

# IDE Research Bulletin

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## **The Impact of Import vs. Export Competition in Technology Flows between Countries**

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## **IDE Research Bulletin**

### **The Impact of Import vs. Export Competition in Technology Flows between Countries**

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After the global financial crisis in 2008, the international trade has made a remarkable recovery in 2010. However, since then the weak global economy has led to slowing down of the international trade growth and in 2015, the volume of international trade has shrunk by 13%. For ASEAN countries, their trade volume was reduced by 10%. According to the WTO, the growth rate of international trade in 2016 is 1.7% increase. Unlike in the past decades when the growth of international trade was registering double-digit growth, it seems that one cannot expect international trade to grow as fast as in the past.

At the same as the growth of international trade is slowing down, so is the growth rates of East Asian countries (ASEAN countries and China, Japan, and Korea), especially of advanced ASEAN countries. For these countries, continuous efforts at innovation is required to sustain their competitiveness in manufacturing activities. For them, how to improve upon their innovation capabilities will be an important issue.

Then the question is how these countries can strengthen their technological capabilities. Often this is achieved through their own R&D efforts. However, the flow of technologies from one country to another is also an important component. For advanced countries, their focus of R&D will be to develop new technology. New technology is not build from scratch but often it is developed based on the past technologies. Hence, “new” technologies contain elements of past technologies. For developing countries, their focus of R&D (or technological development effort) is often in terms of international technology transfer, focusing more on the assimilation of

“advanced” technologies developed in advanced countries. From either perspective, the flow of technology is an important issue for growth. Similar to the interest on the formation of production network, there is now a growing interest in how the knowledge network is forming.<sup>1</sup> In addition to mapping and analyzing how technology and knowledge flow from one country to another, there has been an interest in how such technology flow.

In the international trade literature, trade is often considered to be an important avenue for such flow, especially imports (Fracasso and Vittucci Marzetti 2015; Keller 2010; Nabeshima 2004). By importing products from other countries, an importing country can learn about the characteristics of the product and technologies that are embedded within the product. The incentives to learn and assimilate technologies that are embedded within the product comes from the desires of domestic industries to survive in the face of import competition. Thus, it is the competition effect that is an important driver for technological progress. There are three different types of competition that a firm faces: competition within the domestic market; competition from imports; and competition in the export market. In our study, we look at the impact of import competition, as well as competition in export market, which has been neglected in the literature. Our research considers whether competition in export markets also lead to learning from the competitors. This export-competition part also relates to the literature on “learning-by-exporting” (Aw, Roberts and Xu 2011). As far as imports (and inward foreign direct investment) are concerned, there is a strong evidence that such trade linkages are conduits for international technology transfer (see for instance, Coe and Helpman 1995; Coe, Helpman and Hoffmaister 1997).<sup>2</sup> There has been a debate as to whether exporting activities itself can contribute to the transfer of knowledge. The issue arises because of selections. Studies have found that exporters are more productive in general (Bernard and Jensen 1999; Clerides, Lach and Tybout 1998; Hallward-Driemeier, Iarossi and Sokoloff 2002). The model by Melitz (2003) also depend on the fact that exporters are more productive than non-exporters. Nonetheless, anecdotal evidence points to the possibility of learning by exporting especially through the interactions with buyers from advanced countries or sophisticated consumers. However, they have overlooked the fact that these firms also face

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<sup>1</sup> On knowledge network formation, see Hu, A. G. Z. and Jaffe (2003); Nabeshima, Kang and Kashcheeva (2016).

<sup>2</sup> The impact of inward FDI seems to be influenced by the type of FDI. For instance, the results of horizontal FDI are mixed (Aitken, B., Hanson and Harrison 1997; Aitken, B. J. and Harrison 1999). On the other hand, when one considers vertical FDI, the results seem to be more robust (see for instance, Blalock and Gertler 2003).

competitions in the export market, not only with the firms in destination market but also the exporters from other countries. This can be another source of “learning” for the exporters, which has been neglected in the literature.

In our research, we use patent citation information as the realization of knowledge transfer from one country to another and examine to what extent import and export competition in the third market affect the knowledge flow between two countries. Our empirical model adopts elements from the gravity model.

The results in our study shows that import is indeed an important avenue for knowledge flow, conforming with the results from the previous literature. However, what is interesting is that export competition in the third market (in our study, the US market) seems to also have a positive impact on the flow of knowledge. For the full sample, the impact of export competition seems to be about half as large as those from imports. For the subset of the data, the impact seems to be as large as imports. What this suggest is that exposure to competitions in export market is an important pathway for knowledge transfer, which has been completely neglected in the literature.

Although our results indicate that export competition is a possible pathway for knowledge flow, the data we utilized in this study only includes economies in East Asia. To make our finding more general, we need to expand our data set both in terms of the geographical coverage and time periods. In addition, we would need to control for the innovation activities that are conducted in the country by including R&D spending of each economy, and also to control for another important avenue for technology transfer, foreign direct investment (Branstetter 2006;Saggi 2006;Smeets 2008).