



Trade and productivity: Self-selection or learning-by-exporting in India[☆]

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ABSTRACT

Recent literature tried to explain the Indian growth miracle in different ways, ranging from trade liberalization to industrial reforms. Using data on Indian manufacturing firms, this paper analyzes the relationship between firm's productivity and export market participation during 1991–2004. While it provides evidence of the self-selection hypothesis by showing that more productive firms become exporters, the results do not show that entry into export markets enhances productivity. The paper examines the explanation of self selection hypothesis for total factor productivity differences across 33,510 exporting and non-exporting firms. It uses propensity score matching to test the learning-by-exporting hypothesis. In line with the prediction of recent heterogeneous firm models of international trade, the main finding of the paper is: more productive firms become exporters but it is not the case that learning by exporting is a channel fuelling growth in Indian manufacturing.

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1. Introduction

Exporters tend to outperform non-exporters. The direction of causality – productivity increases exports or exports enhances productivity – within this relationship is, however, still under discussion. Do more productive firms within an industry export? What are the determinants behind different trade patterns within an industry? How are these differences in trade behavior related to productivity differences among firms? This paper analyzes these questions empirically for a sample of firm data from the manufacturing industry in India, a country that has not yet been well investigated from this perspective.

There are two alternative, but not mutually exclusive, hypotheses on why exporters can be expected to be more productive than non-

exporting firms (see [Bernard and Jensen, 1999](#); [Bernard and Wagner, 1997](#)): self-selection or learning-by-exporting.

The first hypothesis points to self-selection (SS) of the more productive firms into export markets. The reason for this expectation is that there are additional costs of selling goods in foreign countries. The range of extra costs includes transportation costs, distribution or marketing costs, personnel with skills to manage foreign networks, or production costs in modifying current domestic products for foreign consumption. These costs provide an entry barrier that less successful firms cannot overcome. Firms face difficulties in foreign market, due to the existence of sunk costs associated with selling abroad and fiercer competition in international markets. For example, [Roberts and Tybout \(1997\)](#) and [Bernard and Wagner \(2001\)](#) find evidence for the existence of sunk costs in exporting.

In addition, competition could be fiercer outside home market, a feature that would again allow only the most productive firms to do well abroad. This explanation is in line with the assumption made in the theoretical literature of international trade with heterogeneous firms that high-performing firms self-select themselves into foreign markets. [Bernard and Jensen \(1999\)](#) find that exporters have all their desirable characteristics before taking up exporting, and that the performance paths of exporters and non-exporters do not diverge following the launch of export activities by the former. Cross-section differences between exporters and non-exporters, therefore, may in

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part be explained by ex ante differences between firms: According to the SS hypothesis, in the period prior to their entry, the productivity distribution of entering exporters should dominate the productivity distribution of non-exporters.

The second hypothesis points to the role of learning-by-exporting. Knowledge flows from international buyers and competitors help to improve the post-entry performance of export starters. Furthermore, firms participating in international markets are exposed to more intense competition and must improve faster than firms who sell their products domestically only. Exporting makes firms more productive.

Empirical papers have investigated the role of exports in promoting growth in general,¹ and productivity in particular, using aggregate data for countries and industries for a long time. However, only recently have comprehensive longitudinal data at the firm level been used to look at the extent and causes of productivity differentials between exporters and their counterparts (which sell on the domestic market only).

For a decade following the seminal paper by Bernard and Jensen (1995), researchers all over the world used firm level data to investigate the relationship between exporting and productivity in micro-econometric studies. Wagner (2007) surveyed the empirical strategies applied, and the results produced, in micro-econometric studies published between 1995 and 2004. In general, he found that the more productive firms self-select into export markets, while exporting does not necessarily improve productivity. Among the countries covered are industrialized countries (e.g., U.S., UK, Canada, Germany); Latin American countries (Chile, Colombia, Mexico); Asian countries (China, Korea, Indonesia, Taiwan); transition countries (Estonia, Slovenia); and least developed countries from sub-Saharan Africa. In particular, these findings include ones for Chile between 1990 and 1996 in Alvarez and Lopez (2005); for China between 1988 and 1992 in Kraay (2002); for Colombia between 1981 and 1991, Mexico between 1986 and 1990, and Morocco between 1984 and 1991 in Clerides et al. (1998); and for Indonesia between 1990 and 1996 in Blalock and Gertler (2004).

However, India has not been explored in this literature. Nevertheless, it seems important to study the Indian context for two reasons. First, India is a large developing country, so it is useful to understand Indian exporting patterns. Second, India's growth in manufacturing and particularly in exporting has been slower than that of many other developing countries (notably China), so it is interesting to understand the drivers of Indian exports.

Hence, this paper adds to the empirical literature on the direction of causality between trade and firm productivity by studying a particularly important developing country, India. Using longitudinal micro data on Indian manufacturing firms – industry accounts for 54.6% of the GDP and employs 17% of the workforce – this paper examines the validity of self selection and learning-by-exporting hypotheses for total factor productivity differences across 33,510 exporting and non-exporting Indian manufacturing firms between 1991 and 2004. While it provides evidence of the self-selection hypothesis by showing that more productive firms become exporters, the paper does not find that entry into export markets enhances productivity. The paper uses propensity score matching to test the learning-by-exporting hypothesis. Firms which face foreign competition perform better than their domestic competitors years before they enter export markets. The changes in characteristics of exporting firms before they start exporting are not statistically different from those of the firms that serve only the domestic markets. While there is weak evidence as to whether these exporting firms prepare themselves consciously for the international markets, the main result is robust.

The paper is organized as follows. Section 2 describes the data. Section 3.1 presents the export premium calculation methodology. Section 3.2 estimates total factor productivity. Sections 3.3, 3.4, and

3.5 sketch the self selection hypotheses along with related empirical evidence as well as apply propensity score matching to test the evidence for learning due to exposure to international markets. Section 4 concludes.

2. Data

We use an Indian firm-level panel dataset of balance sheets and income statements spanning 14 years (1991–2004) throughout the analysis. The data comes from the Center for Monitoring the Indian Economy (CMIE) Prowess database. We limit the analysis to manufacturing firms because the main firm-level productivity measure used in the estimations is the total factor productivity (TFP), which is not an appropriate measure of productivity for non-manufacturing firms as these firms have a different structure of production than manufacturing ones. The dataset covers 33,510 domestically-owned manufacturing companies categorized by sectors. The largest sectors, measured by the number of companies, are food products, textiles, chemicals, basic metals and machinery.

Table 1 provides descriptive statistics. The average percentage of exporters in total firms is 55%. The firms that change their export status from non-export to export (entrant) and from export to non-export (quitter) constitute on average 5.5% and 3.5% of all firms, respectively across time. Exporting firms have on average larger sales, income and capital (Table 2). They spend more on raw materials, power and fuel expenses, and pay higher wages. Non-exporting firms tend to be younger than exporting firms. The TFP index is on average larger for exporters although the difference does not appear to be statistically significant.

However, the unbalanced nature of the sample, frequency of entry and exit behavior of firms, and missing observations make it difficult to interpret these results. A more formal and systematic analysis that takes into account the consistency of firms in terms of export behavior is required for a reliable comparison of exporters and non-exporters.

3. Empirical model and analysis

The below four subsections provide estimation of export premium measurement and TFP as well as present empirical tests for the SS and LE hypothesis.

3.1. Export premium

To document the differences between exporters and non-exporters, we measure the export premium (ceteris paribus percentage differences in firm characteristics between exporters and non-exporters) for each year during the 1991–2004 sample period. The main firm characteristics of interest are productivity measure (TFP), capital, sales, and unit labor cost, which is obtained by dividing total labor cost (salaries and wages) by the value of real output. Following

Table 1
Export patterns of manufacturing firms.

Year	Number of firms	Exporters (%)	Entrants (%)	Quitters (%)
1991	2010	55.8	5.3	2.6
1992	2112	57.4	7.8	2.6
1993	2166	55.7	5.8	2.5
1994	2796	54	6.8	2.3
1995	3367	53.6	7.8	2.5
1996	3538	55.1	7.2	3.6
1997	3512	55.4	5.8	5.2
1998	3522	56	4.6	4.1
1999	3797	53.8	4.2	4.4
2000	4007	52.3	4.5	5.2
2001	3944	52.8	5.6	4.7
2002	4000	52.3	4.5	4.4
2003	4136	53.2	4.4	3.7
2004	3980	56.3	5.1	3.5

¹ Another line of research – i.e. Amin and Haidar (2011), Haidar (2009), Haidar (forthcoming) – looked at the impact of export facilitation and export costs on economic growth.

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