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CANADIAN AGRIFOOD EXPORT PERFORMANCE AND THE GROWTH POTENTIAL OF THE BRICs AND NEXT-11.

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Abstract

In 2011, the Canadian Agrifood Policy Institute released an report highlighting the importance of the agrifood sector to the economy and concluded by stating the need for Canada to double the dollar value of agrifood exports to ensure the viability of the system. This paper seeks to estimate Engel elasticities faced by Canada and four other major agrifood exporter groups for two groups of emerging economies known as the Next-11 and the BRICs, and to forecast the value of agrifood exports to 2017. The findings suggest that despite the relatively low Engel elasticities for agrifood imports faced by Canada, it could sell an additional $3.65 billion in agrifood products to the Next-11 and BRICs by 2017.

Keywords: Agrifood Trade; Import Demand Model; BRICs; Next-11; Engel Elasticities.

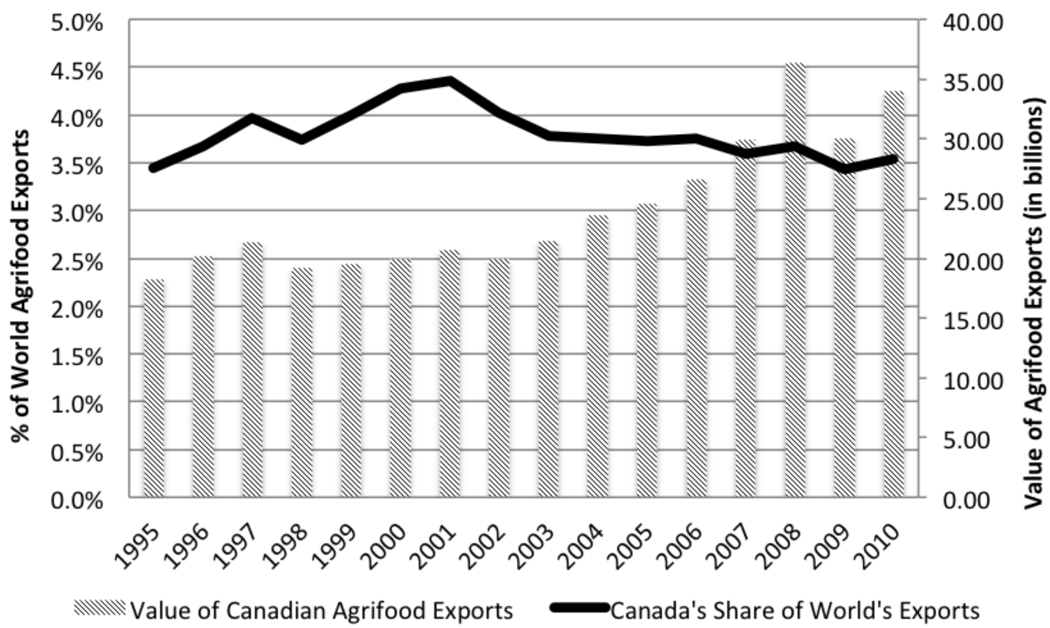
Introduction

In 2011, the Canadian Agrifood Policy Institute (CAPI) released a report assessing the state of Canada's agrifood sector. The report highlighted the importance of the agrifood sector to the Canadian economy – noting that the sector employs 1 in 8 Canadians – and concluded by arguing for the need to double the value of exports to $75 billion (in Canadian dollars) by 2025 to insure the viability of the sector (CAPI, 2011). If Canada is to achieve CAPI's stated objective, it is important for firms and policy-makers to identify those foreign markets where increases in import demand, arising from economic growth, is most likely.

The reliance of Canadian agriculture on trade is notable with roughly 80% of annual farm cash receipts derived from export-dependent commodities (CAFTA, 2008). In 2008, the value of Canadian agrifood exports totalled $36.4 billion rendering it the fourth largest exporter after the EU ($426.8 billion), the United States ($104.1 billion) and Brazil ($49.6 billion) (United Nations, 2010).[1] However, Canada's share of the global agrifood export market has remained stagnant at roughly 3.7% over the last two decades (United Nations, 2010) (figure 1), and heavily contingent on access to US markets. Exports to the US have grown consistently since the implementation of the Canada- United States trade agreement (CUSTA) in 1989 – the predecessor to the North American Free Trade Agreement (NAFTA) – and on average accounted for 63 percent of our agrifood exports between 2000 and 2009 (United Nations, 2010), but an over-reliance on the US for export opportunities could leave Canadian agrifood exporters vulnerable to fluctuations in the Canada-US exchange rate as well as any economic downturn that dampens the US demand for imports. Furthermore, the gains from CUSTA, and it's successor NAFTA, are largely achieved as the liberalization of trade barriers and the harmonization of regulations and institutions is largely completed.

Ignoring the role of prices, the magnitude of any increase in imports is largely contingent

[1] All values in US dollars unless otherwise noted.



*Source: Data obtained from United Nations (2010)

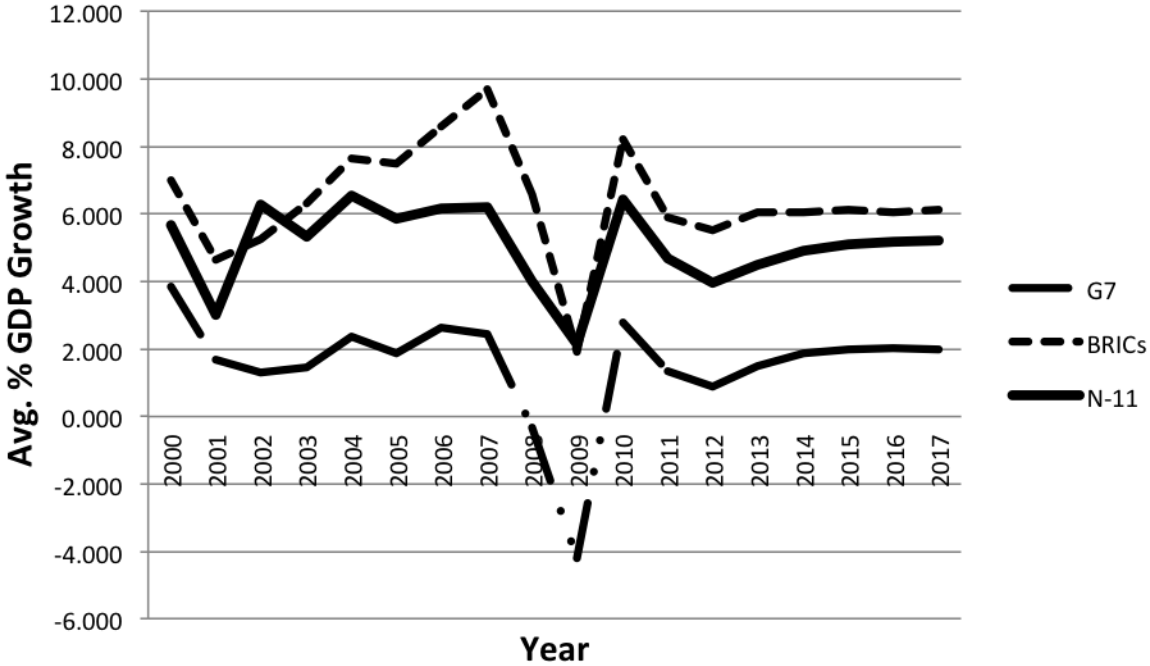
Figure 1: Canada's Agrifood Exports, 1995-2010

on: population growth, income growth and the responsiveness of per capita expenditure to increases in income.[2] Cranfield et al. (2002) estimated differences in expenditure elasticities across countries at various stages of development, finding that Engel elasticities for food are notably larger for developing nations relative to industrialized countries.[3] This suggests that increases in absolute expenditure on food are likely to be greatest in emerging markets where population and income growth are projected to be the largest.

Wilson and Purushothaman (2003) and Wilson and Stupnytska (2007) identified two groups of emerging economies where rapid GDP growth was expected based on their large populations, the BRICs and the Next-11 (N-11), suggesting that projected economic growth

[2]Prices also play a major role in determining the magnitude of demand for all commodities. This study will ignore this obvious fact, as its focus is predominantly on the role of income growth on expenditure.

[3]Engel elasticities indicate the responsiveness of expenditure to income growth – e.g. a one percent growth in income leads to a $x\%$ growth in expenditure. Thus, they parallel income elasticities but measure the responsiveness of expenditure rather than income.



*Source: Data obtained from IMF World Economic Outlook Database (2012)

Figure 2: Average GDP growth rate, 2000-2017

in several member countries could result in their GDPs surpassing several of the current G7 members. Assuming the extrapolated population and income growth foreseen by Wilson and Purushothaman (2003) and Wilson and Stupnytska (2007) comes to fruition (figure 2), these two groups of countries could represent new sources of demand for Canadian agrifood products. However, even if income growth occurs, any increase in import demand is contingent on how responsive expenditure on agrifood imports is to income. This study seeks to estimate whether Engel elasticities faced by Canadian agrifood exports differs from other major agrifood exporters for the BRICs[4] and 'Next-11'[5] and if their import profiles differ from other low, middle or high income countries.

[4]BRIC members: Brazil, Russia, India, China.

[5]N-11 members: Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, South Korea, Turkey and Vietnam.

The Model

This study follows Haq and Meilke (2009a) and Cairns and Meilke (2012) in its use of Hallak's (2006) model, which assumes a two stage budgeting procedure. It is assumed that a representative consumer possesses an additively separable utility function implying that the utility gained from the consumption of imported agrifood products is differentiable from all other products (Cairns and Meilke, 2012; Hallak, 2006; Haq and Meilke, 2009a). It also adopts the conventional Armington assumption, which argues that imported agrifood products are differentiated by exporter, and therefore, not perfect substitutes for each other.

In the first stage, the consumer exogenously allocates their consumption expenditures between imported agrifood products and all other goods. In the second stage, the representative consumer maximizes a CES utility function with Dixit-Stiglitz preferences by purchasing imported products from various exporters subject to the total proportion of income allocated to importable agrifood products in year t (equation 1) (Cairns and Meilke, 2012; Hallak, 2006; Haq and Meilke, 2009a,b):

$$\begin{aligned} \underset{x}{\text{Max}} \qquad & U_{it} = \sum_{j=1}^{J} (x_{ijt}^{\rho})^{\frac{1}{\rho}} \\ \text{s.t.} \qquad & E_{it} = \sum_{j=1}^{J} x_{ijt} p_{ijt} \end{aligned} \tag{1}$$

where x_{ijt} and p_{ijt} are the quantity of agrifood demanded from exporter j by the representative consumer in country i and the price in the importing country of the agrifood product from country j in time t and P_{ijt} represents an index of prices faced by importer i for exporters j where $j = 1 \ldots J$. The utility function in equation 1 is subject to a substitution parameter (ρ), which accounts for the propensity to substitute between various exporters. The substitution parameter has a lower asymptote of zero in order to prevent the possibility that imports from different exporters are consumed in fixed proportions.[6] This is a realistic constraint, as convention dictates that an exporter's share of a country's imports typical varies from year to year. Its upper bound is constrained to be less than one to ensure strict concavity of the utility function and to eliminate the possibility of linearity.[7]

Optimization of the constrained maximization problem produces the Marshallian demand function for a representative consumer (Cairns and Meilke, 2012; Haq and Meilke, 2009a):

$$x_{ijt} = \frac{(p_{ijt})^{\frac{1}{(\rho-1)}}}{\sum_{j=1}^{J} P_{ijt}^{\frac{\rho}{(\rho-1)}}} E_{ijt} \tag{2}$$

From this demand function it is easy to generate a function for the per capita expenditure on imports in country i from exporter j by multiplying equation 2 by the price of the good in the importing country (p_{ijt}) to get:

$$p_{ijt}x_{ijt} = \frac{p_{ijt}^{\frac{\rho}{(\rho-1)}}}{\sum_{j=1}^{J} (P_{ijt})^{\frac{\rho}{(\rho-1)}}} E_{it} \tag{3}$$

It is assumed here that the price of an imported good from exporter j is a function of the exporter's cost of production and the trade costs an importer faces when trading with the specific exporter, therefore let $p_{ijt} = p_{jt}t_{it}$.[8] For notational simplicity, let the elasticity of substitution between agrifood importers be a function of the substitution parameter as represented by $\sigma = \frac{1}{1-\rho}$. Incorporating these changes into equation 3 and defining the per

[6] As $\rho \to 0$ then the utility function begins to mimic a Leontief utility function, which would imply that imported agrifood products are perfect complements.

[7] Imposing strict concavity of the utility function indicates that it is also quasiconcave and therefore the indifference curves will be strictly convex to the origin. Strict convexity of the indifference curve implies that the consumer prefers variety they enjoy consuming imports from several exporters. This dismisses the notion of perfect substitutes which would suggest that the importing country imports food products from single source. Thus, if $\rho = 1$ then the goods are perfect substitutes since equation 1 simplifies to $U_{it} = \sum_{j=1}^{J} x_{jt}$ and the consumer would be indifferent between the source of the imported agrifood products

[8] Note that t_{ijt} must be greater than 1, otherwise it would imply there there are no transaction costs of engaging in international trade, which transitively implies that a given country is trading with itself.

capita expenditure on agrifood imports (from exporter j) as $imp_{ijt} = p_{ijt}x_{ijt}$ gives:

$$imp_{ijt} = \frac{(p_{jt}t_{ijt})^{1-\sigma}}{\sum_{j=1}^{J}(P_{jt}T_{ijt})^{1-\sigma}}E_{it} \tag{4}$$

where $P_{jt}T_{ijt}$ is an index of prices faced by consumers in the importing country (i) in period t.

The empirical model is obtained from the equation 4 by taking the natural logarithm of both sides of equation 4, substituting in several variables representing trade costs for t_{ijt} and adding a stochastic error term to get (Cairns and Meilke, 2012; Haq and Meilke, 2009a,b):

$$\begin{aligned} lnImp_{ijt} = \psi_i + \psi_j + \psi_t + \beta_1 lnIncome_{it} + \beta_2 lnDist_{ij} + \beta_3 Adj_{ij} + \beta_4 Lang_{ij} \\ + \beta_5 Colony_{ij} + \beta_6 PTA_{ijt} + \mu_{ijt} \end{aligned} \tag{5}$$

Following convention (in the literature on the gravity model), equation 5 contains variables proxying the cost of engaging in trade with a particular exporter (t in equation 4). Here dummy variables are set equal to one if the importer shares a common official language, is adjacent to the exporter, had a common colonizer, and/or if a preferential trade agreement or custom union exists between the trading partners, and zero otherwise. The distance variable is the natural logarithm of the distance between the "economic centres" of a country pair. It is calculated by first taking the average distance between economic centres of the exporter (importer) weighted by their respective shares of the country's population and then using these estimates to measure the distance between the trading partners (Head and Mayer, 2002; Mayer and Zignago, 2005).

Empirical Considerations

Several articles dealing with trade flows have discussed the proper estimation of the gravity model (e.g. Anderson and van Wincoop (2003), Matyas (1997), Egger (2000), Haq, Meilke, and Cranfield (2010)). Most recently, a study by Baier and Bergstrand (2007) suggests that previous attempts to estimation of the average treatment effects (the average effect on trade) of a preferential trade agreement or customs union suffers from endogeneity bias. Baier and Bergstrand (2007) state that endogeneity arises for three reasons: omitted variable bias, measurement error and simulateneity. Baier and Bergstrand (2007) claim that omitted variable bias could arise from the exclusion of relevant policy variables which act as determinants of the formation of a PTA (Baier and Bergstrand, 2004), while measurement error results from the use of a binary dummy variable to capture the effect of a heterogeneous group of PTAs which can differ substantially in scope and coverage. Simultaneity bias can arise due to the ambiguity of the direction of causation between trade flows and trade agreements — are trade agreements negotiated to increase trade flows; or are they used to institutionalize already established relationships between trading partners (Baier and Bergstrand, 2007)? Baier and Bergstrand (2007) conclude that the endogeneity bias encountered in using panel data can be corrected through the use of a fixed effects estimator (an approach originally advocated by Egger (2000)).

Endogeneity bias presents a potential problem, that we handle through the inclusion of exporter, importer and year fixed effects (as advocated by Matyas (1997) and Anderson and van Wincoop (2003)) to account for country heterogeneity – which would also capture the effect of any policy that could cause omitted variable bias. Bias caused by the endogeniety of PTAs and trade is an unlikely issue for us as agricultural trade is a small proportion of total trade. In contrast, we feel that zero trade flows (corresponding to a non-random sample), which may introduce sample selection bias into the model, is a more pertinent issue.

Due to the use of a log-linear functional form the presence of zero trade flows presents a dilemma. Zero trade flows can arise for two reasons. First, countries may not engage in trade with each other, not every importer trades with every exporter - e.g. a given product may only be produced by specific exporters. Second, the data may be missing. In either case, simply dropping observations with zero trade flows would result in biased parameter estimates[9]; a bias which Heckman (1976) identified as a case of omitted variable bias in his seminal paper, which can be corrected for through the use of his two–stage estimation procedure. This study takes the advice of Puhani (2000) and Dow and Norton (2003), and adopts the (full–information) maximum likelihood estimator as it is more efficient, relative to the two-step (limited information maximum likelihood) estimator originally suggested by Heckman (1976), to account for the presence of zero trade flows.

The Heckman model accounts for the sample selection issue through the inclusion of the inverse mills ratio, and therefore the marginal effects must be extracted from the parameter estimates. Derivation of the marginal effects is contingent on what assumptions are made regarding the origin of the zero trade flows. If the zero trade flows arise due to the absence of trade between a given country pair then they represent actual outcomes and require the derivation of conditional marginal effects (Dow and Norton, 2003). In contrast, if the zero is due to missing data, then they are indicative of potential outcomes, or latent outcomes, and calculation of the unconditional marginal effects is required. Some have argued that a two-part model is preferable to the Heckman model if the zeros represent actual outcomes (Dow and Norton, 2003; Leung and Yu, 1996; Puhani, 2000). However, due to the inclusion of numerous developing countries in our sample, it is unlikely that all zeros represent actual outcomes; it is more plausible that some zeros represent missing data. Therefore, the Heckman selection model will be employed as it permits the derivation of marginal effects for both actual and potential outcomes.

[9] One cannot take the log of zero which has led some researchers to simply drop them from the data set.

We also estimate the model using, what we call, subsample OLS which simply means that we drop all non-positive trade flows and estimate using OLS. This was done to test the extent of sample selection bias and to examine the robustness of our findings.

Data

This study uses a sample consisting of 47,360 bilateral agrifood trade flows for 40 major agrifood exporters to 75 importers between 1995-2010. Exporters were included if they were a member of the EU-27 and/or if they account for, on average, at least 1% of the value of global agrifood exports over the sample period[10], while criteria for inclusion as an importer required that the country represents at least an average of 0.1% of the value of global agrifood imports and/or if the country is a member of either the EU-27, BRICs or N-11.[11] The dependent variable is the natural logarithm of the real per capita expenditure on agrifood imports – the annual value of agrifood imports obtained from UN Comtrade divided by the IMF population estimates. We define agrifood according to the World Integrated Trading Solution classification of food at the SITC revision 3 level, which includes: 0 – food and live animals; 1 – beverages and tobacco; 22 – oilseeds/oil fruits; and 4 – animal/vegetable oils/fat/wax.

Income is proxied by real per capita GDP obtained from the IMF's World Economic Outlook Database. The common colonizer, adjacency, shared official language and distance variables were retrieved from the CEPII's gravity dataset available on their website. The

[10]Exporter include (from largest exporter to smallest): all members of the EU-27, US, Brazil, Canada, China, Argentina, Australia, Thailand, Mexico, Malaysia, Indonesia, New Zealand, India, Chile, and Turkey.

[11]Importers: from the low income ranking - Cuba, Ghana, Iraq and the Sudan; from the middle income - Algeria, Chile, Columbia, Dominican Republic, Ecuador, Guatemala, Jamaica, Libya, Malaysia, Morocco, Peru, Saudi Arabia, South Africa, Sri Lanka, Thailand, Trinidad and Tobago, Tunisia and Venezuela; from the high income ranking - Australia, Canada, EU-27, Hong Kong, Japan, New Zealand, Norway, Singapore, Switzerland, Taiwan, United Arab Emirates, and the United States; from the BRICs - Brazil, Russia, India, China; from the N-11 - Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, South Korea, Turkey and Vietnam; and, again all members of the EU-27.

PTA dummy variable was constructed from a list of regional trade agreements on the WTO's website (WTO, 2009) and only includes preferential trade agreements and custom unions due to the ambiguous coverage of most partial scope agreements. All monetary variable are deflated using the IMF implicit price deflator (base year = 2005).

Results

We estimate the Engel elasticities faced by five major exporters/exporter groups: Australia, Canada, the EU, the US and a hypothetical group representing the remaining 11 exporters included in the sample (ROW). All current members of the European Union (EU) are aggregated and treated as a single exporter; despite the fact that EU membership increases over the sample period – i.e., in 1995, there were only 15 members and the current EU-27 came into existence in 2007 with the ascension of Bulgaria and Romania.[12] Due to the Canadian-centric approach of this study, these exporter groups were chosen in order to contrast the elasticities faced by the two largest agrifood exporters (US and the EU), and Australia, a country which shares many characteristics with Canada (including the general composition of their agricultural exports).

Due to the use of panel data, the Bruesch-Pagan tests for heteroskedasticity and Wooldridge's test for serial correlation (Wooldridge, 2002) were preformed and revealed that both are present. Due to the ambiguous nature of the forms of heteroskedasticity and autocorrelation, all regressions were estimated with robust standard errors to correct for this.

Exporter, importer and year fixed effects were included to account for country and year heterogeneity (Matyas, 1997). As discussed by Anderson and van Wincoop (2003) these

[12] Although the composition of the EU changes over our sample period, we include all members of the EU-27 in the EU exporter group throughout the sample. This was done for simplicity, as interpretation of the coefficient estimates would be ambiguous if we opted to define the group according to the year each member joined. Furthermore, the latter approach would have led to the composition of the ROW group changing and cross comparison of the estimated Engel elasticities difficult.

fixed effects also control for the omission of a price variable in the empirical model.[13] A likelihood ratio test confirms that inclusion of fixed effects significantly improves the fit of the model, while a Wald test for joint equality rejected the hypothesis that the joint effect of the importer, exporter and year fixed effects are zero. Thus, it can be concluded that omitting the fixed effects would have biased the parameter estimates. The downfall of using fixed effects to proxy price terms is that their interpretation is highly ambiguous, as the source of the country heterogeneity is unclear; and the marginal effect of an increase (or decrease) in price is indistinguishable from other sources of heterogeneity.

Finally, a t-test for sample selection bias was preformed on the estimated coefficients of the inverse mills ratio (ρ and $\ln\sigma$). In both specifications, the t–test identified that sample selection bias was present due to the presence of zero trade flows (table 4 and 6). For simplicity, the remaining discussion of the results will focus on the estimated parameters from the unconditional marginal effect due to the fact that sample selection bias is present and the fact that the unconditional marginal effects represents the combined effect of both the increase in the expenditure on imported agrifood products given an increase in income in countries that trade and the increased probability of a country importing agrifood products.

Specification 1

The first specification interacts the five exporter groups with five importing country groups and income, resulting in 25 individual Engel elasticities. To estimate the Engel elasticities for imported agrifood products, dummy variables are generated for the five mutually exclusive importer groups: the BRICs, the N-11, and low, middle and high income countries and interacted with the natural logarithm of income (proxied by the natural logarithm of GDP

[13] Anderson and van Wincoop (2003) use the term "multilateral resistance terms" in their discussion of price effects on trade flows. Essentially, the latter term refers to the difference between the cost of trading with a given exporter relative to the average price of engaging in trade with all other exporters (Anderson and van Wincoop, 2003).

per capita). If an importer is a member of the BRICs or N-11 they are excluded from the other income groups. Non-N-11 and non-BRIC countries included in the sample are classified according to the World Banks income groups. The composition of each income group may vary annually as some countries may experience enough per capita income growth (loss) to warrant a graduation (demotion) to another group. To estimate the Engel elasticities faced by each exporter, dummy variables identifying each exporter (group) are generated then interacted with the importer group dummy variable and the natural logarithm of income. The results from this estimation are in table 4.

As can be seen in table 4 the common language, common colonizer, adjacency and distance variables all have the expected signs and are statistically significant at the 0.01% level. The PTA variable indicates that it is statistically significant and possesses the expected sign, however its magnitude, suggesting that, on average, the establishment of a PTA only garners a 10 percent increase in agrifood imports, implies a substantially lower effect on agricultural trade than is conventionally reported in the literature (e.g. Grant and Lambert (2008); Haq and Meilke (2009a,b)).[14]

All group Engel elasticities are positive and statistically significant suggesting that income has a positive effect on per capita expenditure on agrifood imports across all exporters. Wald tests for joint equality of the Engel elasticities confirm that the magnitude of the elasticities for each importer group varies by exporter (column e, table 5).

Table 1 ranks the exporters according to the size of the income elasticity they face (from highest to lowest), by importer group. Table 1 reveals that Canada and Australia face lower income elasticities relative to the other exporters (US, EU-27 and ROW). For low, middle and high income countries the EU-27 has the highest elasticity, following by ROW and the

[14]The much lower estimates of the value of a PTA contained in this study – in comparison to those in Grant and Lambert (2008) and Cairns and Meilke (2012) – are of concern and will be the subject of further research. However, we speculate that the larger the number of countries included in the sample the lower the estimated effect of a PTA. We speculate that the effect of a PTA on bilateral trade flows involving one or two small countries have a much smaller effect on trade than those including one or two large countries.

Table 1: Engel elasticities faced by exporters by importer group

	Importer Groups				
Rank	Low Income (a)	Middle Income (b)	High Income (c)	N-11 (d)	BRIC (e)
1.	EU-27 (1.079)	EU-27 (1.007)	EU-27 (0.981)	ROW (0.854)	ROW (0.909)
2.	ROW (0.999)	ROW (0.947)	ROW (0.956)	EU-27 (0.851)	EU-27 (0.867)
3.	US (0.723)	US (0.685)	US (0.671)	US (0.628)	US (0.582)
4.	Aus (0.638)	Can (0.484)	Aus (0.605)	Aus (0.554)	Can (0.393)
5.	Can (0.591)	Aus (0.462)	Can (0.479)	Can (0.402)	Aus (0.383)

US, Australia and Canada. For the N-11 and BRIC countries the ranking is similar, with the average elasticity of the ROW exporters slightly exceeding that of the EU-27, followed by the US with Australia and Canada jockeying for fourth. The EU-27 and ROW exporter groups face import demand elasticities near unity, suggesting that expenditure on their agrifood exports increases (approximately) in proportion with income growth. The United States seems to face similar Engel elasticities across each importing group (around 0.6), with Canada and Australia facing the lowest elasticities, generally below 0.6. Wald tests for equality reveal that Canada faces statistically different Engel elasticities relative to all exporter groups, except for Australia for low and middle income countries and the BRICs, and the United States for low income countries (table 5). This suggests that expenditure on Canadian exports is generally less responsive to income growth relative to other major exporters.

Specification 2

Wilson and Purushothaman (2003) and Wilson and Stupnytska (2007) note there is considerable variation between individual country members within the BRICs and N-11 in terms of their respective challenges to maintaining growth. In this specification we disaggregate

Table 2: Ranking of the Engel elasticities of BRIC members by exporters

Rank	BRIC Members			
	Brazil	Russia	India	China
	(a)	(b)	(c)	(d)
1.	ROW (0.605**)	ROW (0.755***)	ROW (1.624***)	ROW (1.363***)
2.	EU (0.469*)	EU (0.688***)	Aus (1.201***)	Aus (1.025***)
3.	Aus (0.045)	Aus (0.320*)	EU (1.192**)	EU (1.049***)
4.	US (0.0003)	US (0.236*)	US (0.906***)	US (0.892***)
5.	Can (-0.154)	Can (-0.0891)	Can (0.757**)	Can (0.642***)

Note: Asterisks denotes the coefficient's level of significance
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

the N-11 and BRICs by members to account for any heterogeneity masked by the previous specification, and to complement the discussion by identifying the important drivers of the group elasticities. As the focus of this paper is assessing the differential effects of other major exporters relative to Canada in regards to the potential of the N-11 and BRICs, only those groups are differentiated; low, middle and high-income countries remained grouped.

Table 6 shows all of the variables proxying trade costs are both statistically significant and possess the hypothesized signs. However, the level of significance varies across the estimated Engel elasticities, and is contingent on the exporter group under consideration. For simplicity of explanation discussion of elasticities will focus solely on the parameter estimates for the BRIC and N-11 members. Table 2 and 3 rank each of the exporter's estimated elasticities (from table 6) from the most elastic to the most inelastic for the BRIC and N-11 members.

Joint Wald tests confirm that the Engel elasticities are not equal for each of the BRIC members, while individual Wald tests reveal that Canada faces statistically different elasticities than other exporters in the sample with the exception of Australia and the US for Brazil (Table 7).

Table 2 ranks the elasticity estimates from the second specification (table 6) faced by the five exporter groups for each of the BRIC members. For all four BRIC members the ROW group faces the highest Engel elasticity. This is likely attributable to its composition; which contains exporters who are either a member of the BRICs themselves (China, India, and Brazil) or are in close proximity to the BRICs – e.g. Argentina, Chile, and Mexico to Brazil, and Thailand, Malaysia, Indonesia to India and China. Thus, there may be a regionalization of trade present as a result of existing supply-chains and/or due to consumer preferences for regional products due to similar diets – e.g. greater consumption of rice and pork versus beef and wheat. Our findings suggest that for India (table 2, column c) and China (column d) income is a larger determinant of expenditure on agrifood imports as all exporter groups face positive and statistically significant elasticities larger than unity. While the magnitude of the elasticities are notably smaller for Russia (table 2, column b) and Brazil (column a), relative to their BRIC counterparts, suggesting that income is not as an important determinant of agrifood imports. It is also important to note that Brazil is the third largest agricultural exporter (about 4 percent of world exports), and both Brazil and Russia have substantially smaller populations than India and China, implying that agrifood imports may not be necessary to facilitate increased domestic demand. Furthermore, Australia, the United States and Canada all possess statistically insignificant or weakly significant inelastic Engel elasticities for Russia and Brazil suggesting that income growth has little influence on expenditure on their exports.

Table 3 lists and ranks the Engel elasticities faced by each exporter for each of the N-11 members (excluding Iran).[15] As can be seen, and confirmed by joint Wald tests, the elasticity estimates vary substantially for a given importer depending on the exporter group in question. The results in table 3 parallel those of table 2. The ROW group persists as the largest benefactor of income growth in the N-11 (as well as the BRICs), with Australia and

[15]Despite it's inclusion in the N-11 the remaining discussion will exclude any coefficient for Iran, due to the various economic sanctions imposed on it following its pursuit of the development of a nuclear weapons program.

Table 3: Ranking of the Engel elasticities of N-11 members by exporters

	N-11 Members				
Rank	Bangladesh (a)	Egypt (b)	Indonesia (c)	Mexico (d)	Nigeria (e)
1.	ROW (4.2*)	ROW (0.60*)	ROW (0.68***)	ROW (0.76*)	ROW (1.02***)
2.	Aus (4.04*)	Aus (0.45)	EU (0.45**)	EU (0.66*)	EU (0.91***)
3.	EU (3.98*)	EU (0.38)	Aus (0.45*)	Aus (0.50)	Aus (0.56*)
4.	US (3.54*)	US (0.21)	US (0.24)	US (0.30)	US (0.51**)
5.	Can (3.46*)	Can (-0.32)	Can (0.001)	Can (0.15)	Can (-0.07)
	Pakistan (f)	Philippines (g)	South Korea (h)	Turkey (i)	Vietnam (j)
1.	ROW (1.81***)	ROW (0.38)	ROW (0.90***)	ROW (1.26***)	ROW (2.46***)
2.	Aus (1.64**)	EU (0.22)	EU (0.76**)	EU (1.09***)	EU (2.37***)
3.	EU (1.56**)	Aus (0.07)	Aus (0.73*)	Aus (0.93***)	Aus (2.27***)
4.	US (1.219*)	US (-0.4)	US (0.57*)	US (0.91***)	US (1.84***)
5.	Can (1.03)	Can (-0.41)	Can (0.28)	Can (0.56**)	Can (1.53***)

Note: Asterisks denotes the coefficient's level of significance
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

the EU also experiencing noteworthy increases in expenditure on their imports as income grows. However, the magnitude (and signs on the) elasticity estimates vary substantially across importer groups with Bangladesh, Pakistan and Vietnam being the most elastic. It appears that Bangladesh consistently has elasticity estimates around 4 – implying that for every 1 percent growth in income, per capita expenditure on imports increases by 4 percent. Elasticity estimates for Pakistan and Vietnam are around 1.5 and 2, with Turkey also having several elastic estimates. These results suggest that for several N-11 members per capita expenditure will increase faster than income growth.

However, the findings from tables 2 and 3 are less encouraging for Canadian exporters, as they suggest that despite being the world's fourth largest agrifood exporter our exports experience smaller increases in expenditure as BRIC and N-11 members grow, relative to other major exporters. In both tables Canada always has the lowest estimated Engel elasticities. Despite confronting relative weaker demand, the silver lining is that Canadian exporters still have hopeful prospects, as the three aforementioned N-11 members (Bangladesh, Pakistan, and Vietnam) have Engel elasticities in excess of one, suggesting that per capita expenditure on agrifood imports will increase more than proportionally with income growth. Two members of the BRICs (India and China) also deserve a closer look. Despite demonstrating slightly lower Engel elasticities relative to the previously mentioned N-11 members, their sheer population sizes (of 1.22 and 1.34 billion, respectively, in 2010) suggests that on the national level their markets may still represent important sources of new import demand for Canada, even if growth in expenditure on Canada's exports is increasing slower than income.

Forecasts

Even if an importer has a large Engel elasticity, increases in expenditure may not result if income and population growth do not occur. This section uses the estimated Engel elasticities from table 6 and IMF world economic outlook projections for population and GDP per capita to forecast the potential value of agrifood imports in 2017 (in 2010 dollars). It then contrasts the estimated import value for the three importer groups (BRICs, N-11 and G7) with the 2010 value in order to approximate where the largest growth in expenditure will occur for each of the exporter groups. Here we exclude forecasts for the ROW exporter group, because of the heterogeneous composition of the group.

The forecasts were obtained by calculating the percent growth in population and real GDP per capita (base year 2010) for each member of the N-11, G7 and BRIC to 2017.[16] It is

[16]We include forecasts for the G7 in order to continue the commentary on Wilson and Purushothaman (2003) and Wilson and Stupnytska (2007) projections which began in the introduction contrasting the projected economic growth of the N-11 and BRICs relative to the G7.

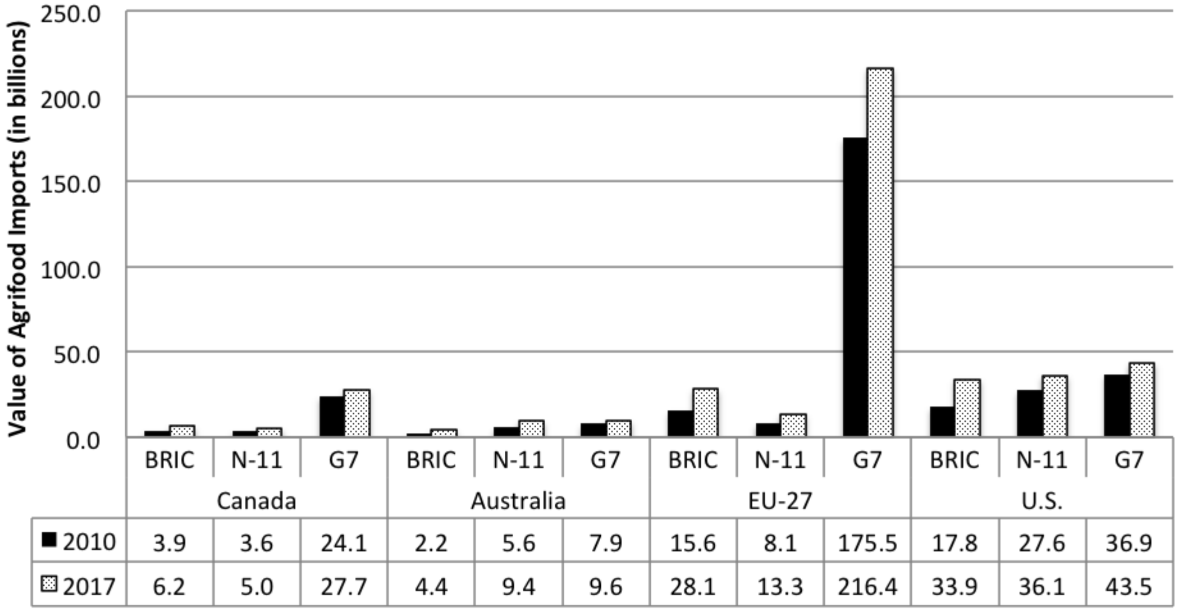


Figure 3: Value of Agrifood Imports, 2010 and 2017

assumed that expenditure on agrifood products is homogenous of degree one in population growth (which is inherent in the model), implying that a one percent increase in population translates to a one percent increase in expenditure. Since the Engel elasticities represent the effect of a one percent increase in GDP per capita, the respective estimated parameters from table 6 were multiplied by the percentage growth in real GDP per capita in order to obtain the percentage increase in the value of agrifood imports attributable to income growth. The percent increase (or decrease) in the value of agrifood imports between 2010 and 2017 for each member of the importing groups (i.e. the G7, the BRICs or the N-11) was then obtained by adding the percent increase in expenditure attributable to income and population growth and multiplying it by the 2010 value of agrifood imports from each of the four major exporter groups (Canada, Australia, EU-27 and the U.S.) (United Nations, 2010). The cumulative growth in value for each importing group was then obtained by summing the increases in the value of agrifood imports of each member, for each exporter.

As shown in figure 3, for all four exporters the G7 represents the largest importer in both

2010 and 2017 (in terms of value). However, Australia has the smallest values for this group of roughly \$7.92 billion in 2010 and \$9.65 billion in 2017, this is likely attributable to the fact that the United States, Canada and several of the largest members of the EU (France, Germany, Italy and the United Kingdom) make up the majority of the G7. In contrast, the EU-27 appears to have the largest gains in absolute terms as the value of their agrifood imports increase \$40.94 billion, again, this is likely due to the fact that four of the seven members of the G7 are members of the EU.

The United States has the largest value of exports to the BRICs (\$33.9 billion) and N-11 (\$36.1 billion) in 2017. While the estimated Engel elasticities faced by the US are not the largest, and income growth is constant for each importer across the various exporters, they experience larger increases due to the fact that their 2010 value of agrifood imports are the largest for the latter two groups.

In terms of absolute value, in figure 3 it appears that Canada faces the lowest prospects in 2017, with the exception of Australian exports to the G7. However, the absolute value of agrifood imports only tells one part of the story, if Canada is to achieve the stated objective of increasing the value of agrifood exports, the relative gain in the value of exports is of greater strategic importance – i.e. where are the largest percentage increases going to occur for each exporter. Figure 4 illustrates this.

In relative terms, it appears that the BRIC nations followed by the N-11 represent the largest regions of increase for all four exporters. This supports Wilson and Purushothaman (2003) hypothesis that rising incomes could translate into increased demand for a variety of commodities. Australia, the US and the EU all see the value of their exports to the BRICs increase by 80-100 percent, while the increases are more tempered for Canada at 60 percent of the 2010 value. This exercise reveals that Australia and the EU experience the largest relative increases in the value of agrifood exports to the N-11 of 70 and 65 percent, respectively. Percent gains in the value of exports to the G7 appear to be relatively similar

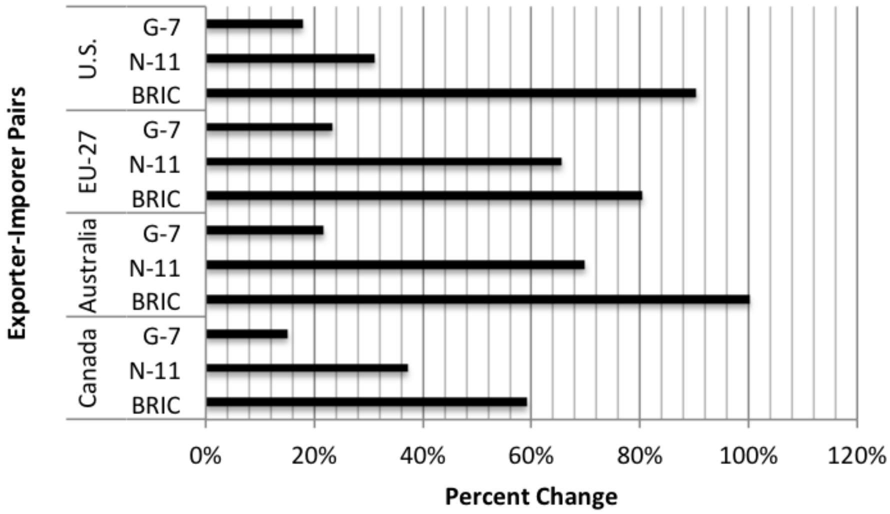


Figure 4: Percent increase in the value of agrifood imports, 2010-2017

across exporters and more moderate relative to the other two importer groups.

The focus of this study is not only on the potential gains from income and population growth in the N-11 and BRICs relative to other major exporters, but also the gains for Canada. In terms of percentage increases of the value of imports from 2010 to 2017, the largest are for Bangladesh (135.9 percent) and Vietnam (135.9 percent), followed by China (72.3 percent), Pakistan (63.5 percent), India (59.5 percent) and Turkey (41 percent). However, as figure 5 shows, in absolute terms the largest gain in value between 2000-2017 occurs from trade with China (roughly \$ 2.03 billion), with Bangladesh (\$681.8 million), India (\$327.39 million), Mexico (\$210.2 million), and Pakistan (\$208.6) also representing substantial gains. In short, the forecasting exercise suggests that if the IMF forecasts for population and income (GDP per capita) growth to 2017 are accurate, and holding prices constant, then the cumulative value of Canadian agrifood exports to the BRICs and N-11 could roughly total \$11.17 billion (in 2010 dollars) – a \$3.65 billion dollar increase from the 2010 total.

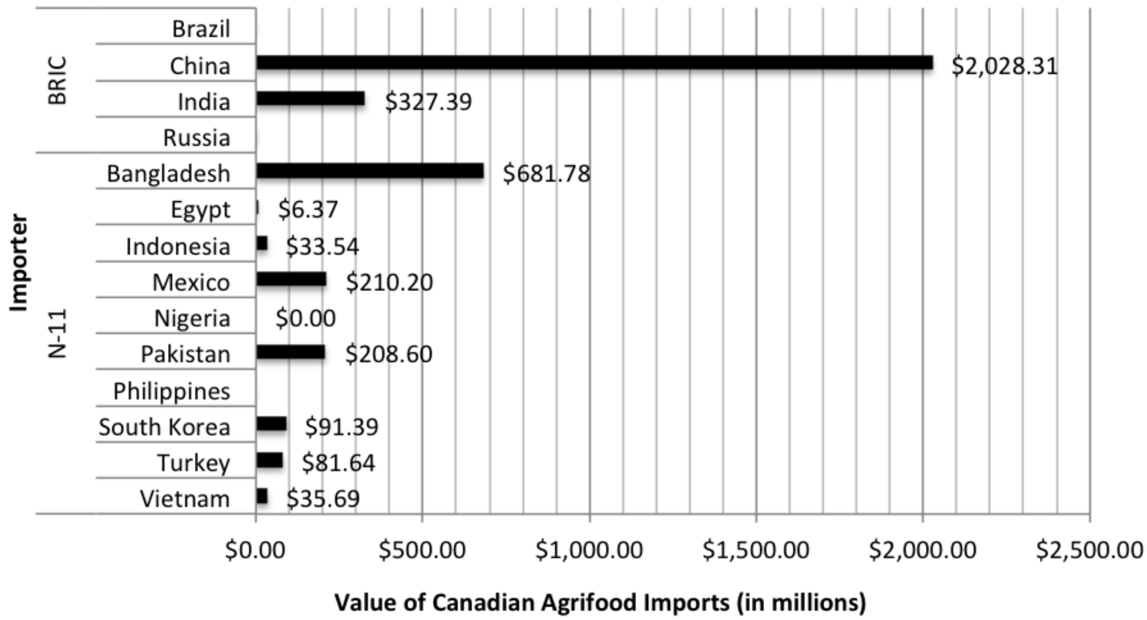


Figure 5: Increased in Value of Canadian agrifood imports by importer (2010-2017)

Conclusions

This study attempted to assess whether income growth in the Next-11 and BRICs has translated into increased expenditure on Canadian agrifood imports. In short, the answer is mixed. While Engel elasticity estimates are large for several BRIC (India and China) and N-11 members (Bangladesh, Pakistan, and Vietnam) across all exporter groups, income growth appears to have a relatively smaller impact on expenditure on Canadian agrifood exports relative to other major exporters. For several members of the aforementioned groups, income appears to have no, or even a negative effect on per capita expenditure for Canadian exports. This is not always the case for other exporters. However, despite this relative disadvantage, trade is not a zero sum game. Estimates for Bangladesh, Pakistan and Vietnam indicate that expenditure may increase at a disproportionately larger rate relative to income growth for agrifood importers from all major exporters included in the sample. Thus, the results suggest that Canada can experience potential gains from engaging in trade with the latter countries.

A forecasting exercise revealed that the G7 still represents larger markets in terms of the absolute value of imports, but the BRICs and N-11 have the largest percentage increases for all exporters. This finding loosely coincides with Wilson and Purushothaman (2003) and Wilson and Stupnytska (2007) predictions, as their projections continue to 2050, while ours are more moderate extending to 2017, suggesting that the value of agrifood imports by these two groups could continue to grow. Nevertheless from a Canadian perspective, relative to the other exporter groups, Canada is projected to gain the least from income growth in the BRICs and N-11 when compared to the exporter groups analyzed. However, this does not preclude Canada from experiencing notable gains from economic growth within the group. If the IMF's income and population projections materialize in 2017, Canada could see substantial increases in the absolute value of imports (from their 2010 values) in China ($2.03 billion), Bangladesh ($681.8 million), India ($327.4 million), Mexico ($210.2 million), and Pakistan ($208.6 million). Thus, despite the tempered gains relative to other major exporters, Canada still seeks to benefit.

We estimated the Engel elasticities faced by five exporters for five importer groups, but the analysis is limited in that it does not explain what influences the variation in the Engel elasticities across exporters – i.e. why does Canada face lower Engel elasticities? Based on the findings of Haq and Meilke (2009b), we speculate that it may have something to do with export composition and consumer preferences in the importing countries. This is worth while a question for future research.

Table 4: Specification 1

	Heckman Coefficients	Marginal Effects Conditional	Marginal Effects Unconditional	Subsample OLS
Aus-LI	0.656***	0.653***	0.656***	0.655***
	(0.124)	(0.123)	(0.124)	(0.124)
Aus-MI	0.485***	0.482***	0.485***	0.483***
	(0.0838)	(0.0834)	(0.0838)	(0.0840)
Aus-HI	0.627***	0.624***	0.627***	0.626***
	(0.0719)	(0.0716)	(0.0719)	(0.0720)
Aus-N11	0.563***	0.561***	0.563***	0.562***
	(0.109)	(0.109)	(0.109)	(0.110)
Aus-BRIC	0.376***	0.375***	0.376***	0.373***
	(0.0948)	(0.0944)	(0.0948)	(0.0950)
ROW-LI	1.013***	1.009***	1.013***	1.012***
	(0.0601)	(0.0599)	(0.0601)	(0.0602)
ROW-MI	0.950***	0.946***	0.950***	0.949***
	(0.0505)	(0.0503)	(0.0505)	(0.0506)
ROW-HI	0.961***	0.957***	0.961***	0.960***
	(0.0485)	(0.0483)	(0.0485)	(0.0486)
ROW-N11	0.841***	0.837***	0.841***	0.840***
	(0.0856)	(0.0852)	(0.0856)	(0.0857)
ROW-BRIC	0.876***	0.872***	0.876***	0.873***
	(0.0648)	(0.0645)	(0.0648)	(0.0649)
Can-LI	0.592***	0.590***	0.592***	0.591***
	(0.0884)	(0.0881)	(0.0884)	(0.0886)
Can-MI	0.494***	0.492***	0.494***	0.492***
	(0.0701)	(0.0699)	(0.0701)	(0.0703)
Can-HI	0.488***	0.486***	0.488***	0.487***
	(0.0632)	(0.0629)	(0.0632)	(0.0633)
Can-N11	0.399***	0.397***	0.399***	0.397***
	(0.0984)	(0.0980)	(0.0984)	(0.0986)
Can-BRIC	0.370***	0.368***	0.370***	0.367***
	(0.0837)	(0.0834)	(0.0837)	(0.0839)
US-LI	0.749***	0.746***	0.749***	0.748***
	(0.0742)	(0.0739)	(0.0742)	(0.0744)
US-MI	0.712***	0.709***	0.712***	0.710***
	(0.0604)	(0.0601)	(0.0604)	(0.0605)
US-HI	0.693***	0.690***	0.693***	0.692***
	(0.0552)	(0.0550)	(0.0552)	(0.0553)
US-N11	0.638***	0.635***	0.638***	0.637***
	(0.0939)	(0.0936)	(0.0939)	(0.0941)

Table 4 – continued from previous page				
	Heckman	Marginal Effects		Subsample
		Conditional	Unconditional	OLS
US-BRIC	0.578***	0.575***	0.578***	0.575***
	(0.0769)	(0.0765)	(0.0769)	(0.0770)
EU-LI	1.095***	1.090***	1.095***	1.096***
	(0.0549)	(0.0547)	(0.0549)	(0.0551)
EU-MI	1.022***	1.018***	1.022***	1.023***
	(0.0485)	(0.0483)	(0.0485)	(0.0486)
EU-HI	0.995***	0.991***	0.995***	0.996***
	(0.0470)	(0.0468)	(0.0470)	(0.0471)
EU-BRIC	0.839***	0.836***	0.839***	0.839***
	(0.0637)	(0.0635)	(0.0637)	(0.0639)
EU-N11	0.850***	0.846***	0.850***	0.851***
	(0.0840)	(0.0837)	(0.0840)	(0.0842)
Adjacent	0.224***	0.277***	0.224***	0.221***
	(0.0412)	(0.0492)	(0.0415)	(0.0413)
Common	0.494***	0.541***	0.494***	0.495***
Language	(0.0301)	(0.0320)	(0.0301)	(0.0302)
Colony	0.558***	0.537***	0.558***	0.559***
	(0.0392)	(0.0430)	(0.0393)	(0.0393)
lnDistance	-1.408***	-1.454***	-1.408***	-1.410***
	(0.0135)	(0.0158)	(0.0142)	(0.0136)
PTA	0.113***	0.180***	0.114***	0.111***
	(0.0237)	(0.0257)	(0.0239)	(0.0238)
athrho	-0.0366***			
(ρ)	(0.00876)			
lnsigma	0.328***			
($\ln\sigma$)	(0.00644)			
Adjusted R^2				0.990
Log-likelihood	-78926.3			-70790.1
F-test				50769.2
Chi^2	7904112.5			
Observations	47360	47360	47360	40513

Marginal effects; Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: Wald tests for equality of Engel elasticities faced by exporters

		Exporter Elasticities				Joint
		Australia	ROW	US	EU-27	Equality
		(a)	(b)	(c)	(d)	(e)
	Low Income	0.237	29.63***	3.129*	45.60***	79.72***
		(0.627)	(0.00)	(0.077)	(0.00)	(0.00)
	Middle Income	0.0146	71.35***	11.88 ***	100.7***	186.7***
		(0.904)	(0.00)	(0.001)	(0.00)	(0.00)
Canadian	High Income	4.219**	111.7***	15.37***	134.6***	228.7***
Elasticities		(0.04)	(0.00)	(0.00)	(0.00)	(0.00)
	BRICs	0.00496	68.94***	8.174***	30.35***	132.9***
		(0.944)	(0.00)	(0.004)	(0.00)	(0.00)
	N-11	3.496*	62.91***	12.14***	69.00***	96.45***
		(0.062)	(0.00)	(0.00)	(0.00)	(0.00)

Marginal effects; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Specification 2

Variables	Heckman Coefficients	Marginal Effects Conditional	Marginal Effects Unconditional	Subsample OLS
Aus-Brazil	0.0454	0.0452	0.0454	0.0421
	(0.226)	(0.225)	(0.226)	(0.226)
Aus-Russia	0.320*	0.318*	0.320*	0.317*
	(0.143)	(0.142)	(0.143)	(0.143)
Aus-India	1.201***	1.196***	1.201***	1.198***
	(0.265)	(0.264)	(0.265)	(0.266)
Aus-China	1.025***	1.020***	1.025***	1.021***
	(0.178)	(0.177)	(0.178)	(0.178)
Aus-Bangladesh	4.043*	4.027*	4.043*	4.054*
	(1.757)	(1.750)	(1.757)	(1.760)
Aus-Egypt	0.446	0.445	0.446	0.449
	(0.297)	(0.295)	(0.297)	(0.298)
Aus-Indonesia	0.450*	0.448*	0.450*	0.446*
	(0.210)	(0.209)	(0.210)	(0.210)
Aus-Iran	-0.173	-0.172	-0.173	-0.179
	(0.424)	(0.422)	(0.424)	(0.425)
Aus-Mexico	0.495	0.493	0.495	0.500
	(0.319)	(0.317)	(0.319)	(0.319)
Aus-Nigeria	0.558*	0.556*	0.558*	0.563*
	(0.224)	(0.223)	(0.224)	(0.225)
Aus-Pakistan	1.644**	1.637**	1.644**	1.642**
	(0.559)	(0.557)	(0.559)	(0.561)
Aus-Philippines	0.0685	0.0682	0.0685	0.0619
	(0.316)	(0.314)	(0.316)	(0.316)
Aus-Korea	0.729*	0.726*	0.729*	0.724*
	(0.287)	(0.286)	(0.287)	(0.287)
Aus-Turkey	0.929***	0.925***	0.929***	0.928***
	(0.215)	(0.214)	(0.215)	(0.216)
Aus-Vietnam	2.272***	2.263***	2.272***	2.269***
	(0.299)	(0.298)	(0.299)	(0.300)
Aus-LI	0.882***	0.879***	0.882***	0.881***
	(0.185)	(0.185)	(0.185)	(0.186)
Aus-MI	0.666***	0.663***	0.666***	0.665***
	(0.136)	(0.135)	(0.136)	(0.136)

Table 6 – continued from previous page				
Variables	Heckman	Marginal Effects		Subsample
		Conditional	Unconditional	OLS
Aus-HI	0.779***	0.776***	0.779***	0.778***
	(0.112)	(0.112)	(0.112)	(0.113)
Can-Brazil	-0.154	-0.154	-0.154	-0.158
	(0.204)	(0.203)	(0.204)	(0.205)
Can-Russia	-0.0891	-0.0887	-0.0891	-0.0921
	(0.107)	(0.106)	(0.107)	(0.107)
Can-India	0.757**	0.754**	0.757**	0.754**
	(0.238)	(0.237)	(0.238)	(0.239)
Can-China	0.642***	0.639***	0.642***	0.637***
	(0.140)	(0.140)	(0.140)	(0.141)
Can-Bangladesh	3.458*	3.444*	3.458*	3.468*
	(1.752)	(1.745)	(1.752)	(1.755)
Can-Egypt	-0.321	-0.320	-0.321	-0.319
	(0.278)	(0.277)	(0.278)	(0.279)
Can-Indonesia	0.000740	0.000737	0.000740	-0.00268
	(0.179)	(0.178)	(0.179)	(0.179)
Can-Iran	-0.688	-0.685	-0.688	-0.694
	(0.409)	(0.408)	(0.409)	(0.410)
Can-Mexico	0.145	0.144	0.145	0.149
	(0.306)	(0.304)	(0.306)	(0.306)
Can-Nigeria	-0.0683	-0.0681	-0.0683	-0.0643
	(0.189)	(0.189)	(0.189)	(0.190)
Can-Pakistan	1.034	1.030	1.034	1.031
	(0.547)	(0.545)	(0.547)	(0.549)
Can-Philippines	-0.407	-0.406	-0.407	-0.414
	(0.295)	(0.293)	(0.295)	(0.295)
Can-Korea	0.275	0.274	0.275	0.270
	(0.274)	(0.273)	(0.274)	(0.275)
Can-Turkey	0.560**	0.557**	0.560**	0.558**
	(0.192)	(0.191)	(0.192)	(0.193)
Can-Vietnam	1.530***	1.524***	1.530***	1.526***
	(0.273)	(0.272)	(0.273)	(0.273)
Can-LI	0.411***	0.409***	0.411***	0.410***
	(0.116)	(0.116)	(0.116)	(0.117)

Table 6 – continued from previous page				
Variables	Heckman	Marginal Effects		Subsample
		Conditional	Unconditional	OLS
Can-MI	0.362***	0.360***	0.362***	0.360***
	(0.0912)	(0.0909)	(0.0912)	(0.0916)
Can-HI	0.386***	0.384***	0.386***	0.384***
	(0.0799)	(0.0796)	(0.0799)	(0.0802)
EU-Brazil	0.469*	0.467*	0.469*	0.467*
	(0.194)	(0.193)	(0.194)	(0.194)
EU-Russia	0.688***	0.686***	0.688***	0.688***
	(0.0692)	(0.0689)	(0.0692)	(0.0694)
EU-India	1.192***	1.187***	1.192***	1.192***
	(0.212)	(0.212)	(0.212)	(0.213)
EU-China	1.049***	1.044***	1.049***	1.047***
	(0.110)	(0.109)	(0.110)	(0.110)
EU-Bangladesh	3.975*	3.959*	3.975*	3.986*
	(1.750)	(1.743)	(1.750)	(1.752)
EU-Egypt	0.376	0.375	0.376	0.381
	(0.263)	(0.262)	(0.263)	(0.264)
EU-Indonesia	0.452**	0.450**	0.452**	0.451**
	(0.157)	(0.156)	(0.157)	(0.157)
EU-Iran	-0.324	-0.322	-0.324	-0.329
	(0.399)	(0.397)	(0.399)	(0.400)
EU-Mexico	0.659*	0.656*	0.659*	0.666*
	(0.299)	(0.298)	(0.299)	(0.300)
EU-Nigeria	0.907***	0.903***	0.907***	0.912***
	(0.159)	(0.159)	(0.159)	(0.160)
EU-Pakistan	1.557**	1.550**	1.557**	1.556**
	(0.541)	(0.539)	(0.541)	(0.542)
EU-Philippines	0.220	0.219	0.220	0.216
	(0.283)	(0.282)	(0.283)	(0.284)
EU-Korea	0.763**	0.760**	0.763**	0.760**
	(0.267)	(0.266)	(0.267)	(0.268)
EU-Turkey	1.090***	1.086***	1.090***	1.092***
	(0.177)	(0.176)	(0.177)	(0.177)
EU-Vietnam	2.371***	2.361***	2.371***	2.369***
	(0.252)	(0.251)	(0.252)	(0.253)
EU-LI	1.054***	1.049***	1.054***	1.054***

Table 6 – continued from previous page				
Variables	Heckman	Marginal Effects		Subsample
		Conditional	Unconditional	OLS
	(0.0562)	(0.0560)	(0.0562)	(0.0564)
EU-MI	0.997***	0.992***	0.997***	0.997***
	(0.0492)	(0.0490)	(0.0492)	(0.0494)
EU-HI	0.978***	0.974***	0.978***	0.979***
	(0.0475)	(0.0473)	(0.0475)	(0.0476)
US-Brazil	0.000333	0.000332	0.000333	-0.00336
	(0.198)	(0.197)	(0.198)	(0.198)
US-Russia	0.236**	0.235**	0.236**	0.233**
	(0.0885)	(0.0881)	(0.0885)	(0.0888)
US-India	0.906***	0.902***	0.906***	0.903***
	(0.226)	(0.225)	(0.226)	(0.227)
US-China	0.892***	0.888***	0.892***	0.888***
	(0.128)	(0.127)	(0.128)	(0.128)
US-Bangladesh	3.543*	3.529*	3.543*	3.553*
	(1.750)	(1.743)	(1.750)	(1.752)
US-Egypt	0.213	0.212	0.213	0.216
	(0.270)	(0.269)	(0.270)	(0.271)
US-Indonesia	0.236	0.235	0.236	0.233
	(0.168)	(0.167)	(0.168)	(0.169)
US-Iran	-1.157**	-1.152**	-1.157**	-1.163**
	(0.412)	(0.411)	(0.412)	(0.413)
US-Mexico	0.302	0.301	0.302	0.307
	(0.302)	(0.300)	(0.302)	(0.302)
US-Nigeria	0.505**	0.503**	0.505**	0.509**
	(0.176)	(0.175)	(0.176)	(0.177)
US-Pakistan	1.219*	1.214*	1.219*	1.217*
	(0.542)	(0.540)	(0.542)	(0.544)
US-Philippines	-0.138	-0.138	-0.138	-0.145
	(0.288)	(0.287)	(0.288)	(0.289)
US-Korea	0.571*	0.569*	0.571*	0.566*
	(0.271)	(0.269)	(0.271)	(0.271)
US-Turkey	0.907***	0.903***	0.907***	0.906***
	(0.184)	(0.183)	(0.184)	(0.185)
US-Vietnam	1.841***	1.833***	1.841***	1.837***
	(0.263)	(0.262)	(0.263)	(0.263)

Table 6 – continued from previous page				
Variables	Heckman	Marginal Effects		Subsample
		Conditional	Unconditional	OLS
US-LI	0.587***	0.584***	0.587***	0.585***
	(0.0929)	(0.0926)	(0.0929)	(0.0932)
US-MI	0.594***	0.591***	0.594***	0.592***
	(0.0733)	(0.0730)	(0.0733)	(0.0736)
US-HI	0.601***	0.599***	0.601***	0.600***
	(0.0650)	(0.0647)	(0.0650)	(0.0652)
ROW-Brazil	0.605**	0.602**	0.605**	0.602**
	(0.191)	(0.190)	(0.191)	(0.192)
ROW-Russia	0.775***	0.772***	0.775***	0.773***
	(0.0702)	(0.0699)	(0.0702)	(0.0704)
ROW-India	1.624***	1.617***	1.624***	1.621***
	(0.216)	(0.216)	(0.216)	(0.217)
ROW-China	1.363***	1.357***	1.363***	1.359***
	(0.115)	(0.114)	(0.115)	(0.115)
ROW-Bangladesh	4.196*	4.179*	4.196*	4.207*
	(1.750)	(1.742)	(1.750)	(1.752)
ROW-Egypt	0.600*	0.598*	0.600*	0.603*
	(0.264)	(0.263)	(0.264)	(0.265)
ROW-Indonesia	0.678***	0.676***	0.678***	0.676***
	(0.157)	(0.156)	(0.157)	(0.158)
ROW-Iran	-0.0992	-0.0988	-0.0992	-0.105
	(0.401)	(0.400)	(0.401)	(0.402)
ROW-Mexico	0.762*	0.759*	0.762*	0.767*
	(0.298)	(0.297)	(0.298)	(0.299)
ROW-Nigeria	1.024***	1.020***	1.024***	1.028***
	(0.156)	(0.155)	(0.156)	(0.156)
ROW-Pakistan	1.812***	1.804***	1.812***	1.810***
	(0.536)	(0.534)	(0.536)	(0.537)
ROW-Philippines	0.377	0.375	0.377	0.371
	(0.282)	(0.281)	(0.282)	(0.283)
ROW-Korea	0.898***	0.894***	0.898***	0.893***
	(0.267)	(0.266)	(0.267)	(0.267)
ROW-Turkey	1.258***	1.253***	1.258***	1.258***
	(0.176)	(0.175)	(0.176)	(0.177)

Table 6 – continued from previous page				
Variables	Heckman	Marginal Effects		Subsample
		Conditional	Unconditional	OLS
ROW-Vietnam	2.461***	2.451***	2.461***	2.458***
	(0.251)	(0.250)	(0.251)	(0.252)
ROW-LI	1.183***	1.179***	1.183***	1.183***
	(0.0638)	(0.0636)	(0.0638)	(0.0640)
ROW-MI	1.088***	1.084***	1.088***	1.087***
	(0.0532)	(0.0530)	(0.0532)	(0.0534)
ROW-HI	1.077***	1.073***	1.077***	1.076***
	(0.0505)	(0.0503)	(0.0505)	(0.0507)
Adjacent	0.209***	0.260***	0.209***	0.205***
	(0.0417)	(0.0488)	(0.0419)	(0.0419)
Common	0.513***	0.559***	0.513***	0.513***
Language	(0.0306)	(0.0323)	(0.0305)	(0.0307)
Colony	0.540***	0.520***	0.539***	0.541***
	(0.0394)	(0.0427)	(0.0394)	(0.0395)
lnDistance	-1.404***	-1.449***	-1.404***	-1.406***
	(0.0138)	(0.0150)	(0.0139)	(0.0138)
PTA	0.131***	0.196***	0.132***	0.129***
	(0.0239)	(0.0252)	(0.0239)	(0.0240)
athrho	-0.0424***			
(ρ)	(0.00886)			
lnsigma	0.320***			
(lnσ)	(0.00651)			
Adjusted R^2				0.990
Log-Likelihood	-78563.8			-70428.7
F-test				41453.2
Chi^2	9113480.9			
Observations	47360	47360	47360	40513

Marginal effects; Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Wald Test of Income Elasticities

Importing Country	Australia	EU-27	ROW	US
Brazil	1.809	58.79***	80.66***	2.413
	(0.179)	(0.00)	(0.00)	(0.12)
Russia	7.283***	84.30***	99.22***	10.29***
	(0.007)	(0.00)	(0.00)	(0.001)
India	5.299**	17.27***	60.03***	1.334
	(0.021)	(0.00)	(0.00)	(0.248)
China	5.203**	20.50***	57.33***	5.025**
	(0.023)	(0.00)	(0.00)	(0.025)
Bangladesh	7.931***	21.43***	36.26***	0.368
	(0.005)	(0.00)	(0.00)	(0.544)
Egypt	20.38***	53.58***	88.76***	21.96***
	(0.00)	(0.00)	(0.00)	(0.00)
Indonesia	6.845***	22.68***	47.78***	4.198***
	(0.009)	(0.00)	(0.00)	(0.041)
Iran	8.867***	12.67***	30.40***	8.290***
	(0.003)	(0.00)	(0.00)	(0.004)
Mexico	6.386***	46.58***	62.21***	2.919
	(0.012)	(0.00)	(0.00)	(0.088)
Nigeria	9.880***	73.87***	88.40***	17.45***
	(0.002)	(0.00)	(0.00)	(0.00)
Pakistan	10.07***	22.88***	46.90***	1.944
	(0.002)	(0.00)	(0.00)	(0.163)
Philippines	7.729***	44.81***	65.99***	5.608**
	(0.005)	(0.00)	(0.00)	(0.018)
South Korea	12.56***	48.50***	74.51***	12.01***
	(0.00)	(0.00)	(0.00)	(0.00)
Turkey	6.332**	43.68***	71.68***	12.95***
	(0.012)	(0.00)	(0.00)	(0.00)
Vietnam	14.11***	54.87***	64.04***	5.316**
	(0.00)	(0.00)	(0.00)	(0.021)

Marginal effects; Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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