Quality upgrading in the European-Union agri-food exports

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Abstract

The paper investigates determinants of quality upgrading in the European Union agri-food exports using panel data models in the 2000-2011 period. Employing highly disaggregated data we show that export unit value is positively associated with level of economic development and the size of population. Our results indicate negative impacts of comparative advantages and trade costs on export quality upgrading. Estimations confirm the important role of income distribution in quality specialization. The income inequality increases specialization in high quality varieties for rich countries. Results are robust to alternative subsamples including vertical specialized and final agri-food products.

Keywords: export quality, income inequality, vertical comparative advantage, agri-food exports, European Union

JEL classification: Q17, D31, C33, C55

1. Introduction

Empirical research on international trade growth has shown that accounting for both specialization across goods and specialization within goods along the quality dimension are important for interpreting the patterns of international trade (Schott, 2004). Although existing literature on international trade tends to focus on either one or the other of these dimensions, the two are likely to be connected. Theoretical and empirical research increasingly emphasizes the importance of product quality in international trade and for economic development. The role of the quality in international trade was already recognised by models on the vertical intra-industry trade (IIT) by Falvey and Kierzkowski (1987) and Flam and Helpman (1987). A body of empirical studies has well documented the growing importance of vertical IIT in international trade (e.g. Fontagné *et al.*, 2006; Jensen and Lüthje, 2009). However, the issue of product quality in international trade in non IIT literature has been recognized during the last decade. There is a growing literature on the drivers of a country's vertical comparative advantage (i.e. comparative advantage in terms of quality). Differences across countries in technology and/or relative abundance of factors have been proposed as potential explanations (e.g. Schott, 2004; Verhoogen, 2008; Fieler, 2011). In addition, Fajgelbaum *et al.* (2011) derive conditions under which a richer or more unequal economically developed country has a larger demand for high quality goods. They provide a demand based explanation for the patterns of international trade in goods of different quality.

The pattern of the European Union (EU) agri-food trade specialisation is well explored (Bojnec and Fertő, 2008, 2009, 2015). Similarly, the increasing role of vertical IIT in the EU countries is already recognised (e.g. Fertő, 2005, Jámbor, 2014, Fertő and Jámbor, 2015). Moreover, the quality content of EU agri-food trade is analysed by Curzi and Olper (2012), Curzi *et al.* (2013, 2015) and Olper *et al.* (2014).

This article aims to analyse the link between specialization across goods and specialization within goods along the quality dimension in the EU agri-food export. A link between export quality upgrading and comparative advantage for EU agri-food export is modelled in econometric framework. The quality of agri-food exports is determined with an exporter country's characteristics: level of economic development and income distribution, and comparative advantage. More specifically, we investigate the quality content of agri-food exports of the EU-27 member states at the global market, whose member states are heterogeneous according to considerable differences both in terms of level of economic development and income inequality.

The rest of the paper is structured as follows. Previous studies and hypotheses development are presented in section 2. Section 3 presents data and database construction. Empirical results are presented in section 4, while section 5 concludes.

2. Previous studies and hypotheses

Theoretical and empirical research on product quality upgrading in international trade offer several testable hypotheses. More specifically, we focus on both supply and demand side drivers of export quality upgrading.

Hummels and Klenow (2005) and Hallak (2006) show that export prices increase with exporter and importer income per capita, respectively, and suggest that countries with higher income per capita produce and consume products of higher quality. Similar evidence for export price increase is found at the firm-level (see Manova and Zhang, 2012; Bastos and Silva, 2010), and using a structural approach as Khandelwal (2010) and Hallak and Schott (2011). On this basis of results we set the following hypothesis (H1):

H1: Richer countries tend to export higher quality products.

Second, demand-based determinants, with income distribution have been accepted as one of key determinants of the quality of trade upgrading. The role of income inequality on different demand patterns has been recognized in early IIT literature (e.g. Falvey and Kierzkowski, 1987; Flam and Helpman, 1987) suggesting different composition of demand on vertical trade patterns with the existence of a vertical home market effect (Linder, 1961; Fajgelbaum *et al.*, 2011). While richer countries tend to import higher-quality goods (Schott, 2004; Hallak, 2006, 2010), countries displaying similar income distributions tend to exhibit similar distributions of import prices (Choi *et al.*, 2009) and countries displaying more unequal income distributions tend to exhibit import lower quality varieties (Bekkers *et al.*, 2012). On this basis we derive the following hypothesis (H2):

H2: Income inequality is more important drivers of export quality upgrading for rich countries.

Following Bernard *et al.* (2007) we expect that higher revealed comparative advantage can translate into better efficiency and lower export prices. Latzer and Mayneries (2011, 2014) confirm this prediction finding negative association between export prices and comparative advantage. Therefore, we derive the next hypothesis (H3) as follows:

H3: Export price is negatively associated with the comparative advantage.

In addition, we control two common factors. First, we introduce trade costs. Recent analyses have revealed empirical regularities concerning the relationship between the quality of exported goods and the distance of the country of destination. Specifically, they show that unit values of exported goods increase with the distance of the trading partner, which suggests that firms upgrade the quality level of the goods they export to more distant markets compared to closer ones. This evidence is robust both at the product and firm levels (Baldwin and Harrigan, 2011; Bastos and Silva, 2010; Manova and Zhang, 2009).

Second, we introduce the size of population as a proxy for market size. However, we should face with theoretical and empirical ambiguities. Fajgelbaum *et al.* (2011) findings imply that a growth in population increases disproportionately the number of varieties that are more horizontally differentiated. Because it is reasonable to assume that high-quality varieties are more differentiated than low-quality ones, this indicates a possible positive association between export prices and population size. Most papers using firm level data find a positive effect of market size on exported good prices (Manova and Zhang, 2012; Bastos and Silva, 2010). However, Desmet and Parente (2010) show that larger markets exhibit lower mark-ups and consequently larger firms, which favours process innovation implying lower prices in bigger countries. Empirical works employing aggregate data on unit values find a negative effect of market size on export prices (Baldwin and Harrigan, 2011; Hummels and Lugovskyy, 2009; Bekkers *et al.*, 2012).

3. Data and Database Construction

3.1. Unit value (UV) of export as dependent variable

To test the set hypotheses from H1 to H3, the crucial question is how to measure the export quality upgrading as dependent variable. There are more approaches how to measure a proxy for product quality upgrading in trade, each with certain advantages and limitations and thus no consensus exists on exact definition. First, traditionally UV of export as a proxy for quality has been used in the empirical trade literature (Aiginger, 1997; Schott, 2004; Hummels and Klenow, 2005; Hallak, 2006; Bekkers *et al.*, 2012; Bojnec and Fertő, 2008, 2009). UV of export is relatively easy to calculate within a given product category (defined at the 6-digit level of the Harmonized Commodity System). More expensive varieties are assumed to be of higher quality (Latzer and Mayneris, 2011, 2014). Critics argue on limitations, that the differences in UV of export might capture some impacts of other elements such as exogenous differences in factor market prices or exchange rates misalignments than product quality (Khandelwal, 2010; Hallak and Schott, 2011). Second, alternative quality measures aim to overcome drawback of UV of export.

Hallak and Schott (2011) derive a proxy for quality of United States (US) imports from UV of export and trade balances of source countries. At a given UV of export, a country with a higher trade balance vis-à-vis the world produces and exports a better quality. Khandelwal (2010) estimates a nested logit demand system for US imports with differences in preferences for horizontal and vertical tastes and attributes of consumers. At a given UV of export, countries that export more to US are considered with a higher quality. The quality measure proposed by Khandelwal (2010) was used by Olper *et al.* (2014) in agri-food trade application. Finally, Amiti and Khandelwal (2013) argue that results of UV of export and more sophisticated measures of quality are qualitatively the same when based on homothetic preference. While Khandelwal (2010) and Olper *et al.* (2014) applied approach looks more sophisticated at first glance, it suffers limitations to captures differences in horizontal testes of consumers with the problem of ordering of exporting countries regarding the quality of imported varieties in different importing countries. Therefore, we prefer to rely on UV of export as a proxy of quality upgrading against method popularized by Khandelwal (2010).

An empirical analysis of the UV of export for agri-food products is conducted for the EU-27 member states using detailed trade data at the six-digit World Customs Organization's Harmonized System (HS-6) level from the years 2000–2011. The annual sample of agri-food export as defined by the World Trade Organization contains 789 product groups at the HS six-digit level. The UN Comtrade database (UNSD, 2013), with the World Integrated Trade Solution (WITS) database and software in US dollars for value and quantity of export (The World Bank, 2013), is used in the UV of export calculations for agri-food products. Following the literature (e.g. Choi *et al.*, 2009), the data on agri-food export are cleaned to consider export flows with the quantity shipped at least equal to one kilogram. The export flows are dropped if UV of export is lower than 0.1 times and higher than 10 times the median UV of export observed for that commodity within EU-27 member states.

Following Latzer and Mayneris (2011, 2014) we employ the following indicator of UV of export for vertical specialization: First, we rank agri-food products according to the coefficient of variation of their UV of export within the EU-27 member states, and then second, we define the top 50% of agri-food products by observed UV of export dispersion as a dummy for vertical differentiated agri-food products.

Following to the literature, agri-food products are classified into two main groups based on the United Nations Broad Economic Categories (UN BEC) classification. The UN BEC classification disentangles products according to their main end use, and then divides them into consumption or final goods (BEC 112 – primary products mainly for household consumption and BEC 122 – processed products mainly for household consumption) and intermediate goods (BEC 111 – primary products mainly for industry, BEC 121 – processed products mainly for industry, BEC 21 – primary products and BEC 22 – industrial supplies not elsewhere specified, processed).

3.2. Explanatory variables

Data for explanatory variables are obtained from the following data sources. GDP per capita and Population are obtained from the World Bank (2014b) database. Gini indices are obtained from UNU-WIDER (2014) database. Agri-food specific trade costs are calculated as average trade costs for each EU-27 member states as a simple arithmetic mean of all bilateral international trade costs on the basis of data obtained from the World Bank (2014a) database. Revealed comparative advantage (RCA) index is calculated as Balassa (1965) index. However due to skewed distribution of RCA index we employ its symmetric version (SRCA=(1-RCA)/(1+RCA)) index (Dalum *et al.*, 1998) on the basis of the World Bank (2013) database.

3.3. Estimated equation

We use natural logarithm (*ln*) of UV of export as dependent variable. General form for estimated models is the following:

$$lnUV_{ijt}=\alpha+\beta_1 lnGDPcapita_{jt}+\beta_2 lnGini_{jt}+\beta_3 SRCA_{ijt}+\beta_4 lntradecost_{jt}+\beta_5 lnPopulation_{jt}+\beta_6 Rich_{jt}*lnGini_{jt}+\beta_7 vertical_{ijt}+\varepsilon_{ijt}, \quad (1)$$

where *i* is exporting country, *j* importing country, *t* is time period (year), Rich is a dummy variable, which takes values of one for a country with the level of economic development (GDP per capita) greater than 16,000 US dollars, and zero otherwise. Except for SRCA index and Rich dummy variables, other explanatory variables are expressed in *ln* form.

4. Results

As can be seen from Table 1, the estimated regression models are on the basis of large data sample with 142,534 observations. Moreover, even sub-samples with restricted observations for vertical differentiated agri-food products in column (5), for final (consumption) agri-food products in column (6), and for agri-food products where export is larger than 10,000 US dollars in column (7) are based on large datasets with 77,933, 84,298, and 122,459 observations, respectively.

The regression coefficients consistently confirmed the set H1 that the richer countries in terms of *ln* GDP per capita tend to export higher quality products in terms of UV of export. This supply-based determinant of agri-food export quality upgrading points in the direction of a sequential development path to implement economic and development policies increasing the GDP per capita of the whole population. In particular, it is important that average GDP per capita reaches a certain level that is high enough for a sizable positive effect on the high-quality agri-food varieties to develop, produce and export. The regression coefficients for *ln* Gini indices of income inequalities are mixed, but are largely consistent with the set H2 that income inequality is more important drivers of export quality upgrading for rich countries. This finding is also consistent with IIT literature on the role of income inequality on different composition of demand and demand patterns on vertical trade patterns and the quality of trade upgrading. The regression coefficients for *ln* Gini indices are insignificant for model in column (4) with the interaction between Rich dummy and *ln* Gini index and for models with restricted observations for vertical differentiated products, final products and larger size of agri-food exports than 10,000 US dollars in columns from (5) to (7).

Except for the regression model in column (7) with restricted observations for export larger than 10,000 US dollars, UV of export is negatively associated with the SRCA index, which is consistent with the set H3. This finding for agri-food products is consistent with Bernard *et al.* (2007) and Latzer and Mayneries (2011, 2014) that higher revealed comparative advantage is translated in better efficiency and price competitiveness with lower UV of export.

Among controlling explanatory variables, contrary to findings of earlier studies the export price is significantly negatively associated with *ln* trade costs for the distance. This result can be explained by the geographic location of the EU-27 member states where most of agri-food products is internationally traded between developed clusters of old core EU member states at higher UV of exports on shorter distances and lower transportation costs.

UV of export is significantly positively associated with *ln* Population. This finding is consistent with Fajgelbaum *et al.* (2011) that a growth of market size or population increases disproportionately the number of horizontally differentiated varieties, which are more high-quality varieties. However, this does not hold for the regression model in column (7) with restricted observations for export larger than 10,000 US dollars, where the regression coefficient for *ln* Population is statistically negatively associated with the UV of export. On contrary, this finding can be consistent with Desmet and Parente (2010) that larger markets exhibit lower mark-ups with presence of economies of scale in favours of innovation, which lowers UV of export in bigger markets.

The regression coefficients for the interaction effect between the Rich countries dummy variable and *ln* Gini index variable are significantly positive clearly indicating that inequalities increase specialization in high-quality varieties only for rich countries. This finding is partly consistent with the theoretical expectation that UV of export is positively associated with vertical product differentiation, but is fully consistent with Latzer and Mayneries (2011) hypothesis that inequalities increase specialization in high-quality varieties only for rich countries.

The regression coefficient for the interaction effect between the Rich countries dummy variable and *ln* Gini index variable is particularly large in column (7) for the regression model with restricted observations for agri-food products where agri-food export is larger than 10,000 US dollars. The differences in the regression coefficients in the regression model in column (7) can be explained by strong revealed comparative advantage in terms of the SRCA index, where larger agri-food export can be achieved at higher UV of export, which is coming from by the size of population from smaller EU-27 member states.

Table 1

Unit value of export (UV_{ijt})

	Dependent variable: $lnUV_{ijt}$						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
					vertical differentiated products	final goods	export>10,000 US dollars
lnGDPcapita	1.554***	1.582***	1.623***	1.635***	1.687***	1.697***	1.768***
lnGini	0.439***	0.440***	0.156***	0.012	0.030	-0.015	-0.008
SRCA		-0.111***	-0.123***	-0.124***	-0.069***	-0.062***	0.230***
lntradecosts			-0.636***	-0.624***	-0.587***	-0.552***	-0.054***
lnPopulation			2.855***	2.832***	2.917***	2.810***	-0.647***
Rich*lnGini				0.199***	0.156***	0.221***	2.856***
Constant	-23.198***	-23.523***	-65.492***	-65.200***	-67.017***	-65.417***	-67.303***
R^2	0.123	0.126	0.169	0.169	0.251	0.216	0.219
N	142534	142534	142534	142534	77933	84298	122459

Source: Authors' own calculations.

*** $p<0.01$

Table 2 presents summary results of sensitivity analysis of stability of the regression coefficients in the estimated regression models by the 23 possible groups of agri-food products by the International Standard Industrial Classification (ISIC) categories. Regression models are for each ISIC categories (23 groups) and various sub-samples where N means the number of models estimated. The sub-samples for vertical differentiated products and particularly for final goods groups have less than 23 regression models, which is due to the insufficient number of observation for estimations of the regression model. For final goods are only 10 ISIC groups with simultaneous existence of final and intermediate groups. The higher percentage in the consistency of the regression coefficients in the regression models with the significant expected signs are found for the positive sign for *ln* GDP per capita and *ln* Population and for the negative sign for *ln* trade costs and to a lesser extent for SRCA. A slightly lower consistency of the positive regression coefficients is for the interaction effect between Rich dummy variable and *ln* Gini index variable and particularly for *ln* Gini index variable.

Table 2

Summary results of sensitivity analysis

Variables	Sign	Full sample	Vertical	Final goods	export>10000 US dollars
lnGDPcap	+	96%	95%	100%	96%
lnGini	+	4%	20%	0%	0%
Rich*lnGini	+	17%	25%	40%	30%
SRCA	-	57%	40%	50%	48%
lntradecosts	-	91%	75%	90%	83%
lnPopulation	+	74%	75%	100%	70%
N		23	20	10	23

Note: N means the number of models estimated by the 23 groups of agri-food products by the International Standard Industrial Classification (ISIC) categories. The data shows the number of models with the theoretically significant expected signs in total number of the regression models (N) expressed in the percentage.

Source: Authors' own calculations.

5. Conclusion

The empirical results of this study clearly confirmed the following main findings on determinants of quality upgrading in the EU agri-food exports. UV of export is positively associated with the level of economic development and the size of population, while UV of export is negatively associated with SRCA and trade costs. Income distribution and income inequalities play the important role in quality specialization, because income inequalities increase specialization in high-quality varieties only for rich countries. The empirical results and findings are robust to alternative data sub-samples including vertical specialized and final agri-food products.

The empirical results and findings are important for research and practice on agri-food exports. To our knowledge, this is the first study on quality upgrading in agri-food export in general and in a particular using panel data models for the EU-27 member states. The results are theoretically consistent and statistically robust. Their practical value is for agri-food international businesses and marketing in direction of higher-quality and higher-value added agri-food products.

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References

Aiginger, K. 'The use of unit values to discriminate between price and quality competition', *Cambridge Journal of Economics*, Vol. 21, (1997) pp. 571–592.

Amiti, M. and Khandelwal, A. K. 'Import competition and quality upgrading', *Review of Economics and Statistics*, Vol. 95, (2013) pp. 476–490.

Balassa, B. 'Trade liberalization and revealed comparative advantage', *Manchester School of Economic and Social Studies*, Vol. 33, (1965) pp. 99–123.

Baldwin, R. and Harrigan, J. ‘Zeros, quality, and space: trade theory and trade evidence’, *American Economic Journal: Microeconomics,* Vol. 3, (2011) pp. 60–88.

Bastos, P. and Silva, J. ‘The quality of a firm’s exports: where you export to matters’, *Journal of International Economics*, Vol. 82, (2010) pp. 99–111.

Bekkers, E., Francois, J. and Manchin, M. ‘Import prices, income, and inequality’, *European Economic Review*, Vol. 56, (2012) pp. 848–869.

Bernard, A. B., Redding, S. J. and Schott, P. K. ‘Comparative advantage and heterogeneous firms’, *Review of Economic Studies*, Vol. 74, (2007) pp. 31–66.

Bojnec, Š. and Fertő, I. ‘European enlargement and agro-food trade’, *Canadian Journal of Agricultural Economics*, Vol. 56, (2008) 563–579.

Bojnec, Š. and Fertő, I. ‘Agro-food trade competitiveness of Central European and Balkan countries’, *Food Policy*, Vol. 34, (2009) 417–425.

Bojnec, Š. and Fertő, I. ‘Agri-food export competitiveness in European Union countries’, *JCMS: Journal of Common Market Studies*, (2015) DOI: 10.1111/jcms.12215

Choi, Y. C., Hummels, D. and Xiang, C. ‘Explaining import quality: the role of the income distribution’, *Journal of International Economics*, Vol. 77, (2009) pp. 265–275.

Curzi, D. and Olper, A. ‘Export behavior of Italian food firms: does product quality matter?’, *Food Policy*, Vol. 37, (2012) pp. 493–503.

Curzi, D., Pacca, L. and Olper, A. ‘Trade collapse, quality and food exports’, *Applied Economics Letters*, Vol. 20, (2013) pp. 1614–1617.

Curzi, D., Raimondi, V. and Olper, A. ‘Quality upgrading, competition and trade policy: evidence from the agri-food sector’, *European Review of Agricultural Economics*, (2015) jbu021.

Dalum, B., Laursen, K. and Villumsen, G. 'Structural change in OECD export specialisation patterns: de-specialisation and 'stickiness', *International Review of Applied Economics*, Vol. 12, (1998) pp. 423–443.

Desmet, K. and Parente, S. L. 'Bigger is better: market size, demand elasticity, and innovation', *International Economic Review*, Vol. 51, (2010) pp. 319–333.

Fajgelbaum, P., Grossman, G. M. and Helpman, E. 'Income distribution, product quality and international trade', *Journal of Political Economy*, Vol. 119, (2011) pp. 721–765.

Falvey, R. E. and Kierzkowski, H. 'Product quality, intra-industry trade and (im)perfect competition', in Kierzkowski, H. (ed.) Protection and Competition in International Trade (Oxford: Basil Blackwell, 1987).

Fertő, I. 'Vertically differentiated trade and differences in factor endowment: the case of agri-food products between Hungary and the EU', *Journal of Agricultural Economics*, Vol. 56, (2005) pp. 117–134.

Fertő, I. and Jámbor, A. 'Drivers of vertical intra-industry trade: the case of the Hungarian agri-food sector', *Agricultural Economics*, Vol. 46, (2015) pp. 113–123.

Fieler, A. C. (2011). Nonhomotheticity and bilateral trade: Evidence and a quantitative explanation. *Econometrica*, *79*(4), 1069-1101.

Flam, H. and Helpman, E. 'Vertical product differentiation and North-South trade', *American Economic Review*, Vol. 77, (1987) pp. 810–822.

Fontagné, L., Freudenberg, M. and Gaulier, G. 'A systematic decomposition of world trade into horizontal and VIIT', *Review of World Economics*, Vol. 142, (2006) pp. 459–475.

Hallak, J. C. 'Product quality and the direction of trade', *Journal of International Economics*, Vol. 68, (2006) pp. 238–265.

Hallak, J. C. ‘A product-quality view of the Linder hypothesis’, *Review of Economics and Statistics,* Vol. 92, (2010) pp. 453–466.

Hallak, J. C. and Schott, P. K. ‘Estimating cross-country differences in product quality’, *Quarterly Journal of Economics,* Vol. 126, (2011) pp. 417–474.

Hummels, D. and Klenow, P. J. ‘The variety and quality of a nation’s exports’, *American Economic Review,* Vol. 95, (2005) pp. 704–723.

Hummels, D. and Lugovskyy, V. ‘International pricing in a generalized model of ideal variety’, *Journal of Money, Credit and Banking,* Vol. 41, (2009) pp. 3–33.

Jámbor, A. ‘Country-specific determinants of horizontal and vertical intra-industry agri-food trade: the case of the EU new member states’, *Journal of Agricultural Economics,* Vol. 65, (2014) pp. 663–682.

Jensen, L. and Lüthje, T. ‘Driving forces of vertical intra-industry trade in Europe 1996–2005’, *Review of World Economics,* Vol. 145, (2009) pp. 469–488.

Khandelwal, A. ‘The long and short (of) quality ladders’, *Review of Economic Studies,* Vol. 77, (2010) pp. 1450–1476.

Latzer, H. and Mayneris, F. ‘Trade in quality and income distribution: an analysis of the enlarged EU market’, Document de Travail No. 2011-21 (Strasbourg: Bureau d'Economie Théorique et Appliquée (BETA), 2011).

Latzer, H. and Mayneris, F. ‘Income distribution and vertical comparative advantage’ (Louvain: Université de Louvain, 2014).

Linder, S. B. ‘An essay on trade and transformation’ (Uppsala: Almqvist and Wiksell, 1961).

Manova, K. and Zhang, Z. ‘Export prices and heterogeneous firms models’, *Quarterly Journal of Economics*, Vol. 127, (2012) pp. 379–436.

Olper, A., Curzi, D. and Pacca, L. ‘Do food standards affect the quality of EU imports?’, *Economics Letters,* Vol. 122, (2014) pp. 233–237.

Schott, P. ‘Across-product versus within-product specialization in international trade’, *Quarterly Journal of Economics,* Vol. 119, (2004) pp. 647–678.

The World Bank. Commodity Trade Database (COMTRADE). Available through World Bank’s World Integrated Trade Solution (WITS) software at: http://www.wits.worldbank.org (Washington, DC: The World Bank, 2013).

The World Bank. The ESCAP World Bank: International Trade Costs Database. http://databank.worldbank.org/data/views/variableselection/selectvariables.aspx?source=ESCAP-World-Bank:-International-Trade-Costs. (Washington, DC: The World Bank, 2014a).

The World Bank. World Development Indicators. http://data.worldbank.org/indicator. (Washington, DC: World Bank, 2014b).

UNU-WIDER. Gini indices. In ‘World Income Inequality Database (WIID3.0b)’. September 2014’**.** http://www.wider.unu.edu/research/WIID3-0B/en_GB/database/.

UNSD. Commodity Trade Database (COMTRADE). (New York: United Nations Statistical Division, 2013).

Verhoogen, E. A. ‘Trade, quality upgrading, and wage inequalities in the Mexican manufacturing sector’, *The Quarterly Journal of Economics,* Vol. 123, (2008) pp. 489–530.