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

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1.0 Introduction

The reliance of Canadian agriculture on trade is notable with roughly 80 percent 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 percent over the last two decades and heavily contingent on access to US markets.

Ignoring the role of prices, the magnitude of any increase in Canadian exports is largely contingent on: population growth, income growth and the Engel elasticities – the responsiveness of per capita expenditure to increases in income in importing nations.

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). The reports suggested that projected economic growth in several member countries could result in their GDPs surpassing several of the current G7 members.² Assuming the extrapolated population and income growth foreseen by Wilson and Purushothaman (2003) and Wilson and Stupnytska (2007) comes to fruition, these two groups 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 differ from other major agrifood exporters for the BRICs and 'Next-11' and if their import profiles differ from other low, middle or high income countries.

2.0 Data³

This study uses data 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 one percent of the value of global agrifood exports over the sample period, while criteria for inclusion as an importer required that the country represents at least an average of one percent of the value of global agrifood imports and/or if the country is a member of either the EU-27, BRICs or N-11.

3.0 Results

We estimate the Engel elasticities faced by five major exporters/exporter groups: Australia, Canada, the EU-27, 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 composition of EU membership changing over the sample period. 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 similar demographic and geographic characteristics with Canada (including the general composition of their agricultural exports).

¹ All dollar values are in US dollars.

² The BRICs are: Brazil, Russia, India and China. The G6 are: France, Germany, Italy, Japan, United Kingdom and the United States. The G7 adds Canada to the G6. ² The Next-11 are: Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, South Korea, Turkey and Vietnam.

³ A complete discussion of the data, model specification and estimation procedures is contained in Cairns and Meilke (2012).

3.1 Aggregated Importers: Model One

In model one the five exporter groups discussed above are considered along with five aggregated importing country groups (low-income, middle-income, high-income, Next-11 and BRIC) resulting in 25 individual Engel elasticities (one for each exporter-importer country group pairing). 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 confirm that the magnitude of the elasticities for each importer group varies by exporter.

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 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 the ROW and the US, Australia and Canada. For the N-11 and BRIC country groups the average elasticity faced by exporters in the ROW group slightly exceeds that of the EU-27, followed by the US with Australia and Canada jockeying for fourth.

Across the importer groups, the EU-27 and ROW exporter groups face Engel elasticities near unity, suggesting that expenditure on their agrifood exports increases (approximately) in proportion with income growth. The United States seems to face consistent elasticity estimates (around 0.6), with Canada and Australia facing the lowest elasticities, usually below 0.6. In short, the results in table 1 suggest that expenditure on Canadian agrifood exports is generally less responsive to income growth relative to other major exporters.

Table 1: Engel elasticities faced by exporters by importer group

Rank	Importer Groups				
	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)

3.2 Disaggregated Importers: Model Two

In model two we disaggregate the N-11 and BRICs by member country; other low, middle and high-income countries remain grouped. Table 2 ranks the elasticity estimates 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 similarity in 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. 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), which may explain the inelastic nature of it's import demand. Australia, the United States and Canada all possess elasticity estimates close to zero which are either statistically insignificant or weakly significant for Russia and Brazil suggesting that income growth has little influence on expenditure on their exports.

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

Rank	BRIC Members			
	Brazil (a)	Russia (b)	India (c)	China (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
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3 lists and ranks the Engel elasticities faced by each exporter for each of the N11 members (excluding Iran). As can be seen, the elasticity estimates vary substantially for a given importer depending on the exporter group in question but the results in table 3 generally parallel those of table 2. The ROW group persists as the largest benefactor of income growth in the N-11, with Australia and 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 on imports 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 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.

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

Rank	N-11 Members				
	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)
	<u>Pakistan</u> (f)	<u>Philippines</u> (g)	<u>South Korea</u> (h)	<u>Turkey</u> (i)	<u>Vietnam</u> (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

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

4.0 Forecasts

Even if an importer has a large Engel elasticity, substantive absolute increases in expenditure may not result if income and population growth are small. We use the estimated Engel elasticities from tables 2 and 3 along with IMF world economic outlook projections for population and GDP per capita to forecast the potential value of agrifood imports in 2017 (in 2010 dollars), excluding the ROW exporter group.

As shown in figure 1, for the four exporters the G7 represents the largest importer in both 2010 and 2017 (in terms of absolute 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.

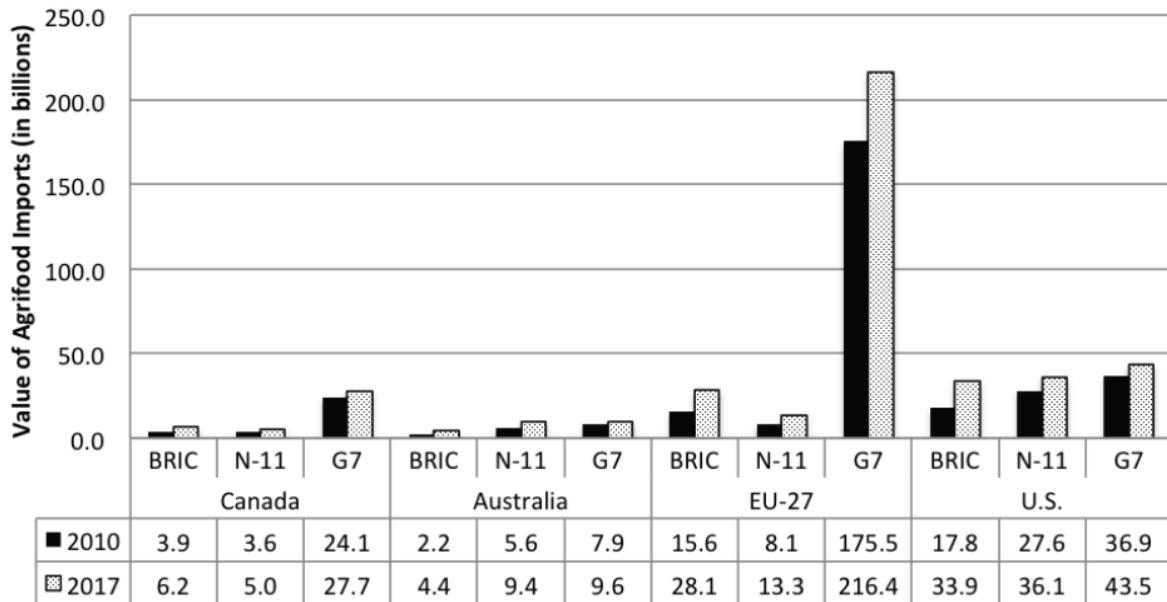


Figure 1: Value of Agrifood Imports, 2010 and 2017.

In terms of absolute value, in figure 1 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.

In relative terms (Figure 2), it appears that the BRIC nations followed by the N-11 represent the largest regions of increase for all four exporters. 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.

The focus of our research is not only on the potential gains arising from income and population growth in the N-11 and BRICs, but also on the gains for Canada. In terms of percentage increases in the value of imports from Canada between 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 3 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 total \$11.17 billion (in 2010 dollars) – a \$3.65 billion dollar increase from the 2010 total.

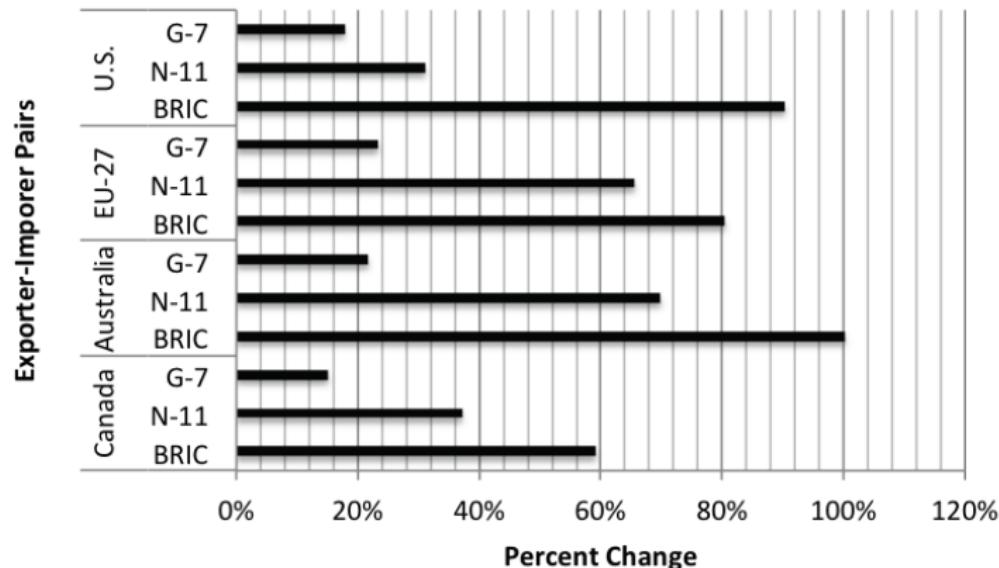


Figure 2: Percent Increase in the Value of Agrifood Imports, 2010 and 2017.

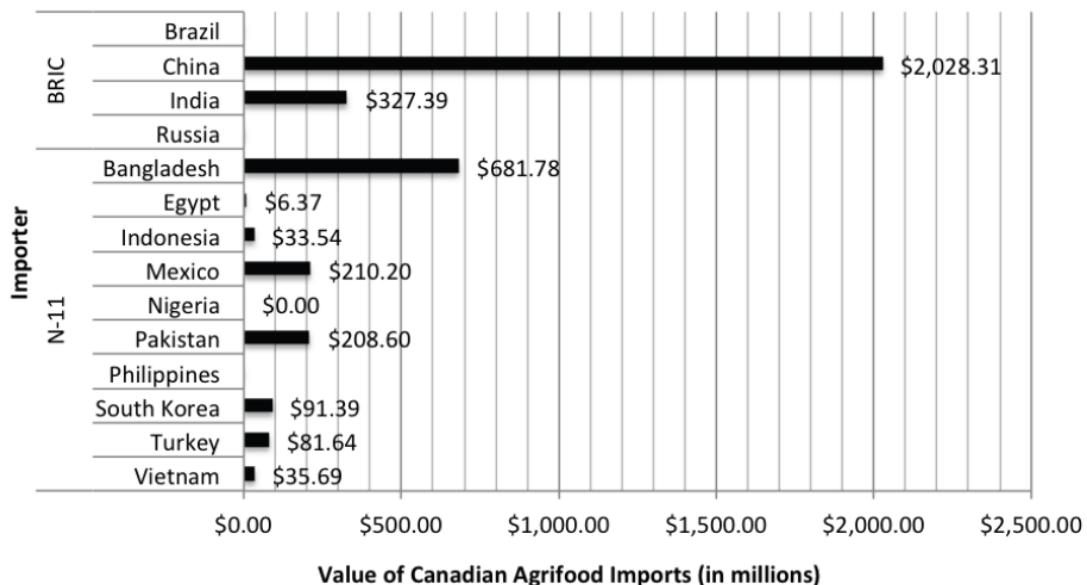


Figure 3: Increase in Value of Canadian Agrifood Imports by Importer, 2010 to 2017.

5.0 Conclusions

We have 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.

The forecasting exercise revealed that the G7 will still represent the largest market in terms of the absolute value of imports, but the BRICs and N-11 have the largest percentage increases across all exporters. 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 – Engel elasticities represent how the pie is distributed, but even if Canada's portion is relatively smaller when compared to other major exporters, if the size of the pie is increasing, Canada can still gain. 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.

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