



Export behavior of Italian food firms: Does product quality matter?

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ABSTRACT

Using firm-level data we investigate the export behavior of Italian food firms, focusing on the link between total factor productivity (TFP), product quality, and export across heterogeneous destinations. We test the main predictions of an international trade model based on firm heterogeneity in product quality and non-homothetic preferences in consumption. In this setting, the firm's export intensity should be increasing in the *per-capita* income of foreign destinations, and the effect should be largely driven by firms' heterogeneity in product quality. Using different measures of revenue-TFP, and different proxies for product quality, we find strong support for the main model predictions. Moreover, consistent with the Alchian–Allen effect, we find a positive relationship between the quality of exported products and the distance of destination countries.

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Introduction

Empirical evidence and theoretical models increasingly point to the importance of product quality for understanding the patterns of international trade. The quality of traded products is of primary importance, especially because economic growth and development are driven by the total factor productivity (TFP) that rises as a result of innovation, either reducing costs, or, indeed, increasing the quality of the input and the final products (Helpman, 2011).¹

The quantification of the role of quality in explaining trade outcomes is, however, prevented by the lack of direct measures of quality, forcing researchers to use proxies such as unit values computed from trade statistics (Crozet et al., 2012; Hallak and Schott,

2011). However, it is well known that the use of unit values introduces noise in the analysis because unit values also capture several aspects that are not attributable to quality.²

In this paper we use an alternative approach to study the relationship between product quality and food export performance. Specifically, we make use of a (unbalanced) panel of roughly 750 Italian food firms, observed in the period 2001–2006. The main advantage of our dataset is that it allows the construction of a large set of firm-level variables, strictly correlated with product quality, like investment intensity, R&D expenditure, product and process innovations, as well as quality standard certifications. Using this data we study the relationship between TFP, product quality and firms export across destinations.

The empirical analysis is based on a theoretical model recently developed by Crinò and Epifani (forthcoming), who extend a heterogeneous-firm's model *a la* Melitz (2003) by incorporating firms heterogeneity in product quality and non-homothetic preferences. In this setting, they show that, conditional to export, firm's export intensity monotonically increases in the *per-capita* income of export destinations and, most importantly, this effect should be largely driven by firms heterogeneity in product quality.

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¹ See Linder (1961), Falvey and Kierzkowski (1987), and Flam and Helpman (1987) for seminal contributions studying the influence of product quality on international trade. Empirical evidence of the link between product quality and trade patterns can be found in Schott (2004) and Hallak (2010). Differently, firms' level evidence can be found in Verhoogen (2008). The contribution of product quality to macroeconomic growth is investigated theoretically by Grossman and Helpman (1991) and empirically by Hummels and Klenow (2005).

² First, because product heterogeneity and classification errors are important sources of unit value noise (Lipsey, 1994). Second, because higher unit values could reflect higher quality but also higher costs (see Aiginger, 1997). Finally because higher unit values could also be the consequence of higher margins created by market power (Knetter, 1997). See Hallak and Schott (2011) and Khandelwal (2010), for recent evidence about the poor ability of export unit values to capture product quality.

Our analysis departs from Crinò and Epifani (forthcoming) in several respects. First, we focus explicitly on the food and beverage industry. This can be important as working at a narrow product level can offer additional insights by reducing any potential aggregation bias due to sector heterogeneity (see Hallak, 2010). The Italian food industry represents an 'ideal' case study to investigate this relationship. This is because a lot of anecdotal evidence emphasizes how the performance of Italian food products in international markets is driven by their high quality nature. Yet, and quite surprisingly, formal evidence of this link is rare, only based on export unit values, and not always in line with common intuition (see Ninni et al., 2006; Fischer, 2010).³ Second, we investigate the relationship for both the overall food industry and the 'sub-samples' related to firms producing typical 'Made in Italy' and 'Protected Designation of Origin' (PDO) products. This offers two main advantages. It gives the possibility to investigate if the perceived quality of these two product aggregations really matters for firm export behavior, and, moreover, it represents an indirect test to investigate whether the firm-level proxies for quality, suggested by industrial organization literature, correlate with the recognized quality of these food products. Third, among the proxies for capturing firm level quality we also consider information about the ISO 9000 certification, an international standard directly linked to product quality, which was recognized in previous studies as being important to characterize a firm's export performance (see Hallak and Sivadasan, 2009; Brown et al., 1998). Finally, we extend the analysis to the period 2004–2006, combining the 9th (2001–2003) and 10th Surveys (2004–2006) on Manufacturing Firms (*Indagine sulle Imprese Manifatturiere*) carried out by Unicredit-Capitalia.

There exists a large literature studying quality and quality assurance for agri-food products.⁴ In the last decades, as a consequence of globalization, product quality and safety issues have become central features in both domestic and international markets for food products (see, e.g., Krissof et al., 2002). This has triggered important research into food quality and its assurance, being especially focused on health and safety standards, related policy implications and impact on international food trade (see, e.g., Bureau et al., 1998; Swinnen, 2007; Henson and Jaffee, 2008). However, within this important strand of literature, little attention has been given to the role of product quality as a key driver of a firms' productivity and export performance.

Our analysis is closely related to recent attempts in the international trade literature to understand which characteristics of firms matter the most for export success. The traditional view is that more productive firms are larger, more likely to export, and serve more, and distant, markets (see Melitz, 2003; Bernard et al., 2007; Melitz and Ottaviano, 2008; Bernard et al., 2009).⁵ Yet, several recent stylized facts are at odds with this interpretation, as

larger exporters are more skill intensive, use more expensive inputs, and charge higher, not lower, prices (Verhoogen, 2008; Manova and Zhang, forthcoming). Moreover, firms' total factor productivity do not seem to univocally determine they export status (Hallak and Sivadasan, 2009). Recent papers aimed at reconciling these apparent contradictory facts have extended the seminal productivity–heterogeneity framework in several directions, introducing heterogeneity into the fixed (sunk) costs of exporting (Das et al., 2007; Armenter and Koren, 2009), a richer treatment of the demand side of the model (Fajgelbaum et al., 2011; Crinò and Epifani, forthcoming; Altomonte et al., 2011; Bernard et al., 2011) and, last but not least, by incorporating heterogeneous quality across firms (Baldwin and Harrigan, 2011; Verhoogen, 2008; Crozet et al., 2012; Fajgelbaum et al., 2011; Crinò and Epifani, forthcoming). All these contributions tend to show that more efficient firms have higher export performance as they use more expensive and better quality inputs to sell higher-quality goods at higher prices.

Finally, our paper, like modern literature on quality and trade, is also related to the so-called Linder (1961) hypothesis. This author, long ago, emphasized product quality as an important determinant of the direction of trade, suggesting that richer countries tend to import more from countries producing higher-quality goods. However, the standard literature using the gravity equation and aggregated trade data find only mixed evidence of the Linder's effect (see Hallak (2010) for a recent survey). Similarly, Haq and Meilke (2011), using an augmented gravity equation, found little evidence of the Linder effect for agro-food products, notwithstanding the high intra-industry trade in that sector.⁶ Differently, our paper show that product quality is an important determinant of trade patterns, in a way consistent with the Linder (1961) hypothesis.

The remainder of the paper is organized as follows: the second section presents the theoretical framework, summarizing the key intuitions of a simple monopolistic competition trade model with firm heterogeneity in both productivity and product quality. The third section presents the data of the Italian food and beverage industry firms, summarizes how we retrieve our firms' level TFP estimates, and introduces the econometric strategy to test the main theoretical hypotheses. In fourth section, the results are presented and discussed. Finally, in the last section the main conclusions are drawn.

Theoretical framework

Consider a representative consumer characterized by the following utility function:

$$U = \left[\int_{v \in V} q(v)^{1-\rho} c(v)^\rho dv \right]^{\frac{1}{\rho}}, \quad 0 < \rho < 1, \quad (1)$$

where V is a continuous set of varieties available for consumption, indexed by v and represents a Cobb–Douglas bundle of physical quantity; $c(v)$ is consumption and $q(v)$ is quality of variety v as perceived by the representative consumer. The demand for variety v is obtained from the maximization of (1) subject to the usual budget constraint

$$c(v) = q(v) \frac{p(v)^{-\sigma} R}{p^{1-\sigma}}, \quad (2)$$

where R is total income, $p(v)$ the price of variety v , $\sigma = (1 - \rho)^{-1} > 1$ is the constant elasticity of substitution between any two varieties, and P is the ideal price index associated with the utility function (1).

The first key assumption of the Crinò and Epifani (forthcoming) model concerns the preferences of a representative consumer.

⁶ More recently, Hallak (2010) demonstrated that the Linder hypothesis theoretically and empirically holds only when formulated at the sector-level.

³ Ninni et al. (2006) studied the role of quality vs. price competition for Italian pasta, cheese, wine, and olive oil, finding weak evidence of quality premium and, more often than expected, indications of price competition. Mixed evidence on the role of quality for export performance is also reported by Fischer (2010). Both papers used export unit values for their analyses.

⁴ The analysis of food quality has followed different and alternative approaches. First, the standard economic approach that formalizes quality as a process of vertical and/or horizontal differentiation. Second, focusing on the characteristics of quality attributes, and classifying them in search, experience and credence on the basis of the level of information available to the consumer (see Hooker and Caswell, 1995; Caswell and Mojuszka, 1996). Finally, following the quality perception approach developed within the applied psychology and marketing literature (e.g., Steenkamp, 1990). See Caswell et al. (2002) for a review and rationalization of this literature.

⁵ Similar patterns have been found for food and beverage firms (see Chevassus-Lozza and Latouche, 2012; Gullstrand, 2011). Specifically, Chevassus-Lozza and Latouche (2012), using a micro-dataset for 2004, studied the accessibility of European markets to French firms. Differently, Gullstrand (2011) investigated the importance of sunk export costs, using a very detailed dataset of Swedish food and beverage sector in the 1997–2002 period.

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