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When Quality Management Helps Agri-food Firms to Export

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IATRC 12/14/2021
Increasing demand for traceability and safety for food products:

- Public regulation (EC regulation 178/2002 of food traceability)
- Sanitary and Phytosanitary Standards (SPS) and Technical Barrier to trade (TBT) at the border
- Private certifications (HACCP, ISO, IFS, BRC...)

→ The ability to produce safe products, ensure their traceability and have it recognized through certification is an important component of competitiveness
This paper investigates the impact of firms’ commitment to traceability and food safety on export performance.

- Relies on the presence of quality management and control personnel to proxy this commitment.
- Uses firm-level data from 2009 to 2016.
- Estimates the impact of quality management on the intensive and extensive margin of trade, on trade unit values and perceived quality (Khandelwal 2010).
- Explores the heterogeneity of the effect by product-destination (presence of Non Tariff Measures).
Quality management and control personnel

- Staff in charge of the firm’s products **quality**:
  - Design quality protocols
  - Conduct inspections and tests
  - Create quality documentation and traceability systems
  - Report feedback from customers and analyse safety issues

- May impact **trade**:
  - by reducing hazards, recalls and complains
  - by increasing the efficiency of supply chains
  - by helping the products to comply with regulatory requirement
  - by enhancing the firm’s reputation (potentially through certifications)
Traceability and quality management system on firms competitiveness on domestic markets (Alfaro and Rabade 2009, Epelbaum and Martinez 2014, Aiello et al. 2015)

Valuation of food traceability system by consumers (Graia et al. 2013, Liu et al. 2019)

→ No papers on quality management or traceability system and international trade
Quality and trade (Verhoogen 2008, Baldwin and Harrigan 2011, Manova and Zhang 2012...) with different proxy for quality:

- Prices (Schott 2008)
- Econometric estimation of quality (Khandelwal 2013)
- Expert ranking (Crozet et al. 2012)
- R&D and Innovation (Curzi et Olper 2012)
- Professional classification (Hansman et al. 2020, Emlinger and Lamani 2020)

→ Here a different definition of quality: safety, reliability, ability to follow regulatory requirements
DADS French administrative employee-firm-level database: number of employees, working hours, total salary, by firm and occupation

- 387d: quality control manager and engineer
- 475b: quality control technician for the processing industries

French Customs trade data: value and quantity exported by firm, product (HS6), destination and year

- From 2009 to 2015
- Agri-food products only
- Focus on Agri-food producing firms (exclusion of wholesalers)
Data: Trade and quality management

Number of agrifood firms

Number of exporting agrifood firms
Data: Trade and quality management
Data: Trade and quality management

French agrifood exports (value)

- 2009
- 2010
- 2011
- 2012
- 2013
- 2014
- 2015

- engineer
- technicians
- both
- none

Emlinger Latouche
Data: NTMs

- Occurrence of Non-Tariff Measures by country and product (6 digits of the Harmonized System) from WITS

- We restrict NTMs to Sanitary and Phytosanitary measures (SPSs), Technical Barriers to Trade (TBTs) and preshipment inspection - chapters A, B and C of UNCTAD classification

- 80 countries
Data: Trade, quality management and NTM
Specification

\[ \text{Exp}_{fjkt} = \alpha_1 \text{Quality}_{ft} + \xi_{jkt} + \nu_f + \varepsilon_{fjkt} \]

- \( \text{Quality}_{ft} \) is a dummy indicating whether firm \( f \) has quality management the year \( t \)
- \( f \) fixed effect controls for time invariant firms characteristics
- \( jkt \) fixed effects controls for characteristics of the market of country \( j \) and good \( k \) the year \( t \)

→ Intensive margin \( \text{Exp}_{fjkt} = \ln\nu_{fjkt} \) log of exports of \( f \) to \( j \) for the \( k \) at \( t \)
### Results

<table>
<thead>
<tr>
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<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \text{Quality}_{ft} )</td>
<td>0.09**</td>
<td>0.13***</td>
<td>-0.05</td>
<td>-0.18**</td>
</tr>
<tr>
<td>( \text{Quality}_{ft} \times \text{EU}_j )</td>
<td>0.02</td>
<td>0.06</td>
<td>0.06</td>
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<tr>
<td>( \text{Quality}_{ft} \times \text{nonEU}_j )</td>
<td>-0.16***</td>
<td>-0.03***</td>
<td>-0.18**</td>
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<tr>
<td>( \text{Quality}_{ft} \times \text{EU}<em>j \times \text{NTM}</em>{jk} )</td>
<td>0.02</td>
<td>0.14</td>
<td>0.07</td>
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<td>( \text{Quality}_{ft} \times \text{nonEU}<em>j \times \text{NTM}</em>{jk} )</td>
<td>0.14**</td>
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<tr>
<td>( \text{Quality}_{ft} \times \text{EU}<em>j \times \text{SPS}</em>{jk} )</td>
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<td>-0.24</td>
<td>0.17</td>
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<td>0.11</td>
<td>0.08</td>
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<td>( \text{Quality}_{ft} \times \text{EU}<em>j \times \text{TBT}</em>{jk} )</td>
<td>0.43**</td>
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<td>( \text{Quality}_{ft} \times \text{nonEU}<em>j \times \text{TBT}</em>{jk} )</td>
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<td>-0.04</td>
<td>0.05</td>
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<tr>
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<td>0.21</td>
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<td>( \text{Quality}_{ft} \times \text{nonEU}<em>j \times \text{Preship}</em>{jk} )</td>
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<td>-0.18***</td>
<td>0.04</td>
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<table>
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<th>Nber Obs.</th>
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<th>329,024</th>
<th>329,024</th>
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<tbody>
<tr>
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<td>0.50</td>
<td>0.50</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Firm and destination-product-year fixed effects included.

* \( p < 0.10 \), ** \( p < 0.05 \), *** \( p < 0.01 \).
Conclusion

- We show that quality management employees:
  - help firms to export more in value ...
  - ... but only to destination-products with NTM
  - Reduce exports on non EU markets without NTM: cost effects?
  - Have a heterogeneous effect according to the type of NTM

- Future steps:
  - Explore the different type of personnel: Engineer, Technicians
  - Explore the intensity of quality management: number of employees, salaries, working time
  - Look at the effect of quality management on the extensive margin of trade, on unit values and perceived quality (Khandelwal 2010)