Does Export and Productivity Growth Linkage Exist?

Evidence from the Indian Manufacturing Industry

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This paper examines the relationship between export market participation and total factor productivity growth at the firm level, using a representative sample of Indian manufacturing firms for the period 1994-2006. We also investigate the productivity differences between exporting and non-exporting firms during different phases of transition in export market. We find some evidence in support of self-selection hypothesis. However, learning by exporting hypothesis, which is tested in two different ways, could not be validated by the Indian data. Further, we find some favourable evidence for Arrow's hypothesis (1962) that firms that continue to exporting, experience decline in productivity over the period. Our results concerning to the direction of effects are quite robust and it works from productivity to exporting, however, not vice versa. It implies, the better ones go abroad, while exporting itself does not help a firm to improve its productivity. These results raise some serious questions on the rationality of the outward-oriented Indian trade policy.

Keywords: Total Factor Productivity; Learning-by-exporting; Self-selection
JEL classification: F10, F14, D21, L60

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1. Introduction

Productivity differential and its continuous growth over time are viewed as important factors that determine the comparative or competitive advantage in international trade. On the theoretical front, there is a common opinion that international trade in general and export in particular enhances economic growth and improves the productivity of involved firms (see Beckerman, 1962; Kaldor, 1970; Balassa, 1988; Bhagwati, 1988). Economic policies under export-led growth strategy have been widely supported on the argument that exposure to international market through export helps to increase the productivity of exporters. Similarly, advocates of endogenous growth theory believe that export plays a crucial role by improving productivity through innovation (Grossman and Helpman, 1991; Rivera-Batiz and Romer, 1991) and technology transfer (Barro and Sala-i-Martin, 1995; Parente and Prescott, 1994). Broadly, productivity growth can occur as a result of many factors such as capital accumulation, the adoption of new technologies, research and development (R&D), changes in the organization of firms and through export participation.

In the recent past, researchers have devoted considerable attention to investigate the linkage and the degree of relationship between export and productivity at both macro and micro level. Export participation is viewed as one of the major factor that makes some firms more productive or efficient than other firms who do not export. The influential works of Bernard and Jensen (1999, 2004a, 2004b) and Bernard et al. (2003) have brought into focus the exceptional performance of exporting firms in terms of labour productivity and firms heterogeneity within sectors. And this initiated a new debate on the issue that whether exporting leads to productivity growth and are exporters more productive than non-exporters. Melitz (2003) made the debate more interesting and added a new dimension by showing that productive firms self-select into export market. And further Helpman, Melitz and Yeaple (2004) show that under the condition of within sectors equal trade and investment opportunity, the least productive firms operate only in domestic market and most productive serve international markets through export as well as foreign direct investment (FDI). Some careful studies, just to name a few, by Aw and Hwang (1995) for Taiwan; Bernard and Jensen (1995, 1999) for US; Clerides, Lach and Tybout (1998) on Colombia, found that firms that export are more productive than non-

exporters. More precisely, the center of this new transformed debate has been the *learning-by-exporting* and *self-selection* hypothesis. While many studies have reported evidences in favour of self-selection hypothesis some other studies have argued that firms become more productive when they participate in export market (see the survey by Wagner, 2007). On the other hand a growing body of literature has suggested that exporting confers little or no benefit in the form of faster productivity growth at the plant level (see for example, Clerides at al. 1998, Bernard and Jensen, 1999 & 2004). In most of the cases, the higher productivity of firms actually predates their entry into export market. Despite a huge wealth of literature on the export-productivity linkage the empirical evidences on whether exporting increases firms' productivity has surprisingly been mixed so far.

In the present study, using firm-level data from Indian manufacturing industry, we attempt to provide a new insight into the debate over export-productivity linkage from the Indian manufacturing. In the post-reform era Indian policy maker have shown interest in the export-led growth through various export promotions policies. And knowing this relationship is vital and relevant for understanding firm level responses to aggregate shocks and for pursuing suitable policy. Export-promotion is one of the key policy stands of India's trade policy. For example, India's foreign trade policy 2009-14 aims to expand its overall share in international trade and massive employment generation by accelerating export (Foreign Trade policy, 2009).[1] The heated debate initiated by Krugman (1994) and Young (1995), that an input driven economic growth story is a short-lived phenomenon and it cannot be sustained in the long-run unless productivity grows continuously, has put major emphasis on the productivity growth. Therefore a precise knowledge of the link between exporting and productivity growth is very important to suggest whether the export-promotion will be an optimal policy or the productivity-enhancing policy will be more suitable for the overall economic growth in the long-run.

Against this background, the present study is set to examine the relation between export and productivity in Indian manufacturing industry in the post-reform era. While doing this we contribute to the growing body of related literature by adding new evidences from manufacturing sector of a rapidly growing economy. To our knowledge, none of the

previous studies on the relation between export and productivity have focused specifically on the Indian economy, and hence, this study attempts to bridge this gap. Along with empirically verifying the direct linkage, we also attempt to examine the relation between export and productivity growth of firms during different phases of transition from non-exporter to exporter and vice-versa. Here our main focus will be to study the movement in productivity growth when a firm start exporting, continues to export forever and exits from export market. Second, we utilize the innovative and most recent Levinsohn-Petrin (2003) technique for the estimation of TFP which provides more consistent and unbiased estimates of TFP than earlier techniques. And finally, unlike previous studies on the subject, this study also utilizes export intensity (the ratio of exports to sales) which is a key indictor of the degree of firm participation in international trade.

The rest of the paper is organized as follows: section 2 presents background theory and review of related literature. Section 3 discusses data related issues and TFP estimation methodology and results. Section 4 presents empirical models, estimation technique and results. The final section 5 provides conclusions and policy suggestions on the basis of empirical findings.

2. Theory and Review of Literature

The wealth of literature on the relationship between export and firm heterogeneity especially in terms productivity differential has witnessed tremendous growth during the recent past. Many recent studies have examined the export-productivity nexus by discriminating between exporters and non-exporters using both firm and industry level data (see the survey of Greenaway and Kneller, 2005 and Wagner, 2007). There are two major hypotheses to explain the linkages between exporting and productivity at the firm-level. The first hypothesis is known as *Self-selection* hypothesis (see Melitz, 2003) which speaks about the self-selection of the more productive firms into the export markets. The much cited reason behind this hypothesis is the presence of sunk costs of entering and selling goods in foreign markets. The second hypothesis is known as *Learning-by-exporting* (Lucas, 1988; Clerides at al. 1998). This hypothesis claims that exporting to foreign market produces many positive learning effects by exposing the domestic firms to advanced technological innovations from international buyers and competitors and helps

them to improve their productivity (Bernard and Wagner 1997; Bernard and Jensen 1999).[2] In general, exporters are found to be more productive, more skill-intensive, more wage payers, bigger in size and more capital-intensive.

Most of the empirical studies have provided support to the theoretical view that there is positive association between exporting activities and productivity of firms. While these results provide some strength to the learning-by-exporting hypothesis, some other careful and extensive studies have argued that firm those involve themselves in exporting are typically more productive or efficient than the firms those who never export or enter into the international market (Clerides et al., 1998). Some important studies in this category include: Bernard (1998, and 1999) for United States; Bernard and Wagner (1997) and Wagner (2002) for Germany; Aw et al. (2000) for the case of Korea and Taiwan; Clerides at al. (1998) for Colombia, Mexio and Morocco; Girma et al. (2004) for United Kingdom.[3] Similarly Arnold and Hussinger (2005) for Germany and Kim et al., (2009) for Korea found that more productive firms self-select into export market and there is, however, no strong evidence to suggest that exporting have any significant on the productivity of firms. Using a non-parametric technique Delgado et al., (2002) in a case of Spanish manufacturing firms reported favourable evidence for self-selection hypothesis and concluded that for learning-by-exporting evidences are somewhat weak and limited to the early years of exporting. Focusing on the different phases of transition from exporter to non-exporter Bernard and Jensen (2004) argue that while exporters have noticeably higher productivity levels, but there is no evidence that export participation increases plant productivity growth rate.

On the other hand, empirical evidences in favor of *learning-by-exporting* are rather weak and less in number (see Wagner, 2007). Nevertheless, some important studies by Kraay (1999) for China, Baldwin and Gu, (2003) for Canada, Fernandes and Isgut, (2005) for Colombia found that past export performance has a significant impact on productivity which apparently provides support to learning-by exporting hypothesis. Similarly, Aw et al., (2000), Van Biesebroeck (2006) and Loecker (2007) and Yasar and Rejesus (2005) found that firms experience productivity improvement after entering export market. In an another study using quantile regression techniques on the plant level data of Turkish manufacturing firms, Yasar et al., (2006) found that exporting status (i.e., new exporter,

continuous exporter) of firms are strongly associated with productivity. Further, the productivity effect of export is much stronger in case of firms that export continuously than the firms in other export status category. Contrary to the theoretical justification Greenaway et al., (2005) for Swedish firms and Damjian and Kostevc (2006) for Slovenian manufacturing enterprises failed to find any evidence either for the self-selection or for the learning-by-exporting hypothesis. More importantly, the learning effects of exporting were found to be significant only in the early years of entry not in later years. In the light of above contrary evidences, it is very relevant to explore the issue to verify that which channel of export-productivity link is valid and operational in the case of Indian manufacturing.

3. Data and TFP Estimation

3.1. The Data

The dataset contains yearly information on Indian manufacturing firms from 1994 to 2006, obtained from Prowess database provided by Center for Monitoring Indian Economy (CMIE). Although, the database collects annual data on all listed firms of Indian industry, but our sample only includes firms in four randomly chosen industries: Cotton textile (93 firms), Electrical (83 firms), Pharmaceutical (87 firms) and Transport equipment (Automobile &Auto-ancillary) (94 firms). We select firms in the study on the basis of the availability of data and firms with missing data of more than one year are excluded from the study. The primary data series extracted from the company accounts are sales, wages & salaries expenses, gross value added, expenses incurred on raw materials, power, fuel and energy, and R&D activates. Since our focus in this study is on export of firms, we also take this data along with import data from the same database. Two capitals related data series namely gross fixed capital and investment are also taken from Prowess database. To obtain the number of workers information of firms, we use Annual Survey of Industry (ASI) as well. Prowess database does not provide number of workers information, but it does provide data on salaries and wages. We obtain average wages rate (total emoluments/total man days) data of the industry from ASI database and each firms' salaries and wages divided by the average wages rate, which gives number of workers information of firms. For capital calculation, we follow Goldar, Renganathan and Banga (2003) and gross fixed capital stock at constant prices is used as the measure

of capital input of firms. The variable is constructed by the perpetual inventory method in two stages. In the first stage, a benchmark estimate of GFC stock is obtained for each firm for the end of year 1994. Then, to this figure, annual deflated gross investment of fixed assets is added to derive the time-series on gross fixed capital stock.

Our data series are deflated with appropriate deflators. Output related data are deflated by industry specific Wholesale Price indices (WPI). This deflator is obtained from the Office of the Economic Adviser (OEA), the Ministry of Commerce & Industry of India (http://eaindustry.nic.in/). Raw materials data are deflated by the all commodities WPI, while energy data are deflated using the Energy Price Index as provided by the OEA. The capital data is deflated by capital deflator, which is obtained from Handbook of Statistics on Indian Economy (RBI) (http://www.rbi.org.in).

3.2. TFP Estimation Results

In this section we start our empirical investigation by estimating the total factor productivity (TFP) of firms included in our sample. As pointed out by Griliches and Mareisse (1995), profit-maximizing firms immediately adjust their inputs (in particular capital) each time they observe a productivity shock, which makes input levels correlated with the same shocks. Since productivity shocks are unobserved, they enter in the error term of the regression. Hence, inputs turn out to be correlated with the error term of the regression, and thus OLS estimates of production functions are biased. Olley and Pakes (1996) and Levinsohn and Petrin (2003) have developed two different semi-parametric estimation procedures to overcome this problem. In this study we apply Levinsohn and Petrin (2003) estimation technique, which has been proved to be a superior method, to estimate the TPF of all the four industries separately. The Levinsohn and Petrin methodology explicitly recognizes the endogeneity that occurs since firms observes its productivity and the econometricians do not. In this process intermediate inputs (raw material and energy) are used as proxy, to avoid the biasedness problem. The estimated production function is reported in Table1, which suggests that workers (LN) and capital (LK) are significant in all industries at conventional level. On the basis this estimation results, TFP of firms are predicated for our further analysis purpose.

Table 1: Cobb- Douglas Production Function Estimation using Levinsohn-Petrin Productivity Estimator (Dependent Variable: gross value added (LY))

Variables	Transport Equipment	Pharmaceutical	Electrical	Cotton
LK	0.3325826* (9.89)	0.26801* (2.50)	0.41813* (9.12)	0.67757* (11.06)
LN	0.610549* (2.24)	0.60809* (13.33)	0.46775* (3.89)	0.28172* (2.94)
Wald test (P-Value)	0.7279	0.1667	0.3087	0.5843

Notes: 1. Z test statistics are in parenthesis, 2.Wald test of constant returns to scale, 3.Proxy variables: Power and fuel expenses; and Raw material expenses.

4. Determining the Export Intensity and TFP of Firms

4.1. The Model

After estimating the TFP of firms, now we turn to estimate the determinants of TFP and export intensity (ratio of export to value of sales) of firms in all the four industries included in our sample. For this purpose we specify following two models for the empirical estimation:

$$tfp_{it} = \alpha + \beta \exp_{it-1} + \delta X_{it} + e_{it} \ldots\ldots\ldots\ldots 1$$

$$\exp_{it} = \alpha + \beta tfp_{it-1} + \delta X_{it} + e_{it} \ldots\ldots\ldots\ldots 2$$

where tfp and exp are TFP and export-intensity (export/sales) of firm *i* at period *t*. in the models. Further, we also include a set of additional control variables (X) which potentially may affect productivity and export of firm. Short discussions on other control variables included in the model are as follows:

R&D intensity (*rd*): It is well established in the related literature that research and development (R&D) intensity is an important determinant of productivity and export performance of firms. In this concern the pioneering study of Griliches (1979) has shown in the R&D Capital Stock Model that this factor has a direct effect on the performance of firms. Empirical evidences reported by Cuneo and Mairesse (1984), Lichtenberg and Siegal (1989) and Hall and Mairesse (1995) also provides strong support to Griliches's view. To capture the R&D activities of firms, the study considers the ratio of R&D expenditure to the firm's total sales. This variable is a measure of R&D intensity of firms and it is expected to have a positive impact on firms' productivity and export growth.

Import intensities (*imp*): Several previous studies have shown that importing firms are better performer or more productive than non-importing firms (e.g. see Ben-David, 1993, Sachs and Warner, 1995). Therefore, on this account we include this variable in our TFP and export-intensity models. The import intensity of firms is captured by the ratio of total import (imports of both raw material and finished goods) to value of sales of firms. Generally higher importing firms receive technological transfers as well as better inputs because of access and exposure to foreign sources, which can potentially help the importing firms to enhance their productivity and export performance.

Size of firm (*sf*): Geroski (1998), and Halkos and Tzeremes (2007) argued that size of firms exert an indirect effect on the performance of firms, as it conditions the impact of other factors on productivity. Bearing this in mind, we accommodate the size of firms in the model by using the value of sales of firms. Theoretically, because of economies of scale, a larger size and increasing output should have a positive influence on the productivity of firms. Therefore, we expect positive sign of this variable.

4.2. Estimation Results

While estimating the model 1 and 2, we face one major challenge: endogeneity. This could lead to a biased estimation of such impact. To tackle potential endogeneity and unobserved heterogeneity, we use the Generalized Method of Moments (GMM), following Arellano and Bover (1995) and Blundell and Bond (1998). The Blundell and Bond estimator, also called system GMM estimator, combines the regression expressed in first differences (lagged values of the variables in levels are used as instruments) with the original equation expressed in levels (this equation is instrumented with lagged differences of the variables) and allows to include some additional instrumental variables. We prefer this option to a fixed-effects estimator for two reasons. First, it allows us to takes into account the unobserved time-invariant bilateral specific effects. Second, it can deal with the potential endogeneity arising from the inclusion of the lagged dependent variable and other potentially endogenous variables.

The estimated results of model 1 are reported in table 2. Our estimation results suggest that export-intensity has significant effect only in the cotton manufacturing, that is also only at 10% critical level. Surprisingly, in the other three industries, it is not found to be significant. Therefore, at this stage our results broadly do not provide any empirical

support to the *learning by exporting* hypothesis that export participation fosters productivity growth.

Table 2: Impact of Export Intensity on TFP of firms

Variables	Transport Equipment	Pharmaceutical	Electrical	Cotton
TFP(-1)	0.9114596** (35.90)	0.3722203** (8.21)	0.5378569** (17.13)	0.6133281** (16.99)
Import intensity (imp) (-1)	0.0094598 (0.15)	0.0548419* (1.77)	0.103853** (3.55)	0.0676952 (1.05)
Size (sf)	0.0367893** (4.11)	0.0585081** (6.35)	0.223512** (24.38)	-0.043050** (-2.10)
R&D intensity (rd) (-1)	0.8882475** (2.44)	0.3759582** (2.46)	0.2164775 (0.41)	0.7131591 (0.59)
Export intensity (exp) (-1)	0.0071881 (0.17)	0.0094559 (0.37)	0.0421644 (1.23)	0.0601994* (1.89)
Const	-0.0310624** (-1.98)	0.1308453** (7.25)	0.0167564 (1.09)	0.2410088** (5.43)
Wald Test χ^2 (P-value)	2174.68 (0.0000)	191.44 (0.0000)	1321.71 (0.0000)	346.21 (0.0000)
Sargan test χ^2 (P-value)	85.42204 (0.2153)	71.58327 (0.6221)	71.19242 (0.6346)	79.05122 (0.3828)
No. of Observations (Panel)	1104(94)	970 (87)	934 (83)	1002(91)

Notes: 1. t-values in parentheses. 2. *, ** indicate statistical significance at the 10% and 5% respectively.

This is perhaps the result of the low exposure of Indian firms to the international export market. And the export participation has possibly not reached to the threshold level, where it could effectively affect the productivity performance of firms. Further, the results for other control variables are also found to be very mixed as R&D and import intensities are found to be significant only for two industries. However, the size of firms seems to be crucial as its coefficient is found to be significant for all our sample industries.

Next we examine the presence of reverse effect i.e. the impact of productivity of firms on export participation. To this end, we estimate the model 2 and results are reported in Table 3.

Table 3: Impact of TFP on Export Intensity

Variables	Transport Equipment	Pharmaceutical	Electrical	Cotton
Export intensity **(**exp) (-1)	0.791961** (25.52)	0.474492** (12.11)	0.545210** (16.79)	0.776081** (17.03)
Import intensity (imp) (-1)	0.281907** (5.16)	0.089803* (1.69)	0.0218456 (0.62)	0.053977 (0.64)
Size (sf)	0.01897* (1.78)	0.08711** (5.19)	-0.02598 (-1.67)	-0.002749 (-0.12)
R&D intensity (rd) (-1)	-0.42085 (-1.21)	-0.181692 (-0.69)	1.070623 (1.59)	0.7964557 (0.50)
TFP(-1)	0.059145* (1.74)	0.057266 (0.79)	0.0730778 (1.36)	0.19002** (3.42)
Const	-0.01259 (-0.52)	-0.09131** (-2.91)	0.016391 (0.91)	-0.01784(-0.35)
Wald Test χ^2 (P-value)	796.07 (0.0000)	243.86 (0.0000)	312.53 (0.0000)	307.27 (0.0000)
Sargan test χ^2 (P-value)	79.6572 (0.3647)	79.05122 (0.3828)	74.50812 (0.5270)	79.05122 (0.3828)
No. of Observations (Panel)	1107(94)	985 (87)	940 (83)	1011(91)

Notes: 1. t-values in parentheses. 2. *, ** indicate statistical significance at the 10% and 5% respectively.

Again we find that in cotton industry, exporting is related to productivity of firms. In transportation equipment industry too, it is found to be significant, however, only at 10% critical level. As both of these industries are export intensive, these result seems to be obvious. The past level of TFP has significant and positive impact on the export intensity and therefore, this finding provides some support for *self selection* hypothesis. In this stage too, we do not find a strong results for R&D and Import intensities and both are found significant only in two industries. Finally, the result concerning to the size of firm is very similar to the previous one and it suggests that economy of scale has positive effect on export performance in all the industries.

4.3. TFP after Start, Continue and Stop Exporting

Now in this stage, we proceed to explore further the role of exporting decision of firms' on their productivity performance. Following Bernard and Jensen (2004) and Yasar et al.

(2004) we attempt to investigate that what happen to productivity when firms transits through various export status from non-exporter to exporter. We divide a change in export status into a set of indicator variables for firms entering into export market, and firms leaving it, and investigate the possibility that the two decisions impact on firm performance. The four possible different situations within the sample are: *stay out* (firms which do not export in period *t-1* and period *t*), *start* (firms which did not export in period t-1 but do export in the period t), *stop* (firms which did export in the period t-1 but stop exporting in period t) and *both* (firms which do export in period t-1and t). Hence,

$start_{it} = 1 \; if \; (\exp_{i0} = 0) \; and \; (\exp_{it} = 1)$

$both_{it} = 1 \; if \; (\exp_{i0} = 1) \; and \; (\exp_{it} = 1)$

$stop_{it} = 1 \; if \; (\exp_{i0} = 1) \; and \; (\exp_{it} = 0)$

Our empirical models of productivity differences between exporters and non-exporters are as follows:

$tfp_{it} = \alpha + \beta_1 \, start_{it} + \beta_2 \, both_{it} + \beta_3 \, stop_{it} + e_{it}$ ……model 3

$tfp_{it} = \alpha + \beta_1 \, start_{it} + \beta_2 \, both_{it} + \beta_3 \, stop_{it} + \delta X_{it} + e_{it}$ ……..model 4

where X is control variables of firm characteristics. In model 3, only export dummies are included, while model 4 also includes other control variables (same those used in the previous section). Further, in this stage, for simplicity we merge all the four sample industries and make one panel of firms for the analysis.

The results of model 3, reported in Table 4, suggest that 'start' dummy is not statistically significant, which validate our earlier findings of learning by exporting hypothesis is not true for our sample firms. This result speaks clearly that entering in the export market does not improve firms' performance. The coefficient of the 'both' is found to be significant, however, negative. This implies that firms that enter into export market and continue to export experience decline in their productivity and hence our results do not lend any support for learning-by-exporting hypothesis. Nevertheless, this evidence apparently supports to Arrow's hypothesis (1962) that learning and productivity slowdown is obvious for the constant exporting firms since firms have learned the proverbial ropes of exporting. Finally, coefficient of 'stop' dummy is found to be significant and negative but the size of the coefficient 0.01 which is, however, not very

large. This implies that though entering in the export market does not affect firms' performance but exit decision does affect the productivity of firms negatively in the subsequent years. The next column of the table reports the results of model 4, which is very similar with results of model 3 for our prime variables and there is not much change in the coefficients even after controlling for size, R&D and import intensity.

Table 4: Firms Export Status and Productivity

variable	Model 3 Coefficient	Model 4 Coefficient
Start	-0.003451 (-0.515918)	0.010828 (0.0872)
Both	-0.032263** (-3.949059)	-0.042196** (-7.883802)
Stop	-0.018491** (-3.363295)	-0.037221** (-4.841844)
Imp		-0.016693 (-0.832457)
Lq		0.099072** (22.58733)
Rd		0.539008** (3.748445)

Notes: 1. t-values in parentheses. 2. *, ** indicate statistical significance at the 10% and 5% respectively.

5. Conclusion and Policy Suggestions

This paper examines the relationship between export and total factor productivity at the firm level, using a representative sample of Indian manufacturing firms for the period of 1994-2006. In the first part of the paper, TFP is estimated using a semiparametric estimation method following Levinsohn and Petrin (2003) which corrects the simultaneity problem. In the next stage, we investigate the export and productivity linkage by using the system GMM method. We find some evidence in support of s*elf-selection* hypothesis which speaks about the self-selection of the more productive firms into the export markets. However, this hypothesis is found true only in two out of four industries included in our sample. We also test the *learning by exporting* hypothesis, which claims that exporting to foreign market produces many positive learning effects by exposing the domestic firms to advanced technological innovations from international buyers and competitors and helps them to improve their productivity. This hypothesis is tested in two ways. First, we investigate the impact of export-intensity on productivity of

firms. Second, by using the start dummy, we analyze whether entering in export market has any positive effect on productivity. In both of the cases, our evidence clearly rejects to the *learning by exporting* hypothesis. In other words, there is no evidence to suggest that firm's learning or experience from exporting increases their productivity. Further, our results lend some support to Arrow hypothesis (1962) that learning and productivity slowdown afterwards since firms have learned the proverbial ropes of exporting. Our results suggest that firms those constantly export observe decline in productivity over the period. Although we don't find any support for the learning-by-exporting hypothesis but the importance of export is reflected in the analysis when firms' exist the export market, their productivity decline in the subsequent years.

Our results concerning the direction of effects are quite robust and it works from productivity to exporting, but not vice versa. In short, our overall results show that the better ones go abroad, while exporting itself does not help a firm to improve its productivity. This result provides empirical support to the selection hypothesis assumed in recent theoretical models of Bernard et al. (2002), Melitz (2003) and empirical model of Arnold and Hussinger (2005). Overall, finding of this study is in the same line of the standard literature of the area. The results of this study raise some serious concern on the rationality of huge subsidies and tax incentives given to exporting firms since there is no clear evidence of productivity improvement through exporting. The positive and significant impact of productivity on export suggests that trade policy should focus on productivity enhancing industrial policies that will, in turn, help firms to enter export market after gaining real competitive edge. Further, the chances of survival in the highly competitive international market are high for more productive firms than the less productive firms.

Notes

1. See Foreign Trade Policy 2009 (27th August 2009-31st March 2014), Government of India, Ministry of Commerce and Industry, accessible at (http://dgft.delhi.nic.in) for more details on India's export targets and trade policy of export promotion.
2. See Krugman (1979) and Jovanovic and Lich (1991) for a detailed discussion on the various channels of productivity gains from exporting. In short they argue that productivity gains from exporting as being caused by: (i) learning and adoption of best production practice and distribution methods, (ii) firms receive valuable feedbacks from their international customers, suppliers and competitors, (iii) and knowledge spillovers.

3. Given the huge wealth of literature we do not claim any completeness in our survey. However, among other, Tybout (2003), Greenaway and Kneller (2007), Bernard et al (2007), Mayer and Ottaviano (2007) and Wagner (2007) provide a comprehensive survey of the empirical literatute on the subject.

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