



Why Learning by Exporting May Not Be As Common As You Think and What It Means for Policy

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International trade economists are convinced that there is a two-way relationship between productivity and exports – not only the most productive firms self-select into export markets, but also exporters improve their technology due to international expansion. In spite of this optimistic view, empirical studies provide only weak (if any) evidence on learning by exporting. This discrepancy between theory and empirics is usually explained with methodological problems. However, there are also some theoretical reasons why one may think that learning by exporting is a wrong or highly limited hypothesis. The paper presents why learning by exporting may not happen and how policy-makers can stimulate learning from foreign markets (and hence economic growth).

Keywords: learning, exporting, heterogeneous firms

Introduction

Since international economists discovered a positive correlation between firm's productivity and its export status, myriads of theoretical and empirical papers have been written aiming at establishing the causality and providing sound microeconomic mechanisms linking productivity and exports. Two hypotheses have been developed. The first (*self-selection* hypothesis) states that only the most productive firms within an industry engage in international trade. In this view, there is no effect of being an exporter on firm's productivity. The second hypothesis (*learning by exporting* hypothesis) is more optimistic about the consequences of engagement in trade. Firms operating on foreign markets gain access to better technology, organizational techniques, different ideas, and so on. In other words, firms learn from these markets.

It seems that more prominent of both hypotheses is *self-selection*. There are two explanations of this state. Firstly, many empirical articles have proven that more productive firms self-select into export markets. These studies analyzed different countries during different periods of time (see for example, Bernard and Jensen (1999) for the United States, Mayer and Ottaviano (2007) for a sample of Western European countries, and Hagemejer (2006) for Poland). Secondly, modeling *self-selection* mechanism is

quite easy. New models (establishing the so called *New New Trade Theory*) are built upon well-known models (mostly on the *New Trade Theory* from the 1980s). For example, seminal Melitz (2003) paper developed Krugman's (1980) model with the introduction of firm heterogeneity and sunk costs of entry into foreign markets.

One must bear in mind that strict causal relation between productivity and exports has been criticized. Armenter and Koren (2009) showed that while exporters are 4 to 5 times bigger (in terms of sales) than non-exporters, standard *New New Trade Theory* models predict differences of the magnitude of 90–100 to 1. Simply speaking, not only big and very productive firms become exporters, but also smaller ones engage in export activity. Hence, analyzing *self-selection* should not concentrate on one determinant of firm's trade (productivity), but on the whole vector of firm characteristics. Several models explaining exports with more than one factor have been lately developed. This so-called second generation of heterogeneous firms' trade models include Chaney (2005), Hallak and Sivadasan (2009) and Bernard, Redding and Schott (2010) among others. Despite this evolution of theoretical models, productivity is still considered as the main (but not the only) determinant of firm's trade.

At the same time, *learning by exporting* hypothesis has gained popularity. However, evidence of it is not strong. This situation creates a puzzle. Since Adam Smith and David Ricardo economists have claimed that the whole economy can gain from greater openness due to more efficient allocation of resources. It seemed natural to use the same logic in firm-level analysis. Why should we not think that firms learn from foreign markets and hence increase their own productivity? Yet, results of a broad range of studies are confusing.

In this paper, explanations of such a puzzle are presented. It must be strongly stated that the aim of the paper is to describe only theoretical reasons for ambiguous results of studies. In other words, only the theoretical mechanism blocking learning from foreign markets is presented. The author leaves aside methodological reasons for underestimation of *learning by exporting*.

The structure of this paper is as follows. The first part summarizes theoretical explanations of *learning by exporting*. The second part is a review of empirical studies. Next, some mechanisms negating *learning by exporting* are described. Then policy implications are discussed. Conclusions and summary constitute the last part.

Theoretical Rationale for Learning by Exporting

The idea that firms increase their productivity due to engagement in international trade needed sound microfoundations supporting this causality. Many

models have been developed to justify *learning by exporting*. According to Redding (2010) ideas presented in these models fall into three categories:

- adjustments within multi-product firms,
- usage of better skills and technology,
- formation of international production networks.

Typical models of trade in a monopolistic competition setting only assume the existence of single-product firms. Broadening of this assumption brings the opportunity to investigate intra-firm consequences of starting exporting. The popular way to explain *learning by exporting* in a multi-product firm framework is that, due to exports, these firms concentrate on their core competence. Firms specialize in the products in which they are the most productive. This means that less efficient production of many other products is ceased. These adjustments lead to improvement of firm-level productivity.

One of the models of this type was presented by Bernard et al. (2010). They introduced product-specific feature, which affects firm's behaviour. The product attribute reflects consumer taste and can be seen as consumer preference for a particular product. In their working paper (Bernard et al., 2006) firm-specific feature was not given a demand-side explanation, but the supply-side one (efficiency of production a particular product rather than consumer taste). Both specifications lead to similar conclusions. Firms drop less efficient or less demanded products and this *product dropping* generates an opportunity for firms to focus on the core competence.

In growing literature covering multi-product firms, authors analyze the impact of firm organizational abilities (Nocke & Yeaple, 2006) and flexibility of product lines (Eckel & Neary, 2010) on firm's tendency to make adjustments within the product portfolio. One must also stress that, in the above-mentioned models, enterprises produce different products (hence multi-product firms) but each product has only one variety. That is why some authors dig deeper to study interactions between different varieties of the same product. One of the fruitful areas of research touches on the so-called *cannibalization effect* when introducing new variety reduces the sales of existing ones (see, for example, Feenstra & Ma, 2007).

The second mechanism generating *learning by exporting* rests on the influence of trade on skills and firm technology. According to Yeaple (2005), in order to be competitive on foreign markets firm may invest to adopt better technology. When such a technology provides reduction of variable cost, it is worth investing. Because exporting activity is connected with additional variable costs (due to, for example, tariffs and transport) everything that decreases other components of the whole variable cost is of great importance. Other models presenting similar mechanisms include Desmet and

Parente (2006), and Costantini and Melitz (2007). Some authors analyzed how trade tends to affect investment in R&D (see Atkeson & Burstein, 2008). It is worth mentioning that, in some cases, the term *learning to export* is used instead of *learning by exporting*. The motivation behind the introduction of the new term is to highlight the time structure of events and the role of expectations. Firms first invest, only then can they start exporting. However, it cannot be assumed that causality leads simply from productivity (increased due to investment) to exporting. The first step is anticipation of export opportunities, then firms invest and, in the end, they start trading.

Apart from the impact on technology, engagement in exports may enable a firm to hire more skilled workers. Verhoogen (2008) built the model in which firms want to export to advanced and more sophisticated markets. Due to higher incomes, potential consumers are more quality-driven. In order to meet these increased quality requirements, firms must first introduce better technology, which is inevitably connected with hiring skilled workers.

The last reason to consider of *learning by exporting* is the impact of trade on the international production networks. The literature on these networks is growing exponentially. The main focus is on a firm's decision whether to engage in vertical foreign direct investment (FDI) or arm's length relationship. In other words, models typically study whether a firm should outsource or insource certain stages of production. In spite of this focus the literature can help explain *learning by exporting*. Since exporters must be competitive on foreign markets, they may slice the production process into separate stages and locate them in places where each stage would be performed most efficiently. In the *learning by exporting* context, an exporter is usually also an importer. In order to produce exportable goods, firm must import intermediate goods from foreign affiliate (vertical FDI) or independent supplier (arm's length relationship). Models examining firm's supply decisions include Antras (2003), Antras and Helpman (2004), and Costinot, Oldensky and Rauch (2011), among others. Each of them emphasize the impact of contractual frictions on firms' sourcing decisions.

Review of Empirical Studies

Although previously presented explanations of *learning by exporting* seem plausible, the results of empirical studies are far from clear. The results are inconclusive in that they sometimes support the *learning by exporting* hypothesis, but in many cases the impact of exports on firm productivity is statistically insignificant. Table 1 presents the results of various studies taken from the review by Wagner (2005).

All these studies present confusing view of *learning by exporting* hypothesis. Although many analyses investigate the behaviour of firms' productivity

Table 1 Results of empirical studies on learning by exporting

Country	Study	Results
Canada	Baldwin and Gu (2003)	Exporters are more productive than non-exporters. The gap is gradually increasing. New entrants into export markets quickly increase their labour productivity.
Chile	Alvarez and Lopez (2004)	Before exporting firms make conscious efforts to improve their productivity. The discrepancies between new exporters and non-exporters are usually statistically insignificant.
China	Kraay (1999)	Previous export status positively correlated with current labour productivity and TFP. Learning effects among new exporters are usually statistically insignificant or negative.
Colombia	Clerides, Lach, and Tybout (1998)	Improvement of labour productivity after entry into export market.
	Isgut (2001)	In a one-year period, productivity difference between new exporters and non-exporters was not significant. In a five-year period, new exporters experienced faster productivity gains than non-exporters.
Germany	Bernard and Wagner (1997)	Larger increase in labour productivity among new exporters than non-exporters.
	Wagner (2002)	Difference in labour productivity between new exporters and non-exporters was statistically insignificant.
	Arnold and Hussinger (2004)	Difference in TFP between new exporters and non-exporters is stable (non-increasing) after a year following the entry into foreign market.
Indonesia	Blalock and Gertler (2004)	Significant productivity improvements among firms entering foreign markets.
Korea	Aw, Chung, and Roberts (2000)	Similar productivity (TFP) path of exporters and non-exporters.
	Hahn (2004)	Increasing TFP gap between new exporters and non-exporters, decreasing gap between new exporters and old exporters.
Mexico	Bernard (1995)	Similar labour productivity growth of new exporters and non-exporters.

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in different countries on a broad level of development, no clear conclusion can be made. Moreover, in the studies, which covered two-way relationship between export status and productivity, *learning by exporting* was often not found, but *self-selection* hypothesis was supported.

Mechanisms Blocking Learning from Export Markets

The results of empirical studies often do not support the *learning by exporting* hypothesis. Many researchers concluded that this situation was caused mainly due to methodological difficulties. Few economists are of a different

Table 1 *Continued from the previous page*

Country	Study	Results
Morocco	Clerides et al. (1998)	Labour productivity improvements after entry into export market.
Slovenia	Damijan, Polanec, and Prasnikar (2004)	No continuous effect of export on new exporters' productivity. Short-term effect is observed. Increase in productivity depends on the destination (firms learn when to export to advanced markets).
	De Loecker (2004)	New exporters increase their productivity but only in half of the industries learning by exporting was statistically significant.
Spain	Delgado, Farinas, and Ruano (2002)	No evidence on learning by exporting.
	Farinas and Martin-Marcos (2003)	Similar growth of labour productivity and TFP of new exporters and non-exporters.
Sweden	Greenaway, Gullstrand, and Kneller (2003)	No differences between TFP growth of new exporters and non-exporters.
	Hansson and Lundin (2004)	Lack of evidence on learning by exporting when TFP is analyzed. When labour productivity is applied, new exporters improve this productivity faster than non-exporters.
Taiwan	Aw, Chen, and Roberts (1997)	Likely positive impact of export on firms productivity.
	Liu, Tsou, and Hamitt (1999)	Faster labour productivity growth among new exporters than non-exporters.
	Aw et al. (2000)	TFP differences increasing favoring new exporters.
	Liu, Tsou, and Hamitt (2002)	Significantly faster TFP growth in case of new exporters than non-exporters.
Turkey	Yasar, Garcia, Nelson, and Rejesus (2003)	Difference in productivity between new exporters and non-exporters larger than the difference between all exporters and non-exporters.

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opinion – that firms do not learn from export markets due to certain economic mechanisms. However, it would not be wise to lose sight of these mechanisms. Therefore, they are presented below in more detail.

Salomon and Shaver (2005) enumerated three reasons why *learning by exporting* may not occur. These are:

- insufficient flow of information from the host market,
- minor impact of export status on process innovations,
- inability of an exporter to wholly appropriate returns from technological change.

The first one states that multinational activity may enhance productivity

Table 1 *Continued from the previous page*

Country	Study	Results
UK	Girma, Greenaway, and Kneller (2003)	Faster growth of TFP among new exporters than non-exporters – especially in the first year of exporting.
	Greenaway and Kneller (2003)	Faster growth of labour productivity among new exporters than non-exporters.
	Greenaway and Kneller (2004a)	Short-term increase in TFP growth among new exporters.
	Greenaway and Kneller (2004b)	Faster productivity growth among new exporters than non-exporters.
	Greenaway and Yu (2004)	Learning by exporting observed especially among new exporters (chemicals industry analysis).
USA	Jensen and Musick (1996)	Difference in labour productivity growth between new exporters and non-exporters was statistically insignificant.
	Bernard and Jensen (1999)	Sound difference between labour productivity growth of new exporters and non-exporters.
	Bernard and Jensen (2004)	In the first year of exporting, new exporters increase productivity faster than other firms.
Ghana, Cameroon, Kenya, Zimbabwe	Bigsten et al. (2000)	Export in a particular year enables the increase of productivity in the next year. Productivity improvements are especially large in the first year of exporting.
Sample of countries from Sub-Saharan Africa (9 countries)	Van Biesebroeck (2003)	Lack of sound differences in labour productivity between new exporters and continuous exporters. Larger differences between new exporters and non-exporters than prior to entry.

Notes Detailed description of above studies can be found in Wagner (2005).

only when a firm engages in more sophisticated operation than simple export. In order to gain access to foreign knowledge and technology, it would be better to establish physical presence on the host market, for example via FDI. It would provide a firm with a contact with a significant pool of ideas that reside in a particular location. In this view, FDI has an obvious advantage over export. The latter is only supplying foreign market without deep presence on this market, hence it cannot benefit the firm in the form of significant flow of information. Being excluded from the knowledge about better technology, an exporter is unable to increase own productivity.

Although this mechanism seems plausible at first, its power should not be overemphasized. Exporting activity may be productivity-increasing too. Suppose that, to benefit from knowledge diffusion, a firm should make a lot of foreign contacts. The best way to do it is to invest (FDI) and hire foreign workers in the new affiliate, because these workers convey important ideas. However, even simple export may provide an access to such knowledge. For

example, when an exporter develops a distribution chain, creating many overseas contacts, this firm is then able to gain access to foreign ideas. It seems that when trade activity is mature enough it can lead to *learning by exporting* and when an export is caused only by, for instance, a short-term beneficial movement of an exchange rate, then this learning is highly limited. After all, if export could not improve firm's technology, we would expect no study to support *learning by exporting*. As one may recall, some studies support this hypothesis.

The second limitation of *learning by exporting* is connected with minor impact of foreign trade on process innovations. It is stated that the link between an exporter and new ideas is a consumer. Hence, a firm may gain knowledge mainly about the demand-side conditions on foreign market. It may lead to some product innovations, such as launching new product or quality improvements of the existing one. However, a firm still does not have the knowledge about better methods of production even if they are applied by foreign competitors.

Just like previously mentioned criticism of *learning by exporting*, this one is not very challenging. Firstly, it is usually hard to separate product and process innovations. In many cases a firm must improve its equipment and/or hire more skilled workers prior to the introduction of new goods or mastering current products. This obviously leads to process innovations. One may therefore conclude that engagement in export may result directly in product innovations and indirectly in process innovations. Secondly, even if a firm is at first exposed mainly to demand-side knowledge, after some time it can gain access to supply-side ideas; for example, by observing competitors. The longer it stays in foreign markets, the more opportunity to observe it has.

The last reason for non-existence of *learning by exporting* presented by Salomon and Shaver (2005) is associated with the negative consequences of spillover effects. Suppose the firm must decide whether it should invest in better technology anticipating some sales opportunities on foreign market. Suppose next the existence of quick and substantial spillovers among firms within the same country. If an investment is profitable, then other companies will instantly duplicate it thus significantly reducing the ability of the first investor to recoup its investment. In this case, all the benefits will be socialized in the sense that they will not be appropriated by a pioneer. If instead investment is not profitable, then other companies would not copy it and only the initial investor would be left with the losses. These losses will be internalized. It seems that an exporter considering an investment would be exposed to a risk which may discourage this firm from such an activity. That is why exporter may treat foreign markets only as a sales platform and not as a pool of ideas and technology.

This explanation of non-existence of *learning by exporting* is plausible. However, one may raise some caveats against it. Most importantly, there is an asymmetry between the effects of intranational and international spillovers. While diffusion of ideas within the same country is regarded as a factor discouraging firms from productivity-enhancing activities, diffusion between countries is not an obstacle. Putting it differently, using this explanation one only describes the detrimental effects of domestic spillovers. At the same time, nothing is said about why the transmission of knowledge from country A to B does not discourage the firms in country A from innovative activities.

The problem of negative effects of intranational spillovers has been discussed by Hausmann and Rodrik (2003) in the context of entrepreneurship. In their model, a firm has to make some investment to learn its productivity. However, this investment reveals the true costs of some activities within the country (firms learn their country's comparative advantage). It enables other firms to duplicate this activity, making investment hard to recoup. Wagner and Zahler (2011) confirm their predictions that pioneer's success entail the informational externality in the context of international trade. They built a model (confirmed empirically using Chilean data) in which the followers are more likely to enter foreign market when the pioneer survives, and in which the followers are bigger than pioneer firms – it supports the view that the first entrant is a *data producer* (using Wagner's and Zahler's terminology).

Policy Implications

Having stated that *learning by exporting* is blocked mostly by intranational spillovers, it is important to look at the policy implications. It seems that two types of policy arise. Both are inevitably connected with export concentration.

The first one is limiting intranational diffusion of knowledge and technology adopted by the exporters due to international expansion. Theoretically, it would give the exporters some time needed to recoup their investments. However, this policy may be seriously flawed. Firstly, intranational diffusion may be socially desired because it increases the productivity in the country and enhances the economic growth. Secondly, this policy may lead to export concentration. For small open economies the result would be the exposure to firm-level shocks. Last but not least, from a practical point of view, it is almost impossible to limit the transfer of foreign knowledge through exporters to non-exporters.

The second approach is promoting the extensive margin of trade. Because of the flaws of the above-mentioned policy, it seems that enhancing the extensive margin is a better way of stimulating *learning by exporting*.

The problem with appropriability of returns may be seen as a problem of intermediation. *Learning by exporting* is reduced when learning by domestic firms (non-exporters) rests on intermediation provided by the exporters (exporters link non-exporters with foreign knowledge and technology). However, this process reduces the exporters' incentives to invest and adopt foreign technology. By facilitating the entry of domestic firms into export markets, these firms would be able to learn *directly* – not *indirectly* through other exporters – from foreign markets. It can be seen on Figure 1. Panel A graphically presents the standard *learning by exporting* hypothesis. Panel B introduces the impact of non-exporters on exporters' will to learn (*learning by exporting* arrow is crossed). Panel C shows entry into export markets by former non-exporters. Panel D presents the final situation when the intranational diffusion of foreign knowledge is not an important obstacle to firm's learning abilities (and country's growth prospects).

As was previously mentioned, one way to maximize the effect of *learning by exporting* on the growth prospects is to promote the extensive margin of export. In order to make it achievable, policymakers should take sweeping actions. Increasing a firm's tendency to engage in trade requires the use of incentives other than typical trade instruments. Although these incentives are in majority widely known, it is important to enumerate them. Developing an extensive margin of export to promote *learning by exporting* is a very peculiar justification for taking these actions.

Firstly, policymakers should facilitate quality upgrading. Many economists are convinced that only high-quality producers are able to become exporters (see for example Crozet, Head, & Mayer, 2009; Hallak & Sivadasan, 2009). One way to upgrade a firm's quality is to establish some industry-specific bodies responsible for quality control. Another way is to increase competition, for example through FDI inflow (see Harding & Smarzynska-Javorcik, 2011).

Secondly, many potential exporters face a liquidity constraint. This problem has been analyzed by Manova (2010) and Chaney (2005) among others. Many export entry costs are paid up-front, hence the lack of access to credit dampens the extensive margin of exports. Tax rebates or preferential loans to exporters can relax this constraint.

Thirdly, international transactions are connected with higher risk than transactions between parties from the same country. This problem has gained some attention. Crozet, Koenig, and Rebeyrol (2008), as well as Seruga-Cayuela and Villarubia (2008) developed models presenting firms' export behaviour in the presence of uncertainty. One of the obvious ways to reduce trade risk is the establishment of an export insurance company. Another way is promoting the usage of derivatives to reduce exchange rate risk.

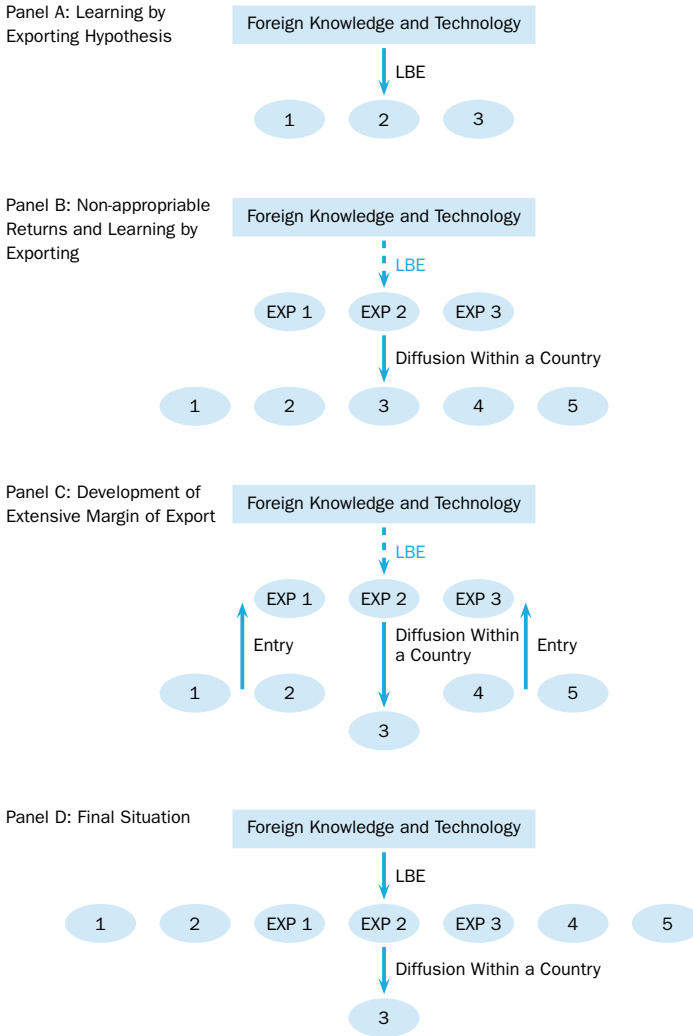


Figure 1 Impact of Extensive Margin of Export on Learning by Exporting Effect

Finally, some authors are of opinion that in order to export, a firm must develop some contacts (see especially Rauch (1996)). Despite the fact that many models treat the correlation between supply and demand on international markets as the *black box*, this process can be extremely time- and cost-consuming and it can discourage firms from exporting. Facilitating trade intermediation would lead to the development of the extensive margin of export. Moreover, as Volpe Martincus, Estevadeordal, Gallo, and Luna (2010) have shown, export promotion agencies can be effective in widen-

ing the international contacts network because they specialize in providing foreign customers with detailed information about differentiated products.

Summary and Conclusions

The correlation between productivity and export status caused many researchers to theoretically and empirically investigate whether international expansion in the form of export improves a firm's technology. Although some mechanisms were proposed in theoretical literature, econometric studies provided weak – if any – support to *learning by exporting*. It is partly caused by methodological problems, but there are also some economic reasons to think that this kind of learning may not occur or may be significantly limited. It seems that the most important one is constituted of intranational spillover effects. Moreover, developing an extensive margin of trade could reconcile a firm's willingness to learn from other markets with the policy-makers' obligation to stimulate the economic growth.

The author did not empirically investigate this hypothesis – it will be the subject of future research. One important suggestion for every future researcher is that endogeneity problem should be controlled. According to the above hypothesis, the extensive margin of export may positively influence the economic growth via *learning by exporting* effect. At the same time, more advanced economies may be constituted of more productive, high-quality firms benefiting from developed financial market. In this environment it would be relatively easy for firms to start with the export. In other words, causality would lead from the level of economic advancement to the extensive margin of export.

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