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Scope for Export-Led Growth in a Large Emerging Economy: Is India Learning by Exporting?*

Saleh S. Tabrizy and Natalia Trofimenko

Abstract:

The ongoing debate of the literature on learning-by-exporting is whether the conspicuously stellar performance of exporters relative to non-exporters can be, at least partially, attributed to the horizon-widening interaction with foreign consumers and learning of cost-efficient and quality enhancing production methods, or whether all of the differential is due to the self-selection of best firms into exporting. This study uses data from the 1998-2008 Prowess Database to examine how firm-level productivity paths differ between firms with varying degrees of exposure to international trade in India, the country to rank third among the most dominant economies by the year 2050. Having used Levinsohn-Petrin measure of total factor productivity and a proxy for labor productivity, we find significant ex-ante differences in productivity between exporters and non-exporters and no difference in the ex-post productivity gains. These findings suggest that even in a large emerging economy with strong absorptive capacity and a significant catch-up potential, learning-by-exporting effects are non-existent. Rather, self-selection of more productive firms into exporting explains the productivity differential between exporters and non-exporters.

Keywords: trade, total factor productivity, exports, export-led growth, learning by exporting

JEL classification: D21, F10, L60

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1. Introduction

The intuitive appeal and the evident success of export-led growth in China combined with the growing concern about the cost-effectiveness of export promotion schemes has prompted the rise of a literature on the beneficial effects of engagement in exporting on the firm-level productivity. A micro-econometric survey of evidence from over 30 countries uniformly confirms that exporters are more productive than non-exporters and these productivity differentials are statistically and economically significant even when observed and unobserved firm characteristics are accounted for (Wagner, 2007). Two factors are claimed to be responsible for such productivity differences. Conventional learning-by-exporting theory holds that exporters enjoy stellar economic performance as they expose themselves to the competition abroad and to the state-of-the-art technologies not available in the domestic market (Aw et al., 2002; Wagner, 2006). Whereas existence of learning-by-exporting effects has been proved for small backward economies (van Biesebrock, 2005; Loecker, 2007), the overwhelming empirical evidence for the rest of the world suggests that the productivity improvements occur prior to the entry into foreign markets and dissipate once the firm becomes an exporter (Wagner, 2007). Our work contributes to the literature by investigating the possibility of learning-by-exporting effects in a large emerging economy with strong absorptive capacity and venues for a catch-up.

India is different from most of the countries under investigation in learning-by-exporting analyses along several dimensions. According to the scenarios presented in the BRIC report released by Goldman Sachs in 2003, by the year 2032 India will be the world's third largest economy in terms of GDP at market prices. Updated sources (PricewaterhouseCoupers, 2008) claim that India is expected to be 90% of the US economy by 2050. Whereas other BRIC members, such as Russia or Brazil, rely primarily on exports of raw materials, India has the potential of replicating what China has achieved in exports of manufactured goods. Moreover, unlike China who lacked the technology to be competitive in manufactured goods and invited in foreign direct investors to

provide the capital and the expertise to achieve export competitiveness, India aspires to become a major player in knowledge-based business services, innovation and R&D and these aspirations are reflected in the increasing spending on post-graduate education, R&D infrastructure investments and the New Millennium Indian Technology Initiative, aimed at enhancing the effectiveness of R&D.

We use data on 1,822 firms over the period 1998-2008 from the Prowess Dataset to examine how firm-level productivity paths (measured as total factor productivity based on the Levinsohn-Petrin estimator and as labor productivity proxied by the sales per dollar spent on labor force) differ between firms with varying degrees of exposure to international trade in India. Following the empirical strategy proposed by Wagner (2007) and implemented for 14 economies by the International Study Group on Exports and Productivity (ISGEP, 2007), we have found that the 30 to 60 percent productivity differential between exporters and non-exporters is attributed to the selection of more productive and faster growing firms into exporting. Having gained a productivity advantage prior to the entry into foreign markets, exporters do not experience additional productivity gains from the exporting activity per se. Moreover, exporters who fail to survive in foreign markets lose this productivity advantage and end up being worse off than the firms who never export.

Our findings, therefore, suggest that even in a large emerging economy with strong absorptive capacity and venues for catch-up, learning-by-exporting effects are non-existent. Rather, self-selection of more productive firms into exporting explains the productivity differential between exporters and non-exporters. Our conclusion is not meant to undermine Bajpai and Sachs' (1998) appeal to make export-led growth the first prong of India's economic development. Rather, we put forward that the benefits in terms of gained productivity from such policy orientation may be lower than anticipated by the proponents of the learning-by-exporting.

In the rest of the paper, we summarize the literature (Section 2), explain the data at hand (Section 3), lay out our empirical approach and discuss our findings in view of the evidence from other BRIC economies (Section 4), and conclude with policy recommendations (Section 5).

2. Background

A micro-econometric survey of evidence from over 30 countries (Wagner 2007) uniformly confirms that exporters are more productive than non-exporters, irrespective of the country under analysis and the measures of productivity being used. These productivity differentials are statistically and economically significant even when observed and unobserved firm characteristics are accounted for: the differentials range from 3.5 percent in Japan (Kumora and Kiyota, 2004), 8-9 percent in the United States (Bernard and Jensen, 2004) and 9-10 percent in Great Britain (Greenaway and Yu, 2004) to 30 percent in Solvenia (De Loecker, 2007) and Mexico (Bernard, 1995) to 50 percent in sub-Saharan Africa (Van Biesebroeck, 2003) and 80-100 percent for small plants in Colombia (Isgut, 2001).[1]

Productivity is not the only dimension along which exporters differ from non-exporters. Starting with the influential article by Bernard and Jensen (1995), empirical literature has settled on the following stylized facts about exporters: exporters are larger in size and have higher capital intensity, higher investment per employee, a different mix of skilled and unskilled workers, higher labor productivity and pay higher wages and benefits to their workers. Mayer and Ottaviano (2007) use a sample of seven European countries to come up with additional facts about exporters. Putting the details aside, they suggest that the aggregate export is driven by a handful of top exporters and there are only a few firms among this handful who export a relatively large

[1] Whereas it is difficult to provide direct comparison of the estimates because of the differences in empirical approach and the utilized measures of productivity, Hallward-Driemeier et al. (2002) conduct cross-country analysis and confirm that the productivity gap between exporters and non-exporters is higher in the countries with less developed markets.

fraction of their sales. Furthermore, not only a majority of top exporters tend to select more than one product to export, but also they target more than one country for their exports. Interestingly, there is a clear distinction between exporters when it comes to selecting a target market which can, partly, be explained by firm characteristics. Among the top exporters, for instance, these are few large exporting firms who afford to export to the most challenging markets while small exporters select to serve the easy markets. Finally, they suggest that exporters are, in general, more likely to be foreign-owned even though the share of foreign-owned exporters differs across countries.

In spite of the intuitive appeal of the learning-by-exporting hypothesis that posits that exporters are more productive than non-exporters due to a more stimulating and competitive environment abroad and access to the knowledge about production processes not available in the domestic markets, a groundbreaking theoretical model by Melitz (2003) demonstrated that the empirically derived conclusions about the differences in productivity between exporters and non-exporters can be explained by the selection of more productive firms into exporting. He showed that only the most efficient firms can afford to pay the additional costs associated with exporting and enter foreign markets.

Adopting a different approach, Yeaple (2005) suggests that heterogeneity among firms can be modeled using the interaction of export costs, a set of competing technologies and a set of work-force with heterogeneous skills that are available to each firm in a specific industry. His model predicts that exporting firms are larger and more productive than the non-exporting ones. These firms also tend to employ more advanced technologies and pay higher wages. Unlike the Melitz's model in which firms are assumed to be inherently heterogeneous and face random technology shocks, Yeaple models an industry in which firms are inherently homogenous but have different choices over the technology and the work-force that they employ. This is a distinguishing feature of Yeaple's model that provides theoretical underpinnings for the idea that future exporters may

engage in preparatory work before entering foreign markets and make conscious decisions regarding the production process in the expectation of the future activities abroad.

Whereas these two studies are not the only attempts to model the self-selection of more productive firms into exporting (Bernard et al. 2003), we believe they illustrate well why the literature has been relentless in identifying exactly the relative contribution of self-selection and learning-by-exporting to the overall productivity differential between exporters and non-exporters. So far, the weight of the self-selection effect in the so-called exporter premium has been overwhelming: in every single country exporters have been shown to be more productive than non-exporters prior to the entry into foreign markets. This difference becomes evident two to three years before the onset of exporting (Iacovone and Javorcik, 2007; Wilhelmsson and Kozlov, 2007). In general, it is not only the more efficient firms that go into exporting, but these are also the firms who experience the highest growth rates, i.e. firms enter foreign markets at the peak of their performance.[2]

As for the learning-by-exporting effects as demonstrated by the post-entry differences in productivity, the most optimistic findings reveal statistically significant productivity improvements following the initiation of exporting (Bernard and Wagner, 1997; Clerides et al., 1998; Bigsten et al., 2000; Blalock and Gertler, 2004; De Loecker, 2007; Greenaway and Kneller, 2004a; Kimura and Kiyota, 2004), especially for young plants (Delgado et al., 2002; Fernandes and Isgut, 2005). However, these gains are short-lived (Isgut, 2001; Damijan et al., 2004; Kostevc, 2005). At best, the gap does not widen over time (Arnold and Hussinger, 2005), in most case studies the gains dissipate within a year. The ability to generate learning-by-exporting effects has been linked to the R&D activities and worker training (Aw et al., 2005), exposure to the competition from foreign firms (Greenaway and Kneller, 2004b), firm size (Requena Silvente,

[2] There are some exceptions to this rule. Liu et al. (1999), for example, find that in Taiwan the growth of labor productivity is no different in exporters than in non-exporters.

2005), increased market share abroad (Girma et al., 2004), industry (Blalock and Gertler, 2004; Aw et al., 2005), distance to the technological frontier (Yasar et al., 2003) and target market (Damijan et al., 2004, De Loecker, 2007). The overwhelming evidence, however, is that the post-entry productivity improvements are statistically insignificant (Bernard, 1995; Jensen and Musick, 1996; Clerides et al., 1998; Wagner, 2002; Hansson and Lundin, 2004; Alvarez and Lopez, 2005; Arnold and Hussinger, 2005; Greenaway et al., 2005).

Our conclusions from the literature are that self-selection and learning-by-exporting are two alternative but not mutually exclusive reasons for the observed differences between exporters and non-exporters, that self-selection is the most likely explanation of the exporter premium and that the debate regarding the existence of learning-by-exporting effects is far from settled. This verdict is derived from the case studies based on a large sample of industrialized countries or small open economies. The evidence on the potential for learning-by-exporting effects in a large emerging economy is scarce (Kraay, 2002; ISGEP, 2007[3]).

Indian Prowess Database seems to be a fruitful dataset for studying learning-by-exporting effects in the context of a large emerging economy with strong absorptive capacity and a significant catch-up potential. In the next section we describe the dataset and how we employ it.

3. Data, Sample, and Variables

3.1. Data Source and Sample

We compile a firm-level panel dataset that covers 1,822 firms from seven manufacturing sectors and spans the period 1999-2008. The dataset comes from the Prowess database collected by the Center for Monitoring of the Indian Economy. It contains information from the balance sheets and income statements of close to 10,000 publically listed companies, half in the manufacturing

[3] Team members responsible for the analysis of the Chinese data are Johannes Van Biesebroeck, Loren Brandt, and Yifan Zhang.

sector. The companies in the database comprise 60-70 percent of the economic activity in the organized Indian production and account for ¾ of the corporate taxed and 95% or excise duty collected by the Indian government (for more information about the dataset, see Topolova 2007).

Our sample is restricted to the 1,822 firms who provide complete information for the most recent available period – year 2008. In Table 1 we look at the distribution of exporters over the window of ten years. Note that non-exporters in Table 1 are those firms who have never reported any positive earnings from export between 1999 and 2008. On the other hand, exporters are considered to be exporting continuously throughout the window. There are, of course, firms who who enter and leave foreign markets. These include sporadic exporters (exporters who enter foreign markets only to leave them after a year or more and to re-enter at some later date), firms who did not export at the beginning of the period, but started doing so later on, and firms who failed at surviving in the foreign market before the end of the period in 2008.

Numbers reported in the table suggest that our sample is unusual to the extent that it contains a relatively high share of exporters – as mentioned earlier, in reality exporters represent only a handful of firms in the economy. Our attempt to create a sample of firms with complete information for the period in question may have skewed the distribution of firms towards the exporters. This could have serious implications for the analysis. The bias in favor of exporters, for example, may result in the overestimation of the exporter premium. Such bias is expected to work against our finding of insignificant learning-by-exporting effects. Insignificant learning-by-exporting effects could, in principle, reflect bias in favor of established domestically oriented firms who have been in operation over a long period of time. This, however, is not a concern in our case, since we do find highly significant ex-ante differences between exporters and non-exporters. Hence, although a relatively high share of exporters in our sample deserves further investigation, it should not bias the conclusions of our study.

In Table 2 we look at the productivity differentials between exporters and non-exporters in 2008. The mean values and the standard errors of the two productivity measures – total factor productivity estimated via Levinsohn-Petrin estimating procedure and a proxy for labor productivity computed as sales per dollar spent on labor – are reported for both groups within different sectors. Both in aggregate and within each sector, one can find clear dissimilarities between exporters and non-exporters. The differences seem to be particularly high for the total factor productivity, a finding not uncommon in the learning-by-exporting research (Greenaway and Kneller, 2004) but also not very usual since typically the exporter premium in terms of labor productivity is higher than the exporter premium in terms of total factor productivity, sometimes by significant amounts.[4] A cursory look also suggest some inter-sectoral differences, although not as striking as reported in some other studies (Aw et al., 1997).

3.2. Variables

Prowess Database does not contain a measure of firm-level employment. We follow Topalova (2007), who uses the same dataset, to build an ordinal size measure in which firms are divided into three groups, based on the distribution of average sales. A firm is considered to be small if its average sale is below the median. Those firms who have above-the-median records are considered to be middle-sized unless their average sale stands at the 99th percentile. Firms in the 99th percentile will be categorized under the large firms. Out of 23 large firms in the sample, 20 firms have been exporting with no interruption over the entire period.

[4] Hahn (2004), for example, reports an exporter premium in Korean firms of 20-50 percent for labor productivity and only 2.5-7.5 percent for total factor productivity. Even within labor productivity, estimates differ significantly, depending on whether they are measured in terms of value added or shipments per employee. Mexican exporters, for example (Bernard, 1995) have labor productivity 30 percent higher than that of non-exporters when measured in terms of shipments and over 50 percent higher when measured in terms of value added.

Typical of the standard learning-by-exporting analyses, the underlying productivity measure in this study ($\omega_{i,t}$) is being estimated using the Levinsohn and Petrin's estimation method (Levinsohn and Petrin, 2003; Levinsohn et al., 2004). We use Power and Fuel Expenditures and the Raw Material Expenses as the intermediate inputs that control the unobserved productivity shocks for each firm. Wage and Salary Expenses ($W_{i,t}$) and Gross Fixed Assets ($C_{i,t}$) are used to represent the labor input and the level of capital input in a Cobb-Douglas production function. We employ firm-level Value Added ($VA_{i,t}$), computed as the difference between Total Sales and the aforementioned intermediate inputs.

We deflate nominal values using India's Wholesale Price Index, take the natural logarithm of the real values, and estimate the following equation:

$$VA_{it} = \beta_0 + \beta_{SW} W_{it} + \beta_{SC} C_{it} + \omega_{it} + \eta_{it} \qquad (1)$$

The predicted level of productivity is then used as a total factor productivity measure for the firm i at time t using the estimated coefficient for each sector *S*:

$$\hat{\omega}_{it} = \exp(VA_{it} - \hat{\beta}_{SW} W_{it} - \hat{\beta}_{SC} C_{it}) \qquad (2)$$

To investigate whether the findings are sensitive to the used measure of productivity, we construct a proxy for labor productivity. As mentioned earlier, we have no access to the number of employees and make use of expenditure on labor as a proxy for labor input and formulate the labor productivity in the following way:

$$\ln(\varphi_{it}) = \ln(VA_{it}) - \ln(W_{it}) \qquad (3)$$

Labor productivity, therefore, can be interpreted as the value added that firm *i* produces at time *t* per dollar spend on labor, measured by Spending on Wages and Salary. The use of a wage bill as a proxy for employment is arguably an imperfect measure of the number of employees. Higher wage bill may reflect a different skill composition of the labor force or simply higher

remuneration for the equally qualified workers. Both scenarios are likely in view of the overwhelming empirical evidence that exporters employ better skilled labor and pay higher wages than the firms targeting domestic market. We acknowledge the weakness of this proxy.

4. Regression Analysis

To analyze the presence of self-selection and learning-by-exporting effects in India, we follow Wagner's proposal (2007), primarily to contribute to his ongoing initiative to provide comprehensive cross-country evidence on the learning-by-exporting effects. The International Study Group on Exports and Productivity (ISGEP, 2007) has conducted investigations for 14 different countries, with India being a new case study to complement this enterprise. We anticipate our findings to be of significant importance, especially as they compare to the conclusions regarding the learning-by-exporting effects in other BRIC economies.

We proceed as follows. We start by looking at the exporter premium in equation 4, defined by how productivity, other things being equal, differs between exporters and non-exporters. Then, using equation 5, we investigate the differences in productivity growth within three groups of firms: those who become an exporter, those who continuously export and those who give up exporting. In equation 6, we scrutinize the *ex-ante* productivity differences. Finally, equation 7 is used to investigate the possibility of *ex-post* productivity differences. In all estimations we use the Levinsohn-Petrin productivity estimator and check the robustness of the results with the proxy for the labor productivity. The main independent variables of interest are export-status dummy (a zero-one variable equal to one if a firm reported positive export sales in a given period and zero otherwise) and an export intensity measure (share of exports in total sales[5]). Deviations are discussed throughout the text as appropriate.

[5] Following ISGEP (2007), the Export Intensity is computed as $ExportIntensity = \frac{\ln(Exports + 1)}{\ln(Sales + 1)}$.

4.1. Are exporters different from non-exporters?

To compute exporter premium, i.e. the productivity differential between exporters and non-exporters, we estimate equation 4 below.

$$\ln \omega_{it} = \alpha + \beta X_{it} + \gamma Z_{it} + \varepsilon_{it} \qquad (4)$$

The dependent variable ω_{it} is a Levinsohn-Petrin productivity estimator for the firm i at time t. The control vector Z_{it} includes an ordinal measure of size, age, location dummies, sector dummies, year dummies and a set of interactions between years and sectors. The results are reported in Table 4.

Regardless of the way we define the export status variable and the productivity measure, there exists a palpable exporter premium: exporters are more productive than non-exporters, a finding very much in line with most of the empirical literature. The magnitude of the premium, computed as $ExportPremium = 100(\exp(\hat{\beta}) - 1)$, shows the average percentage difference in productivity between exporters and non-exporters, controlling for the observable characteristics of a firm. Depending on the productivity measure, exporters are 30 to 60 percent more productive than non-exporters. This value is comparable to the exporter premium in Russia and Brazil, two other members of the BRIC, but higher than the estimated exporter premium in China.[6]

As reflected by the increasing and highly significant size coefficients, exporter premium is higher for larger firms. Similar pattern has been found by Bernard and Wagner (1997) in the case of German manufacturing firms, where labor productivity is found to be 30-50 percent higher in

[6] Wilhelmsson and Kozlov (2007) use a panel of Russian manufacturing firms over the period 1996-2002 and find that exporters are over 40% more productive than non-exporters. Gomes and Ellery (2007) find exporters in exporters in Brazil to be 50 to 67% more productive than non-exporters, depending on the target market. ISGEP (2007) estimate the premium in China to be around 15% for small and over 20% for large firms.

large export firms than in large non-exporters and insignificant in small firms. However, it is not unlikely to find opposite patters. Isgut (2001), for example, found an 80-100 percent exporter premium for plants with up to 100 employees and only 27-32 percent premium for larger plants.

Highly significant coefficients on the share of exports in total sales and its squared term in the bottom panel of Table 3 suggest that the share of exports in total sales matters for the size of the exporter productivity premium. The fact that the first coefficient is positive and larger in magnitude than the second implies that the exporter premium increases with export intensity. The positive coefficient on the export intensity and the negative coefficient on the squared term suggest diminishing returns to increasing the share of exports in total sales. The estimated maximum is reached, however, for a value of the share of exports that is above 100 percent. The overall pattern is similar to the one found for China, with the exception that in China the exporter premium reaches its maximum at around 50 percent and decreases afterwards.

4.2. Do more efficient firms enter the export market and what happens when they stop exporting?

We observe a number of switches from being a non-exporter to initiating exporting activities and the other way around over the period 1999-2008. This provides an opportunity to track down the changes in the productivity of new exporters, those who are continuously exporting and those who quit exporting. With non-exporting firms as the reference group, we split our exporters into three groups, for a given point of time, using the three dummies below and estimate the following equation.

$$\ln \omega_{it} - \ln \omega_{i0} = \alpha + \beta_1 nx + \beta_2 xx + \beta_3 xn + \gamma Z_{i0} + \varepsilon_{it} \qquad (5)$$

Where the dummy variables for the export status are defined as follows:

nx=1 if $X_{i,0}$=0 but $X_{i,t}$=1 (Switch: Non-exporter → Exporter) and zero otherwise.

xx=1 if $X_{i,0}$=1 and $X_{i,t}$=1 (No switch) and zero otherwise.

xn=1 if $X_{i,0}$=1 but $X_{i,t}$=0 (Switch: Exporter → Non-exporter) and zero otherwise.

Note that the control vector in this equation captures firm characteristics back in the year 1999. Vector Z_{i0} contains the ordinal measure of size, age, location dummy and sector dummy.

The regression coefficients in equation 5 are estimates for the changes in growth rates of productivity for new exporters, continuing exporters and quitters relative to the firms, who did not export in both years. Specifically, coefficient β_1 sheds light on the hypothesis that the more productive firms self-select into foreign markets. Coefficient β_2 reflects differences between exporters and non-exporters. Finally, β_3 sheds light on what happens to the productivity gains of the firms who cannot survive in foreign markets.

The results are reported in Table 4. The total factor productivity growth of new exporters is about 36 percent higher than that of non-exporters, whereas continuing exporters grow at a somewhat lower rate of about 26 percent. This suggests that not only more efficient firms self-select into exporting, but it is also the faster growing firms who become exporters. This pattern of ex-ante productivity growth is very much in line with the literature for developed countries such as Canada and Germany (Baldwin and Gu, 2003; Bernard and Wagner, 1997), but different from the evidence from another BRIC member, Russia. Although Russian exporters are more productive than non-exporters prior to the entry, there is no evidence suggesting that there are ex-ante differences in the growth rates.

The size of the coefficient being highest for export starters than for other groups of firms, such as ongoing exporters, is similar to what has been found for Colombia (Cleredis et al., 1998). It seems that new entrants into exporting experience a short-term productivity boost that dissipates

with time, although the advantage in terms of the productivity levels persists if the firm remains an exporter.

The negative and highly significant (in the case of total factor productivity) coefficient on the dummy variable tagging export quitters suggests the worst performance of this group relative to everybody else. Thus, firms exiting foreign markets lose whatever productivity gains they have accumulated prior to the entry into foreign markets and end up performing worse than firms who never export. In Russia, for example, although exiting firms grow at a much lower rate than export starters or continuing exporters, they still retain their advantage in comparison to non-exporters.

4.3. What are the pre-entry differences between today's exporters and today's non-exporters?

In previous section we have demonstrated that export starters are more productive than non-exporters. We next investigate whether these differences date back some years, i.e. that future exporters are significantly more productive than future non-exporters several years prior to the entry into foreign markets. To do so, we select all firms that did not export between year t-3 and t-1 and compute the mean difference in performance in year t-3 between exporters in year t and non-exporters in year t (Wagner, 2007).[7] The main variable of interest is therefore a dummy variable for those who initiate their exporting activities at time t:

[7]Whereas the choice of three years is motivated primarily by our desire to provide an analysis comparable to that of the ISGEP (2007) and Wagner (2007) and to demonstrate the stability of their findings to the inclusion of an additional economy, we stand by it because, if anything, it would underestimate the ex-ante differences between exporters and non-exporters. Iacovone and Javorcik (2007) show that preparatory work for the entry into a foreign market starts in the two years preceding exports and increases gradually: in the case of Mexican exports, the premium increases from 6 percent two years before exporting to 8 percent one year before and 11 percent in the exporting period. Extending the analysis to three years before the product's introduction into export markets, suggests that

$$\ln \omega_{i,t-1} - \ln \omega_{i,t-3} = \alpha + \beta X_{it} + \gamma Z_{i0} + \varepsilon_{it} \qquad (6)$$

The control vector Z_{i0} is the same as in the equation 5. Coefficient β reflects the pre-entry premium and, transformed according to $ExportPremium = 100(\exp(\hat{\beta}) - 1)$, gives the mean percentage difference in performance between today's exporters and today's non-exporters in the years prior to the entry into foreign market.

The results are reported in Table 5. In the years prior to entry, exporters outperformed non-exporters by approximately 15 percent. It is worth noting that this is the only specification where the exporter premium measured in total factor productivity is nearly identical in magnitude to the one measured in labor productivity. Ex-ante exporter premium does not depend on the share of exports in total sales, as reflected by insignificant findings for the specification with export intensity and its squared term. This implies that it is truly accessing the foreign market per se and not gaining market share abroad that is viewed as an important hurdle.

4.4. Does exporting boost productivity growth?

To test that exporting fosters productivity, we investigate the existence and extent of the post entry productivity gains within the following framework:

$$\ln \omega_{i,t+3} - \ln \omega_{i,t+1} = \alpha + \beta X_{it} + \gamma Z_{it} + \varepsilon_{it} \qquad (7)$$

As before, we use export status dummy or the export intensity measure for the main regressor X_{it}. The control vector's components are identical to equation 4 and take their values at time *t*. In this test we compare firms that did not export in years t-3 through t+3 to those that did not export in years t-3 through t-1, but started exporting in year t and continued to export continuously for at least three years in a row. The post-entry premium illustrates the difference in

changes take place only during the two years prior to exporting and not earlier. Similar pattern has been reported by Wilhelmsson and Kozlov (2007) for Russia. Thus, our measure may be described as conservative.

the productivity growth between exporters and non-exporters over the three years after exporters enter the foreign market.

Results are reported in Table 6. Insignificant coefficients in every specification suggest that exporters perform no differently from non-exporters during the years immediately following the entry into foreign markets. This finding implies that there are no learning by exporting effects, in line with the general conclusion of the empirical literature. Compared to other BRIC economies, Indian exporters perform better than the Chinese – learning effects for China has been occasionally found negative (Kraay, 2002) – and worse than the Russian who have been shown to grow 3 percent faster than non-exporters during the two years following the entry.

5. Conclusions

The intuitive appeal and the evident success of export-led growth in East Asian countries and, recently, in China has combined with the growing concern about the cost-effectiveness of export promotion schemes to generate increasing interest in the beneficial effects of engagement in exporting on the firm-level productivity. The basic question is whether the conspicuously stellar performance of exporters relative to non-exporters can be at least partially attributed to the horizon-widening interaction with foreign consumers and learning of cost-efficient and quality enhancing production methods, or whether all of the differential is due to the self-selection of best firms into exporting.

In this paper we have used the approach proposed by Wagner (2007) to investigate the contribution of self-selection and learning-by-exporting to the productivity differential between exporters and non-exporters in India and thereby to contribute to Wagner's ongoing initiative to provide comprehensive cross-country evidence on the learning-by-exporting effects. We have found that exporters are 30-60 percent more productive than non-exporters and that this significant productivity differential is attributed entirely to the selection of more productive and faster growing firms into exporting. There are no additional productivity gains from exporting

per se. Moreover, exporters who fail to survive in foreign markets lose this productivity advantage and end up being worse off than the firms who never export.

Our findings on self-selection of more productive firms into exporting are consistent with virtually all other empirical studies and with the predictions of the theoretical models that posit that the high costs associated with exporting ensure that only best domestic firms can afford to enter foreign markets. They are not consistent with the hypothesis that there are learning-by-exporting effects.

After China has replicated the phenomenal export-led growth of East Asian Tigers, it demonstrated the virtues of export-oriented policy even in the context of an economy of massive size, vast but low-skilled labor force, lack of technological base, and non-democratic exterior. India appears to be even better placed to benefit from a similar growth strategy: it has the advantage of providing a combination of a vast low-skilled labor force and a highly skilled engineering and scientific community, strong private sector and a democratic environment. It is natural to want to supplement services-based growth with policies aimed at improving the moderately successful export growth that India experiences. Our conclusion that there are no learning-by-exporting effects for Indian manufacturing firms is not meant to undermine Bajpai and Sachs' (1998) appeal to make export-led growth the first prong of India's economic development. Rather, we propose that the long-term benefits in terms of gained productivity from such policy orientation may be lower than anticipated by the proponents of the learning-by-exporting.

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Sectors	Number of Non-exporters	Number of Exporters
Food and Beverage	81 (32%)	62 (25%)
Textile Products	46 (16%)	125 (44%)
Chemical Products	77 (15%)	245 (47%)
Non-metallic Mineral Products	23 (18%)	69 (55%)
Metal Products	43 (20%)	73 (34%)
Machineries	33 (10%)	154 (48%)
Transportation Equipments	12 (9%)	67 (52%)
Total	315 (17%)	795 (43%)

Table 1: Sectoral distribution of firms who exported continuously or served only domestic market during 1999-2008

Sectors	Levinsohn-Petrin productivity estimator		Labor Productivity	
	Non-Exporters	Exporters	Non-Exporters	Exporters
Food and Beverage	1.96	3.75	1.51	2.26
	(1.30)	(1.44)	(1.07)	(1.16)
Textile Products	1.14	2.85	1.45	1.76
	(1.29)	(0.99)	(1.15)	(0.81)
Chemical Products	1.33	3.55	1.31	2.14
	(1.47)	(1.33)	(1.16)	(0.69)
Non-metallic Mineral Products	1.59	3.77	1.41	2.35
	(2.13)	(1.41)	(1.52)	(1.16)
Metal Products	1.79	3.8	1.82	2.31
	(1.72)	(1.24)	(1.44)	(0.70)
Machineries	1.2	3.75	1.17	1.87
	(1.83)	(1.26)	(1.55)	(0.64)
Transportation Equipments	2.34	3.77	1.15	1.76
	(2.09)	(1.00)	(1.46)	(0.42)
Total	1.57	3.55	1.44	2.04
	(1.59)	(1.29)	(1.27)	(0.81)

Table 2: Productivity differences (means and standard deviations) between firms who were continually exporting or remained non-exporters over the period 1999-2008.

Note: Productivity measures are provided in logarithm form. A proxy for the labor productivity is computed as value added per dollar spent on labor.

	Levinsohn-Petrin productivity estimator	Labor Productivity
Export Status	0.467***	0.262***
	(27.094)	(11.957)
Middle-sized firm	1.621***	0.828***
	(40.205)	(23.694)
Large firm	3.625***	1.726***
	(20.416)	(11.304)
Firm's age	0.007***	-0.008***
	(6.289)	(-9.307)
Number of observations	18,013	18,013
Export Intensity	0.855***	0.489***
	(25.425)	(11.072)
Export Intensity Squared	-0.229***	-0.234***
	(-11.080)	(-7.953)
Middle-sized firm	1.572***	0.813***
	(39.571)	(23.617)
Large firm	3.491***	1.674***
	(20.006)	(11.199)
Firm's age	0.007***	-0.008***
	(7.277)	(-8.959)
Number of observations	17,838	17,838

Table 3: Exporter Premium

Note: z-statistics in parentheses; significance level ***, ** and * for significance at the 1%, 5% and 10% level respectively

	Levinsohn-Petrin productivity estimator	Labor Productivity
A dummy for those who are new exporters (nx)	0.309***	0.131***
	(8.281)	(3.606)
Continuing exporters' dummy (xx)	0.235***	0.088*
	(5.841)	(1.877)
A dummy for those who are not an exporter any more (xn)	-0.190***	-0.066
	(-4.470)	(-1.485)
Middle-sized firm	0.134***	-1.635***
	(2.755)	(-18.886)
Large firm	0.426**	-2.656***
	(2.029)	(-7.010)
Firm's age	-0.008***	-0.024***
	(-6.872)	(-10.672)
Number of observations	8,954	8,954

Table 4: Differences between non-exporters and different types of exporters

Note: z-statistics in parentheses; significance level ***, ** and * for significance at the 1%, 5% and 10% level respectively

	Levinsohn-Petrin productivity estimator	Labor Productivity
Export Status	0.137**	0.132*
	(2.391)	(1.699)
Middle-sized firm	0.070	-0.219***
	(1.620)	(-3.685)
Large firm	0.273	-0.449
	(0.775)	(-0.932)
Firm's age	-0.003***	-0.002
	(-2.650)	(-1.225)
Number of observations	3,436	3,436
Export Intensity	0.185	0.305
	(0.461)	(0.539)
Export Intensity Squared	0.368	0.280
	(0.637)	(0.344)
Middle-sized firm	0.035	-0.250***
	(0.749)	(-3.938)
Large firm	0.210	-0.484
	(0.566)	(-0.947)
Firm's age	-0.002**	-0.001
	(-2.201)	(-0.995)
Number of observations	3,319	3,319

Table 5: Ex-ante differences in productivity growth
Note: z-statistics in parentheses; significance level ***, ** and * for significance at the 1%, 5% and 10% level respectively.

	Levinsohn-Petrin productivity estimator	Labor Productivity
Export Status	-0.022	-0.006
	(-0.815)	(-0.186)
Middle-sized firm	-0.002***	0.001**
	(-3.248)	(2.022)
Large firm	0.054***	-0.008
	(2.669)	(-0.362)
Firm's age	0.168**	-0.015
	(2.327)	(-0.187)
Number of observations	7,296	7,296
Export Intensity	-0.001	0.066
	(-0.014)	(0.627)
Export Intensity Squared	-0.040	-0.079
	(-0.445)	(-0.755)
Middle-sized firm	-0.002***	0.001*
	(-3.498)	(1.845)
Large firm	0.056***	-0.009
	(2.758)	(-0.389)
Firm's age	0.176**	-0.014
	(2.424)	(-0.177)
Number of observations	7,294	7,294

Table 6: Ex-post differences in productivity growth

Note: z-statistics in parentheses; significance level ***, ** and * for significance at the 1%, 5% and 10% level respectively