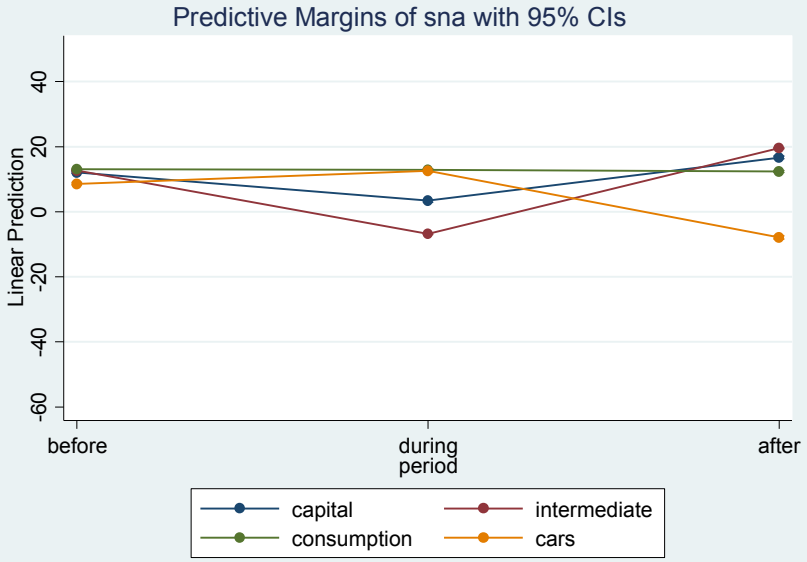


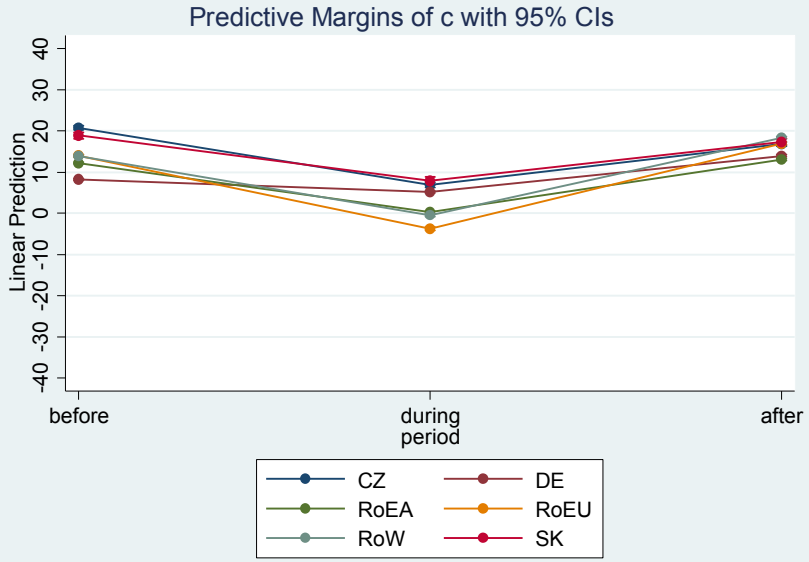


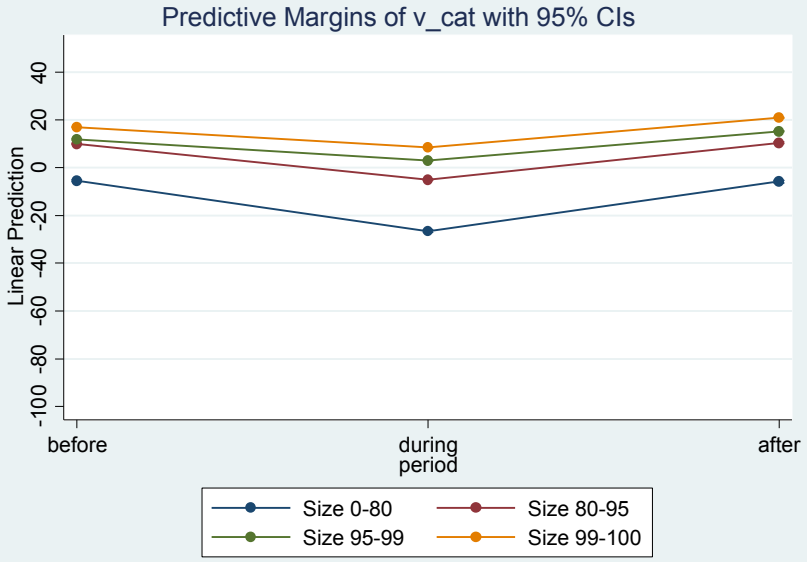


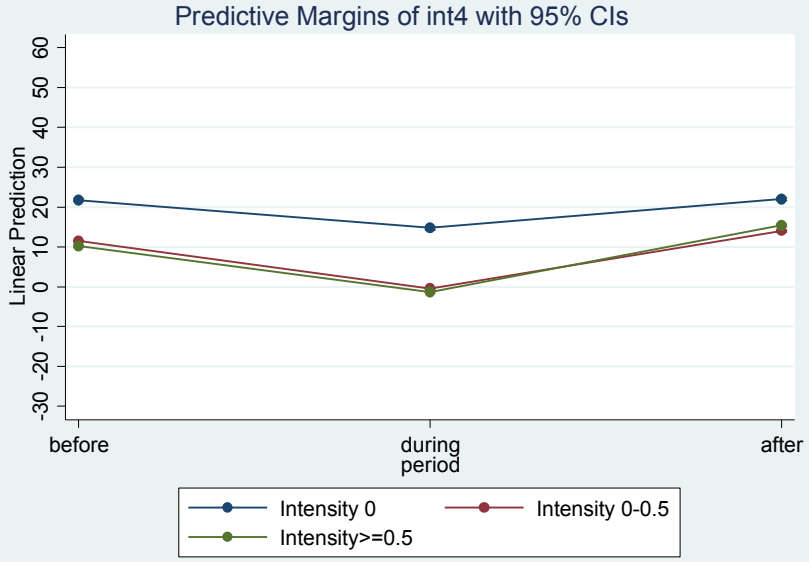
Appendix A: No firm fixed effects

PL, no firm fixed effects









Appendix B: Predicted effects

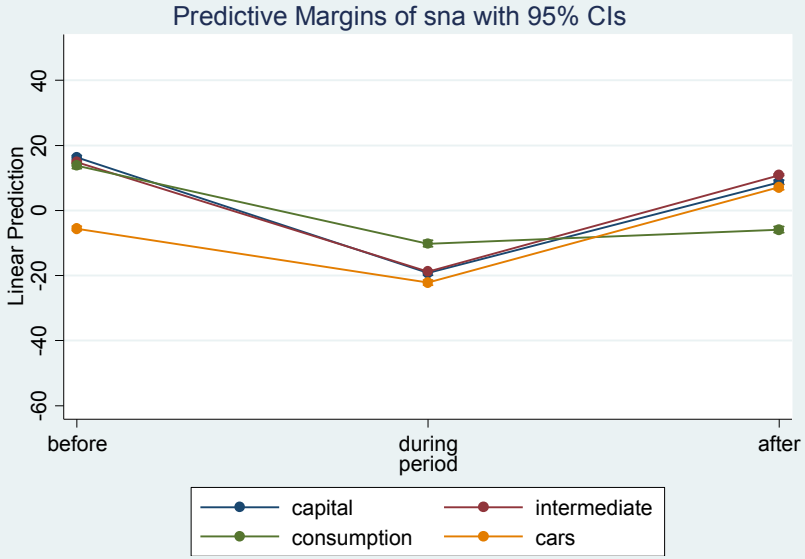
Predicted effects in 2006-2011; crisis period: 3q2008-4q2009

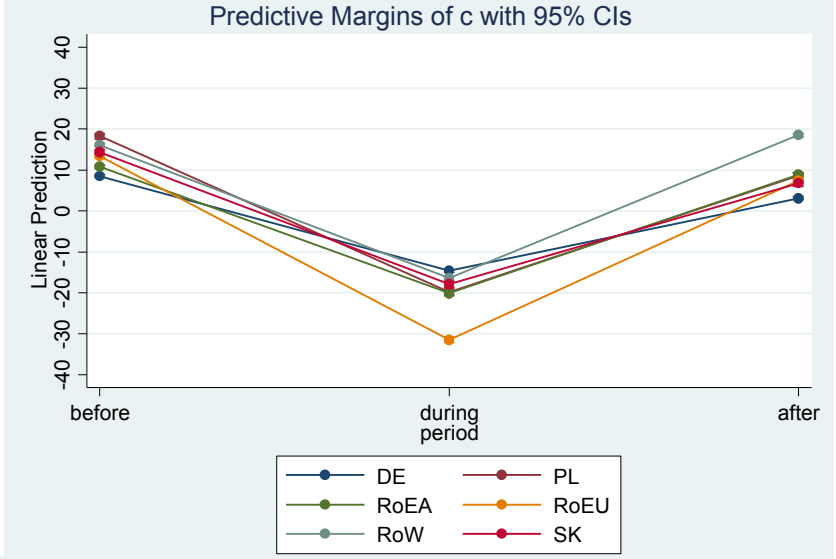
	CZ				SK				PL			
	during vs before		after vs before		during vs before		after vs before		during vs before		after vs before	
Capital vs mean	-8.95***	-6.78***	-6.40***	-10.37***	7.25***	9.63***	-6.02***	-4.93***	2.45***	3.83***	3.51***	5.99***
Intermediate vs mean	-2.22***	-3.98***	1.78***	0.37***	1.63***	2.63***	4.63***	-1.02***	-8.23***	-7.05***	0.40***	2.91***
Consumption vs mean	13.53***	10.91***	-4.78***	-10.59***	21.53***	23.77***	4.30***	3.43***	11.05***	7.07***	0.45***	-7.59***
Cars vs mean	10.66***	21.98***	2.06***	22.25***	-23.92***	-27.24***	-10.45***	-7.41***	15.25***	17.65***	-12.89***	-4.26***
Other vs mean	-38.68***	-92.29***	41.11***	-3.41*	10.66***	5.08***	-3.77***	33.63***	-9.05***	1.73**	2.60***	11.07***
DE vs mean	8.30***	9.67***	-0.26	2.33***	7.80***	12.91***	9.27***	20.92***	7.96***	9.12***	3.90***	5.71***
PL vs mean	-8.80***	-14.25***	0.43	-8.32***	3.32***	2.65***	-4.64***	-10.74***				
SK vs mean	-1.64***	-5.77***	-1.51***	-10.84***					0.06	-4.03***	-4.05***	-7.79***
CZ vs mean					2.05***	0.09	-2.70***	-9.98***	-2.89***	-3.81***	-6.11***	-6.56***
RoEA vs mean	-2.37***	-0.98***	-1.67***	2.20***	-3.87***	-6.56***	-5.11***	-6.46***	-0.95***	-0.75***	-0.81***	0.05
RoEU vs mean	-12.22***	-12.77***	-4.81***	-4.95***	-8.35***	-11.50***	-1.95***	-15.29***	-6.66***	-7.71***	0.35*	-0.03
RoW vs mean	-1.48***	-1.54***	5.87***	3.80***	-1.15*	0.65	1.53***	6.92***	-3.29***	-3.58***	-1.48***	-3.61***
Size 0-80 vs mean	-6.36***	-6.85***	-1.27**	0.27	-12.56***	-18.08***	-8.47***	-17.74***	-10.39***	-16.34***	0.48*	-9.51***
Size 80-95 vs mean	-4.95***	-4.73***	-1.12***	-0.68**	-2.93***	-7.86***	-3.30***	-5.01***	-4.24***	-7.90***	0.12	-6.34***
Size 95-99 vs mean	1.33***	1.49***	-1.52***	-1.65***	0.22	-2.20***	-5.28***	-3.46***	1.97***	1.64***	1.99***	0.76***
Size 99-100 vs mean	1.78***	1.66***	1.54***	1.27***	2.43***	5.95***	4.86***	5.65***	2.20***	4.95***	-1.45***	3.75***
Intensity 0 vs mean	4.84***	-11.00***	-12.33***	-56.92***	-1.70**	-12.20***	2.31***	-27.73***	4.05***	-4.50***	-1.74***	-22.73***
Intensity 0-0.5 vs mean	0.19**	0.65***	0.86***	3.17***	0.05	2.20***	-5.73***	4.24***	-0.75***	0.89***	0.31***	4.10***
Intensity>=0.5 vs mean	-1.73***	1.39***	1.24***	7.61***	1.34*	0.02	28.09***	4.03***	-0.36*	0.23	0.2	2.30***
Firm fixed effects	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes

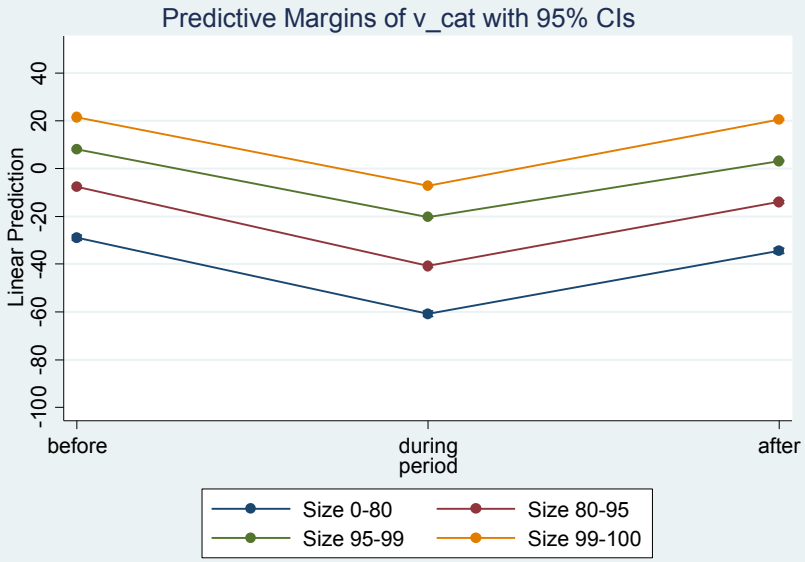
Note: * p<0.05; ** p<0.01; *** p<0.001. To identify the coefficients, we impose that their weighted sum within each group of characteristics is zero.

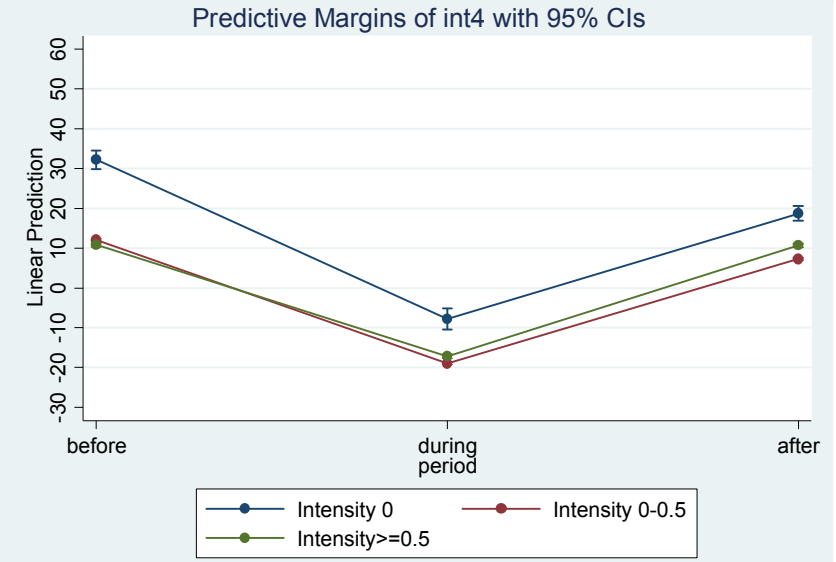
Appendix C: Panel of active firms

CZ, panel of active firms, firm fixed effects









Appendix C: Panel of active firms

CZ, panel of active firms, no firm fixed effects