TRADE COLLAPSE DURING THE 2009 CRISIS: HOW DID EUROPEAN COMPANIES FARE? LESSONS FROM SEVEN COUNTRIES

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Great recession, trade collapse and research agendas

- 2009: massive shock to European economies
  - Trade collapsed, falling by 30% in early 2009

- Policy related questions:
  - Did all firms in Europe suffer?
  - What are key differences?

- EFIGE project
  - **Policy Report** forthcoming by CEPR & Bruegel in October
Synchronized export change in EU countries

Annual change in total exports

12-month cumulated change

0%
10%
20%
30%
40%

-10%
-20%
-30%
-40%


- Germany
- Spain
- France
- Italy
- Hungary
- Austria
- Portugal
- United Kingdom

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This paper - Motivated by policy

- There is a large shock
  - Policy makers believe it is temporary
  - Thus, want to protect existing producers etc

- How did the crisis affect firms?
- Maybe useful for next crisis…
Related theory/evidence on crisis

1. Trade decline strongly correlated across developed countries
2. Demand decline led to systematic decline in trade
3. In exports, the extensive margin is small
4. Composition - durables, intermediate goods sectors more volatile
5. Value chains - vertical linkages exacerbate shocks
6. Value chains - outsourcing helps reduce volatility of HQ
7. Imports decline through volatile inventory cycle
8. The effect of trade credit is uncertain
9. Labour flexibility – useful but may increase short term impact
10. Significant fiscal stimulus to attenuate the crisis effect
- Data
- Introduce variables
- Methodology
- Results
- Policy
Data

- **EFIGE Dataset**: 15,000 firms surveyed across 7 countries (Austria, France, Germany, Hungary, Italy, Spain, UK)
  - Manufacturing firms only
- Survey in 2010 targeting year 2008 /2009
  - The questionnaire is mainly focused on 2008,
- Crisis indicator variables were asked directly, such as how did sales or export change in 2009 compared with 2008.
- Representative survey – plus weights (industry, size, regional location)
Some questions in survey targeted specifically at the crisis

The key outcome variables that firms reported are
1. reduction (if any) in *sales* between 2008 and 2009,
2. the percentage change in *exports*
3. the percentage change in *employment*.

**Sales: multiple outcome** variable: Change 2009/08:
- 0 if sales rose or were unchanged,
- 1 for small (0-10%) decline,
- 2 for moderate (10-30%) decline
- 3 for large decline (>30%).
What affected firm performance?

Topics

1) Synchronized shock -- Synchronized response?.
2) The role of trade
3) Labor composition
4) Internationalization (ownership, outsourcing)
5) Finance
6) Fiscal policy
What affected firm performance? - Topics

1) Synchronized shock -- Synchronized response?.
2) The role of trade
3) Labor composition
4) Internationalization (ownership, outsourcing)
5) Finance
6) Fiscal policy
Methodology: Regressions

(1) $D_{sales} = \alpha + \beta X_i + \gamma CD_i + \varepsilon_i$

(2) $D_{exports} = \alpha + \beta X_i + \gamma CD_i + \varepsilon_i$

(3) $D_{employment} = \alpha + \beta X_i + \gamma CD_i + \phi D_{sales_i} + \varepsilon_i$

- $X_i$ is a vector of different firm-level variables
- For employment, we control for sales decline, $S$
- (2), (3) OLS
- (1) Interval regression
- $CD_i$ is a set of country, 2-digit industry and size dummies
- Weighted regressions (to control for survey bias)
Methodology: Interval regression

- Sales: multiple outcome variable: Change 2009/08:
  - 0 if sales rose or were unchanged,
  - 1 for small (0-10%) decline,
  - 2 for moderate (10-30%) decline
  - 3 for large decline (>30%).

- Interval regression
  - ordered probit with cut points fixed and with coefficients and variance estimated by maximum likelihood
  - Results - percentage change. +%: increase in sales
  - Results robust to using OLS with mid-points instead
Variables – measuring the impact of crisis ($X_i$)

- **Firm response** $= f(\text{firm properties})$
  - Internationalisation
    - exporter,
    - importer of intermediate goods
    - Does outsourcing, did FDI
  - Organisation of the firm
    - Ownership (home, foreign), place in a group
  - Labor
    - Skill composition
  - Finance
    - Reliance on external financing
    - Use trade credit
RESULTS
#1. Heterogeneity in sales response

- Global financial shock affected all European countries at a similar fashion...
- Yet firm reaction was diverse
  - Sales, exports

<table>
<thead>
<tr>
<th>Change in sales</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Larger decline than 30%</td>
<td>18.1</td>
</tr>
<tr>
<td>Between 30-10% decline</td>
<td>34.4</td>
</tr>
<tr>
<td>Smaller decline than 10%</td>
<td>19.1</td>
</tr>
<tr>
<td>No change or growth.</td>
<td>28.4</td>
</tr>
</tbody>
</table>
#1 Frequency of export volume change of 2009 vs 2008 – national diversity in reaction

Distribution of firms due to export change by country

- Germany
- UK
- Austria
- Spain
- Italy
- Hungary
- France

- Export reduced
- No change in export
- Export increased

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#1 Frequency of export volume change of 2009 vs 2008 – industry differences matter some
#1 Frequency of export volume change of 2009 vs 2008 – size does not matter much

![Distribution of firms due to export change by size](image)

- **10-19 employees**
  - Export reduced: 25%
  - No change in export: 25%
  - Export increased: 50%

- **20-49 employees**
  - Export reduced: 25%
  - No change in export: 25%
  - Export increased: 50%

- **50-249 employees**
  - Export reduced: 25%
  - No change in export: 25%
  - Export increased: 50%

- **250 or more employees**
  - Export reduced: 25%
  - No change in export: 25%
  - Export increased: 50%

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#1. Heterogeneity in export response
#1 Heterogeneity in export response: 2% exit

![Histogram](image_url)

**export change in 2009 vs 2008**

- Percent change of export: -100% to 100%
- Percent change distribution

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# 1: There is heterogeneity in sales change

- **Fact 1a:** Regarding declining sales and exports, some diversity
  - **Countries:** highest decline in Hungary and Spain, lowest in Austria and Germany
  - **Industries** (food sector stable, metal production declining the most).
  - **Firm size** did not matter, small and large firms performed similarly.

- **Fact 1b:** Firm level heterogeneity is overwhelmingly
  - Over 13% and 18% of firms were able to sustain or even increase their sales even in the worst hit industries (metal products) and countries (Spain), respectively.
  - Differences within sector, country, size
#2 Internationalization and sales change in crisis

- Internationalisation
  - exporter,
  - importer of intermediate goods
  - Importer of services
  - did FDI

- Look at overall sales and exporters only
#2 Internationalization and sales change in crisis

<table>
<thead>
<tr>
<th></th>
<th>All firms</th>
<th>All firms</th>
<th>Exporters</th>
<th>Control variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exporter dummy</td>
<td>-2.173***</td>
<td>-2.219***</td>
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<td>-Sector</td>
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<tr>
<td></td>
<td>(0.381)</td>
<td>(0.383)</td>
<td></td>
<td>-Region</td>
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<tr>
<td>Importer dummy</td>
<td>0.776**</td>
<td>0.733*</td>
<td>0.846*</td>
<td>-Firm size category</td>
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<td>(0.377)</td>
<td>(0.38)</td>
<td>(0.433)</td>
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<td>Import services dummy</td>
<td>0.195</td>
<td>0.184</td>
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<tr>
<td></td>
<td>(0.633)</td>
<td>(0.672)</td>
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<tr>
<td>FDI dummy</td>
<td>1.494*</td>
<td>2.069**</td>
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<tr>
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<td>(0.885)</td>
<td>(0.916)</td>
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<td>14412</td>
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<tr>
<td>McKelveyZavoina_R2</td>
<td>0.0798</td>
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<td>0.07</td>
<td></td>
</tr>
</tbody>
</table>

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#2: Trade contributes to the transmission of the crisis

- **Fact 3:** Exporters contracted more than non-exporters, while importers suffered less of a decline.
  - small effects on the “extensive margin”
  - exporters decline significantly more than non-exporters (2.5 percent)
  - intermediate importers fare somewhat better than non-importers (0.8pp)
  - **Country differences** reflect domestic macro
#3: Firms laying off unskilled workers more

- Firms employing skilled workers laid off less employees compared to other firms faced with a similar fall in demand.
  - (White collar and skilled blue collar) vs unskilled
Supply chain/value chain/linkages

Produced-to-order goods share

Outsources some production

Share of output used as intermediate of other domestic sectors

- Effect of input-output linkages – linkage measured at the country/industry level (we control for both country and industry FE), estimates = variation across countries within the same industry.

- Firms in countries and industries with a larger share of output going to other producers suffer a larger sales decline.
#4 Value chain

- Supply chain/value chain/linkages

- Produced-to-order goods share (-)
- Outsources some production (+)
- Share of output used as intermediate of other domestic sectors (-)
  - Effect of input-output linkages – linkage measured at the country/industry level (we control for both country and industry FE), estimates = variation across countries within the same industry.
  - Firms in countries and industries with a larger share of output going to other producers suffer a larger sales decline.
#4 Value chain 2

- Control - firms in different parts of the governance network.
  - “controlling firms” firms: have affiliates or are the head of a network.
  - “controlled by others”: firms that are subordinate members of a network, or have been acquired by another firm.

- Effects employment reaction more than sales
#4 Value chain 2

- Control - firms in different parts of the governance network.
  - “controlling firms” firms: have affiliates or are the head of a network. (+)
  - “controlled by others”: firms that are subordinate members of a network, or have been acquired by another firm (-)

- Effects employment reaction more than sales
# 4: The value/supply chain may provide insurance against demand shocks …. If you are the buyer.

- Firms did worse:
  - producing a large fraction of their output to order
  - selling a large fraction to other firms

- Firms did better
  - Did FDI before
  - Do outsourcing
  - Control other companies.

- Impact is largest when firm in country/industry faced with large shock
# 5: Financially constrained firms contract more

- Firms relying on external finance and experiencing financial constraints to growth (before the crisis) experienced a greater sales decline.
- The use of trade credit itself did not prove to be a significant factor.
# 6: Counter-cyclical fiscal policy may help mitigate the effects of the crisis on firms

- Counter-cyclical fiscal policy may help mitigate the effects of the crisis on firms
  - while home brewed crisis (such as in Spain and Hungary) will substantially reduce sales.
#6 Traders lost more in sales revenue – with country differences: domestic policy matters

Figure 4: Sales decline for exporters and non-exporters

- Austria
- France
- Germany
- Hungary
- Italy
- Spain
- UK

- Exporters
- Non-exporters

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Insight for policy 1: Export not enough

- Industry difference is small (exc food) and size does not matter
- Import, outsource actually helps in bad times
- Fiscal policy can make big difference in bad times - room needed
Insight for policy 2: Dominant firms

- Dominant firms, centrally placed in the technology, trade and ownership network, fared better.
  - Firms producing final goods
  - relying on skilled workers.
  - Not making specific products ordered by large customers
  - Relying on a network of suppliers (importing /outsourcing)
  - Controlling other companies at home or abroad

- In crises, policy should focus on helping stabilize firms that are
  - in weaker position,
  - owned by foreign / larger firms
  - making less skill-intensive products
  - Being a supplier, making specific products to large customers
Thanks for the attention!

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Key findings

1) Despite a synchronized, large macro-economic shock, the firm response was rather diverse. There is a large heterogeneity but firm size made no difference.

2) Firms reduced employment less than their sales had dropped, and firms with relatively more skilled workers preserved more jobs.

3) Exporters contracted more than non-exporters, while importers suffered less of a decline.

4) Outsourcing firms and firms that control other companies fared somewhat better, while firms relying on specific demand of others lost more.

5) Firms relying on external finance and experiencing financial constraints experienced a greater sales decline. Firms with more pre-crisis tangible assets (e.g. properties) or relying on local bank finance were particularly constrained.

6) Expansionary fiscal policy both mitigated the effects of the crisis through supporting general domestic demand and maintaining orders of public bodies for supplying firms.