Understanding India's Export Dynamism of the 1990s

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I. INTRODUCTION

In 1991, faced with a balance of payments crisis, India embarked on a historic set of macroeconomic, industrial, and trade reforms to free its economy from four decades of inward-looking policies. Subsequently, there was a boom in exports with total exports of goods and services going up from about US$18 billion in 1991 to about $51 billion in 2002. This decade long expansion has been the most dramatic export growth in its post-colonial history.

Rigorous attempts at understanding the determinants of this large increase have been few and have normally looked at aggregate data. However, understanding developments at the level of the exporting firm is critical in explaining the increase as well as in informing policy advice. This paper seeks to understand the determinants of the export increase by focusing on the microeconomic foundations of exporting success.

This paper builds on different strands of the international trade literature. One strand has considered the impact of trade and FDI liberalization on firm productivity.[1] Recent work has shown that liberalization, both of trade and FDI, can potentially lead to large and positive productivity effects on firms. A second strand of the literature considers the factors that drive a firm to export. This literature has considered firm productivity and sunk costs as important determinants of a firm's exporting success. A third strand of the literature has analyzed the importance of FDI as an export catalyst through technology spillovers. These spillovers occur through the demonstration effects on local firms of multinational exports. This paper combines these different strands by providing evidence on the link between FDI liberalization and export success working through productivity increases spurred by competitive forces.

One of the key potential determinants of firm export behavior in developing countries is the presence of multinationals (MNCs).[2] In principle, there are two primary channels through which MNCs can affect trade performance. First, through information and technological spillovers, domestic firms can learn to export from multinationals. The potential for spillovers from multinationals derives from their better access to information about foreign markets, distribution channels, and international marketing skills. One much documented case is that of the development of garment exporters in Bangladesh. The entry of one Korean garment exporter in Bangladesh lead to the establishment of hundreds of exporting enterprises, all owned by local entrepreneurs. The implication is that for positive spillovers to take place, the multinational must be exporting. However, if the multinational were to produce only for the local market these demonstration effects would be absent.

A second channel through which MNCs can induce export behavior is through increased competition in the domestic market. The competitive pressure constitutes an incentive to

[1] The literature is discussed in greater detail in Section II below.

[2] As in much of the literature, FDI and multinationals are used interchangeably in this paper.

engage in more efficient and leaner production techniques, which in turn facilitates entry into foreign markets. The reforms of 1991 in Indian industry, which liberalized the entry of FDI, provide a natural experiment to test this hypothesis. There were large increases in FDI at the same time as exports were booming.[3] In this paper we use firm-level data to test whether MNCs have acted as export catalysts due to demonstration effects or through the *competitive pressure* channel.

This paper takes as its starting point that multinational production in India has been primarily aimed at the domestic market and has increased competition in local industry.[4] The MNC driven competitive pressure has acted as a spur for local firms to innovate, with the consequence of failure being exit. The paper follows in the direction of Aghion, et al. (2003) who show that in India, incumbent firms have responded to the entry threat posed by liberalization by innovating. We build on these findings to show that the increases in efficiency spawned by entry due to liberalization, and by multinational entry in particular, has been an important determinant of exporting success.

The first issue to be addressed is in determining whether incumbent firms are indeed driving the export growth in the post 1991 phase. In order to do this, we decompose export growth to identify the quantitative importance of four potential contributors—new, more export-oriented firms entering the industry; less export-oriented firms exiting, thereby raising overall export intensity; reallocation of output to the most export-intensive firms; and an increase in the average export orientedness of pre-existing firms. The decomposition exercise shows that it is indeed incumbent firms that are driving export intensity increases.

We then consider the factors that drive Indian firms to export. The literature identifies sunk costs as a primary determinant of export behavior.[5] If non-exporters must incur a sunk entry cost in order to enter foreign markets, then the current period export supply function depends on the number of producers that were exporting in previous periods. These sunk costs produce hysteresis in trade flows, such that firms that exported previously have a greater tendency to export. We test for sunk-cost hysteresis in Indian industry by estimating a dynamic discrete choice model that expresses each firm's current exporting status as a function of its previous exporting experience.

Individual firm characteristics can potentially play a significant role in determining whether a firm exports or not. There is much debate in the international trade literature on the relation between firm characteristics and export behavior, i.e., do successful firms export, or does exporting lead to firm success.[6] The direction of causality is by no means established. This paper provides fresh evidence on the effects of firm characteristics such as productivity, profitability, size, and capital intensity on exporting behavior.

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[3] Annual Foreign Direct Investment inflows into India went up from US$200 million in 1991 to US$3.5 billion by 2002. See UNCTAD, World Investment Report, 2003.

[4] See Poddar (2003).

[5] See Baldwin (1988), Baldwin & Krugman (1989), and Roberts & Tybout (1997).

[6] See Bernard & Jensen (1995, 1997).

An additional potential source of variation in export behavior among firms is their ownership structure. Multinationals are generally considered more open than local firms due to their presence in multiple markets, and would be expected to have a higher likelihood of exporting. Conversely, public sector firms with their focus on the domestic economy could have a lower probability of exporting than private firms. This paper tests for whether being a multinational or a public sector firm has any influence on exporting behavior.

Our main results can be summarized as follows. The increase in export intensity in Indian manufacturing has largely been driven by pre-existing firms becoming more export intensive. This finding is contrary to the notion that the opening up of industry through reforms led to large scale entry of more export-oriented firms who then drove the overall export performance. Using a dynamic framework and comparing and contrasting different estimation methodologies, we investigate the determinants of export behavior in Indian industry. We find that there are substantial sunk costs to exporting. Firm characteristics play an important role in determining export behavior. In particular, more productive firms tend to have a higher probability of exporting. Ownership matters, and multinationals tend to have a higher likelihood of exporting. Conversely, public sector firms are less likely to export. We do not find evidence of informational and technological spillovers from MNCs. Controlling for all other determinants of export behavior, a larger MNC market share in the same industry tends to increase the likelihood that a firm will export.

A highly illustrative case study which motivates the results of this paper is the case of the Indian auto sector.[7] Until 1993, the auto sector in India had been a highly protected industry restricting the entry of foreign companies with steep tariffs against imports. Domestic companies, HM and PAL, had monopolistic domains and operated at a fraction of the productivity of global best practice companies. In 1983, the government permitted Suzuki, the lone FDI company, to enter the market in a joint venture with Maruti, a state-owned enterprise. Ten years later, as part of the wider economic liberalization, the sector was fully opened up to FDI.

Once, the sector was opened up to FDI, almost all the major global companies entered producing cars in all segments and roughly $1.6 billion has been invested. The MNC entry was driven by the lure of the Indian market and was, therefore, market seeking. Twelve new players entered since 1993, and all indicators suggested that competition intensified. Real prices fell on average by 2–6 percent between 1998 and 2001. Sector level profitability declined by about 25 percent in 2001–02, largely due to real price declines. The lowest productivity manufacturers such as PAL exited the industry, while the state-owned HM saw its market share dwindle from 100 percent in pre-1983 to about 3 percent by 2003. Productivity[8] of the joint venture, Maruti, which still has over half of the total market share, grew at a compound annual growth rate of 10 percent since 1993.

[7] The case study discussed below on the auto sector in India was done by McKinsey Global Institute (2003).

[8] Measured as cars produced per employee.

FDI appears to have had a strong positive impact on India's auto industry. The productivity of the industry increased five-fold and India now produces 13 times more cars than it did in 1983, and exports have grown from a base of zero to roughly 10 percent of production today. India has also developed a world-class components industry, witnessing annual exports growth in excess of 40 percent. FDI created a competitive industry dynamic that forced incumbents to reform or exit. The highly productive incumbents could then enjoy exporting success.

The rest of the paper is structured as follows. The next section provides a brief literature survey. Section III, presents a simple model of the export decision. Section IV details the empirical methodology to be used. Section V presents descriptive statistics and describes the decomposition of export intensity growth. Section VI presents the basic results, and section VIII discusses these results. Finally, section VIII concludes.

II. Related Literature

There have been a number of recent papers which explore the microeconomic aspects of exporting success. Bernard and Jensen, in a series of papers, examine export success at the plant level using data on U.S. manufacturing plants. Bernard and Jensen (1998) show that U.S. exporters have faster sales and employment growth than non-exporters in the same industry but do not have faster productivity growth. They also find that there are large ex-ante advantages in terms of both growth rates and levels for future exporters. Clerides, Lach, and Tybout (1996) test for the importance of "learning-by-exporting" on plant productivity in Columbia, Mexico, and Morocco. They find that exporting does not lower average variable cost relative to non-exporters. They also find some evidence that low-cost firms are more likely to enter. Bernard and Wagner (1997) study the relationship between firm success and exporting in German plants and also find that larger firms, and firms with higher productivity, are more likely to become exporters ex-ante but they do not outperform non-exporters after entry.

The literature on exporting and firm performance has also considered the role of entry costs in the export decision. Roberts and Tybout (1997) develop a dynamic model of the export decision by a profit-maximizing firm and test for the presence and magnitude of sunk costs using a sample of Colombian plants. They find that sunk costs are large and are a significant source of export persistence. In their sample, prior exporting experience can increase the probability of exporting by as much as 60 percentage points. They find that unobserved heterogeneity across plants plays a significant role in the probability that a firm exports. They also find that larger, older plants that are part of a multi-plant firm are more likely to export. Bernard and Jensen (2001) employ a linear probability framework with plant fixed effects and also find substantial sunk costs in export entry. Export experience in the previous year increases the probability of exporting by 40 percent, although the entry advantage depreciates very quickly.

In a static framework, Aitken, Hanson, and Harrison (1997) examine the role of geographic and sectoral spillovers on exporting by plants in Mexico. They find that the presence of multinational exporters in the same industry and state increases the probability of exporting by Mexican firms. They, however, do not find evidence of spillovers from general exporting

activity. Rhee and Belot (1981) provide case study evidence from several developing countries to show how MNCs act as export catalysts.

Recent work on the export behavior of firms has emphasized the heterogeneity of firm characteristics. Comparing plants at a point in time, Bernard and Jensen (1995, 1997) document large, significant differences between exporters and non-exporters among US manufacturing plants. Exporters have more workers, proportionally more white collar workers, higher wages, higher productivity, greater capital intensity, higher technology intensity, and are more likely to be part of a multi-plant firm. However, these substantial cross-section differences between exporters and non-exporters cannot tell us about the direction of causality, i.e., do good firms become exporters or do exporters become good firms. Roberts and Tybout (1997) include some plant characteristics in their work and find that plant size, plant age, and the structure of ownership are positively related to the propensity to export. Aitken, Hanson, and Harrison (1997) report evidence that plant size, wages, and especially foreign ownership are positively related to the decision to export.

A number of recent studies have looked at the impact of inward FDI on firm productivity. Keller and Yeaple (2003) show that FDI leads to substantial productivity gains for domestic firms in the US. Girma and Wakelin (2001) as well as Haskel, Pereira, and Slaughter (2001) have studied inward FDI for the UK. Both studies find evidence for positive FDI spillovers. There is also evidence of trade liberalization leading to increases in firm efficiency. Harrison (1994), Tybout and Westbrook (1995), Pavcnik (2002) and Fernandes (2003) observe productivity increases following liberalization in, respectively, Côte d'Ivoire, Mexico, Chile, and Columbia.

Aghion, et al. (2003) have studied the effects of the 1991 Indian liberalization on industries and regions. They find that the reforms have had strong inequalizing effects, by fostering productivity and output growth in three-digit industries that were initially closer to the Indian productivity frontier and which were located in states with more pro-employer labor institutions.

III. THE MODEL

The theoretical literature on the decision to export is developed in papers by Dixit (1989), Baldwin (1988), Baldwin and Krugman (1989), and Krugman (1989). Here, we follow Roberts and Tybout (1997) and especially Bernard and Jensen (2001) in modeling the decision to export by the rational, profit-maximizing firm as analogous to the decision to market a new product.

The firm considers expected profits today and in the future from the decision to enter the foreign market net of any fixed costs. If the firm enters the foreign market, we assume that it can always produce at the profit-maximizing level of exports, q_{it}^*. Thus, in the one period case with no entry costs, the firm receives profits

$$\pi_{it}(\Omega_t, \Phi_{it}) = p_t q_{it}^* - c_{it}(\Omega_t, \Phi_{it} \mid q_{it}^*). \quad (1)$$

where p_t is the price of goods sold abroad and $c_{it}(.)$ is the variable cost of producing quantity q_{it}^*. Exogenous factors affecting profitability, such as exchange rates, are denoted as Ω_t, while firm-specific factors are denoted by Φ_{it}. Firm characteristics that might increase the probability of exporting include size, profitability, capital intensity, ownership structure.

The export status of firm i in period t is given by Y_{it}, where

$$\begin{array}{ll} Y_{it} = 1 & \\ & \text{if} \quad \pi_{it} \geq 0 \\ Y_{it} = 0 & \end{array} \qquad \pi_{it} < 0$$

This single period model can be extended to multiple periods. When there are no entry costs, the expected profits of the firm in multiple periods is given by

$$\pi_{it}(\Omega_t, \Phi_{it}) = E_t\left(\sum_{s=t}^{\infty} \delta^{s-t}\left[p_s q_{is}^* - c_{is}(\Omega_s, \Phi_{is} \mid q_{is}^*)\right]\right). \tag{2}$$

As long as the cost function does not depend on the level of output in a previous period, the solution of this multi-period problem is identical to the single period case. If there is any effect of production today on costs tomorrow, then export status of the firm today will play a role in the decision to export tomorrow. Hence,

$$c_{it} = c_{it}(\Omega_t, \Phi_{it}, q_{it}^* \mid q_{it-1}^*) \text{ and } \frac{\partial c_{it}(.)}{\partial q_{it-1}^*} \neq 0 .$$

This might occur if there is learning by doing in production of the export good. The value function for the problem is given by

$$V_{it}(.) = \max_{\{q_{it}^*\}}\left(\pi_{it} * Y_{it} + \delta E_t\left[V_{it+1}(.) \mid q_{it}^*\right]\right),$$

and a firm will choose to export in period t, i.e. $Y_{it} = 1$ if

$$\pi_{it} + \delta E_t\left[V_{it+1}(.) \mid q_{it}^*\right] > \delta E_t\left[V_{it+1}(.) \mid q_{it}^* = 0\right].$$

Entering foreign markets, however, has entry costs. These costs could be acquiring information about the foreign market, obtaining credit, establishing a distribution system, meeting foreign government regulations. Here we assume that these entry costs recur in full if the firm exits the export market for any amount of time.

Profits for the firm in the single-period maximization problem with entry costs are given by

$$\tilde{\pi}_{it}(\Omega_t, \Phi_{it}, Y_{it-1}) = p_t q_{it}^* - c_{it}(\Omega_t, \Phi_{it}, q_{it}^* \mid q_{it-1}^*) - N(1 - Y_{it-1}), \tag{3}$$

where N is the entry cost for the firm. The firm does not have to pay the entry cost if it exported in the previous period, (i.e., if $Y_{it-1} = 1$). Firms will export if expected profits net of entry costs are positive: $Y_{it-1}=1$ *if* $\tilde{\pi}_{it} > 0$.

This formulation of entry costs as sunk costs yields an option value to waiting and thus increases the region where the firm chooses not to act. The firm chooses a sequence of output levels, $\{q_{is}\}_{s=t}^{\infty}$, that maximizes current and discounted future profits,

$$\pi_{it} = E_t\left(\sum_{s=t}^{\infty}\delta^{s-t}\left[\tilde{\pi}_{is} * Y_{is}\right]\right), \tag{4}$$

where period-by-period profits are given by equation (3) above, and are constrained to be nonnegative, since the firm always has the option not to export. This is equivalent to the firm choosing whether to export in each period since we allow the firm to always pick the within period profit-maximizing quantity. The value function is the same as before with the addition of potential entry costs in the within period profits,

$$V_{it}(.) = \max_{\{q_{it}^*\}}\left(\pi_{it} * [q_{it}^* > 0] + \delta E_t\left[V_{it+1}(.) \mid q_{it}^*\right]\right).$$

A firm will choose to export in period t, i.e. $q_{it}^* > 0$, if

$$p_t q_{it}^* + \delta E_t\left[V_{it+1}(.) \mid q_{it}^* > 0\right] - E_t\left[V_{it+1}(.) \mid q_{it}^* = 0\right] > c_{it} + N_{it}(1 - Y_{it-1}). \tag{5}$$

The difference in the multi-period models with and without entry costs comes through the added intertemporal link between exporting today and exporting tomorrow embodied in the cost of entry. However, without a structural model of the production function, and cost function, we will be unable to identify intertemporal spillovers due to learning and those due to sunk costs.

Now, we may estimate the export decision in two ways. First, we could develop a structural representation of the participation condition by making specific assumptions about the form of the cost function. Alternatively, we could forgo identification of structural parameters and approximate the export decision as a reduced-form expression in exogenous firm and market characteristics that are observable in period t. The advantage of the first approach is that, in principle, it allows identification of the parameters of the cost function and provides a complete description of the dynamic process. Its main disadvantage is that very restrictive parameterizations are required to make structural estimation feasible.[9] Because of this difficulty, we employ a nonstructural model in testing hypotheses about the role of spillovers, firm characteristics, ownership, sunk costs, and period of entry in the decision to export by the firm. We then extend this to capture the amount the firm eventually exports.

[9] See Roberts & Tybout (1997) for more on the above

IV. EMPIRICAL METHODOLOGY

From the multi-period model with entry costs, we find that a firm exports if current and expected revenues are greater than costs,[10]

$$Y_{it} = \begin{cases} 1 \;\; if \;\; \hat{\pi}_{it} > c_{it} + N_{it}(1 - Y_{it-1}) \\ 0 \;\; otherwise \end{cases}$$

where

$$\hat{\pi}_{it} \equiv p_t q_{it}^* + \delta\left(E_t\left[V_{it+1}(.) \mid q_{it}^* > 0\right] - E_t\left[V_{it+1}(.) \mid q_{it}^* = 0\right]\right)$$

We aim to identify and quantify factors that increase the probability of exporting. To estimate the factors that affect the probability of exporting, we use a binary choice nonstructural approach of the form

$$Y_{it} = \begin{cases} 1 \;\; if \;\; \beta\Phi_{it-1} + \gamma\Omega_{t-1} - N(1 - Y_{it-1}) + \varepsilon_{it} > 0 \\ 0 \;\; otherwise \end{cases}. \qquad (6)$$

A. Sunk Costs

The most difficult issue in the estimation of equation (6) above is the identification of the parameter on the lagged endogenous variable. There are unobserved firm characteristics, such as managerial ability or corporate strategy which affect the decision to export by the firm. Since these characteristics are highly serially correlated and unobserved, they will induce persistence in export behavior. This will cause us to overestimate entry costs. This means that the error term, ε_{it}, can be thought of as comprising two components, a permanent firm-specific component, μ_i, and a transitory component, η_{it}, which captures other, exogenous shocks.

For the dynamic binary choice model with unobserved heterogeneity, there are several potential estimation strategies. Roberts and Tybout (1997) use a random effects probit specification in their analysis of sunk costs and entry. To use a random effects model, the required assumption is that firm effects be uncorrelated with the explanatory variables. This assumption is likely to be violated in our export decision model as firm characteristics such as size, profitability, productivity, and ownership are correlated with unobserved firm effects such as managerial expertise.

An alternative strategy is to use the fixed effects model. The "within" transformation wipes out time invariant firm effects and does not cause the problems discussed above. However,

[10] Here we assume that fixed costs of entering the export market, such as fulfilling export requirements, foreign government regulations, installing distribution channels, etc., are the same for all firms.

the lagged dependent variable is still correlated with the error term, and the coefficient will be biased of magnitude $O(1/T)$. Hence, to get unbiased and consistent results, either the number of time periods has to be very large, or one can estimate the extent of the bias following Nickell (1981), and then construct unbiased and consistent estimates on the lagged dependent variable.[11] This strategy is used in identifying the parameters of the model as discussed below.

A transformation that wipes out the individual effects, yet does not create the above problem, is the first difference (FD) transformation.[12] This instrumental variable (IV) estimation method leads to consistent but not necessarily efficient estimates of the parameters in the model because it does not make use of all the available moment conditions.[13] A more efficient procedure to estimate dynamic panel data models is the Arellano and Bond procedure which is a GMM estimator. The procedure obtains additional instruments by utilizing the orthogonality conditions that exist between lagged values of the dependent variable and the disturbances. Thus, more instruments can be used as the panel progresses yielding efficiency gains relative to other estimation methods.[14] Here we use the Arellano and Bond procedure to compare and contrast the coefficient on the lagged dependent variable with those obtained from the fixed effects estimates.[15]

The equation to be estimated is

$$Y_{it} = \beta \Phi_{it-1} + \gamma \Omega_{it-1} + \theta Y_{it-1} + \varepsilon_{it} \qquad (7)$$

First equation (7) is estimated in levels without firm effects. This enables us to observe the effects of time-invariant firm attributes such as size, profitability, productivity, ownership, on export probabilities. Now, firms that change from exporting to non-exporting, and vice versa, may undergo contemporaneous changes in size, performance, and capital intensity. Hence we lag all firm characteristics and exogenous variables one year to alleviate simultaneity problems.

We then consider the role of firm fixed effects

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[11] See Nickell (1981), and Ridder and Wansbeek (1990) for a derivation of this asymptotic bias.

[12] Anderson and Hsiao (1981) suggest first differencing the model to get rid of the individual firm effects and then using $\Delta y_{i,t-2} = (y_{i,t-2} - y_{i,t-3})$ as an instrument for $\Delta y_{i,t-1} = (y_{i,t-1} - y_{i,t-2})$. These instruments will not be correlated with $\Delta \eta_{it} = \eta_{it} - \eta_{it-1}$, as long as the η_{it} themselves are not serially correlated.

[13] See Baltagi (1995) for a discussion of the above. Also see Ahn and Schmidt (1993). The IV estimation method also does not take into account the differenced structure on the residual disturbances $\Delta\mu_{it}$. Arellano (1989) finds that the differences rather than the levels have very large variances over a range of parameter values.

[14] See Arellano and Bond (1991) for details.

[15] We also applied the FD-IV estimation strategy which was used by Bernard and Jensen (2001). The results were very similar to the Arellano and Bond method, and hence are not reported here.

$$Y_{it} = \beta\Phi_{it-1} + \gamma\Omega_{it-1} + \theta Y_{it-1} + \mu_i + \eta_{it}. \quad (8)$$

Equation (8) is estimated in levels with fixed effects. As discussed earlier, the coefficient on the lagged dependent variable are biased downwards and inconsistent. To correct this, the extent of the bias is computed, which for reasonably large values of *T*, can be approximated by

$$p\lim_{N\to\infty}\left(\hat{\theta} - \theta\right) \approx \frac{-(1+\theta)}{T-1}$$

Adding back the bias gives us an unbiased estimate of the effect of sunk costs. This is our preferred specification.

Finally, equation (8) is estimated in differences with instrumental variables using the Arellano-Bond method to provide a comparison with the fixed effects estimates, and given by

$$\Delta Y_{it} = \beta\Delta\Phi_{it-1} + \gamma\Delta\Omega_{it-1} + \theta\Delta Y_{it-1} + \Delta\eta_{it}. \quad (9)$$

This formulation also allows us to control for persistent shocks. If shocks are highly persistent, they can overcome the effects of large entry costs. Unmodeled persistence in the error structure would be picked up by the lagged endogenous variable and thus incorrectly interpreted as high entry costs. The first-differences specification should help alleviate this problem as well, although there is a loss in efficiency if the shocks are purely transitory.

B. FDI

This paper seeks to determine whether FDI has had any impact on the export behavior of local firms. As discussed in Section I above, the presence of multinationals can affect local firms through two channels, through spillovers, both information and technological, and through competitive pressure. We construct variables so as to distinguish between these two channels.

We test whether the presence of multinationals in the same industry and state generates spillovers, i.e., whether MNCs act as export catalysts; and whether all export activity generates spillovers. If there are localized externalities associated with exporting, then we expect the firms that export in an industry to be geographically concentrated. However, many factors, including regional variation in factor abundance cause firms to agglomerate. To isolate the effect of export spillovers on the likelihood of a firm exporting, we need to control for the overall geographic concentration of industry activity. In this way, we hold constant other factors that contribute to industry agglomeration. In other words, localized export spillovers imply there will be an excess geographic concentration of economic activity beyond that which exists for the industry as a whole.

Geographic concentration is measured at the level of the state and industry. To control for variation in size of industries at the national level, the geographic concentration of industry is measured as the state-industry share of national industry activity. To control for situations

where the state-industry is large purely because the state is large, the measure is normalized by the state share of national manufacturing activity. The two measures of geographic activity considered are the concentration of MNC export activity, and the concentration of overall export activity. MNC export activity is measured as the share of state-industry MNC exports in national industry exports, relative to the state share of national manufacturing exports. Local export concentration is defined as the state-industry share of national industry exports, relative to the state share of national manufacturing exports. This measure controls for situations where a state industry has high exports purely because the state has high exports. This allows for the possibility that domestic exporters, rather than MNCs, are the source of spillovers.

If export spillovers exist, we would expect the probability that a firm has positive exports to be increasing in the level of MNC export concentration. Similarly, if local firms generate spillovers for local exporters, we expect the probability a firm exports to be increasing in the local concentration of export activity.

There are several ways to test for competitive pressure spawned by multinational entry. Borrowing from the industrial organization literature, market share is considered a reliable measure of competitive forces in the industry. Several studies have used this measure previously.[16] The larger the MNC market share, the greater their presence in the industry, and the more likelihood that they increase the competitive pressure on local firms to adopt more efficient production techniques. Hence, if exports are indeed influenced by competitive pressure, we would expect that a larger MNC market share in the industry would lead to higher exports. If competitive pressure applied by MNCs does not affect exports, then we would expect the MNC market share to be insignificant.

C. Firm Characteristics

Firm characteristics are critically important in explaining export behavior, in addition to the macroeconomic environment, and industry-level factors. As discussed in Section II above, there is some debate in the literature as to whether successful firms tend to export, or exporting improves firm performance. The firm-level dataset used in this paper allows the testing of these hypotheses. In particular, this paper focuses on whether being a successful firm increases the likelihood of exporting.

The measures of firm success used are firm size; firm profitability; and importantly, firm productivity. Larger firms are naturally those which have been successful in the past and hence grown in size. Larger firms may also have lower average, or marginal costs, providing a separate mechanism for size to increase the likelihood of exporting. In addition, profitability is used as a direct measure of past success. Two measures of profitability, profits over assets (returns), and profits over sales (margins) are used. A third measure of firm

[16] See Kumar (1990).

performance, productivity, is used.[17] If firm success increases the probability of exporting, then one would expect these variables to enter with a positive sign. Since the direction of causality between firm characteristics and export behavior is uncertain, all firm characteristics are lagged one period to alleviate simultaneity problems.

D. Ownership

MNCs are generally considered as likely to be more open than local firms due to their presence in multiple countries and hence easier access to, and knowledge about, foreign markets. Hence, a dummy for multinationality is included in the model to ascertain whether multinationals tend to export more than their local counterparts.

Indian industry has traditionally been dominated by public sector units (PSUs). This paper tests whether being a public sector firm has an influence on exporting behavior. Among Indian private firms, one can distinguish between the top 50 firms by assets, large business houses (such as the Birlas or Tatas), and other private businesses. Foreign firms can be divided into foreign business houses, those which are owned by nonresident Indians (NRIs), and other private foreign firms. This allows us to investigate whether these distinctions in ownership matter for export behavior.

E. Location

Location can have a large role to play in the export decision of a firm. The spillover variables discussed above catch some of the locational variation. However, is there additional variation coming from locating in a particular state? In particular, the literature on economic geography seems to suggest that locating close to the coast may have a beneficial impact on the likelihood of exporting.[18] A dummy is included if a firm is located in a coastal state to investigate whether this increases the probability of exporting.

[17] The measure of productivity we use is gross value added over total wage bill. Admittedly, this measure has problems as a pure measure of labor productivity. However, given the paucity of employee and labor data in India, this measure would give a good approximation to productivity.

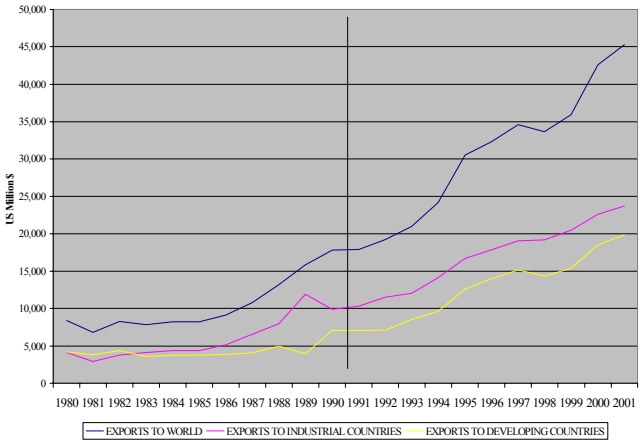
[18] See Radelet and Sachs (1998), and Gallup, et al (1998).

V. DATA AND DESCRIPTIVES

Two sources of data are used – the UN Comtrade database for the aggregate export analysis, and Prowess for the firm-level analysis. The former has overall export data as well as exports by industry. The latter has balance sheet information on over 6000, mostly listed, firms on various Indian stock exchanges, but also includes other public, private, cooperative and joint sector companies,[19] accounting for more than 70 percent of the economic activity in the organized industrial sector.

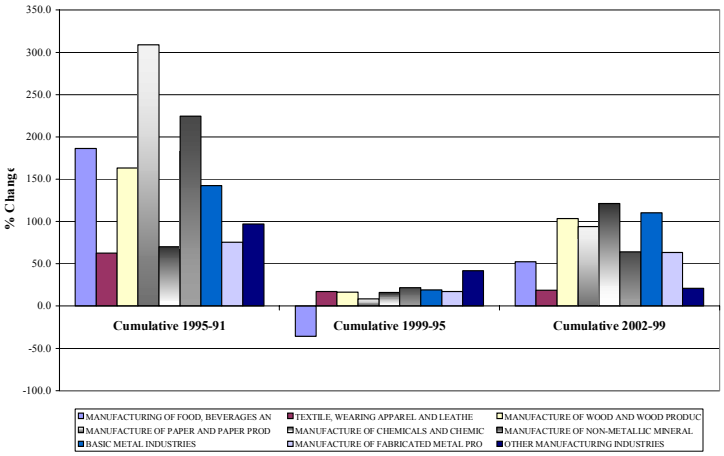
Figure 1 shows that India has witnessed a large increase in exports in value terms. Even though exports started rising in 1986, the real acceleration has come since 1991.[20] However, the figure shows that there was some slowdown in export growth between 1995 and 1999, before picking up again. Hence, two stylized facts emerge from Figure 1. First, there has been a boom in exports in the 1990s. Second, there are three distinct periods of export growth in the 1990s. A rapid acceleration from a low base starting in 1991, some slowdown after 1995, and then subsequently a pick up again. In terms of destination, the figure shows that exports have shown a fairly consistent increase to both developing and industrial countries.

Figure 1. India's Annual Exports 1980-2001



Disaggregating to the industry level, we can also ascertain whether the stylized fact of three distinct export growth periods during the 1990s was driven by certain sectors or was a more general phenomenon. Figure 2 shows the presence of the three phases quite distinctly in terms of sector growth rates using the UN Comtrade data at the two-digit level. For most sectors, export growth declined or remained stagnant during 1996–99 after a high growth phase in the early 1990s. The figure suggests that export growth resumed in 1999.

Figure 2. Sectoral Growth Rates in the 1990s



[19] The data is compiled by the Centre for Monitoring Indian Economy (CMIE).

[20] India's share of world exports increased more modestly from 0.5 to 0.8 percent in the period 1991-2002.

Figure 3 compares the largest exporting industries at the start of the sample period (average of 1989–91) with those at the end of the period (1999–2001), and finds that apart from computer software, the largest 10 exporting industries over the period has remained largely similar, with some movements within this group. The state-dominated sectors of trade& services, air transport services, and petroleum products have seen a decline in their share of total exports, while the more competitive ones of chemicals, textiles, and computer software have increased their share. Note that the former industries have all seen absolute export growth, even if their share in total exports has been declining. In terms of concentration of exports, there has been not much change, with the largest 10 industries having an almost identical share of exports at the end of the period as the beginning. Of course, the biggest and much documented change is in the software industry, which has developed from no exports to having 11.3 percent of export share.

Figure 3. Largest Exporting Industries

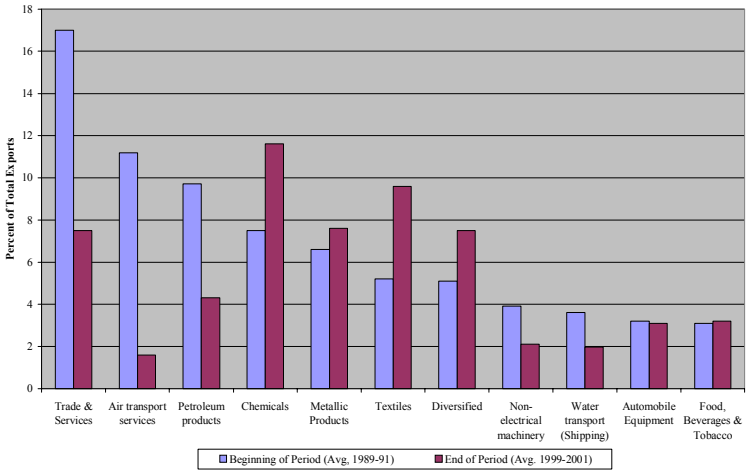


Table 1 shows sample characteristics. The total number of firms in the sample have generally increased during the period due to large scale entry. The percentage of firms exporting started out by being more than a half of all firms, but has gradually declined over the sample period. This percentage is perhaps greater than the percentage of exporting firms in the entire economy, because the sample comprises mostly publicly listed firms which tend to be larger, and more open than unlisted firms. Although the absolute number of firms exporting has increased quite substantially, the percentage of exporting firms has gone down due to a large increase of domestic market-oriented firms.

Table 1. Sample Characteristics

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Total # of firms	2065	2412	3008	3998	5141	5603	5715	5654	5983	6384	5558
# of firms exporting	1090	1276	1494	1903	2302	2518	2514	2532	2581	2729	2516
% of firms exporting	52.8	52.9	49.7	47.6	44.8	44.9	44.0	44.8	43.1	42.7	45.3
# of MNCs exporting	144	157	175	187	209	216	222	246	258	272	258
# of MNCs	209	227	268	294	320	341	370	395	415	437	403
% of MNCs exporting	68.9	69.2	65.3	63.6	65.3	63.3	60.0	62.3	62.2	62.2	64.0
# of Govt. Firms	227	231	246	260	283	305	311	314	328	345	293
# of Govt. Firms exporting	101	101	104	107	123	124	117	114	112	116	101
% of Govt. Firms exporting	44.5	43.7	42.3	41.2	43.5	40.7	37.6	36.3	34.1	33.6	34.5
# of Entering Firms	...	350	875	1668	2535	2910	3087	3175	3829	4465	3540
# of Entering Firms exporting	...	95	259	547	847	1025	1091	1177	1336	1556	1351
% of Entering firms exporting	...	27.1	29.6	32.8	33.4	35.2	35.3	37.1	34.9	34.8	38.2

Source: Prowess.

Among multinationals, the percentage which export is greater at around 65 percent. Conversely, the percentage of public sector firms and newly entering firms that export is lower than the full sample. This seems to suggest that being a multination increases the probability of being an exporter while being a government-owned firm or a new firm decreases the probability of exporting.

A. Decomposing Export Growth

To understand what has happened to exports in Indian industry, we look at the evolution of export intensity in the period 1989-2002. Aggregating across firms, overall export intensity X is defined as:

$$X = \sum_j \frac{Z(j)}{Z} X(j) \tag{10}$$

where *Z(j)* is sales of firm *j*, and *Z* is total sales. Figure 1 plots the evolution of export intensity over the sample period and clearly shows that there has been a trend break in the post reform period. Whereas firms in Indian industry were exporting about 6 percent of their net sales in 1991, that number has doubled to 12 percent of sales by 2001. This pattern is quite robust across industries.

We would like to decompose this export-intensity to get a better understanding of the firms that are driving this increase. There are four potential contributors to the increase in export-intensity. First, is it due to entering firms being more export intensive? Second, is it the case that less export-intensive firms have exited in the sample period, thereby raising overall intensity? Third, is it due to a reallocation of output to the most export-intensive firms? Fourth, can we explain the increase due to an increase in the average export-intensity of surviving firms.

We follow the decomposition procedure of Bailey, Hulten, Campbell (1992)[21] and decompose aggregate export intensity growth into the contributions of entering firms (*n*), exiting firms (*x*), reallocation among surviving incumbents (*s*), and export intensity gains for surviving incumbents. Denoting the set of firms of each type as ω_k , $k = n,x,s$:

$$\begin{aligned} X' - X = & \frac{Z'_n}{Z'}(X'_n - X'_s) - \frac{Z_x}{Z}(X_x - X_s) + \\ & \sum_{j \in \omega_s} \left(\frac{Z'(j)}{Z'_s} - \frac{Z(j)}{Z_s} \right) X'(j) + \sum \frac{Z(j)}{Z} \left(X'(j) - X(j) \right) \end{aligned} \tag{11}$$

[21] The authors cited here use the procedure for decomposing aggregate productivity growth for firms into its constituent elements.

The first term represents the export intensity contribution from entrants whose intensity levels differ on average from that of surviving incumbents. The second term represents the corresponding export contribution from firm exit. The third is the contribution from reallocation across incumbent survivors. The fourth is the contribution of export intensity changes within the incumbent survivors.

Table 2 shows the results from the export intensity decomposition.[22] Observe that the largest contributor are surviving firms. Export intensity changes for incumbent survivors has contributed over 46 percent of the growth, while a reallocation of output to the more export-oriented firms has contributed another 25 percent. Taken together, surviving firms have contributed over 73 percent of the change. Hence, in the period 1991-2001, the increase in export intensity in Indian industry is largely driven by incumbent firms getting more export intensive.

Table 2. Decomposition of Growth in Aggregate Export Intensity: 1991-2000

	Percentage Contribution
Contribution of Entering Firms	**26.4**
Contribution of Exiting Firms	**2.3**
Reallocation amongst Surviving Firms	**24.8**
Export Intensity Gains for Survivors	**46.5**

Decomposition based on Bailey, Hulten, and Campbell (1992)

VI. BASIC RESULTS

Table 3 shows the impact of time-invariant firm characteristics on exporting behavior when we estimate equation (7) in levels without fixed effects. The lagged dependent variable is highly significant and accounts for approximately 76 percent of the likelihood of a firm exporting. This is an overestimation for the reasons discussed in Section IV. Turning to the firm characteristics, we find that our productivity measure is positive and significant showing that more productive firms are more likely to export. The sales variable has a positive and significant co-efficient and so do both the profitability measures--profits over assets and profit margins over sales. These taken together suggest that more successful firms tend to be exporters.

[22] We perform the decomposition for the change between 1991–2000. This is representative of the export-intensity changes in the period. Using different years produced similar results.

Firm ownership is an important determinant of firm export behavior. Table 3 shows that the multinational dummy is positive and significant. Hence, as the summary statistics suggest, being an MNC increases the likelihood that the firm will export by about 3.5 percent. If the firm is a public sector firm then it is less likely to export. In fact, being a public sector manufacturing firm reduces the probability of exporting by more than 5 percent. We also tested whether other categories among ownership groups mattered for export behavior. Dummies for foreign business house, foreign private, and nonresident Indian firm was included and not found to be significant. For domestic firms, dummies for top 50 Indian firm, large Indian business house, and other business house were all insignificant. This suggests that being a business conglomerate has no additional explanatory power in explaining a firm's propensity to export.

Given the findings from the export decomposition exercise on firms which are driving export intensity growth, the effect of being a surviving firm (i.e., a firm that has been in operation throughout the sample period), on the probability of exporting was tested.[23] Table 3 reports that being a survivor increases the probability of exporting by 3 percent. Dummies for entering firms and exiting firms were not significant in this specification, and is not reported here.

The next set of variables test the FDI effect hypotheses. The lagged local export concentration, as well as the lagged MNC export concentration in the state and industry are both found to be insignificant. This result provides evidence against the presence of spillovers from export concentration of both local and foreign firms.

Significantly, the lagged MNC market share in the industry is positive and significant. This suggests that the larger the presence of multinationals in the industry, the more likely it is that a firm will export. This result is fairly robust, and robustness checks are discussed in the next section. Hence, the presence of MNCs unleashes forces within the industry, which makes firms tend to export more and thus is consistent with our hypothesis about competition acting as a spur for improving performance and export growth.

Finally, the year dummies capture all the time specific effects that reflect macro-level changes in export conditions such as exchange rates, credit-market conditions, trade-policy conditions, and all other factors that are common to all firms.

[23] Defining surviving firms by year of incorporation yielded similar results.

Table 3. Firm Characteristics and the Decision to Export 1/

	OLS (1)	**OLS** (2)	**OLS** (3)
Exported Last Year	0.76**	0.76**	0.74**
	0.005	0.004	0.004
Last Exported 2 years ago	0.18**	0.177**	0.17**
	0.01	0.01	0.02
Sales		0.006**	
		0.001	
Profitability	0.02**		0.02**
	0.008		0.008
Productivity	0.04**	0.04**	0.04**
	0.01	0.01	0.01
Public Sector Firm	-0.06**	-0.06**	-0.06**
	0.008	0.008	1.008
Multinational	0.03**	0.03**	0.06**
	0.007	0.007	0.009
MNC market share in industry	0.06**		
	0.02		
New MNCs in Industry	-0.005	0.003	
	0.006	0.008	
MNC Export Conc.in State-Industry		0.002	
		0.001	
Local Export Conc. In State-Industry	0.002		0.009
	0.01		0.01
Incumbent Firm	0.03**	0.03**	0.03**
	0.005	0.005	0.005
Coastal State	0.02**	0.01**	0.01**
	0.004	0.004	0.004
Age	-0.004*	0.018*	0.01*
	0.002	0.008	0.008
Reforms Dummy	0.069**		
	0.01		
Year Dummies	Yes	Yes	Yes
Industry Dummies	No	No	Yes
No. of Observations	29640	29728	29640
Adj. R-squared	0.60	0.60	0.61

[1] Binary Dependent Variable: Y=1 if exporter; ** Significant at 1 percent level;
* Significant at 5 percent level. Standard errors below coefficients.
Profitability measured as Profits/Assets; Productivity measured as gross value added/wage bill.

Table 4 reports the results of the fixed effects regressions. The lagged dependent variable is highly significant, but the coefficient is biased downwards, for the reasons discussed in Section IV earlier. The extent of the bias is computed using the Nickell (1981) method, and is found to be 0.11. Adding the bias to the coefficient on the lagged dependent variables gives an unbiased and consistent estimate of 0.45. Thus, according to the fixed effects regression, having exported the year before increases the likelihood of exporting by 45 percent. Comparing this to the Arellano-Bond technique (specification (3)) which finds a coefficient of 0.43 suggests that the estimate is fairly robust to different estimation methodologies.

Looking at firm characteristics, the productivity variable is significant and positive even after controlling for firm fixed effects. Likewise, higher profits on assets increases the probability of exporting. In the Arellano-Bond (FD-IV) specification, none of the firm characteristics are significant. This may be due to firm characteristics such as productivity, returns on assets, and profit margins are level effects and hence no longer significant in the differences specification. Further, the problem of weak instruments also complicates the FD-IV version as discussed earlier, leading to insignificant coefficients. Note that the fixed effects regression drops all the time invariant variables such as ownership group, age, and reforms dummy.

Considering the effects of FDI, none of the spillover variables are significant in the fixed effects specifications in Table 4. Thus, there seems to be little evidence to suggest that spillovers from general exporting activity or multinational activity has had a large role in stimulating firms to export. However, the variable for MNC market share in the industry in positive and highly significant, and is consistent with the hypothesis that foreign presence in the industry has increased competitive pressure on local firms and has indirectly increased their probability of exporting.

Table 4. Fixed Effects and First Difference-IV Model of Export Participation

	FE (1)	FE (2)	FD-IV (3)
Exported Last Year	0.34**	0.34**	0.43**
	0.005	0.005	0.01
Productivity	0.03**	0.04**	0.007
	0.01	0.01	0.01
Profitability	0.02**	0.02**	-0.004
	0.008	0.008	0.01
MNC market share in industry	0.15**	0.15**	-0.06
	0.06	0.06	0.12
Local Export Conc. In State-Industry	0.002		
	0.01		
MNC Export Conc. in State-Industry		0.02	0.003
		0.2	0.03
Year Dummies	Yes	Yes	Yes
No. of Observations	35493	35493	29085
Overall R-squared	0.59	0.59	
F-statistic	288.4	288.4	
Wald Chi-square			1857

[1] Binary Dependent Variable: Y=1 if exporter; ** Significant at 1percent level; * Significant at 5 percent level. Standard Errors below coefficients.
Profitability measured as profits/assets; Productivity measured as gross value added/wage bill.

VII. DISCUSSION

The sample period witnessed significant macro, industrial as well as trade reforms in the Indian economy. The exchange rate was devalued starting from 1991 and the system transformed in less than two years from a discretionary basket pegged system to a market-determined, unified exchange rate. The heavy anti-export bias in the trade and payments regime was also reduced substantially by a phased reduction in the exceptionally high customs tariffs and a phased elimination of quantitative restrictions on imports.[24] Ideally, we would like to have data on the differential tariff changes by industry, to consider the impact of these on firm exporting behavior. Since we have year dummies in all the specifications, we are able to control, to some extent, for macroeconomic factors affecting the economy as well as the annual changes in trade policy.

[24] Trade weighted tariff rates fell from 87 percent in 1991 to 25 percent by 1997. Non-tariff barriers such as licensing requirements on imports of industrial inputs and capital goods were also reduced. See India – Recent Economic Developments, (IMF Staff Country Report No. 00/155, November 2000 for a description of trade policy reforms.

The result that there are large sunk costs to exporting squares well with the finding of the decomposition of export growth in Section III above. Since there are sunk costs to exporting, incumbent firms have been better able to take advantage of trade reforms and the general improvement in exporting conditions. The result that better performers tend to export more also reconciles with the notion that survivors are more likely to be better performers than firms that exit. Hence, they have driven the increase in exporting activity.

Multinational activity in Indian industry after 1991 has largely been of the horizontal type and aimed for the domestic market.[25] Hence, the result that there are lack of positive spillovers from MNC export concentration on firm exports is not surprising. Since the MNCs are not focusing on exports, the demonstration effects for local firms in the same industry are correspondingly small. Hence, local firms do not show a significantly increased propensity to export.

Starting with the result that the entry of MNCs has made an industry more competitive in terms of reduced profit margins, we show that foreign market share in the industry increases the probability that a firm will export. The results also show that firms which are more productive are also more likely to export. These results are not inconsistent with the hypothesis that increased foreign participation, led to increases in productivity, which led to a higher probability to export.

There could be endogeneity concerns that MNC market share would be higher in those industries which are open, hence the number and probability that local firms export may be higher in those industries. These concerns are mitigated to the extent that MNC investment in India is primarily intended for the local market. This can be seen by the low share of exports from their total production, as well as the types of industries in which they are located. As a further robustness check, we focused on those industries which have seen MNC entry at a more disaggregated level (equivalent to four to five digit ITC classification). Constructing MNC market shares at this level, and running fixed effects regressions on equation (8) gave us significant and positive effects of MNC market share on probability of exports. These results are not reported due to the obvious non-random nature of picking industries based on MNC entry, and the biases thereby caused.

The results confirm that multinationals have a higher probability of exporting, and government firms have a lower tendency to export. Hence, a declining public sector share of GDP should encourage higher export activity. This result is also not inconsistent with the view that liberalization has not really had similar positive productivity effects on public sector firms as they are likely well below the technology frontier.

[25] In earlier work, Poddar (2003), it is shown that post 1991, FDI in India has been of the horizontal type, i.e., MNCs are producing goods and services roughly similar to those the firm produces for its home market. It also shows the low share of exports from MNC total production, as well as the types of industries in which they are located.

The result that firms in coastal states are more likely to export is as expected, given evidence from East Asia and China, that access to the coast is an important determinant of exporting success.

This paper has focused on the supply of exports by considering developments at the level of the firm. During the sample period, there were clearly demand considerations affecting exporting success, such as the East Asian crisis. Demand factors would affect firms differentially. However, as Figure 1 earlier shows, exports during the 1990s grew dramatically to both industrial as well as developing countries.

There are several caveats to these results. First, there could be sample selection problems as the data does not contain small, unregistered firms. This would be a problem for our main results only if the number of exporters and the export intensity amongst these firms differed significantly from both the larger sample as well as from earlier time periods. In particular, there may be new small export-oriented firms entering, which are more likely to export than older firms which are not captured by the data. However, the results from the export decomposition are so stark that the latter claim is unlikely. Further, there may be small local firms learning to export from multinationals but not captured by our sample. This proposition would only hold if there is a reason to believe that small, unregistered firms are better able to harness information, distribution, and other externalities than larger registered firms. In fact, since MNCs are typically larger, it is conceivable that domestic firms similar in size would be better suited to benefit from spillovers.

Our findings are somewhat different to those of Aitken, et al. (1997) who find positive geographical spillovers from MNCs but not from general exporting activity. The results are, however, consistent with Bernard and Jensen who also fail to find evidence of industry level spillovers from exporting activity. One reason for this paper not finding evidence of positive spillovers could be that the geographical location of a firm is taken to be the same as its headquarters. This would be a problem if a firm has multiple plants and tends to disperse these plants across the country. To correct for this, data on plant-level location would be required. As an approximation, assuming that firms locate in the same state as their headquarters, seems fair. However, it does point to the need for better data and more research on whether export spillovers exist in Indian industry.

VIII. CONCLUSIONS

Ever since the reforms of 1991 there has been a substantial increase in exporting activity of Indian industry. This paper has tried to analyze the microeconomics of the export performance of Indian firms. We find that most of the increase in export intensity in the reform period has been driven by existing firms becoming more export-oriented. This finding is contrary to the notion that the opening up of industry through reforms led to large scale entry of more export-oriented firms who then drove the overall export performance.

The Indian export story for the 1990s based on evidence presented in this paper can be summarized as follows. Liberalization and trade reforms of 1991 and a devaluation of the exchange rate gave the initial impetus for exports. Starting from a low base, the existing exporters in largely manufacturing industries took advantage of the reforms to increase

exports in both volume and value terms. By 1995, trade reforms slowed, new firms—both local and multinational—entered increasing competitive pressure and squeezing profit margins and the rate of export growth slowed. The next few years were characterized by a shakeout in manufacturing, and some belt-tightening by Indian corporates. The competitive pressure was intensified by the liberalization of rules for FDI and the entry of MNCs. This forced Indian firms to become more efficient and cut costs. After 1999, export growth resumed its upward trend, largely driven by services exports, comprised mainly of IT-related products, but also of manufactured goods. The increased productivity of Indian firms had a large role to play in this phase of export expansion. Additionally, favorable macro conditions added to the profitability of manufacturing firms.

The Indian export story is in stark contrast to the Chinese case, where FDI was largely export oriented. Multinationals moved production to China largely to take advantage of factor endowments. They acted as catalysts for local firms to enter. These were new small and medium sized firms who were largely export oriented.[26] In India, FDI has acted as a competitive spur for domestic exporters forcing them to innovate. MNCs are primarily serving the local market rather than exporting. The competitive pressure has enabled Indian firms to also become competitive in export markets, thus boosting exports. It must be borne in mind that although growing rapidly, Indian exports are still less than 1 percent of world trade and are relatively small compared to those of China. Hence, there is a need to continue the process of increasing competitiveness if India has to gain further export market share.

The Indian case offers interesting policy implications. It provides evidence of an alternative export growth strategy which is primarily driven by internal competitive forces. The implication of this strategy is that vulnerability to external developments and shocks to trade due to disputes, collapse of agreements, or unilateral sanctions are likely to be reduced for exporting companies as they also serve the domestic market. It also implies that firms are more likely to innovate and be competitive. The flipside of this strategy is that small and medium enterprises are not the lynchpin of export growth as in East Asia.
The evidence from this paper also suggests that policy should distinguish between exporters attempting to export more, and new firms trying to enter the export market. If entry costs are important, policy should be aimed at easing bottlenecks such as providing information about potential markets, developing exporting infrastructure, eliminating bureaucratic hurdles to export rather than on providing direct subsidies based on the value of exports.

This paper reinforces evidence against ‘infant industry’ type protection arguments. The evidence that competition has spurred innovation, which has led to export growth, suggests that in order to boost exports, policy makers should focus on traditional forms of comparative advantage, i.e., domestic firms becoming more productive. A key ingredient of increasing productivity is fostering competition in the domestic market through liberalization of FDI rules. Hence, rather than protection and export incentives for firms, policymakers should encourage competition and innovation, so that incumbent firms who are close to the technology frontier can get more productive and thereby increase exports.

[26] See Chen and Kwan (2000).

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