Strengthening European Food Chain Sustainability by Quality and Procurement Policy

Deliverable 4.6:

DO EU GEOGRAPHICAL INDICATIONS AFFECT THE QUALITY OF EU IMPORTS?

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EXECUTIVE SUMMARY

The objective of this work is to provide an empirical assessment of the effect exerted by the diffusion of EU Geographical Indications (GIs) on the quality of exported agri-food products from non-EU countries to the EU. Product quality has been estimated using trade data, by relying on the methodology developed by Khandelwal, Schott and Wei (2013), which is based on the following straightforward presumption: after controlling for price, products exported in higher quantity are assigned higher quality. This methodology allows for the splitting of the export price (expressed as unit value) into its quality and quality-adjusted price components. From this perspective, our analysis allows for the empirical assessment as to what extent the diffusion of EU GIs affect differently the quality of the exported products and their *pure* price component. Our results show that, on average, the diffusion of EU GIs leads to a reduction of prices of exported agri-food products from non-EU countries to the EU. In particular, the price effect seems to dominate the quality effect, as the *pure* price component seems to be more affected than the quality one. These results thus suggest that, on average, non-EU countries, when exporting in categories where EU GIs proliferate, are more likely to opt for a price competition strategy, rather than a quality competition strategy. This is because non-EU countries, targeting exports in categories where the presence of GIs set high quality standards, in order to be competitive can either decide to upgrade the quality of their exports (and thus compete on the quality level), or they can decide to export low price and, thus low quality products, hence competing on price. Our results suggest that the latter strategy seems to prevail.

We also empirically assess whether the estimated effect is heterogeneous across countries. Our evidence suggests that the negative price-quality effect is particularly relevant for more developed countries (i.e. OECD countries) than for less-developed ones (i.e. non-OECD). This result is probably due to the fact that non-OECD countries, exporting on average lower quality products, already compete on price, while developed countries seem to react to the diffusion of EU GIs by deciding to adopt a price competition strategy, and thus opting for a sharp decrease in the price and quality of their exported agri-food products. Our results also show that countries recognizing the EU's GI policy and/or producing GI products according to their own policy, do not show, on average, any significant variation in their quality or price export strategy. This is probably because a mutual recognition of the GI policy facilitates bilateral trade relationships, in a way that a further diffusion of EU GIs does not significantly affect export strategy in these non-EU countries.

Overall, our findings suggest that EU quality policy, by setting high quality standards, seems to put downward pressure on the quality of exports from non-EU countries seeking to export in these sectors where GIs are present, as they opt for price-based competition rather than to compete on quality. Our results thus suggest that unless non-EU countries do not establish their own quality policy, the increasing number of EU GIs will lead them to compete progressively more on the basis of price. From this perspective, EU consumers will increasingly considers products coming from non-EU countries as a cheaper and low-quality alternative to EU-produced, high-quality products.

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LIST OF ABBREVIATIONS AND ACRONYMS

CES – CONSTANT ELASTICITY OF SUBSTITUTION

EU – EUROPEAN UNION

GI – GEOGRAPHICAL INDICATION

NTM – NON-TARIFF MEASURE

OECD – ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

PDO – PROTECTED DESIGNATION OF ORIGIN

PGI – PROTECTED GEOGRAPHICAL INDICATION

SPS – SANITARY AND PHYTOSANITARY

STC – SPECIFIC TRADE CONCERN

WTO – WORLD TRADE ORGANIZATION

Do EU Geographical Indications affect the quality of EU imports?

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1. INTRODUCTION

Food quality schemes represent an important policy instrument employed by the EU to promote the quality of its agri-food products and to preserve their original characteristics that are rooted in geographical factors, human local knowledge and production methods (Agostino and Trivieri, 2014). Geographical Indications (GIs) represent the main tool through which this policy is implemented. At the international level, while the EU strongly supports this policy and asks for better protection of EU GI products, it is widely regarded by most non-EU countries a cumbersome policy which often acts as a non-tariff barrier to trade (Chambolle and Giraud-Heraud, 2005). Both theoretical and empirical evidence emerging from Deliverable 4.5 seems to legitimate this concern raised by non-EU countries, as indeed the diffusion of EU GIs appears to be linked to a (weak) reduction of agri-food imports, when both intra- and non-EU trade are considered. While the trade effect exerted by EU GIs, both considering the export and the import side, has already been covered by different studies in the literature, there is no evidence on the effect of the diffusion of GIs on the quality of products imported into the EU from non-EU countries. This issue is particularly relevant in the light of recent and growing tensions at the World Trade Organization (WTO) level, where non-EU countries blamed the European Union to be excessively protectionist on its domestic market by imposing very restrictive Non-Tariff Measures (NTMs). In this setting, GIs may have a similar effect to NTMs (see Deliverable 4.5), and, thus, the effect exerted by EU policy on the quality of imported products from non-EU countries is particularly important to study. This analysis allows for a better understanding of how the implementation of EU quality policy stimulates the competitive behaviour of non-EU countries exporting to the EU. Indeed, the imposition of high quality standards in the domestic market where GIs are produced, leads non-EU countries seeking to exporting to that market either to compete on quality, and thus to upgrade the quality of their products, or to be competitive on their price, which in turn leads to a downward shift in quality, as they would export low-price products. In the analysis proposed in this deliverable we try to address this issue, by empirical studying the extent to which the diffusion of EU GIs leads the quality effect or the price effect to prevail when considering imports from non-EU countries. Our analysis covers the period 1996-2014 and considers exports from non-EU countries to EU15. We decided to focus on the 15 older member state only, to avoid potential bias determined by the progressive enlargements occurred from 2004 to 2013, and the subsequent abolition of intra-EU tariffs (and NTMs).

2. QUALITY ESTIMATION

2.1. The importance of product quality as determinant of international patterns

In recent years, product quality in the food sector assumed increasingly importance, becoming a fundamental feature of products. This is motivated by the growing concerns of consumers towards what they eat, also due to a number of food scares, and their increasingly awareness of nutrition and health issues (Caswell and Mojduszka, 1996; Grunert, 2005; Bontemps et al., 2013). This growing concern toward food quality has been also triggered by the steadily increasing international trade in food products due to the progressive lowering of tariffs, which made available to worldwide consumers a vast choice of products. Indeed, exporting

countries often rely on different domestic regulation on food safety and quality with respect to the importer, and for this reason consumers in importing countries perceive a higher risk of encountering unsafe products. Therefore, product quality and safety become the key driver of their choice.

Several authors in the literature have stressed the importance of product quality in driving international trade flows. Indeed, quality is often recognized for its essential role in driving the direction of trade and viewed as a pre-condition for export success (Grossman and Helpman, 1991; Amiti and Khandelwal, 2013). In this framework, the enhancement of food quality represents an important driver for countries' development, as well as a fundamental step toward raising products' competitiveness in the international market. It also presents new challenges, especially for developing countries aimed at exporting to rich countries, as they have to make their products meet the high quality requirements (Maertens and Swinnen, 2009; Henson et al., 2011; Minten et al., 2013).

However, the quantification of the role of quality in explaining trade outcomes is often prevented by a lack of direct measures of quality, forcing researchers to use proxies, to make quality measurable (Schott, 2004; Hallak, 2006; Hummels and Klenow, 2005). The most common proxy used by researchers to measure the quality of exported goods is the unit value from trade data, whereby higher unit values reflect higher-quality products. However, multiple studies in the literature indicate that unit values are an imprecise measure of quality, which also reflect several aspects that are not attributable to quality. In order to overcome this problem, some recent studies have developed alternative methodologies to infer product quality, with the aim of obtaining more reliable measures (see, e.g., Khandelwal, 2010; Hallak and Schott, 2011; Khandelwal, Schott and Wei, 2013). These methods allow for the inference of quality from trade data, by disentangling the quality component from trade unit values.

In this work, we adopt the method of Khandelwal, Schott and Wei (2013) to infer the quality of exported food products to the EU. This approach became increasingly popular in recent years among trade economists, and is based on the intuition that, conditional on price, traded products with higher quantities are assigned higher quality. The next section presents in detail this quality estimation method.

2.1. The Khandelwal, Schott and Wei (2013) method

Khandelwal, Schott and Wei (2013) developed a method to infer product quality which is based on the straightforward presumption that conditional on price, a product with a higher quantity is assigned higher quality. This method exploits the property of the CES demand function and defines, for a given importing country, consumers' preferences for a variety *v* (product *j*, exported by country *c*), produced by industry *i* as:

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

where $q(v)$ represents the consumed quantity of variety v, $\lambda(v)$ identifies quality, and $\sigma > 1$ is the elasticity of substitution. Then, consumers' demand for a product *j*, exported by a country *c* to a country *i* in year *t* is given by the maximization of the relation (1), under the usual budget constraint, obtaining:

$$q_{jcit} = (\lambda_{jcit})^{\sigma-1} (p_{jcit})^{-\sigma} P_{ct}^{\sigma-1} \, Y_{ct} \tag{2}$$

where p_{jcit} is the price of the exported variety, while λ_{jcit} represents the relative quality attributed by the consumer. P_{ct} and Y_{ct} are, respectively, the ideal price index associated with

(2) and the total amount spent for industry i's varieties. After taking the logs of (2), the following OLS regression can be estimated:

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

Where q_{jcit} and p_{jcit} are, respectively, the quantity and the price (unit value) of product *h*, exported by country *c* to country *i* at time *t*. α_j and α_{ct} account for product and exporter-year fixed effects, respectively. e_{jcit} is an error term. Quality is then estimated taking the residual from (5), and dividing it by the country-industry specific elasticity of substitution minus 1. Thus, quality $= \hat{\xi}_{jcit} \equiv \hat{e}_{jcit}/(\sigma - 1)$. [1]

Moreover, once quality has been estimated, this method allows us to obtain the quality-adjusted-price component, $\hat{\delta}_{jcit}$, as follows: $\hat{\delta}_{jcit} \equiv \ln p_{jcit} - \hat{\xi}_{jcit}$.

Product quality has been estimated at the product level (hs 6-digit), by running separate regressions for each importing country-industry (hs 4-digit level), as quality can be compared only within the same industry or product.

3. Empirical Strategy and Data

3.1. Empirical Strategy

The empirical analysis employed in this study, mimics the one used in Deliverable 4.5, in particular when the effect of the diffusion of GIs on non-EU trade is considered. In order to study the effect of EU GIs on the quality of agri-food products imported to the EU from non-EU countries, the following equation has been estimated:

$$lnX_{od,ht} = \beta_0 + \beta_2 GI_{d,ht} + \beta_3 \ln tariff_{od,ht} + \beta_4 \ln SPS_{d,h(HS4)t} + \beta_5 d\ STC_{d,h(HS4)t} + \epsilon_{d,t} + \epsilon_{o,t} + \epsilon_{od} + \epsilon_{ht} + \varepsilon_{od,ht} \quad (4)$$

where $X_{od,ht}$ represents, alternatively the (log of) quality, price and quality adjusted-price, of a HS 6-digit product *h*, exported from an non-EU country *o* to an EU15 country *d*, at time *t*. $GI_{d,ht}$ represents our main variable of interest, and account for the number of GI products (either PDO or PGI) registered in the HS 6-digit product line *h*, in country *d* at time *t*.[2] $\ln tariff_{d,ht}$ accounts for the bilateral *ad valorem* tariff imposed by country *d* to country *o* for product *h*, at time *t*, and is measured as the log of (1+tariff), to account for the presence of zero tariffs. $SPS_{d,ht}$ accounts for the log of (one plus) the number of Sanitary and Phytosanitary (SPS) measures enforced by the EU, for product *h*, at time *t*. Note that SPS data are available at the HS 4-digit product level and they do not have a bilateral dimension as NTMs tend to be enforced unilaterally by the importing country and enforced upon all exporting countries of a certain HS tariff line. Our empirical strategy also controls for the presence of Specific Trade Concerns (STCs), which are NTMs deemed to be particularly restrictive by WTO members (for a more detailed description see the data section 3.2). In particular, in equation (4) $d\ STC_{d,ht}$ is a dummy variable that is equal to 1 if the EU maintains a NTM in product *h* (at the HS 4-digit level), at time *t*, that is considered to be trade restrictive by one or more WTO members. $\epsilon_{d,t} + \epsilon_{o,t} + \epsilon_{od} + \epsilon_{ht}$ account, respectively for, importing

[1] Country–industry specific elasticities of substitution are taken from Broda et al. (2006).

[2] Note that, like in the analysis presented in Deliverable 4.5, as the log of zero is undefined, we use the GI variable in level and, thus, the estimated coefficient of interest (β_2) can be interpreted as semi-elasticity.

country-time, exporting country-time, exporting-importing and product time fixed effects. Finally, $\varepsilon_{od,ht}$ is the error term.

The main objective of our empirical analysis is the estimation of the effect of the diffusion of GI products on the quality of products imported to the EU. The estimation of equation (4), thus, allows us to assess what is the effect of the addition of one GI product on the (log) of the quality of imported agri-food products from an non-EU country. Note that the use of the Khandelwal, Schott and Wei (2013) method allows us to disentangle the quality and quality-adjusted price components from export prices. As a consequence, our empirical analysis considers also the effect of the diffusion of GIs on the (log of) export prices (expressed as unit values) and quality-adjusted price. The latter represents the "*pure price*" component, which is obtained from subtracting the estimated quality from the export price, for a given product *h*, exported from country *d* to country *o*, at time *t*. From this perspective, our empirical strategy allows for the assessment of whether the diffusion of EU GIs affect more the quality or the price of agri-food products exported to the EU from non-EU countries. Hence, our results will shed some light on the effect of EU GIs on the competitive behavior of exporting countries to the EU. In particular, our analysis points to better understand whether the high quality standards imposed by the EU lead other countries to adopt a price or a quality based competition strategy. The former envisages exports of low-price and low-quality products, while the latter is based on upgrading the quality of exported food products, which will likely be of higher price.

3.2. Data

Our empirical analysis requires the use of different sources of data.[3] We use trade data from the BACI database for the quality estimation of agri-food exported products at the HS 6-digit level over the period 1996-2014. As in the analysis presented in Deliverable 4.5 we considered exports to EU 15 countries only.[4] Data on GI products are taken from the DOOR database. We matched manually each registered GI (either PDO or PGI) with the corresponding HS classification at the HS 6-digit level (see Section 4.1 of Deliverable 4.5 for a more detailed description of this variable). Ad valorem bilateral tariffs are taken from the UNCTAD-Trains database, while data on SPS measures are taken from the WTO I-TIP notification database.

The empirical analysis presented in this deliverable accounts also for the presence of products subject to Specific Trade Concerns in the EU. The STC database has been recently released by the WTO for the period 1995 to 2010. For the purpose of the present analysis we extended it until 2014. STC refers to concerns that are raised, in either written or oral form, by individual WTO members in the SPS or TBT committee. Members use the Committees to discuss issues related to specific SPS (TBT) measures that are maintained by other member countries and which might have a significant effect on trade. The issues are denoted as Specific Trade Concerns (STC). Each STC provides information on (i) the country raising the concern and the country imposing the measure; (ii) the year of the concern; (iii) the product of concern at the HS4 digit level; and (iv) the type of measure and subject of the concern. One of

[3] Most of the variables used in this deliverable have been already described in depth in Deliverable 4.5. To avoid repetition we have not reported the same information in this deliverable, and thus we refer to sections 4.1 and 4.2 of Deliverable 4.5 for a more detailed description of the variable used.

[4] For comparability purposes, we only selected those sectors that have been also been analysed in Deliverable 4.5. The considered HS 2-digit sectors are: HS 02, 04, 07, 08, 15, 16. More details on the choice of these sectors are presented in Section 4.1 of Deliverable 4.5.

the main advantages of the STC information is that it selects only those NTMs that, at least by some countries, are perceived as significantly restricting trade. In the analysis we focus on all SPS-STCs that have been raised toward the EU in the considered period. Specifically the database provides information on STCs classified at the HS 4-digit level. Our analysis does not consider the bilateral dimension of STSs, but we use data at the maintaining country (i.e. EU)-product level. Indeed, we assume that once a country maintains a measure that is considered restrictive for trade by one or more countries, this would be true also for other countries. As in the case of SPS, this is consistent with the non-discrimination rule of the WTO. Note, moreover, that this strategy leads our analysis to suffer less from potential endogeneity bias, that may occur from the use of bilateral STCs.

As evident from Figure 1, where the number of HS 4-digit products under STC by maintaining country is shown, the EU represents a relevant case study, as it represents the target of most of the concerns raised by different WTO members. From this perspective, it is of fundamental importance to properly control for them in our empirical analysis, as STCs can be considered, *de facto*, real trade-restrictive non-tariff measures.

4. RESULTS

4.1. A preliminary look to the data

Before moving to the results of our empirical analysis it worth considering our quality estimations, in order to better understand the property of the methodology used to infer the quality of the agri-food products exported to the EU in the considered period. Figure 2 presents an example of the quality ranking for a product (bovine meat), that has been obtained using product quality, as measured with the Khandelwal et al. (2013) method. As already introduced in the previous section, this methodology is based on the straightforward presumption that after controlling for price, products exported in higher quantity are assigned higher quality. Figure 2 takes as an example, exports of bovine meat (HS 020130). The top panel of the figure presents the average quality ranking for this product, while the bottom panel presents data on the respective average unit value and export volume. The Khandelwal et al. (2013) methodology combines information on products' unit value and export volume, to infer product quality through the use of equation (4). Countries are ranked according to the average level of quality assigned by consumers in EU countries to their exports, from the higher-quality to the lower quality one. Figure 2 shows that according to our estimations, Argentina is the country to which, on average, is assigned the higher quality by EU importing countries. In following order are Brazil, Australia and USA. Overall, it is evident that our quality estimations are coherent with average values of export volumes and unit price. For instance, Argentina and Brazil report by far higher average export volumes, while the average unit price is close to that of other countries. Argentina and Brazil are then considered, on average, the higher quality meat exporters, as, after controlling for price, they export much higher volumes than other countries, thus reporting the higher preference of EU consumers.

Our empirical analysis is focused on better understanding the effect of the diffusion of EU GIs on the quality of imported products. In particular, our main interest is in assessing whether EU GIs lead non-EU exporting countries to adopt quality- or price-based competition strategies. In order to have a preliminary look to the data, in Figure 3 we compare the average exporting countries' quality growth with the average price growth over the considered period, separately for products characterized by the presence of GIs (right panel) and those products where GIs are absent in the entire considered period (left panel). The results are quite intriguing. While

most of the exporting countries in non-GI products show in the considered period, on average, a price growth that is followed by a quality growth, the results for GI products are more heterogeneous. Indeed, more than half the countries in the sample show a reduction in price and quality. These preliminary findings thus suggest that the strategy adopted by non-EU countries when considering exports toward the EU in product categories with GIs, is more heterogeneous than when their exports are oriented to product categories where EU countries do not have any GI. Indeed, while the quality-price upgrading strategy seems to prevail in non-GI products, where only a handful of countries show the opposite pattern, the price competition (downward trend in price and quality) strategy is much more common when considering GI products. However, these results suggest simple correlations. In order to properly test our main research question, in the next section we present the results of our empirical analysis.

4.2. Econometric results

Table 1 presents the main results of our empirical analysis, where we study the effect of the diffusion of EU GIs, alternatively, on the price, quality and quality-adjusted price of agri-food exports from non-EU countries toward the EU. The results in column 1 show that the GI effect on the price of agri-food exports of non-EU countries is negative and highly significant. Quantitatively, this result suggests that the addition of a GI on a given HS 6-digit product line leads the export price to reduce by 5.5%.[5] Our empirical specification also controls for the effect of tariff and non-tariff barrier to trade. The results in column 1 show that both tariffs and SPS measures have a positive effect on export prices, although only the SPS effect is (weakly) significant. As described in the methodological section, the use of the Khandelwal et al. (2013) methodology allows for the division of the export price into its quality and quality-adjusted price components. This allows in our specific case to assess to what extent the price reduction effect of GIs is due to a reduction in the quality of the exported products and/or to a reduction of the pure price component. The results concerning the quality and quality-adjusted price components are presented in columns 2 and 3, respectively.[6] Both the coefficients are negative and significant, although the magnitude and the significance of the quality-adjusted price component is higher than that of quality. Specifically, by looking at the coefficient on the GI variable, these results suggest that the negative effect of GIs on export prices shown in column 1 is due 80% (0.0446/0.055) to a reduction of the quality-adjusted price component, and 20% (0.0104/0.055) to a quality reduction. These results thus suggest that the GI effect on non-EU exports of agri-food products mainly concerns their price rather than their quality. From this perspective, our evidence shows that non-EU countries are more likely to rely on price-competition strategy in product categories where EU countries have GI products, thus by exporting lower price and lower quality products. Interestingly, both tariffs and SPS measures have the opposite effect on quality and quality-adjusted price components, being negative for the former and positive for the latter, although the effect seems to be particularly significant for the quality-adjusted price component only.

In columns 4 to 6 of Table 1, we run the same specification but we also control for STCs. The main results still hold. It is worth noting that STCs have a strong positive and significant effect on export prices. STCs show also a positive effect on both quality and quality-adjusted

[5] As the dependent variables in equation (4) is expressed in log and the GI variable in level, this relationship has to be interpreted as a semi-elasticity.

[6] Note that by construction the sum of the quality and quality-adjusted price coefficients is equal to the price coefficient, as they exactly represent the two components in which the export price is divided.

price components, although the effect proves to be particularly significant for the latter only. This is probably due to the fact that, in order to comply with the most restrictive standards imposed by the EU, exporting countries have to adopt more costly production methods, which in turn results in an increase of export prices.

We then go further in our empirical analysis, by considering whether the effect is heterogeneous across countries of different levels of development. In a first step, we estimated separately our main equation (4) for the group of OECD and non-OECD exporting countries. The results are presented in Table 2, and show that the effect is much higher for OECD than for non-OECD member countries. Indeed, the estimated coefficients for our GI variable suggest that the addition of one GI product in a given HS 6-digit product category, leads to a reduction of export prices of about 10% for OECD countries (column 1), while the effect for the non-OECD countries is a reduction of about 3% (column 4). However, what is interesting to note is that, while for the group of non-OECD countries the effect is almost exclusively due to a reduction of the quality-adjusted price component (the quality coefficient in column 5 approaches zero), the quality effect for the group of OECD countries is quite relevant. Indeed, the estimated GI coefficient in column 2 suggests that the addition of a new GI product, leads to a strong, significant reduction of the quality of the exported products, which captures about 40% (0.038/0.10) of the overall price effect, while the quality-adjusted price components captures the remaining 60%. These results suggest that the diffusion of EU GIs seems to affect to a greater extent more developed countries rather than less developed ones. This effect may be due to the fact that richer countries are more likely to export higher quality products than developing countries, in particular towards richer countries (see Linder, 1961; Curzi and Olper, 2012). As a consequence, in order to adopt a price competition strategy, OECD countries have to opt for a sharp decrease in the quality of the exported product, and thus to export lower-quality and lower-price products. In contrast, non-OECD countries are more likely to export low-quality products, and thus, the diffusion of EU GIs leads to a slight decrease of the price of the exported products, but not of their quality, as it is already lower than that of richer countries.

In a second step, we further analyze the potential heterogeneity of the GI effect across countries, by studying the extent to which those non-EU countries that recognize the EU GI policy or that produce GIs according to their own policy (as described in deliverable 4.5, Section 4.1), show a different effect than the other countries. For this purpose, we interact our GI variable, with a dummy variable that is equal to 1 if an non-EU country recognizes the EU's GIs policy and/or produce GI products according to its own policy, and zero otherwise.[7] We thus run our main specification (4), and we add this interaction variable to control whether the effect is heterogeneous across countries that recognize or not-recognize GIs.

The results are presented in Table 3. At a first sight it looks evident that the main results on our GI variable are in line with those shown in Table 1. The results on the interacted variable show a similar pattern, although it is interesting to note that the estimated price coefficient is negative but not significant (column 1), while the estimated quality coefficient is not significant as well, and approaches zero (column 2). These results remain virtually unaffected when controlling for STCs (columns from 4 to 6).

Summarizing, the additional evidence suggests that countries that recognize and/or produce GIs are not significantly affected by the diffusion of EU GIs. This is probably because a

[7] For a more detailed description of this dummy variable, see Deliverable 4.5, Section 4.1. In particular, the list of extra-EU countries producing GIs is presented in Table A.2 of Deliverable 4.5.

mutual recognition of the GI policy facilitates bilateral trade relationships, in a way that a further diffusion of EU GIs does not affect the export strategy of these non-EU countries.

5. CONCLUSIONS

In this work we studied whether the diffusion of EU GIs affects the quality of the agri-food exported products to the EU from non-EU countries. We estimate product quality using the Khandelwal et al. (2013) method. The main results suggest that the presence of EU GIs negatively affect the price and the quality of exported food products to the EU. Our results show that the price effect seems to prevail over the quality effect, thus suggesting that non-EU countries exporting to the EU in sectors where GI products proliferate decide, on average, to opt for a price competition strategy, by exporting lower-price and lower-quality products. There is however a degree of heterogeneity across countries. In particular, the reduction in price and quality due to the diffusion of EU GIs, seems to be particularly relevant for the most developed countries, while the effect for countries recognizing the EU's GI policy and/or adopting their own policy seems to be not significant.

Overall these findings suggest that the diffusion of EU GIs leads non-EU countries to change their export strategy in order to be more competitive. However, as GIs probably set quality niches that are too high to be reached, they prefer to compete on a different level, and thus exporting products of lower quality and thus of lower price. Our evidence thus suggests that unless non-EU countries establish their own quality policy, the increasing importance covered by product quality for EU consumers, which is reflected by the increasing number of GIs, will lead them to compete progressively more on a price basis. From this perspective EU consumers will increasingly consider products coming from non-EU countries as a cheaper and low-quality alternative to domestic, high-quality products.

Tables:

Table 1. EU GIs effect on Price, quality and quality adjusted price

	(1)	(2)	(3)	(4)	(5)	(6)
	Price	Quality	Quality-adjusted price	Price	Quality	Quality-adjusted price
GIs	-0.0550***	-0.0104*	-0.0446***	-0.0554***	-0.0105*	-0.0449***
	(0.0174)	(0.00596)	(0.0156)	(0.0173)	(0.00595)	(0.0155)
log (1+tariff)	0.199	-0.225*	0.424**	0.196	-0.226*	0.422**
	(0.136)	(0.124)	(0.169)	(0.136)	(0.124)	(0.169)
log (1+SPS)	0.00882*	-0.00793	0.0167***	0.00876*	-0.00794	0.0167***
	(0.00481)	(0.00519)	(0.00578)	(0.00480)	(0.00519)	(0.00578)
dummy STC				0.621***	0.0685	0.553*
				(0.228)	(0.216)	(0.314)
Observations	169529	169529	169529	169529	169529	169529
R-squared	0.274	0.066	0.225	0.274	0.066	0.225

Note: robust standard errors clustered by country pairs-product HS 6-digit in parenthesis. All the regressions include exporter-year, importer-year, product-time and importer-exporter fixed effects.
*, **, *** indicate significance at 90%, 95% and 99% confidence levels, respectively.

Table 2. EU GIs effect on Price, quality and quality adjusted price: OECD vs non-OECD countries

	(1)	(2)	(3)	(4)	(5)	(6)
	OECD countries			non-OECD countries		
	Price	Quality	Quality-adjusted price	Price	Quality	Quality-adjusted price
GIs	-0.103***	-0.0381***	-0.0653**	-0.0358*	0.000802	-0.0366*
	(0.0313)	(0.0114)	(0.0277)	(0.0192)	(0.00609)	(0.0188)
log (1+tariff)	1.243***	-0.702***	1.945***	-0.902***	0.199	-1.101***
	(0.209)	(0.180)	(0.246)	(0.170)	(0.171)	(0.222)
log (1+SPS)	-0.0122*	-0.0220***	0.00973	0.0316***	0.00989	0.0217**
	(0.00659)	(0.00673)	(0.00734)	(0.00721)	(0.00824)	(0.00918)
dummy STC	0.573**	0.0884	0.485	0.645***	0.0456	0.600**
	(0.264)	(0.259)	(0.390)	(0.248)	(0.210)	(0.286)
Observations	75346	75346	75346	94174	94174	94174
R-squared	0.304	0.052	0.269	0.249	0.073	0.198

Note: robust standard errors clustered by country pairs-product HS 6-digit in parenthesis. All the regressions include exporter-year, importer-year, product-time and importer-exporter fixed effects.
*, **, *** indicate significance at 90%, 95% and 99% confidence levels, respectively.

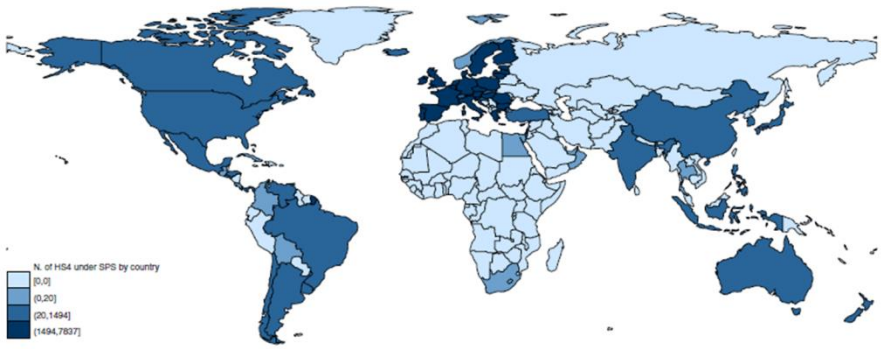
Table 3. EU GIs effect on Price, quality and quality adjusted, controlling for non-EU countries GI producers

	(1)	(2)	(3)	(4)	(5)	(6)
	Price	Quality	Quality-adjusted price	Price	Quality	Quality-adjusted price
GIs	-0.0508***	-0.0116*	-0.0392**	-0.0512***	-0.0116*	-0.0396**
	(0.0186)	(0.00636)	(0.0162)	(0.0185)	(0.00635)	(0.0161)
GIs*extra-EU PDO producers	-0.0312	0.00840	-0.0396	-0.0308	0.00844	-0.0392
	(0.0423)	(0.0166)	(0.0438)	(0.0423)	(0.0166)	(0.0438)
log (1+tariff)	0.199	-0.225*	0.424**	0.196	-0.226*	0.422**
	(0.136)	(0.124)	(0.169)	(0.136)	(0.124)	(0.169)
log (1+SPS)	0.00884*	-0.00794	0.0168***	0.00879*	-0.00794	0.0167***
	(0.00481)	(0.00519)	(0.00578)	(0.00480)	(0.00519)	(0.00578)
dummy STC				0.620***	0.0689	0.551*
				(0.228)	(0.216)	(0.313)
Observations	169529	169529	169529	169529	169529	169529
R-squared	0.274	0.066	0.225	0.274	0.066	0.225

Note: robust standard errors clustered by country pairs-product HS 6-digit in parenthesis. All the regressions include exporter-year, importer-year, product-time and importer-exporter fixed effects.
*, **, *** indicate significance at 90%, 95% and 99% confidence levels, respectively.

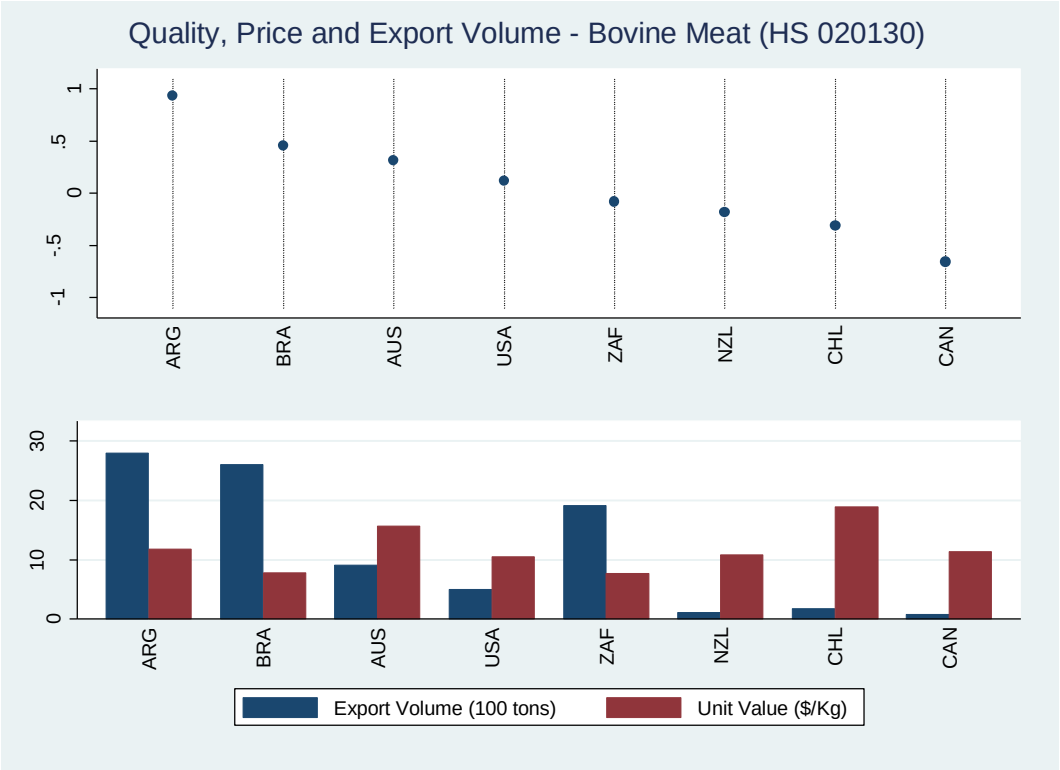
Figures:

Figure 1. Number of HS 4 lines under SPS-STC by maintaining country (1996-2010)



Source: Fontagné et al. (2015), based on WTO STC database

Figure 2. Quality ranking for bovine meat (HS 020130)



Countries are ranked based on their mean quality value over the considered period (see text for alculation details). Countries in the figure are presented with their ISO 3-digit code. The extended names of the countries are the following: ARG – Argentina; BRA- Brazil; AUS – Australia; USA – United States; ZAF – South Africa; NZL – New Zealand; CHL – Chile; CAN – Canada.

Figure 3. Average Quality growth vs. average Price growth of EU imports in agri-food products over the 1996-2014 period in non-GI vs GI products.

Note: This figure shows a comparison between normalized quality (y-axis) vs. normalized price (x-axis) growth in the period 1996–2014 for the sample of non-GI products and GI products.

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The Strength2Food project in a nutshell

Strength2Food is a five-year, €6.9 million project to improve the effectiveness of EU food quality schemes (FQS), public sector food procurement (PSFP) and to stimulate Short Food Supply Chains (SFSC) through research, innovation and demonstration activities. The 30-partner consortium representing 11 EU and four non-EU countries combines academic, communication, SMEs and stakeholder organisations to ensure a multi-actor approach. It will undertake case study-based quantitative research to measure economic, environmental and social impacts of FQS, PSFP and SFSC. The impact of PSFP policies on nutrition in school meals will also be assessed. Primary research will be complemented by econometric analysis of existing datasets to determine impacts of FQS and SFSC participation on farm performance, as well as understand price transmission and trade patterns. Consumer knowledge, confidence in, valuation and use of FQS labels and products will be assessed via survey, ethnographic and virtual supermarket-based research. Lessons from the research will be applied and verified in 6 pilot initiatives which bring together academic and non-academic partners. Impact will be maximised through a knowledge exchange platform, hybrid forums, educational resources and a Massive Open Online Course.

www.strength2food.eu