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The (lack of) international harmonization of EU standards: import and export effects in developed versus developing countries

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ABSTRACT

This article studies the effect of the lack of international harmonization in agri-food standards on international trade flows focusing on the European Union (EU). The EU is characterized by high level of protectionism, which makes it an ideal case study. We measure the differences in countries' level of 'protectionism' by applying an index of aggregation of non-tariff measures to data on maximum residue levels on pesticides and veterinary drugs allowed by countries on agri-food products. The restrictiveness of countries standards is compared with the one imposed by the Codex Alimentarius, which is considered as non-protectionist. The EU emerges as the most rigorous standards setter. The higher standards imposed by the EU affect in particular imports from developing countries, while it facilitates its exports, irrespective of the level of development and standard restrictiveness set by the importing countries.

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1. Introduction

The importance of food standards in shaping trade flows is in the spotlight of the international debate. The last decades have witnessed a steep reduction in the level of tariffs, which has been counterbalanced by the imposition of a growing number of standards (Baldwin 2000; Beverelli, Boffa, and Keck 2014). The high cost of complying with most of the food standards, especially for firms in developing countries, makes them often comparable to non-tariff barriers to trade (Disdier, Fontagné, and Mimouni 2008). However, standards may also enhance trade, as they allow for the reduction in the level of information asymmetry, and their application may induce a process of product quality upgrading (Maertens and Swinnen 2009; Olper, Curzi, and Pacca 2014). In this setting, the lack of harmonization in the standards requirements is a crucial point. In this respect, over the last few years the European Union (EU) has been often characterized by setting too stringent standards to protect its domestic market. This concern is often raised by the World Trade Organization (WTO) member countries (and in particular by the US,

and has sometimes turned into complex trade disputes, such as the debates on genetically modified organisms and the use of hormone-derived drugs in meat production.¹ Investigating the effect of standards' restrictiveness on EU trade flows is clearly an empirical question, that we aim at addressing in this work. In particular, the objective of this article is to assess to what extent the level of standards set by the EU affects both the import and the export side.

The primary difficulty that arises when investigating this topic empirically is represented by the lack of direct measures of standards. In principle, country notifications of new standards to the WTO are collected in the I-TIP Database. However, these data do not provide any information on the restrictiveness and the asymmetry of these measures between countries. In order to address our research question, we rely on data provided by the USDA FAS International MRL database. These data provide information on the maximum residue levels (MRLs) on pesticide and veterinary drugs allowed by different countries in the world on agri-food products. Using these data, we compute an index developed by Li and Beghin (2014), which allows

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¹Considering, for instance, the case of Sanitary and Phytosanitary measures, Fontagné et al. (2015) show that, within the WTO members, the highest number of specific trade concerns is raised against the EU. Specific trade concerns are raised at the WTO by countries towards other countries on one or more measures maintained on one or more products, which they consider to be trade restrictive.

The (lack of) international harmonization of EU standards: Import and export effects in developed vs. developing countries

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Abstract: *This paper studies the effect of the lack of international harmonization in agri-food standards on international trade flows focusing on the European Union. The EU is characterized by high level of protectionism, which makes it an ideal case study.. We measure the differences in countries' level of "protectionism" by applying an index of aggregation of non-tariff measures to data on Maximum Residue Levels on pesticides and veterinary drugs allowed by countries on agri-food products. The restrictiveness of countries standards' is compared with the one imposed by the Codex Alimentarius, which is considered as non-protectionist. The EU emerges as the most rigorous standards setter. The higher standards imposed by EU affect in particular imports from developing countries, while it facilitates its exports, irrespective of the level of development and standard restrictiveness set by the importing countries.*

Keywords: *Agri-food Standards; Maximum Residue Levels (MRLs); EU agri-food trade, Harmonization.*

I. Introduction

The importance of food standards in shaping trade flows is in the spotlight of the international debate. The last decades have witnessed a steep reduction in the level of tariffs, which has been counterbalanced by the imposition of a growing number of standards (Baldwin, 2000; Beverelli et al., 2014). The high cost of complying with most of the food standards, especially for firms in developing countries, makes them often comparable to non-tariff barriers to trade (Disdier et al., 2008). However, standards may also enhance trade, as they allow for the reduction in the level of information asymmetry, and their application may induce a process of product quality upgrading (Maertens and Swinnen, 2009; Olper et al. 2014). In this setting, the lack of harmonization in the standards requirements is a crucial point. In this respect, over the last few years the European Union (EU) has been often characterized by setting too stringent standards to protect its domestic market. This concern is often raised by World Trade Organization (hereafter WTO) member countries (and in particular by the US), and has sometimes turned into complex trade disputes, such as the debates on genetically modified organisms (GMOs) and the use of hormone derived drugs in meat production.¹ Investigating the effect of standards' restrictiveness on EU trade flows is clearly an empirical question, that we aim at addressing in this work. In particular, the objective of this paper is to assess to what extent the level of standards set by the EU affects both the import and the export side.

The primary difficulty that arises when investigating this topic empirically is represented by the lack of direct measures of standards. In principle, country notifications of new standards to the WTO are collected in the I-TIP Database. However, these data do not provide any information on the restrictiveness and the asymmetry of these measures between countries. In order to address our research question, we rely on data provided by the USDA FAS International MRL database. These data provide information on the maximum residue levels (henceforth MRLs) on pesticide and veterinary drugs allowed by different countries in the world on agri-food products. Using these data, we compute an index developed by Li and Beghin (2014), which allows us to assess

¹ Considering for instance the case of Sanitary and Phytosanitary (SPS) measures, Fontagné et al. (2015) show that, within the WTO members, the highest number of specific trade concerns is raised against the EU.. Specific trade concerns are raised at the WTO by countries towards other countries, on one or more measures maintained on one or more products, which they consider to be trade restrictive.

the asymmetry in the restrictiveness on MRLs between different countries in the world. Other papers in the literature have used these data to assess the effect of food standards in shaping international trade flows, and often concluded that stricter food standards hinder trade (e.g. Drogué and Demaria, 2012; Scheepers et al., 2007). The effect is particularly relevant when these standards are imposed by developed countries (Xiong and Beghin, 2014; Melo et al, 2014).

However, the literature lacks consideration of the specific effects of standards on the EU trade. Our paper addresses this issue considering simultaneously the EU bilateral trade flows with all world trading partners, all the MRLs set on agri-food products and the list of all affected products available in the database. The analysis is carried out accounting for both the import and export side.² Moreover, our paper is the first to account for all these issues in a comprehensive framework.

Since the EU plays a major role in world trade, and issues related to the protectionist nature of its food standards are often in the public eye, we believe that this analysis could have important policy implications, in particular considering current and future bilateral and multilateral trade negotiations.

II. Data and measures

The USDA FAS International MRL database refers to the Maximum Residues Levels (MRL) – the highest level of pesticides that is legally allowed to be used in plants, food and feed - and is composed by the *pesticide MRLs database* and the *veterinary drug database*. The pesticide MRLs database covers 698 products, 359 pesticides and 85 countries. In total there are 44,739 pairs of products by pesticides, classified at the HS 6-digit levels. The veterinary drugs MRLs database covers 7 products groups, classified in three categories: mammal group, poultry group and dairy products. In addition, the database contains 89 active ingredients, 310 commodity terms, 86 countries and 3,220 pairs of commodities by pesticides.

We compute countries' level of protectionism by using the aggregation index of non-tariff measures developed by Li and Beghin (2014), and by applying it to MRLs standards. We use the Codex Alimentarius international standards as benchmark, by referring to it as the non-protectionist level (M_{CA}). The MRL set by a given country j on a given product h is considered as protectionist when its stringency exceeds the analogous international MRL (integrated by Codex). In contrast, if such MRL is higher than the MRL set by Codex, than we consider the MRL as anti-protectionist. The protectionism index is computed as follows:

$$Score_{jh} = \frac{1}{K(h)} \left(\sum_{K(h)=1}^{K(h)} \exp \left(\frac{M_{CA,hK(h)} - M_{j,hK(h)}}{M_{CA,hK(h)}} \right) \right) \quad (1)$$

where, $K(h)$ expresses the pesticide (or veterinary drug) applied on product (h); $M_{CA,hK(h)}$ is the international maximum residue levels for product (h) with respect to pesticide $K(h)$, while $M_{j,hK(h)}$ is the maximum residue level set by country (j) for product (h) and pesticide $K(h)$. The higher the score, the more stringent the country's MRLs on the product.³ A score equal to 1 corresponds to a “non-protectionist” policy, as the MRL is the same as in the Codex. A score greater than 1 is associated with a “protectionist” policy, because the MRL is

² Most of the published papers assessing the role of food standards in shaping international trade focus on some specific products or countries. For instance, Drogué and Demaria (2012) studied the case of trade in apples and pears; Melo et al. (2014) consider the case of Chilean fruit exports, while Scheepers et al., 2007 focus on avocado exports from South Africa to the EU. Other papers consider all the products and substances available in the MRL database, but focus on different countries than the EU. Xiong and Beghin (2013) focus on USA and Canada, while Xiong and Beghin (2014) consider the case of OECD countries' imports from their major trade partners.

³ MRLs have different scales, which could vary from 0.01 ppm (parts per million) to 10 ppm or more. The lower the MRL value, the stricter the standard.

considered more stringent than the Codex one. Finally, a score lower than 1 indicates an “anti-protectionist” policy, because the MRL is found to be “softer” than the Codex one.⁴

Finally, trade data are collected from the EUROSTAT Comext database, which provides information on bilateral EU imports and exports at the HS 6-digit level for the year 2014.

III. Empirical approach

Our empirical approach relies on the one used by Xiong and Beghin (2013), who study the implication of different level of stringency in MRLs with respect to the ones set by the Codex on trade performance of USA and Canada using the standard gravity model, consistent with the approach suggested by Anderson and van Wincoop (2003). We thus estimate the following equation, considering alternatively two scenarios where the EU is the importer or the exporter:

$$E(X_{jh}) = \exp(\beta_0 + \beta_1 EUscore_h + \beta_2 score_{jh} + \varphi_j + \varphi_h + \varepsilon_{jh}) \quad (2)$$

where, X_{jh} represents EU imports (exports) from (to) country (j) for product (h); $EUscore_h$ accounts for the EU restrictiveness score for product (h), while $score_{jh}$ is the score for country j exporting (importing) product h to (from) the EU; φ_j and φ_h account for exporting (importing) country and sectoral (i.e. HS 2-digit) fixed effects, respectively; finally, ε_{jh} is the error term.⁵ Our empirical analysis considers the zero trade flows issue, which is usually addressed in the gravity framework by the Poisson Pseudo Maximum Likelihood (PPML) estimator, following Santos Silva and Tenreyro (2006). In our empirical analysis, we run equation (2), first considering the pooled sample of countries; second, distinguishing the origin of exports (destination of imports when considering EU as exporter) according to countries’ level of development. This is done by classifying countries as OECD (i.e. most developed) or non-OECD (least developed).⁶

IV. Results

Figure 1 shows the average MRL score of our protectionism index in the different sectors considered in our analysis after spitting the sample into EU, OECD and non-OECD countries. The red line in the figure is set at the value of 1, representing the standard referred to the Codex. In all the considered sectors the EU shows, on average, a higher score than OECD and, in particular, non-OECD countries, except for the coffee, tea and spices sectors (i.e. HS 09), where the average score is slightly lower than the one of OECD countries. The scores of OECD countries prove to be, on average, higher than those of non-OECD countries in all the considered sectors, which are usually set close to that of the Codex.

Table 1 presents our main econometric results. Column 1 shows the results when considering the EU as importer. The table shows a negative and significant relationship between EU imports of agri-food products and the EU MRL score. This result suggests that higher restrictiveness of EU standards acts as a barrier to trade for countries intending to export to the EU market. When considering the result of the MRL score of countries exporting to the EU, it emerges that the higher the restrictiveness of the standards set by these countries, the higher the exports towards the EU. When considering EU imports from OECD countries (column 2), although the pattern of signs is the same as detected in column 1, nor the EU MRL score, nor the score of

⁴ For further details on data characteristics and shortcomings, as well as on the index properties, see Li and Beghin (2014).

⁵ By including EU as a single country, we do not include other typical gravity variables (e.g. bilateral distance and other bilateral trade costs), as country and sectoral fixed effects already account for them.

⁶ Note that the OECD (Organization for Economic Cooperation and Development) group of countries includes all OECD members with the exception of EU countries.

the exporting countries plays a significant role in affecting exports towards the EU. The results in column 3 consider the case of EU imports from non-OECD countries. In this case the coefficient of EU MRL score is negative and highly significant, while the MRL coefficient of exporting countries is positive and significant. These results are interesting and suggests that the high restrictiveness of EU food standards seems to act as a barrier to trade, in particular when considering exports from developing countries intending to export to the EU. However and symmetrically, developing countries setting higher level of restrictiveness in their standards are favored as exporters to the EU.

The results in column 4 explore the case of the EU as exporter. When considering the EU MRL index, the result suggests that higher restrictiveness of EU standards is positively associated with exports of agri-food products from the EU. When considering the results relative to the MRL of the importing countries, we show that the level of restrictiveness does not significantly affect EU agri-food exports. The pattern presented in column 4 is confirmed when considering separately the sample of OECD and non-OECD importing countries. These results suggest that higher restrictiveness of EU food standards facilitates EU exports, as the EU firms do not have to incur large additional costs to adapt their products to the requirements set by the trading partners.

Looking at these results in the light of existing literature, they seem to confirm the ambiguous effect of standards in shaping international trade flows. On the one hand, when considering the EU as importer, it is evident that the high restrictiveness of EU standards acts as a barrier to trade, in particular for developing countries, thus confirming growing evidence from the literature, such as the work by Disdier et al. (2008). On the other hand, the results seem to suggest that high restrictive standards have a trade facilitating role. This evidence is even more relevant when considering the case of developing countries exporting to developed countries. From this perspective, our results are consistent with previous evidence from the literature suggesting that complying with high restrictive food standards may promote trade by stimulating product quality upgrading, as suggested by Maertens and Swinnen (2009) and Olper et al. (2014), and thus facilitating exports towards richer countries.

Conclusions

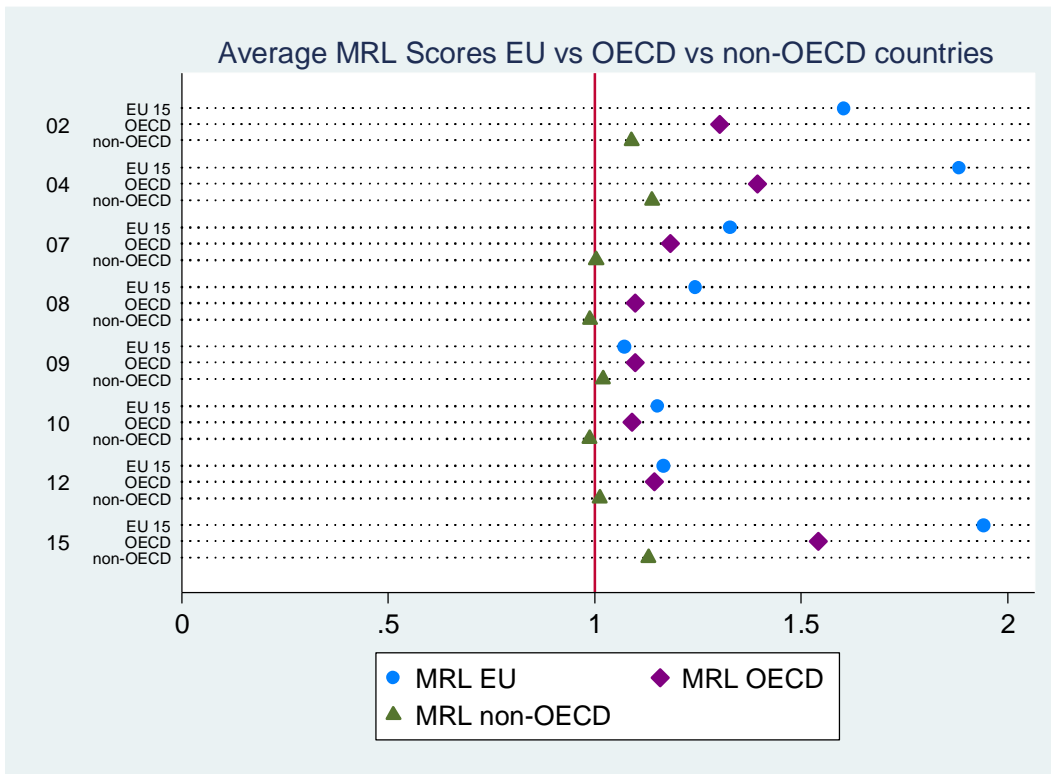
This paper tests empirically how the lack of harmonization in food standards affects international trade of agri-food products, by referring in particular to the case of the EU. We use the protectionism index developed by Li and Beghin (2014) to measure the extent to which EU and its trading partners depart from the international standards set by the Codex Alimentarius in terms of maximum residue levels of pesticides and veterinary drugs allowed in their food productions. The EU sets, on average, higher restrictive standards than other countries. This seems to negatively affect imports from developing countries, but to favor EU exports towards both developed and developing countries, irrespectively of the level of restrictiveness of the destination countries. However, developing countries setting high restrictive standards are favored as exporters of food products to the EU.

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Figure1: Average difference in the MRLs stringency between the EU, OECD and non-OECD countries, by sectors.



Source: see Text.

Table 1: Effect of different stringency in MRLs scores in affecting EU imports and exports of agri-food products

	EU IMPORTS			EU EXPORTS		
	(1)	(2)	(3)	(4)	(5)	(6)
	All countries	OECD	non-OECD	All countries	OECD	non-OECD
MRL EU15	-0.475*** (0.148)	-0.242 (0.209)	-0.565*** (0.197)	0.336*** (0.0750)	0.382*** (0.105)	0.326*** (0.107)
MRL Exporter	0.847** (0.359)	0.434 (0.333)	2.009** (0.936)			
MRL Importer				-0.00872 (0.0986)	-0.0947 (0.117)	0.316 (0.193)
Product FE	YES	YES	YES	YES	YES	YES
Exporter FE	YES	YES	YES	NO	NO	NO
Importer FE	NO	NO	NO	YES	YES	YES
N	16708	4622	12086	16484	4521	11963
R-sq	0.059	0.114	0.090	0.136	0.214	0.051

Note: All the results in the table are estimated through the use of the PPML estimator. Robust standard errors in parenthesis. ***, **, * indicate, respectively, significance at 1%, 5% and 10% level.