

WHY LEARNING BY EXPORTING MAY NOT BE AS COMMON AS YOU THINK

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Abstract:

International trade economists almost unambiguously claim that engagement in export enables a firm to increase its productivity. They 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 theoretical and empirical findings is usually explained by methodological problems econometricians encounter during their research. Although it may be right, there are also some theoretical reasons why one may think that learning by exporting is a wrong or highly limited hypothesis. The paper presents rationale for learning by exporting and describes drawbacks of this hypothesis aiming at highlighting limitations of firm's ability or propensity to learn from foreign markets. Mechanisms both blocking and limiting this learning are covered.

Keywords: learning by exporting, trade and heterogeneous firms.

1. 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 hypothesis have been developed. The first one (*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 the most prominent of both hypotheses is *self-selection*. There are two explanations of this state. Firstly, many empirical articles proved 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 Hagemeyer, 2006, for Poland). Secondly, modeling *self-selection* mechanism is quite easy. New models (establishing so called *New New Trade Theory*) are built upon well-known models (mostly of *New Trade Theory* from the 1980s). For example, seminal Melitz (2003) paper developed Krugman (1980) introducing firm heterogeneity and sunk costs of entry into foreign markets.

One must bear in mind that the strict causal relation from productivity to 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 Trade Theory* models predict differences of the magnitude of 90-100 to 1. Simply speaking, not only big and very productive firms are exporters but also smaller ones engage in export activity. Hence, analyzing *self-selection* one should not concentrate on one determinant of firm's trade (productivity) but on the whole vector of firm characteristics. Several models explaining exports by 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 more 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 puzzle are presented. It must be strongly stated that the aim of the paper is to describe only theoretical reasons of ambiguous results of studies. In other words, only theoretical mechanism blocking learning from foreign markets is presented. The author leaves aside methodological reasons of underestimation of learning by exporting.

The structure of the 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

mechanism negating learning by doing is being described. Conclusions and summary constitute the last part.

2. THEORETICAL RATIONALE FOR LEARNING BY EXPORTING

The idea in which 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 assume the existence of only single-product firms. Relaxation of this assumption brings the opportunity to investigate intrafirm consequences of starting exporting. The popular way to explain learning by exporting in multi-product firm framework is that due to exports, these firms concentrate on their core competence. Firms specialize in these 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 resented by Bernard, Redding and Schott (2010). They introduced product-specific feature which affect firms behavior. These product attributes reflect consumer taste and can be seen as consumer preference for a particular product. In their working paper (Bernard, Redding & Schott, 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 impact of firm organizational abilities (Nocke & Yeaple, 2006) and flexibility of product lines (Eckel & Neary, 2010) on firm’s tendency to make adjustments within 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 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 what 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 of 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 is not the case 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 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 economically advanced and more sophisticated markets. Due to higher incomes potential consumers are more quality-driven. In order to meet these increased quality expectation, firms must first introduce better technology what is inevitably connected with hiring skilled workers.

The last reason to think 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 firm's decision whether to engage in vertical foreign direct investment (FDI) or arm's length relationship. In other words, models typically study whether firm outsource or insource some stages of production. In spite of this focus the literature can help explain learning by exporting. Because 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. It implies in this setting usually an exporter is 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 of firms' sourcing decisions.

3. REVIEW OF EMPIRICAL STUDIES

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

Table 1: Results of empirical studies on learning by exporting

Country	Study	Results
Canada	Baldwin, Gu (2003)	Exporters are more productive than non-exporters. The gap is gradually increasing. New entrants into export markets quickly increase their labor productivity.
Chile	Alvarez, 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 (2002)	Previous export status positively correlated with current labor productivity and TFP. Learning effects among new exporters are usually statistically insignificant or negative.
Colombia	Clerides, Lach, Tybout (1998)	Improvement of labor productivity after entry into export market.
	Isgut (2001)	In one-year period productivity difference between new exporters and non-exporters was not significant. In five-year period new exporters experienced faster productivity gains than non-exporters.
Germany	Bernard, Wagner (1997)	Larger increase in labor productivity among new exporters than non-exporters.

	Wagner (2002)	Difference in labor productivity between new exporters and non-exporters was statistically insignificant.
	Arnold, Hussinger (2004)	Difference in TFP between new exporters and non-exporters stable (non-increasing) after a year following entry into foreign market.
Indonesia	Blalock, Gertler (2004)	Significant productivity improvements among firms entering foreign markets.
Korea	Aw, Chung, 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 labor productivity growth of new exporters and non-exporters.
Morocco	Clerides, Lach, Tybout (1998)	Labor productivity improvements after entry into export market.
Slovenia	Damijan, Polanec, Prasnikar (2004)	No continuous effect of export on new exporters' productivity. Short-term effect is observed. Increase in productivity depends on the destination (firm learn when they export to advanced markets).
	De Loecker (2004)	New exporters increase their productivity but only in a half of industries learning by exporting was statistically significant.
Spain	Delgado, Farinas, Ruano (2002)	No evidence on learning by exporting.
	Farnas, Martin-Marcos (2003)	Similar growth of labor productivity and TFP of new exporters and non-exporters.
Sweden	Greenaway, Gullstrand, Kneller (2003)	No differences between TFP growth of new exporters and non-exporters.
	Hansson, Lundin (2004)	Lack of evidence on learning by exporting when TFP is analyzed. When labor productivity is applied new exporters improve this productivity faster than non-exporters.
Taiwan	Aw, Chen, Roberts (1997)	Likely positive impact of export on firm productivity.
	Liu, Tsou, Hamitt (1999)	Faster labor productivity growth among new exporters than non-exporters.
	Aw, Chung, Roberts (2000)	TFP differences increasing favoring new exporters.
	Tsou, Liu, Hamitt (2002)	Significantly faster TFP growth in case of new exporters than non-exporters.
Turkey	Yasar, Nelson, Rejesus (2003)	Difference in productivity between new exporters and non-exporters larger than the difference between all exporters and non-exporters.
UK	Girma, Greenaway, Kneller (2003)	Faster growth of TFP among new exporters than non-exporters – especially in the first year of exporting.
	Greenaway, Kneller (2003)	Faster growth of labor productivity among new exporters than non-exporters.
	Greenaway, Kneller (2004a)	Short-term increase in TFP growth among new exporters.
	Greenaway, Kneller (2004b)	Faster productivity growth among new exporters than non-exporters.
	Greenaway, Yu (2004)	Learning by exporting observed especially among new exporters (chemicals industry analysis).
USA	Jensen, Musik (1996)	Difference in labor productivity growth between new exporters and non-exporters was statistically insignificant.
	Bernard, Jensen (1999)	Sound difference between labor productivity growth of new exporters and non-exporters.
	Bernard, Jensen (2004)	In the first year of exporting new exporters increase productivity faster than other firms.
Ghana, Cameroon, Kenya,	Bigsten et al. (2000)	Export in a particular year enables to increase productivity in the next year. Productivity improvements especially large in the first year of exporting.

Zimbabwe		
Sample of countries from Sub-Saharan Africa (9 countries)	Van Biesebroeck (2003)	Lack of sound differences in labor productivity between new exporters and continuous exporters. Larger differences between new exporters and non-exporters after than prior to entry.

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

All these studies present confusing view of learning by exporting hypothesis. Although many analyzes investigate behavior of firms' productivity 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 very often learning by exporting was not found but *self-selection* hypothesis was supported.

4. MECHANISMS BLOCKING LEARNING FROM EXPORT MARKETS

The results of empirical studies very often do not support the *learning by exporting* hypothesis. Many researchers concluded that this situation was caused mainly by methodological difficulties. Very few economists are of different opinion – that firms do not learn from export markets due to some economic mechanisms. However, it would be wise to lose sight of these mechanisms. Therefore, they are presented below in a 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 only when a firm engages in more sophisticated operation than a 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 a firm in the form of significant flow of information. Being excluded from the knowledge about better technology an exporter is unable 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, then this firm is able to gain access to foreign ideas. It seems that when trade activity is mature enough it can lead to learning from 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 ever improve firm's technology we would expect no study to support learning from 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 mainly knowledge about 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 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 more hire skilled workers before 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 and quick and substantial spillovers among firms within the same country. If an investment is profitable, then other companies will instantly duplicate it significantly reducing ability of the first investor to recoup its resources. In this case all the benefits will be socialized in the sense that they will not be appropriated by a decision maker. If instead investment is not profitable, then other companies would not copy it and only the investor would be left with losses. These losses will be internalized. It seems that an exporter considering investment would be exposed to 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 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 detrimental effects of domestic spillovers. At the same time, nothing is said why transmission of knowledge from country A to B do not discourage the firms from the former one from innovative activities.

5. LIMITS OF LEARNING BY EXPORTING

Despite all above mentioned factors are questionable, it must be clearly stated that to some extent they negate *learning by exporting*. Yet it is also possible that this sort of learning occurs but only when some additional conditions are satisfied. Reviewing a vast empirical literature one may conclude that very often *learning by exporting* is limited to specific trade transaction. According to Silva, Africano and Afonso (2010), this specificity includes both characteristics of an exporter (like experience and trade intensity) and foreign market (like a level of development). These features are presented in table 2.

Table 2: Determinants of *learning by exporting*

Determinant	Empirical results (examples)
Firm's experience	<p>Higher probability that relatively new firms learn from foreign markets due:</p> <ul style="list-style-type: none"> • Greenaway i Yu (2004) – in UK chemicals industry new firm learned faster from export markets than old firms; • Fernandes i Isgut (2005) – productivity improvements faster among young Colombian exporters than non-exporters; <p>AT THE SAME TIME:</p> <ul style="list-style-type: none"> • Kraay (1999) – learning from foreign markets was statistically insignificant among young Chinese exporters; learning was large among old, established exporters
Export intensity	<p><i>Learning by exporting</i> more likely among firms with high intensity of export:</p> <ul style="list-style-type: none"> • Castellani (2002) – larger productivity improvements among Italian firms with sound export intensity than among low-export-intensity firms • Fernandes i Isgut (2007) – large productivity improvements among intensive Colombian exporters; <i>learning by exporting</i> was statistically insignificant in the group of firm with marginal engagement in export
Firm's initial technology	<p><i>Learning by exporting</i> dependent on firm's relative technology:</p> <p>CONVERGENCE:</p> <ul style="list-style-type: none"> • Cassiman i Golovko (2007) – Spanish exporters with low initial technology experienced faster learning than technologically advanced firms <p>DIVERGENCE:</p> <ul style="list-style-type: none"> • Albornoz i Ercolani (2007) – <i>learning by exporting</i> more likely among firms with high originally high abilities than among less technologically advanced firms in Argentina; • Salomon i Jin (2008) – <i>learning by exporting</i> larger among Spanish firms with high initial technology than among technologically lagging firms
Industry specificity	<p>Higher probability of <i>learning by exporting</i> among firms from less technologically advanced industries:</p> <ul style="list-style-type: none"> • Yasar, Garcia, Nelson i Rejesus (2007) – <i>learning by exporting</i> larger in Turkish textile and apparel industry than in automobile industry • Salomon i Jin (2008) – <i>learning by exporting</i> larger in Spanish low-technology industries than in technologically dominant industries
Destination specificity	<p><i>Learning by exporting</i> more likely when selling on advanced markets:</p> <ul style="list-style-type: none"> • Trofimenko (2005) – larger productivity improvements among Colombian firms exporting to high-income OECD countries than among firms exporting to lower-income OECD countries; • De Loecker (2007) – Slovenian firms exporting to high-income countries experience larger productivity improvements than firms exporting to lower-income destinations.

Having looked at the table, one may find that sometimes it is hard to say in which direction a particular feature affects learning abilities of a firm. For example, some studies show that due to exports firms converge in productivity – that is firms which are further from their technological frontier catch up. However, other studies present totally different result and indicate that the more technologically advanced a firm is in pre-export years, the better it absorbs foreign knowledge and technology after starting exporting. The same confusion applies to firm's experience. Do more or less experienced learn from export? There is no unambiguous answer to that question.

6. CONCLUSIONS

Correlation between productivity and export status caused many researchers to theoretically and empirically investigate whether international expansion in the form of export improves firm's technology. Although some mechanism 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. However, these reasons are very often neglected and economists encountering unsatisfactory results of their studies conclude that the only reason is methodology. In this paper, other reasons were presented in order to highlight that it may not be the case. By doing so, the author pointed that learning from foreign markets is not automatic.

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