

PROOF COVER SHEET

Journal acronym: RAEL
Author(s): D. Curzi, L. Pacca and A. Olper
Article title: Trade collapse, quality and food exports
Article no: 829191
Enclosures: 1) Query sheet
2) Article proofs

Dear Author,

1. Please check these proofs carefully. It is the responsibility of the corresponding author to check these and approve or amend them. A second proof is not normally provided. Taylor & Francis cannot be held responsible for uncorrected errors, even if introduced during the production process. Once your corrections have been added to the article, it will be considered ready for publication.

Please limit changes at this stage to the correction of errors. You should not make insignificant changes, improve prose style, add new material, or delete existing material at this stage. Making a large number of small, non-essential corrections can lead to errors being introduced. We therefore reserve the right not to make such corrections.

For detailed guidance on how to check your proofs, please see
<http://journalauthors.tandf.co.uk/production/checkingproofs.asp>.

2. Please review the table of contributors below and confirm that the first and last names are structured correctly and that the authors are listed in the correct order of contribution. This check is to ensure that your name will appear correctly online and when the article is indexed.

Sequence	Prefix	Given name(s)	Surname	Suffix
1		D.	Curzi	
2		L.	Pacca	
3		A.	Olper	

Queries are marked in the margins of the proofs.

AUTHOR QUERIES

General query: You have warranted that you have secured the necessary written permission from the appropriate copyright owner for the reproduction of any text, illustration, or other material in your article. (Please see <http://journalauthors.tandf.co.uk/preparation/permission.asp>.) Please check that any required acknowledgements have been included to reflect this.

- AQ1** The reference “Broda et al., 2006” is cited in the text but is not listed in the references list. Please either delete in-text citation or provide full reference details following journal style.
- AQ2** Please provide missing publisher location for the “EBDR, 2011” references list entry.
- AQ3** Please provide missing location (city) name for the “Esposito and Vicarelli, 2011” references list entry.
- AQ4** Please update volume number and page numbers for the reference “Khandelwal et al., 2013” if applicable.

How to make corrections to your proofs using Adobe Acrobat

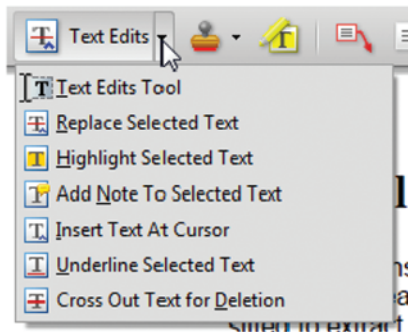
Taylor & Francis now offer you a choice of options to help you make corrections to your proofs. Your PDF proof file has been enabled so that you can edit the proof directly using Adobe Acrobat. This is the simplest and best way for you to ensure that your corrections will be incorporated. If you wish to do this, please follow these instructions:

1. Save the file to your hard disk.
2. Check which version of Adobe Acrobat you have on your computer. You can do this by clicking on the "Help" tab, and then "About."

If Adobe Reader is not installed, you can get the latest version free from <http://get.adobe.com/reader/>.

- If you have Adobe Reader 8 (or a later version), go to "Tools" / "Comments & Markup" / "Show Comments & Markup."
- If you have Acrobat Professional 7, go to "Tools" / "Commenting" / "Show Commenting Toolbar."

3. Click "Text Edits." You can then select any text and delete it, replace it, or insert new text as you need to. If you need to include new sections of text, it is also possible to add a comment to the proofs. To do this, use the Sticky Note tool in the task bar. Please also see our FAQs here: <http://journalauthors.tandf.co.uk/production/index.asp>.



4. Make sure that you save the file when you close the document before uploading it to CATS using the "Upload File" button on the online correction form. A full list of the comments and edits you have made can be viewed by clicking on the "Comments" tab in the bottom left-hand corner of the PDF.

If you prefer, you can make your corrections using the CATS online correction form.

Trade collapse, quality and food exports

D. Curzi^{a,*}, L. Pacca^a and A. Olper^{a,b}

^a*Department of Economics, Management and Quantitative Methods (DEMM),
 University of Milan, Via Celoria 2, 20133 Milano, Italy*

^b*LICOS – Centre for Institution and Economic Performance, Catholic University
 of Leuven, Waaistraat 6, Leuven, Belgium*

This article revisits the so-called ‘Collapse in Quality’ hypothesis, according to which, during the 2008–2009 crisis, higher quality goods experienced a stronger export reduction compared to low-quality ones. Using disaggregated trade data from three European countries that traditionally export high-quality food products – France, Italy and Spain – we do not find any econometric evidence supporting this hypothesis. In contrast, we provide preliminary evidence for the concurrent hypothesis, namely that firms reduced their markup to preserve market share.

Keywords: 2008–2009 crisis; trade collapse; food quality; markup

JEL Classification: F41; F42; Q17

I. Introduction

During the 2008–2009 global crisis, international trade slowed down dramatically with respect to the level of economic downturn. Among the different dynamics that stand behind this trade collapse, the idea that the quality of exported products played a significant role – the so-called ‘Collapse in Quality’ hypothesis – has been only marginally explored by the economic literature.¹ This hypothesis has been put forward by Berthou and Emlinger (2010), who found that, during the crisis, goods with higher unit value were affected by stronger import collapse in the EU market. This pattern supports the ‘Collapse in Quality’ hypothesis, assuming that price (unit value) represents a good proxy for quality. Yet, this assumption has been

brought into question by recent literature (Khandelwal, 2010; Hallak and Schott, 2011).

The idea that the demand for quality goods reduced during the crisis is supported by some key stylized facts and anecdotal evidence. First, the reduction in trade flows has been stronger in nominal than in real terms. Considering the US food and beverage exports, their value component dropped by 12.7%, whereas their quantity only by 6.7% (Levchenko *et al.*, 2010). Thus, one can infer that this relevant price reduction is the result of a shift in the consumers’ demand from high- to low-quality products. This interpretation is also supported by the fact that, in 2009, European consumers changed their behaviour, shopping more often in discounts and convenience stores and increasing their purchases of supermarket-(cheaper)

*Corresponding author. E-mail: daniele.curzi@unimi.it

¹ Several possible explanations are put forward in the literature to interpret the trade collapse during the global crisis. Bems *et al.* (2010) point to the role played by vertical trade, and the subsequent strong reduction of trade in intermediates. Ahn *et al.* (2011) find evidence that bank credits play a key role in the international transactions. By contrast, Levchenko *et al.* (2010) proved the existence of a ‘compositional effect’, namely sectors that experienced a larger reduction in domestic output lowered more their trade. Interestingly, although trade protection increased during the recent crisis, it is by far not considered among the main reasons of the trade collapse (Baldwin and Evenett, 2009). See Levchenko *et al.* (2010) for a review on the main empirical evidence.

owned brands. Moreover, European households reduced their luxury goods consumption by more than 30% (EBDR, 2011).

50 Levchenko *et al.* (2011) tested the ‘Collapse in Quality’ hypothesis on the US market, using direct quality estimates from trade data, instead of simple unit values. However, they did not find any sizable reduction in the quality of US imports during the crisis. By contrast, 55 Esposito and Vicarelli (2011), working on Italian exports towards the EU, provide evidence that quality had a relevant role in the trade collapse. However, once again, their exercise relied on the use of unit value as proxy for quality.

Our article contributes to this literature focusing on 60 food exports from the three EU countries – France, Italy and Spain – that are universally recognized as producers and exporters of the highest quality food products. Differently from previous works, we first infer quality at the very detailed product level using trade data relying on 65 the Khandelwal *et al.* (2013) method. Then we test the extent to which the 2008–2009 crisis affected the quality of the exported products. Our main results show that although we detect a significant reduction in the prices of the exported goods, their quality component did not 70 display any significant change.

II. Empirical Approach and the Data

We infer product quality using trade data, relying on the approach recently proposed by Khandelwal *et al.* (2013), which is based on the following straightforward intuition: 75 ‘conditional on price, a variety with a higher quantity is assigned higher quality’.

This method exploits the property of the CES demand function. Let us assume that the consumer’s preference in a country c for a variety v (product h , imported by country 80 c), produced by industry I , is characterized by the following CES utility function:

$$U = \left[\int_{v \in V} [\lambda(v)q(v)]^{(\sigma-1)/\sigma} dv \right]^{\sigma/(\sigma-1)} \quad (1)$$

where $q(v)$ is the consumed quantity of variety v , characterized by a quality $\lambda(v)$, and $\sigma > 1$ is the elasticity of substitution across varieties. The demand for variety v in 85 year t is then obtained by maximizing the relation (1) subject to the usual budget constraint, yielding

$$q_{cht} = (\lambda_{cht})^{\sigma-1} (p_{cht})^{-\sigma} P_{ct}^{\sigma-1} Y_{ct} \quad (2)$$

where p_{cht} represents the price of the imported variety and λ_{cht} the relative quality attached by the consumer. P_{ct} is the ideal price index associated with Equation 1 and Y_{ct} represents the total spending for industry I ’s varieties. 90 Taking the logs of Equation 2, product quality is inferred from the residual of the following OLS regression:

$$\ln q_{cht} + \sigma \ln p_{cht} = \alpha_h + \alpha_{ct} + e_{cht} \quad (3)$$

where α_h and α_{ct} account for, respectively, product and country-year fixed effects. Thus, product quality is 95 inferred weighting the estimated residual from Equation 3 by the country-industry-specific elasticity of substitution minus one, $\hat{\lambda}_{cht} \equiv \hat{e}_{cht}/(\sigma - 1)$.

We estimate Equation 3 separately for each of the three considered exporter countries (France, Italy and Spain), within each NACE 4-digit industry, with varieties classified at the CN 8-digit level. Country-industry-specific 100 elasticities of substitution are taken from Broda *et al.* (2006), where they are available at the HS 3-digit level of disaggregation.² AQ1

Next, to test the ‘Collapse in Quality’ hypothesis, we 105 follow Khandelwal *et al.* (2013), decomposing the price of each variety into a quality-adjusted price and a quality component. The quality-adjusted price is obtained by subtracting from the log prices the estimated quality (which is already in log).³ Then, using a single difference 110 approach, we regress, alternatively, the three variables (price, quality and price-adjusted quality) on a dummy indicator, which assumes the value of 0 for the 2007–2008 and the value of 1 for the 2008–2009 variation, yielding

$$\Delta y_{cht} = \alpha_0 + \alpha_h + \alpha_c + \alpha CRISIS_t + e_{cht}$$

where $\Delta y_{cht} \equiv \ln y_{cht} - \ln y_{ch,t-1}$, α_h and α_c account for, 115 respectively, product and destination country fixed effects. This approach allows us to check, first, whether during 2009 (set as the crisis year) there has been a significant price reduction for exported goods, when compared to the pre-crisis period. Second, we test whether this 120 possible slowdown is mostly attributable to a reduction in the quality or in the price component of the exported goods.

Data in value and in volume for both the quality estimates and the empirical exercise are taken from the 125 EUROSTAT Comext database at the maximum level of disaggregation (CN 8-digit level). In order to infer quality separately for each exporter country-industry, the CN 8-

² Following Colantone and Crinò (2011), we aggregate these elasticities at the NACE 4-digit level, by taking the median value across all corresponding HS 3-digit products. Before estimating Equation 3, as usual, we drop varieties with unit value that fall below the 5th and above the 95th percentile.

³ Note that, by construction, prices are the sum of the quality and price-adjusted quality components.

130 digit products are then mapped into the corresponding
NACE 4-digit industries, through appropriate correspon-
135 dence tables provided by EUROSTAT.

III. Results

135 We first analyse the extent to which nominal and real food
exports of the three considered countries have been
140 affected by the crisis. Results in columns 1 and 2 of
Table 1 confirm a significant reduction in both the value
(−18.0%) and the volume (−10.6%) of the exported food
products. The observed stronger reduction in the nominal
140 food exports is in line with findings from previous litera-
ture referred to total trade (see Berthou and Emlinger,
2010; Levchenko *et al.*, 2010). These results hold true

with only minor differences when the three exporting
countries are studied separately (see columns 3 and 4)
and, interestingly, even when the destination markets are
split in developed (OECD) and emerging (BRIC) coun-
tries (columns 5 and 6).

145 Table 2 displays our main findings, obtained by testing
whether the export price decrease due to the global crisis
corresponds to a significant reduction in the quality com-
ponent. First, results in column 1 confirm that, on average,
150 export price shrank by 7.3%. However, when we regress
the quality component on the crisis indicator, its estimated
coefficient, although negative, is not statistically different
from zero. Results in column 3 display a negative and
155 significant reduction in price-adjusted quality, providing
further evidence that the decrease in the value of trade is
not due to exporting lower quality products but to a

Table 1. Variation in volume and value of exports during the crisis (2007–2008 versus 2008–2009)

	(1) Δ Volume	(2) Δ Value	(3) Δ Volume	(4) Δ Value	(5) Δ Volume	(6) Δ Value
Crisis	−0.106*** (0.0111)	−0.180*** (0.0106)				
Crisis × France			−0.102*** (0.0142)	−0.168*** (0.0128)		
Crisis × Italy			−0.105*** (0.0146)	−0.184*** (0.0140)		
Crisis × Spain			−0.118*** (0.0173)	−0.195*** (0.0160)		
Crisis × OECD					−0.0891*** (0.0110)	−0.149*** (0.0103)
Crisis × BRIC					−0.105*** (0.0357)	−0.170*** (0.0301)
Product F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Destination F.E.	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	106 578	106 576	106 578	106 576	106 578	106 576

Note: Robust SEs in parentheses are clustered within products. ***, ** and * indicate, respectively, significance at 1%, 5% and 10% level.

Table 2. Variation in price, quality and price adj. quality of exports during the crisis (2007–2008 versus 2008–2009)

	(1) Δ Price	(2) Δ Quality	(3) Δ Price Adj. Qual.	(4) Δ Price	(5) Δ Quality	(6) Δ Price Adj. Qual.
Crisis	−0.0735*** (0.00586)	−0.0113 (0.00715)	−0.0622*** (0.00683)			
Crisis × OECD				−0.0595*** (0.00478)	−0.0102 (0.00730)	−0.0493*** (0.00605)
Crisis × BRIC				−0.0653*** (0.0153)	−0.0101 (0.0232)	−0.0552*** (0.0206)
Product F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Destination F.E.	Yes	Yes	Yes	Yes	Yes	Yes
No. of obs.	106 576	106 576	106 576	106 576	106 576	106 576

Note: Robust SEs in parentheses are clustered within products. ***, ** and * indicate, respectively, significance at 1%, 5% and 10% level.

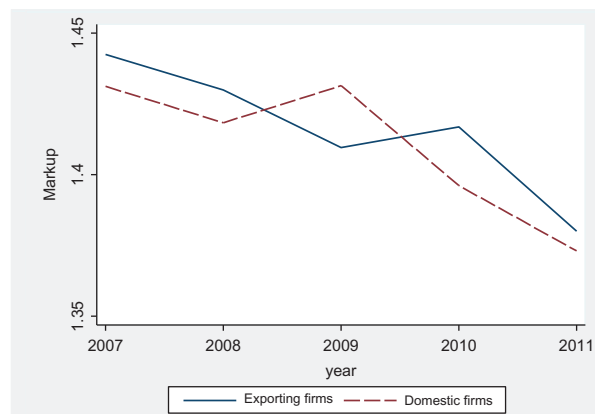


Fig. 1. Evolution of markup for exporting and domestic French firms

Note: Markup is computed using Amadeus data

genuine reduction in prices. Finally, columns 4–6 show that the above results do not change significantly when OECD and BRIC countries are considered separately. Similar results are obtained by running the same regression for each of the three exporting countries taken individually (results not shown).⁴ Thus, our findings provide a broad confirmation that the export price turned down during the crisis, but fail to attribute this reduction to a variation in the quality of products. Thus, in line with the findings of Levchenko *et al.* (2011), we do not support the ‘Collapse in Quality’ hypothesis.

A concurrent explanation for the export prices slowdown, alternative to the ‘Collapse in Quality’ hypothesis, is that, during the crisis, exporting firms reduced their markup. This means that they lowered the prices of the exported products, maintaining their quality constant. To provide evidence for this hypothesis, we computed markup for a representative sample of French food firms.⁵

Figure 1 reports the last few years’ evolution of markup for domestic and exporting French firms.⁶ Consistent with our conjecture, in 2009 only the exporting firms experienced a reduction in markup, thereby providing some preliminary credence to our alternative interpretation.

IV. Conclusions

In this article, the ‘Collapse in Quality’ hypothesis is revisited with respect to exports of three EU countries (France, Italy and Spain). To do this, we estimated quality at the

⁴ These additional results are available from the authors upon request.

⁵ Markup is computed from Amadeus data. Ideally, we would need data on prices and marginal costs to measure markup. However, marginal costs are difficult to observe. Thus, we estimate markup for firm f in year t , following Chen *et al.* (2009) and many others, using the information on turnover and variable costs: $\mu_{ft} = \left[\frac{\text{turnover}_{ft}}{\text{tot. variable costs}_{ft}} \right] = \left[\frac{\text{unit price}_{ft}}{\text{unit cost}_{ft}} \right]$

⁶ We select France among the three exporting countries, as it is the only one with information on international trade activities in the Amadeus database, allowing us to compare the markup of domestic and exporting firms.

product line level relying on the Khandelwal *et al.* (2013) method. Overall, the main results provided a broad confirmation to the key stylized facts emerged from the literature on the trade effects of the global crisis, i.e. a stronger reduction in value than in the volume of exports. However, although we detect a significant reduction in food export prices, this cannot be attributed to a change in the quality of the products. By contrast, we find preliminary evidence supporting the concurrent hypothesis, according to which during the 2008–2009 crisis exporting firms reduced the markup in order to maintain their market share.

References

- Ahn, J., Amiti, M. and Weinstein, D. E. (2011) Trade finance and the great trade collapse, *American Economic Review*, **101**, 298–302.
- Baldwin, R. and Evenett, S. (2009) *The Collapse of Global Trade, Murky Protectionism, and the Crisis: Recommendation for the G20*, CEPR, London, 1–9, chapter 1.
- Bems, R., Johnson, R. C. and Yi, K. (2010) Demand spillovers and the collapse of trade in the global recession, *IMF Economic Review*, **58**, 295–26.
- Berthou, A. and Emlinger, C. (2010) Crisis and the collapse of World trade: the shift to Lower Quality. CEPII, Working Paper No. 2010-07.
- Chen, N., Imbs, J. and Scott, A. (2009) The dynamics of trade and competition, *Journal of International Economics*, **77**, 50–62.
- Colantone, I. and Crinò, R. (2011) New Imported Inputs, New Domestic Products, Development Working Papers No. 312, Centro Studi Luca d’ Agliano, University of Milano.
- EBDR (2011) *Crisis and Transition: The People’s Perspective*, EBDR publications, Chapter 2.
- Esposito, P. and Vicarelli, C. (2011) Explaining the performance of Italian exports during the crisis: (Medium) quality matters, Working Paper No. 95, Luiss Lab of European Economics.
- Hallak, J. C. and Schott, P. (2011) Estimating cross-country differences in product quality, *The Quarterly Journal of Economics*, **126**, 417–74.
- Khandelwal, A. (2010) The long and short of quality ladders, *Review of Economic Studies*, **77**, 1450–76.
- Khandelwal, A. K., Schott, P. K., Wei, S. J. *et al.* (2013, forthcoming) Embedded institutional reform: evidence from Chinese exporters, *The American Economic Review*.
- Levchenko, A. A., Lewis, L. and Tesar, L. L. (2010) The collapse of international trade during the 2008–09 crisis: in search of the smoking gun, *IMF Economic Review*, **58**, 214–53.
- Levchenko, A. A., Lewis, L. and Tesar, L. L. (2011) The ‘Collapse in Quality’ hypothesis, *American Economic Review*, **101**, 293–7.