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INNOVATION AND EXPORT PERFORMANCE OF THE FOOD PROCESSING SECTOR: OPPORTUNITIES AND LIMITATIONS

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Issue

The extent of globalization is incessantly amplified through multilateral and regional trade liberalization, reduction in communication and transportation costs, and spectacular surge in Foreign Direct Investment (FDI). This continuously evolving international economic landscape is putting food processing firms at the competition edge. Innovation is one principal avenue for firms to maintain competitiveness and to ensure greater international market share. It is expected that private innovation efforts in the food processing sector, such as developing new processed food varieties and implementing strategies to reduce transaction costs along the supply chain, would enhance exports. In addition, the impact of innovation in the primary agricultural sector could have significant impact on the trade performance of the food processing sector. In other words, innovation in the primary agricultural sector is expected to be vertically transmitted to the downstream food processing sector. Understanding the implications of innovation in the food processing sector and in the primary agricultural sector on international trade in processed food products is essential for designing policies that are intended to enhance the international performance of the food processing sector. Primary empirical results in Ghazalian and Furtan (2007) indicate that innovation, represented by Research and Development (R&D) expenditure in the food processing sector, has an overall net positive effect on the export performance of the food processing sector of the Organization for Economic Co-operation and Development (OECD) countries. Ghazalian and

Furtan (2007) also found that innovation activities in the primary agricultural sector have promoted exports of processed food products. This policy brief goes one further step and discusses in details the various potential effects of innovation on trade in the food processing sector.

Concluding Remarks and Policy Implications

The potential effect of innovation in the food processing sector on exports should be analyzed not only in absolute levels, but also relative to the innovation performance of foreign food processing firms. Outperformed domestic food processing firms in terms of innovation activities could result in foregone international market share. Many factors would naturally limit export growth associated with innovation activities in the food processing sector, such as large geographical distances. However, the foregone opportunities associated with innovation in foreign markets due, for example, to remote geographical distances, can be recuperated through FDI. Also, it is important to emphasize the dynamic effects between innovation and exports. In a dynamic setting, innovation would increase the international market share which in turn promotes more innovation activities given the attainment of higher returns to scale.

Innovation in the primary agricultural sector can be vertically transmitted to the food processing sector. Innovated supply arrangements between the primary agricultural sector and the food processing sector would result in improvements in international competitiveness. Also, development of new primary agricultural varieties would increase the margin of differentiation in the food processing sector and, hence, exports. Whereas cost-reducing innovation in primary agricultural sector is expected to enhance exports of the corresponding processed food products, foreign policies that limit the access of innovated primary agricultural products (e.g., European Union (EU) policies vis-à-vis products containing Genetically-Modified (GM) ingredients) would result in foregone potential export markets. These limitations can be overcome by sourcing alternative primary agricultural products that are not the subject of restriction policies. However, when this is not feasible, undertaking FDI in foreign markets where sourcing of unrestricted primary agricultural products is practical, could constitute an optimal alternative strategy.

The aforementioned effects of innovation on exports should be considered when formulating governmental innovation policies in the agricultural and agri-food sector. Understanding these effects would assist the policy makers to determine the structure and level of intervention (e.g., funding) and to favour some types of innovation over others.

Innovation in the Food Processing Sector

Innovation in the food processing sector is generally expected to have positive effects on exports of processed food products. Many empirical studies showed that innovating firms are more likely to export than non-innovating firms (e.g., Basile, 2001). Innovation can be expressed through the development of new varieties targeting larger markets or market segments, the development of higher quality products, the introduction of technologies that induce reduction in production cost, and the restructuring of the supply chain that results in reduction in transaction costs. Also, innovation in the food processing sector can be associated with business

arrangements between the food processing firms and international wholesale/retail outlets. These innovated arrangements in business networks would promote improvements in firms' export performance.

Innovation efforts are expected to place the firms in a more competitive position vis-à-vis foreign firms in the domestic and international markets. However, the effects of innovation on exports of food processing firms in one country are function of the innovation performance of foreign firms. When innovation activities of domestic food processing firms fall behind those of foreign firms, the resulting effects on exports of domestic firms can be potentially small. These implications span over their exports to the foreign market of the innovating foreign firms or to a third market where their potential exports can be replaced by exports of innovating foreign firms.

It is important to mention the reverse channel through which exporting activities stimulate innovation. Learning-by-exporting would allow firms to improve their innovation performance by deriving critical information from their business interactions with foreign agents and through exposure (Aw, Chung, and Roberts, 2000).

Geographical proximity to large markets, such as the United States' market, provides the opportunity for Canadian food processing firms to develop innovated and value added products. This geographical advantage allows the realization of economies of scale to innovation by these firms. As noted in McCAnn (2003) and emphasized in Vitalis (2008), larger geographical distances could lessen the trade opportunities in large remote markets for innovated and high value added products, particularly those that require just-on-time delivery and closer business interactions. One likely channel for the Canadian food processing sector to exploit the opportunities that exists in larger remote markets, such as the EU market, is FDI. Opting for this strategy requires, however, the consideration of other factors such as the cost of building plants abroad, market potentials, and barriers facing foreign investment.

Innovation and export performance of food processing firms can be further understood in a dynamic framework. Consider initial innovation activities that resulted in increases in exports. There will be higher returns to scale which eventually place the food processing firms in an expedient position to carry out more innovation activities, which in turn would promote further growth in exports. Consider now the dynamic implication of imports and inward FDI on the innovation activities of domestic firms. Two counteracting effects can be identified. The first effect is export promoting. Imports and inward FDI would provoke domestic firms to be further engaged in innovation activities through the competition effect, in order to maintain their market share. This reaction could eventually increase their exports and open up new foreign markets. In the long run, these primary effects would place the innovating domestic firms in an improved position to conduct more innovation activities as a result of the learning-by-exporting and the realized increases in returns to scale. The second effect is export restraining. The competition effect of imports and inward FDI could also cause reduction in the economies of scale for carrying out new innovation activities due to reduction in markets shares. Therefore, exports are expected to decrease in this case. The magnitudes and the net effects of these two counteracting effects should be well understood in a

static as well as in a dynamic context when formulating innovation-related policies. Finally, the learning-by-exporting effect can also be analyzed in a dynamic setting. Firms will learn more from a wider network of foreign interactions which in turn would further stimulate the innovation activities of the exporting firms and their export performance, and so on.

Innovation in the Primary Agricultural Sector

Innovation in the primary agricultural sector can affect processed food exports through three main channels. First, business-related and organization-related innovation can reduce transaction costs along the supply chain between primary agricultural and processed food sectors. These innovated supply arrangements would make processed food products to be more competitive in international markets, resulting in increases in exports. Second, innovation may result in product differentiation, such as the development of GM peanut varieties that do not contain allergens, which eventually leads to the opening up of new peanut butter markets. Third, innovation in the primary agricultural sector can lower the costs of production of processed food products. This type of innovation can be non-commodity specific such as improvements in infrastructure and telecommunication network in the primary agricultural sector, and commodity specific such as the introduction of GM herbicide-resistant canola varieties. The effects of the innovation activities in the primary agricultural sector on exports of the food processing sector partly depends on the innovation activities in foreign countries, in an equivalent way that was described in the previous section. Hence, the effects of innovation in the primary agricultural sector on exports of processed food products should not only be analyzed in absolute levels of innovation but also relative to the innovation activities realized in foreign countries.

Innovation in the primary agricultural sector expressed through the introduction of GM varieties can elicit different reactions by consumers to GM agricultural commodities and to processed food products made from GM primary agricultural ingredients. These various reactions could be eventually translated into various import policies that have adverse effects on processed food exports. For instance, Japan has no regulations against processed canola oil from GM canola varieties whereas the EU imposed restrictions on imports of these products since 1999. Hence, on one side, innovation through the introduction of GM canola varieties has positive exporting effects for the oil processing industry stemming from lower costs of production. Yet, these positive effects are lessened by the EU restrictions on the imports of canola oil made from the innovated herbicide-resistant canola. This illustration highlights the tradeoffs between limitations and opportunities for exports.

Sourcing alternative types of innovated primary agricultural products that are not subject to restrictions (e.g., non-GM Clearfield canola that was developed through natural breeding techniques) constitutes a natural option for food processing firms to maintain opportunities in foreign markets. Therefore, diversification of innovation in the primary agricultural sector is a convenient strategy in what concerns exports. When sourcing non-GM products to produce GM-free processed food products that target restricted markets is infeasible, undertaking FDI can become a viable strategy. For instance, food processing firms

can strategically build production facilities in foreign markets where sourcing of non-GM primary agricultural products is feasible.

The dynamic implications of innovation are also relevant in the case of the vertically-channelled innovation from the primary agricultural sector to the food processing sector. The original transmitted effect of innovation that occurred in the primary agriculture sector on processed food exports would increase the demand for the innovated primary agricultural products. These primary effects would promote the primary agricultural sector to get further engaged in innovation activities. Hence, more innovating activities in the primary agricultural sector would vertically promote more exports of processed food products in the long-run.

In summary, this policy brief discusses the various implications of innovation in the food processing sector and in the primary agricultural sector on exports of processed food products. It describes the opportunities generated by innovation activities for exports and delineates the limitations. Comprehending these implications is essential when designing innovation policies at the governmental level.

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