Sources of Productivity Growth in Traditional and Emerging Sectors: What are the Effects of Liberalization?

Preliminary Evidence from Tamil Nadu, India

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Abstract

The paper explores preliminary evidence from Tamil Nadu’s manufacturing sector about sources of productivity growth and export performance and its relationship to industrial competitiveness. The paper focuses on four sectors — textiles and garments, leather and footwear, automobiles and components and the emergent sector of information technology. After situating these sectors in the context of recent, national-level trends in productivity and export performance, the paper reports a set of findings from the field about Tamil Nadu’s recent experience. The main findings are as follows:

(1) While labor productivity, per capita wages, capital intensity (automation, introduction of new technology and production processes), and exports, have risen across all the sectors studied in the paper, these increases have been accompanied by labor shedding in key industries. Moreover, the rate of growth of per-capita earnings, though positive, is lowest in the two sectors that account for the largest employment share in Tamil Nadu: textiles/garments and leather.

(2) Export growth and productivity growth are not necessarily the outcome of more open markets and the liberal trade regime introduced in the early 1990s. The most dramatic gains in export and productivity growth occurred in the 1980s, and up to the early 1990s. These changes coincided in part with the efforts by government to support and encourage exports in a variety of ways, including ongoing efforts to help modernize the technological base of local industry through assistance, credit, and consultancy programs.

(3) The most important factor accounting for successful market penetration on the part of firms, however, is a growing appreciation by local firms of the importance of “embracing the new conditions of competition, namely, “price, quality, consistency and timely delivery.”

While the better performers (across sectors) are characterized by a growing ability to access demanding markets and sustain their presence by adapting to shifting demands, the information about what it takes to enter and adapt flexibly to new and fluctuating global markets is very unevenly diffused across firms, and not available to most producers. The government can play a critical role in helping to build institutional platforms to diffuse this knowledge across firms, and help firms make continuous improvements and learn about the successful experience of their peers and competitors—within and outside Tamil Nadu.

(4) A critical role that the state can play is to move away from focusing on individual firms in its assistance programs, and focusing instead on developing regional competencies and networks to support firms in the region as whole. This involves making efforts to enhance local skill levels, easing the flow of credit, supporting local production networks in a more customized way, and most critically providing consistent and basic supplies of productive and social infrastructure. This includes strategic investments in R&D, new efforts to help firms focus not only on innovations in production, but also on product design. Product design is critical to global competitiveness today, and remains a severe weakness of Indian industry. This implies a renewed focus on ongoing skill development and training, as well as the development of a creative industrial extension service, which draws in the strength of local universities to work with firms to jointly solve problems of production, input supply, marketing, warehousing and distribution.

A major area complaint among a plurality of firms was about unreliable power; poorly managed ports (Central responsibility), roads and transportation and water supply. At a time when cooperation among firms and between firms and the state has emerged as a key source of dynamism among firms, it is odd to find the state government (or its municipal wing) deadlocked with local firms and their associations over water supply and garbage collection and road repair in the government own industrial estates of Guindy, Ambatur and others. It is a matter of great urgency that this battle be resolved.
A larger lesson is that it would be strategic for the government to carefully plan for industrial growth (as it has done in Maramallai Nagar and Irungattikotai), and to thoroughly service those areas – with corporate financial and political support – with not only water, power and roads, but also space for small suppliers to locate near their larger customers, housing, small medical clinics, banks, markets and other amenities. This would help stem the slow bleeding of productivity that is currently occurring throughout the state’s economy as workers struggle with access to basic amenities, transportation, water, and housing. Several firms reported how their productivity suffered daily as workers routinely arrived late or left early because they are forced to meet the water tanker at their homes at unpredictable time. Firms clearly support their workers’ need to procure drinking water, but losses occur not only due to lost work, but also due to the damage it does to quality and timely deliveries that are key to staying competitive. Other firms spoke of their decision to provide housing to their employees near their factories in order to overcome the transportation bottleneck. The spontaneous growth and development of the villages near Irungattukotai are an example of the potential that is available in making a more serious effort at localizing production and social facilities around areas of work and industry.
Analysis of firm-level productivity: The Evidence from Tamil Nadu

1. Introduction

In recent years firm level productivity has emerged as a key indicator of successful restructuring and upgrading by firms and industries in the face of intensified global competition and liberalized trade. Productivity growth, of course, has traditionally been regarded as one of the main sources of income growth, along with factors such as capital accumulation and the deepening of human capital development (Rodrik 2001). These factors, and the historically positive link between productivity, employment and earnings have made the search for sources of productivity improvement an important policy lever for economic development. But with rapid changes in the nature of international competition—the push for de-regulation and liberalization, the widespread restructuring of global and domestic product markets, adoption of new technologies and production arrangements—it is no longer clear what the main sources of productivity improvement are within firms today. It is not clear, moreover, how the arrows of causality between openness, accumulation, productivity growth, income growth and development flow. This is of particular concern in industrializing countries where the dismantling of protected markets over the past decade has exposed more and more firms to open trade and stiff competition in export and import markets. It is unclear which types of firms are doing well under openness, and under what circumstances.

This raises several questions for policy: What accounts for productivity growth? Why do some firms and industries become more productive than others over time? Should policy makers focus on firms or on industries when assessing changes in productivity? If industries become productive does that mean that firms also do (Levinsohn and Petrin 1999)? What factors lead to productivity improvements in firms, and why? How do “traditional” factors like managerial ability, technology, human capital, and regulation affect productivity? How do newer factors such as learning, international exposure, being part of production networks, quality of the workforce, the nature of worker skill, as well as the adoption of new production technologies – soft and hard – and the form of ownership impact firm productivity?

The literature addresses these questions in mainly two ways: (1) one body of literature focuses on cross-sectional analyses of productivity dispersion and growth, based on industry-level data sets. This body of literature provides an understanding of how changes in policy regimes or environmental factors affect aggregate productivity (see Caves 1998, Tybout 2000 and Bartelsman and Doms 2000 for recent reviews). (2) The other body of literature is more empirical. It raises contextual and disaggregated questions at the micro level to explore what factors (and processes) underlie productivity change, how these factors relate to each other, and what they suggest about causality. Much of this research is at the firm level, and draws upon either micro-data (see for example the work reviewed in Bartelsman and Doms 2000), or upon detailed case studies.

This paper analyses the sources of firm performance (and indirectly, productivity) in Tamil Nadu’s leading sectors using the second approach described above. The study draws on forty-two interviews conducted in Tamil Nadu in the summer of 2001 in four
main sectors: garments and textiles, auto-parts, leather and footwear, and information technology. These particular sectors because they represent the top tier of Tamil Nadu’s industrial spectrum—both in terms employment and exports; and represent the region’s historical and emergent strength. Textiles, leather, and engineering (auto parts and metal products) have historically been the main pillars of Tamil Nadu’s industry; Garments, auto-assembly, and Information technology are the region’s emergent sectors, and currently the State’s fastest growing employers and exporters.

The study consisted of two linked phases of research: one component involved a survey that was mailed to a sample of randomly selected firms in early summer (the sample was drawn from a “universe” of firms assembled from lists provided by sector associations and the state government). The goal of this part of the research was to measure how capital and labor productivity in Tamil Nadu's key sectors had changed over the past decade, and what the key determinants of these trends were. At the time of writing, the returns from the survey were not yet sufficient to allow systematic analysis.

The second component of the study involved detailed face-to-face, semi-structured interviews with over 42 firm-owners in the four sectors mentioned above, and several government officials and industry associations. The aim of the interviews was to identify—from the perspective of the firms—what they saw as the most significant sources of productivity change for their firms; and to see how these sources of improved performance varied (or not) across sectors and firm size, and across exporters and non-exporters. Rather than focusing on estimating statistical values of productivity change—which recent studies have done (see Trivedi et al. 2000), the aim was to understand what institutional arrangements—at the intra- and inter-firm level, as well as between industries, buyers, and government, contributed to good performance, and how these arrangements played out in practice. What were the bottlenecks to productivity improvement among firms and how did successful firms get past them? What lessons did the experience of successful and less successful firms suggest about what firms as well as governments can do to enhance productivity—especially among small firms in traditional sectors—in the current environment of liberalized trade? How does the experience of Tamil Nadu compare with international experience, and what lessons can be drawn from the comparison?

The paper is organized as follows. The next section summarizes what is known about recent national trends in firm and industry level productivity in the sectors that are the focus of the study. Section three examines specific findings from Tamil Nadu, and the final section concludes with policy lessons and international comparisons.

Section 2:

Trends in Indian industrial productivity: what do we know so far?

Recent changes in Indian industrial productivity show some surprising trends, which resonate with the patterns we saw in Tamil Nadu. These trends must necessarily be framed in the context of the country’s liberalization policies instituted most visibly since the early 1990s. These reforms, as is well known by now, involved a shift to a
more open trade regime and included (1) Substantial deregulation of internal protections in key sectors and dismantling of licensing and quota restrictions on production volumes; (2) liberalization of financial markets, especially by the reduction of restrictions on the capital account, and the complete convertibility of the Rupee on the current account, (3) relaxation of controls on Foreign Direct Investment, and (4) the lowering of trade barriers—tariffs and quotas on a wide range of previously protected items. The relationship between trade policy and productivity growth clearly is a major issue in the industrial policy literature. Though still an area of controversy and ongoing empirical research, a major hypothesis is that open trade improves industrial productivity. What does the Indian case show?

Table 1, 2 and 3 below highlight several patterns of export performance, productivity growth, capital intensity and earnings growth in Indian manufacturing that are relevant for Tamil Nadu.
Table 1
India’s Exports as a Percentage of Total Exports - 1970-71 to 1998-99
(Total Exports in millions of US $)

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<tr>
<td>Primary Products</td>
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<tr>
<td>Agriculture and Allied</td>
<td>42%</td>
<td>37%</td>
<td>24%</td>
<td>21%</td>
<td>22%</td>
<td>20%</td>
<td>23%</td>
<td>24%</td>
<td>22%</td>
<td>21%</td>
</tr>
<tr>
<td>Ores and Minerals</td>
<td>32%</td>
<td>31%</td>
<td>19%</td>
<td>18%</td>
<td>19%</td>
<td>16%</td>
<td>19%</td>
<td>20%</td>
<td>20%</td>
<td>19</td>
</tr>
<tr>
<td>Manufactured Goods</td>
<td>50.30%</td>
<td>55.80%</td>
<td>72.90%</td>
<td>76.10%</td>
<td>75.60%</td>
<td>76.80%</td>
<td>74.00%</td>
<td>73.50%</td>
<td>76.70%</td>
<td>78.70%</td>
</tr>
<tr>
<td>TOTAL EXPORTS</td>
<td>2,031.00</td>
<td>8,486.00</td>
<td>18,143.00</td>
<td>18,537.00</td>
<td>22,238.00</td>
<td>26,331.00</td>
<td>31,797.00</td>
<td>33,106.00</td>
<td>35,006.00</td>
<td>33,659.00</td>
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Source: Trivedi et. al. 2000
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</tr>
</thead>
<tbody>
<tr>
<td>Manufactured Goods</td>
<td>50.30%</td>
<td>55.80%</td>
<td>72.90%</td>
<td>76.10%</td>
<td>75.60%</td>
<td>76.80%</td>
<td>74.00%</td>
<td>73.50%</td>
<td>76.70%</td>
<td>78.70%</td>
</tr>
<tr>
<td>Textiles, fabrics, mfrs.</td>
<td>9.50%</td>
<td>14.00%</td>
<td>21.00%</td>
<td>23.30%</td>
<td>21.30%</td>
<td>24.00%</td>
<td>22.60%</td>
<td>23.50%</td>
<td>24.70%</td>
<td>25.40%</td>
</tr>
<tr>
<td>Engineering Goods</td>
<td>12.90%</td>
<td>12.30%</td>
<td>11.90%</td>
<td>13.30%</td>
<td>13.60%</td>
<td>13.30%</td>
<td>13.80%</td>
<td>14.60%</td>
<td>15.00%</td>
<td>13.00%</td>
</tr>
<tr>
<td>[25.6%]</td>
<td>[22.1%]</td>
<td>[16.3%]</td>
<td>[17.4%]</td>
<td>[18.0%]</td>
<td>[17.4%]</td>
<td>[18.7%]</td>
<td>[19.9%]</td>
<td>[19.6%]</td>
<td>[16.5%]</td>
<td></td>
</tr>
<tr>
<td>Chemicals and Allied</td>
<td>2.00%</td>
<td>3.30%</td>
<td>6.50%</td>
<td>7.40%</td>
<td>8.20%</td>
<td>7.40%</td>
<td>7.40%</td>
<td>8.10%</td>
<td>10.50%</td>
<td>10.00%</td>
</tr>
<tr>
<td>Leather and Goods</td>
<td>5.20%</td>
<td>5.80%</td>
<td>8.00%</td>
<td>10.80%</td>
<td>5.80%</td>
<td>6.10%</td>
<td>5.40%</td>
<td>4.70%</td>
<td>4.70%</td>
<td>4.80%</td>
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<tr>
<td>[10.4%]</td>
<td>[10.4%]</td>
<td>[11.0%]</td>
<td>[14.3%]</td>
<td>[7.7%]</td>
<td>[8.0%]</td>
<td>[7.4%]</td>
<td>[6.4%]</td>
<td>[6.1%]</td>
<td>[6.1%]</td>
<td></td>
</tr>
<tr>
<td>Total of 4 lead Sectors</td>
<td>29.40%</td>
<td>35.40%</td>
<td>47.30%</td>
<td>54.80%</td>
<td>48.90%</td>
<td>50.80%</td>
<td>49.20%</td>
<td>50.90%</td>
<td>54.90%</td>
<td>53.20%</td>
</tr>
<tr>
<td>[58.6%]</td>
<td>[63.3%]</td>
<td>[64.9%]</td>
<td>[72.1%]</td>
<td>[64.7%]</td>
<td>[66.3%]</td>
<td>[66.7%]</td>
<td>[69.2%]</td>
<td>[71.5%]</td>
<td>[67.5%]</td>
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</tr>
</tbody>
</table>

Source for Table 1 and 2: Economic Survey, Government of India, Adapted from Trivedi et. al. 2000.
Table 3
Average Annual Real Output per Employee (first 5 columns)
(Measured in 1981-82 Rupees)

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</thead>
<tbody>
<tr>
<td>Textiles and textile products</td>
<td>49000</td>
<td>63000</td>
<td>93000</td>
<td>135000</td>
<td>149000</td>
<td>6.40%</td>
</tr>
<tr>
<td>Leather and leather products</td>
<td>102000</td>
<td>98000</td>
<td>116000</td>
<td>142000</td>
<td>180000</td>
<td>8.20%</td>
</tr>
<tr>
<td>Machinery and transport eqpt.</td>
<td>83000</td>
<td>107000</td>
<td>154000</td>
<td>202000</td>
<td>294000</td>
<td>8.30%</td>
</tr>
<tr>
<td>Metal and metal products</td>
<td>107000</td>
<td>140000</td>
<td>175000</td>
<td>233000</td>
<td>300000</td>
<td>6.80%</td>
</tr>
<tr>
<td>Chemical and chemical prod.</td>
<td>172000</td>
<td>215000</td>
<td>299000</td>
<td>417000</td>
<td>498000</td>
<td>9.10%</td>
</tr>
<tr>
<td>Manufacturing Sector</td>
<td>78000</td>
<td>101000</td>
<td>147000</td>
<td>191000</td>
<td>240000</td>
<td>7.80%</td>
</tr>
</tbody>
</table>

Source: Adapted from Trivedi et. al. 2000: pp 28 and 56; Trend rate estimated as semilog trend

Table 4
Average Capital Intensity in Selected Sectors: 1973-1995
Average Real Capital Stock per Employee (measured in 1981-82 Rupees)

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</thead>
<tbody>
<tr>
<td>Textiles and textile products</td>
<td>27134</td>
<td>30696</td>
<td>42125</td>
<td>57928</td>
<td>87281</td>
<td>5.50%</td>
</tr>
<tr>
<td>Leather and leather products</td>
<td>17307</td>
<td>23486</td>
<td>25936</td>
<td>34931</td>
<td>49251</td>
<td>5.00%</td>
</tr>
<tr>
<td>Machinery and transport eqpt.</td>
<td>47924</td>
<td>51206</td>
<td>67552</td>
<td>84539</td>
<td>116497</td>
<td>4.30%</td>
</tr>
<tr>
<td>Metal and metal products</td>
<td>121120</td>
<td>122180</td>
<td>142141</td>
<td>222306</td>
<td>276322</td>
<td>4.00%</td>
</tr>
<tr>
<td>Chemical and chemical prod.</td>
<td>146940</td>
<td>146121</td>
<td>175934</td>
<td>240361</td>
<td>325038</td>
<td>3.60%</td>
</tr>
<tr>
<td>Manufacturing Sector</td>
<td>63806</td>
<td>72447</td>
<td>96839</td>
<td>127925</td>
<td>168987</td>
<td>4.80%</td>
</tr>
</tbody>
</table>

Table 5
Average Per Capita Earnings in Selected Sectors: 1973-1995
(Average annual per capita earnings measured in 1981-82 Rupees)

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</thead>
<tbody>
<tr>
<td>Textiles and textile products</td>
<td>5407</td>
<td>9377</td>
<td>15268</td>
<td>24881</td>
<td>33388</td>
<td>9.80%</td>
</tr>
<tr>
<td>Leather and leather products</td>
<td>4973</td>
<td>8340</td>
<td>12302</td>
<td>19630</td>
<td>28697</td>
<td>9.00%</td>
</tr>
<tr>
<td>Machinery and transport eqpt.</td>
<td>7840</td>
<td>14693</td>
<td>24931</td>
<td>41885</td>
<td>66924</td>
<td>11.20%</td>
</tr>
<tr>
<td>Metal and metal products</td>
<td>7702</td>
<td>13611</td>
<td>22065</td>
<td>36515</td>
<td>59440</td>
<td>10.50%</td>
</tr>
<tr>
<td>Chemical and chemical prod.</td>
<td>8385</td>
<td>15163</td>
<td>25406</td>
<td>43816</td>
<td>63826</td>
<td>10.80%</td>
</tr>
<tr>
<td>Manufacturing Sector</td>
<td>5644</td>
<td>10397</td>
<td>18473</td>
<td>30761</td>
<td>48536</td>
<td>11.30%</td>
</tr>
</tbody>
</table>

Source: Trivedi et. al. 2000: 20, 21
Several issues stand out from these figures.

First, between the 1970s and late 1990s India’s total exports grew 17-fold. Total exports rose from a low of $2031 million in 1970-71 to $33,659 million in 1998-99—a sixteen-fold increase. Not only did total exports increase but the composition Indian exports also changed, away from agricultural and commodity exports toward manufacturing exports. Agricultural exports fell by 20 percentage points from 42% of total Indian exports in the early 1970s to 21% in 1998-99, while manufacturing exports rose from a share of 50% of Indian exports in the early 1970s to nearly 79% by 1999.

During this period, it is noteworthy that exports grew the fastest – at a rate of 32% per annum or four-fold (though from a very small base)– during the decade of the 1970s arguably the most closed period in India’s trade regime in the last fifty years. Exports grew at an average annual rate of 11% per annum during the decade of the 1980s (a doubling of exports), and at about 10.6% during the 1990s, the most open period in India’s trade regime. In other words, the fastest growth in exports occurred, ironically, before the trade reforms and deregulation measures were introduced in 1991.

This is quite consistent with De-Long’s and other studies which have also found that the “significantly more ambitious reforms of the 1990s actually had a smaller impact on India's long-run growth path,” than growth during previous periods (cf. Rodrik 2001: 19). A similar story could be told about productivity growth. As we see in Table 3, in most manufacturing sectors, productivity growth preceded trade liberalization. Indeed, except for a subset of manufacturing industries—metal working and leather—in the growth of productivity of Indian manufacturing was the fastest in the period between 1982-83 and 1992-93, and has been positive since the mid 1970s (Trivedi et. al 2000).

In textiles for example, Trivedi et. al (2000) have estimated three distinct phases of productivity growth. During 1973-4 through the early 1980s (1982-3), labor-productivity grew by 4.4% per annum. Between 1982-83 and 1992-93 labor productivity jumped nearly 8.2%, and then fell to 3.1% during 1993-4 and 1998-98, the period when trade was the most liberalized (Trivedi et. al. 2001:29). Thus, open trade in itself is not enough to boost export and productivity. In the Indian case, clearly something other than tariff reduction and open trade was driving the impressive gains in productivity in the 1980s through the early 1990s.¹

¹ This finding, about the disjunction between open trade and productivity growth, is not specific merely to this recent period of trade liberalization, but has strong historical resonance. In a recent study Clark and Wolcott (2001) found that in colonial India, economic performance (especially in textiles) lagged during 873-1947 despite the presence of an “ideal” policy regime – of ‘open capital markets,
The bigger point is that the Indian data caution us against conflating trade liberalizing economic reforms with expectations of automatic gains in productivity (or performance) at the firm or industry level. Rather, if the goal is to understand how to promote productivity-enhancing changes among firms, it is critical to look at cases of actual good performance and ask how the good performance came about and what the sources of productivity gains actually were. We report some early findings from the field on this question in section 3 below.

The second pattern that stands out from the foregoing export-productivity data is that the sectors that increased their export shares over the last fifteen years, are also the sectors that displayed the largest gains in productivity. These sectors include, textiles, machinery, transport equipment, including auto parts, and chemicals. The inclusion of textiles in this list, and the growth in this sector of both export share and labor productivity, is interesting because it is the one sector that has seen the most contraction since 1991. It has also been portrayed as unproductive, weak and ridden with malaise. The owners of spinning mills routinely blame the sector’s declining productivity on the government’s rigid labor laws, and complain of being plagued by labor unrest and strikes. Without decomposing the pattern of productivity growth of this sector further, it is hard to definitively say whether this increase in productivity and export share came from the rise of a vibrant apparel sector, or from the restructuring and modernization, or from the fact that slower growing firms contracted, cutting labor sharply, thus raising productivity. The data do show that of all manufacturing sectors employment contracted the fastest in the textile industry over the past twenty years, and the sector has grown in capital intensity over the same period (See table 3, 4). But in our field interviews we also found that the rise of a vibrant apparel sector over the last 20 years has contributed significantly to exports and rising productivity in the textile/apparel sector. Thus, firms have shed labor, wages, capital investment, and output in the textile sector has increased, as has the sector’s contribution to exports in the past two decades. This increase in exports began well before the recent liberalization of trade, as we noted, and despite a strong history of labor organization and unionization.

This trend is consistent with field level findings from Tamil Nadu which suggest that the region’s best performing textile and garment firms have been quick to integrate with the world economy, even more so than sophisticated sectors such as auto-components and engineering.

Does this mean that exporting is causally linked to productivity growth? Not necessarily. There is a growing consensus in the literature that firms that become exporters typically already have high productivity before they enter foreign markets, and that their relative efficiency does not systematically increase after exports are initiated (Cleridis et. al. 1998 cf. Bartelsman and Doms 2000). There may be a self-selection of efficient firms into export markets, but without further investigation it is secure property rights, free trade and social and political stability’ (cf. Rodrik 2001:15). Clearly free trade does not automatically lead to improvements in productivity.
not possible to definitively assert this sequence. At the same time, our field study showed that the market segment to which firms export (high or middle or low end) might influence how much productivity-enhancing learning occurs from exporting, and whether or not it spills over into a firm’s non-exporting establishments. In a few cases we found that such learning did spill over into the exporting firm’s domestic operations (Interview summer 2001). Other studies suggest that the causality may also run in the opposite direction as—that firms producing for demanding, high-end domestic markets may find it easier to switch to foreign markets (Tewari 1999).

A pattern that stands out clearly among the better performing textile and garment exporters in Tamil Nadu is that productivity improvements are more substantial and sustained when new knowledge (such as about waste minimization or reduction of rejection or quality control) acquired through exports is applied to new contexts or new markets. This allows for a “more efficient” use of existing resources.

A recent study comparing long-run productivity of the Indian textile industry with that of other developed economies (US and UK) made this point very clearly. It found that historically, the productivity of India’s textile industry lagged behind that of its competitors not because of inadequate access to technology, but the “inability to effectively employ the technology (Clark and Wolcott 2000, cf. Rodrik 2001:12). The authors trace the problem of low technical efficiency of Indian firms despite access to top of the line technology to the nature of the “employment problem” characterized by a mutual distrust, shirking, and opportunism. However, as we see in the next section, a common pattern among better performing firms is that they all find ways to get around this problem—i.e., it does not remain a binding constraint.

Finally the leather industry, which is heavily represented in Tamil Nadu, has performed well nationwide in terms of output growth and contribution to exports, but not in terms of productivity performance. Many changes have occurred in the leather sector since the 1970s. There has been a gradual shift away from the export of skins and raw hides toward higher value added production. Exports of raw hides and wet-blue leather is banned. And since the early 1990s leather manufactures have accounted for 70% of leather exports. The manufacture (and export) of finished leather was delicensed since 1993, and the government has encouraged the promotion of finished items such as shoes with policies to promote joint ventures and the rationalization of import duties. But at about the same time the industry faced a few, quite serious overseas environmental challenges in the mid 1990s (Trivedi 2000). The irony of the leather sector is that the aggregate national level productivity figures obscures the fact that the performance of leather firms in the different leather-goods producing clusters in the country is quite varied. In contrast to the poor performance of the leather sector in Agra and West Bengal, for example, Tamil Nadu’s leather sector has exhibited important gains in exports and productivity after a downturn in the mid-1990s. Of all the sectors we studied for this report, the leather sector in Tamil Nadu had the most dynamic association-level leadership, co-directed by representatives from industry and government. They have aggressively sought to revitalize the sector—at least in Tamil Nadu and move it toward the higher end. The Council for Leather Exports has launched an impressive image-
building program to especially boost exports in the US market, and to improve productivity. This process has also been accompanied by significant automation.

Indeed, growing automation was a recurring theme across all four sectors in our fieldwork. A common pattern across firms that reported improvements in sales, exports, and profitability over the last decade was their recent investments in new equipment, modernization of production processes, and automation (adoption of labor-saving technologies) as an important perceived source of productivity improvements. This trend is supported by Trivedi’s quantitative estimates of productivity reported in Table 4. As the table shows, capital intensities have increased sharply in many industries since the 1980s, especially since the late 1980s and early 1990s. This is true even for sectors such as textiles and garments and leather, which have historically been characterized by low capital intensity. Trivedi et. al (2000) found that most of the increase on the labor productivity index is explained by rising capital intensity in most sectors (2000:27). They also found a correlation between capital intensity and per capita earnings across most industries.

Clearly, then, aggregate figures point to three trends that run across the industries we are examining in this study: falling employment, rising output, increasing labor productivity accompanied by rising capital intensity and in most cases, rising per-capita earnings.

Section 3

The Evidence from Tamil Nadu: Themes from the Field

What are the most significant sources of improved productivity in Tamil Nadu’s key sectors? What are the patterns that run across firms that have done well. How do these patterns vary by firm size? How do they vary across labor-intensive traditional sectors such as garments and leather and non-traditional sectors such as auto-parts and information technology? Across firms producing for the domestic vs. the export market? What are the bottlenecks to firm-level productivity increases? And what can the government do to enhance firm productivity? Brief responses to these questions follow from our findings from the field.

1. Variances by sector and size

Some of the more interesting patterns of good performance that we saw tended to run across sectors, but clearly, there are several differences by sector which also stand out as important. We begin with a brief overview of those differences.
Garments and Textiles:

The textile and garment industry has two components: spinning (and weaving); and garments. Spinning and weaving are Tamil Nadu’s oldest manufacturing sector. Of the 20 million workers employed in this sector nationwide, nearly half are located in the textile mills of Tamil Nadu. But the state’s textile sector is currently in flux and undergoing significant restructuring and a search for productivity enhancing interventions is a serious concern among industrialists, specialized agencies such as SITRA and SIMA, and government officials. This task is complicated by the fact that the country (and Tamil Nadu’s) textile industry is highly segmented by policy: At one end is an extensive, decentralized handloom sector, at the other end is a sizeable segment of large-scale spinning mills and some vertically integrated composite mills, with a large protected small and medium scale, power-loom weaving sector in between. Productivity varying widely within and across these segments.

The most successful firms have (a) Integrated forward into garments; (b) upgraded their technical base by replacing older machines with more efficient newer machines; (c) cut energy costs through ongoing energy audits, waste-reduction programs, and increasing efficiency by hiring consultants (such as KSA Technopark, and others) to help them reorganize production arrangements. (d) Many have entered new markets at home and abroad with the help of government agencies as well as their own contacts with the local agents of large buyers (e) Have begun to pay greater attention to worker training, especially those involved in skill-intensive tasks, (f) have strengthened their distribution networks, and (g) in some cases have moved to overseas locations in the gulf countries, Sri Lanka or Maldives.

The garment industry, in contrast to spinning-weaving, is ‘new’ rapidly growing industry in Tamil Nadu. It rose to prominence with its spectacular contributions to exports in the early 1980s—prior to liberalization. Ready-made garments, mostly cotton based, include cotton, blends and knits, and together account for five billion dollars in exports. Tiruppur, Tamil Nadu’s hub of knitwear production alone accounted for $1.0 billion in exports in 2000. Since the mid-1990s there are growing signs of cross-segment specialization and forward linkages between spinning, weaving and garments, as well as some backward linkages between garments and spinning. The biggest policy change in this field was the de-reservation of the garment sector last year. Till recently garment production was restricted to small firms, and large firms could enter the sector only if they exported at least 75% of their output. Elimination of this protection has increased competition in the garment business.

Four patterns characterize the changes taking place in the garment/textile sector. (1) Smaller firms tend to specialize tightly in a singly or a small range of related products—Tiruppur is an example, while medium and large firms in metro areas (around Chennai) tend to diversify and/or vertically integrate. (2) The production strategies of firms that target the export versus firms that focus on the domestic market differ, but there are good performers in both categories. (3) reorganization of industrial relations and human resource practices—including training, skill development and outsourcing has emerged as an important new theme that good performing firms are paying greater attention to, and
For many firms for whom size is critical, especially the larger spinning mills, there is a strong desire to cut labor costs. Though the industry can do little given existing labor laws and the lack of an exit policy, there is a perception that a potential opening in policy is possible in this area. It is striking that despite the rhetoric around rigid labor laws and labor unrest, most of the best performing firms have found ways around the problem by employing a carrot and stick approach. (a) The carrot is their efforts to work more closely with their labor leaders and build in performance and production standards, as well as better benefits. And (b) the ‘stick’ is their attempt to build strategic outsourcing networks that provide flexibility while limiting the power of their workforce.

The sector also displays wide heterogeneity in managerial ability, which the literature has pointed out as an important factor behind productivity variances across firms. It was common to find in the field that some firms in the same sector, and the same region performed stunningly differently. Within the Madras Export Processing Zone (MEPZ) one exporter of winter jackets was performing abysmally poorly, lamenting labor relations and poor demand, while another firm, yards away, had grown spectacularly, adding new buyers and expanding business every year. Despite the same restrictive labor laws, and the notoriously high absentee rate in the industry, the firm had no complaints, and an absentee rate much below average. The key difference was the nature of market “hook” for each firm, and how exports were anchored within their overall production practices. In future studies we will explore these variances more fully.

**The Leather sector**

As we saw in Table 2 and 3, the leather sector, nationwide, has suffered from declining productivity—both capital and labor. However, the pattern in Tamil Nadu was quite different, as we noted above. This sector had the most vibrant and active associations; it operated with strong apparent cooperation between industry and government, and seemed to be very well aware of the problems of productivity the sector needed to combat. Even as we were in the field, the main producers association of the leather sector (CLE) had launched a major “image building” and “learning” campaign aimed at entering the US market. (Germany and the EU have traditionally been India’s largest markets for leather and leather products). CLE had invited two American consultants to meet individually and jointly with member firms to acquaint them with the American market, and to discuss what it would take to enter the US market successfully. Most impressively, there was a strong site-visit component of this consultancy: the consultants would visit a selected number of firms, and provide them customized feedback at their own factory floors.
The leather industry also has some of the most active R&D institutions—including the CLRI. The primary challenge facing the industry as it expands exports into North America is to decide what it wants to be: a volume producer like China, or a high-quality, high value-added niche player such as Italy. There is no clear agreement about this within the industry yet, some powerful voices within the industry believe it is foolish to relinquish India’s existing comparative advantage in batch production and move toward the scale intensive Chinese model, where the Chinese already have an advantage over India. Equally strong voices caution against relinquishing an important arena of future competition and growth by abandoning low-cost mass markets in the US (Boston Harbor interview). It remains to be seen how this debate plays out politically.

However, irrespective of whether firms want to scale up, or refine their comparative advantage in batch production, it is clear that a critical source of productivity growth in this sector will be the development of a strong, high quality, and flexible leather-components industry. A recent study that compared the footwear industry in four countries, China, India, Brazil and Italy found that India’s performance lagged behind the others mainly because of a weak components industry. It also spoke of the problems imposed by a “rigid, less flexible employment relationship,” and workers that are “less committed and less willing to learn from outsiders” compared to workers in China, Brazil, and Italy (Schmitz and Knorringa 1999:17). It must be pointed out, however, that this study was based on the Agra cluster, not on the better performing Tamil Nadu firms.
Table 2: Footwear Imports of US and UK from China, India, Brazil and Italy, 1998

<table>
<thead>
<tr>
<th>Producers</th>
<th>US Imports</th>
<th>UK Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% Ranking</td>
<td>% Ranking</td>
</tr>
<tr>
<td>China</td>
<td>46.2</td>
<td>5.6</td>
</tr>
<tr>
<td>India</td>
<td>1.1</td>
<td>4.9</td>
</tr>
<tr>
<td>Brazil</td>
<td>12.0</td>
<td>5.5</td>
</tr>
<tr>
<td>Italy</td>
<td>11.5</td>
<td>26</td>
</tr>
</tbody>
</table>

Source: Schmitz and Knorringa 1998:7

Table 3. Performance Profiles, China, India, Italy and Brazil, 1998

(Rankings from the point of view of importers in US and UK: 1 is poorest and 5 is best or most attractive). Source: Schmitz and Knorringa 1998:9

<table>
<thead>
<tr>
<th>Trait/Country</th>
<th>China</th>
<th>India</th>
<th>Brazil</th>
<th>Italy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price</td>
<td>5.0</td>
<td>4.2</td>
<td>3.0</td>
<td>2.0</td>
</tr>
<tr>
<td>Quality</td>
<td>4.0</td>
<td>2.0</td>
<td>4.0</td>
<td>3.7</td>
</tr>
<tr>
<td>Punctuality</td>
<td>4.2</td>
<td>1.5</td>
<td>3.9</td>
<td>3.2</td>
</tr>
<tr>
<td>Response Time</td>
<td>3.0</td>
<td>2.2</td>
<td>3.7</td>
<td>3.5</td>
</tr>
<tr>
<td>Small Order Flexibility</td>
<td>2.0</td>
<td>3.0</td>
<td>3.5</td>
<td>4.0</td>
</tr>
<tr>
<td>Large Order Flex</td>
<td>3.9</td>
<td>3.0</td>
<td>4.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Innovation</td>
<td>1.9</td>
<td>0.5</td>
<td>1.9</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Source: Schmitz and Knorringa 1998
As table 2 and 3 indicate, the Indian leather industry has a lot of catching up to do. The main areas of advantage are its flexibility with small orders (or batch production) and its price attractiveness. But China beats its competition in both price attractiveness, quality, punctuality, and flexibility in large orders. As Schmitz and Knorringa report, it is this combination of punctuality, quality and price that makes China such an attractive source of most importers.

Leather firms in Tamil Nadu are responding to the need to improve their response time, quality and delivery times. However, given the relatively labor-intensive production process in the leather industry, there are fewer technical/equipment upgrades that firms say can be made. But many leather firms seem to have garnered productivity increases through time-motion studies and the reorganization of assembly line configurations (to the degree possible), and making organizational changes within the firm. Further, they tend to do more out-sourcing, than the other sectors: many firms evaluate which aspects of their operation can be undertaken more cheaply by sub-contractors, without jeopardizing then delegate these functions. Some of the industry leaders repeatedly pointed to the case of the TATA Leather company, which “leases-in” or buys small failing component shops, and then retrofits them for its own use, as an example of how to use flexible work arrangements and production networks can be successfully organized.

The Auto parts sector:

With the arrival of new FDI in the automobile sector in the past decade, the competitive landscape within the small-and medium firm based auto-parts manufacturing sector has been dramatically altered. To succeed in getting orders from buyers (i.e., from the first tier suppliers of Ford, Hyundai and Mitsubishi), firms must improve quality, lower cost, streamline their own supply networks, and improve input quality. To do all of this, firms need to investment more—strategically—and to lower costs to improve productivity.

Technology and machinery upgrades, although necessary, are very expensive. Only the largest most successful firms can afford to make these investments. Yet, quality is of the utmost importance; and ISO designations are very critical for this sector – the nature of the product demands high tolerances, and buyers are relentless in enforcing stringent standards in machined auto parts. Productivity in auto parts firms - at least for engine components - is constrained by 100% quality inspection; manufacturers cannot afford to have even one component fail. On the one hand, this expensive and time-consuming process hampers productivity. Conversely, mandatory quality inspections tend to push rejection rates quite low, so waste tends to be minimal. The auto parts sector appears to have gained the most ground in terms of productivity and quality control with the implementation of a variety of just in time and other “soft” improvements to their institutional arrangements within the firm. Compared to leather or garment firms, which can always sell a sub-par item in the seconds market or at a markdown, in the auto parts sector, flawed components must be scrapped at the cost of the supplier.

Information Technology:
Productivity in this sector is largely determined by two factors: the quality and motivation of employees and their access to the latest equipment and software. In order to maintain/increase productivity, IT firms seem to rely heavily on motivational schemes. They clearly realize that different people require different incentives, and though the largest “carrot” still remains salary, the IT firms analyzed in this study also relied a great deal on rewarding productive employees with increased responsibility and even foreign travel.²

Variance by size

A reclassification of small firms in late 1999 has siphoned off the best performing of the SSI into an alternate category known as “not small” industries. Size is more critical in the textile industry than with the others, where economies of scale are especially critical where large orders are concerned. One mill in particular stated emphatically that they can only survive through securing larger orders - if they fail to attract more large-scale orders within the next year, they will be forced to close down.³

In general, it seems that medium sized firms are poised to succeed - mainly due to their access to capital for technological upgrades, production improvements and marketing capacity. In the leather sector, for example, one small-scale producer found that in order to compete (and ultimately remain in business) they had to upgrade the size of their operation and production capacity.⁴ But, size alone is not a guarantor of success. Smaller firms tend to remain below the government’s regulatory radar and often attribute part of their success to getting away with ignoring and/or bending regulations. On the other hand, larger firms tend to attract the scrutiny of government inspectors cannot easily circumvent labor laws. These large firms tend in the words of one large producer to become “hamstrung” by inflexible policies.

2. Patterns that Cut Across Sectors: Variation by Nature of Markets,

(a) Markets: Sequence and correlation: exports vs. Domestic

Across all sectors, there does not appear to be any particular trend about sequence. Some of the more successful firms commenced operations by serving the domestic markets then later shifting into exports wholly or in part. Conversely, there are firms (generally newer) that have targeted the export markets first. The more prominent trend remains the move from the domestic market to exports, although some of the larger firms that have started to export have expressed an interest in maintaining a presence in the domestic market. This seems more important in the garments and textile sector where recent changes in the domestic market have led the larger players to stake out claims by floating new brands that they hope will become popular.

(b) Domestic competition as a trigger to exports: Conversely, rising domestic competition has pushed some firms to enter export markets. A few textile firms

² SDTechnologies, Interview Chennai, July 17, 2001
³ Interview with Mr. B. J, Tiruppur, July 5, 2001
⁴ Interview with M and RRoy, Chennai, July 10, 2001
have found that increased domestic competition has forced them to compete in the export markets, and for one successful firm it was brand recognition was paramount to their success with international buyers.\(^5\)

3. **Cross cutting findings about the sources of productivity change: Who is doing well and why?**

In this section we list a set of trends regarding productivity and performance that stand out from the field.

1. A striking trend is the **drive toward automation as a way to improve productivity and lower costs**, among many firms, including small and medium firms. Most firms that have increased productivity have said they have upgraded their machines and equipment in recent years.

   Equipment and technological upgrades appear to be a necessity in all sectors for producing both the quantity and quality buyers demand. Capital, financing and access to other credits then become a key factor. It should come as no surprise that the more successful firms are those with such access - whether it is of a traditional institutional source or non-conventional source.

2. **An increasingly important aspect of technological improvements includes software and information technology.** Some firms have adopted sophisticated software that has helped improve productivity. For example, a number of garment firms have adopted the General Sewing Data (GSD) software that enables them to analyze all production stages for a given garment. This allows engineers to maximize the efficiency of the tailors during the production process and set benchmarks for employees.\(^6\) Similar software has been adopted for drawing out life-size patterns from computer-aided designs. One small garment firm used software to design plaid shirts and then to customize it in consultation with its Seattle based buyer through email and file-transport communications.

   These changes are currently happening entirely in the private sector upon the initiative of the firms themselves and their associations. **Most firms reported that they were not aware of any special line of credit, consultancy or assistance from the government for the adoption of software and IT related technologies.**

3. **What are the implications of this for policy?** Technological modernization programs have long been popular instruments of upgrading outdated production systems and improving productivity. The government has a range of subsidized credit lines for firms to purchase new equipment or to modernize existing processes—though not as we noted above, for adopting new IT and other soft technologies. As our interviews showed, automation is clearly widespread among

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\(^5\) Interview with representatives of SSM., Coimbatore, July 6, 2001

\(^6\) Interview with representatives of LSLace, Chennai, July 20, 2001
medium, large and even small firms, across sectors. But fieldwork also showed that automation and technical modernization was not a guarantor of success. We found instances where automation or adoption of new machines was associated with good performance across a broad range of indicators (output growth, exports, lower costs and increased productivity) as well as with firms that were doing quite badly. A clear pattern was that in firms that were doing well, automation was one of several other changes they had made, and in firms that were not doing well, it was often the only initiative. As several other empirical studies have begun to show, productivity improvement and good performance are not a matter of diffusion of technology per se, but its effective use and employment, as we will see below.

4. Successful firms, especially those who export, are taking the new conditions of competition very seriously. Especially new firms, most of them small, who began exports in the post-liberalization period repeatedly said that they considered three factors as critical to their continued export success: **attention to price, product quality, and delivery times.** What assures good quality? Managerial vigilance, work organization, quite sophisticated equipment and the use of high quality inputs, and good labor relations.

5. A trait that ran across better performing firms, such as the above, was that they were associated with **buyers who did not hunt for the lowest price**, but were “willing to pay a bit more” for good quality input use, good and consistent performance with respect to quality, timely delivery and flexibility. As one garment firm whose price was higher than that of local competitors noted, their price was admittedly higher, but their focus on quality and timeliness in delivery kept their buyers happy. Firms of this sort seem to be prepared to take cuts in their profit margins in the short run to maintain relationships with their buyers over the long run. This often leads to innovative collaborative agreements between buyer and supplier. For example, as one Tiruppur based producer of garment-labels explained, the government imposed an 11% tax on labels in June of 2001, which pushed up its production costs. The firm called its buyers and informed them of the dilemma and the implications for price. Together the supplier and buyer decided that rather than cut the labels into individual pieces, the supplier would keep the uncut labels as large rolls of woven fabric as they came off the machines. This would qualify not as “labels” but as narrow woven fabric, and hence would not be subject to the tax. The buyer would then send the labels to a job-worker to be cut to size. Since this would be a job-working operation it would again not be subject to the label tax.

The ties between the buyer and supplier clearly were open enough for them to be able to work out a joint solution to circumvent the tax and keep prices low. The supplier noted that not all buyers agreed to such an arrangement, and simply did not want the hassle of developing a new link in the chain to process their labels. In such cases the
supplier agreed to cut the labels but passed along the tax to the buyer, as one would in a more hands-off relationship (Manoj Interview, July 2001)

6. **Producing standardized base products vs. value added** In general, firms that can provide a value-added product tend to perform better. The only exceptions to this general rule seem to be those firms with a very robust buyer-seller relationship - yet even this is change rapidly. Strong long-term relations between buyer and seller are becoming especially critical even for firms that produce base products, such as raw leather or gray cloth. In the face of increased global competition, producers of base products in Tamil Nadu are relying more and more on these relationships as the glue holding their buyers’ loyalty. However, with final WTO changes forthcoming and the lifting of quotas, international buyers are finding it increasingly hard to maintain their traditional loyalties.

7. **Branding**: In both the garment and leather sectors, several of the more successful firms have come to the conclusion that branding is critical for the long-term growth of their business. Firms that pursue this goal tend to focus on the domestic market due to the generally higher costs of creating brand recognition in the export markets. Both Ambattur Clothing and Gaitonde Shoes are examples. In the face of diminishing buyer loyalty, these firms believe that through creating a demand for their specific product they will be more apt to survive after final WTO changes come into full force. In addition to size, starting one’s own brand seems to demand both sufficient capital and industry know-how to succeed. Marketing savvy is also a must. Most small-scale firms in nearly all sectors seem to lack these critical ingredients.

8. **Training**: across all sectors, there is a growing appreciation for the need for training. Much of this is technology-driven. Firms are acquiring more sophisticated equipment that requires more specialized knowledge to operate. In addition, firm owners are gradually coming to the realization that a more educated and highly skilled and adaptable workforce is preferable to that, which is less skilled. Conversely, many of the newer sophisticated machines used by various sectors do not require a great deal of skill to operate.

9. **The battle over labor**: Labor remains a bone of contention across all sectors. There is a near unanimous feeling that firms should possess the power to hire and fire employees as production demand rises or falls. Some firms have claimed that their productivity has been constrained due to the labor policies; several firms in both the garment and leather sectors have mentioned they had to turn away business out of fear that they would become permanently saddled with the additional labor required.

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7 Mr. K.Y.G Interview, Chennai, July 14, 2001
to complete the job. There is widespread use of contract labor for non-production aspects, such as housekeeping and maintenance; in the garment industry, for example, it is not uncommon for firms to not have their own workforce. Rather, they outsource all their labor needs with independent contractors who in turn provide the laborers. Some of the more successful firms have been able to limit their labor cost by offering time off without pay. Given their 6-day work schedule, many employees seem eager to take time off without pay during slow periods to visit family.

The more successful firms - especially in leather and garments - have started providing various employee benefits as a way to improve productivity and cut down on labor cost. It is increasingly common for the larger firms to provide transportation to/from the worksite, an on-site canteen, limited health care and day care for children. However, it is only the larger cash-rich firms that can afford such luxuries for their employees. Ambattur Clothing, for example, has noticed a marked reduction in absenteeism among its employees since opening their health care and day care facilities in Ambattur: absenteeism fell from 12-13% down to 3-4%.

There is clearly a relationship between good human resource practices, labor productivity, and labor retention. For some innovative firms, what they do with training fits in with “bigger picture” of the firm’s success – and their own conception of their identify: as having more rounded skills; having higher skilled workers/more educated, etc.; paying workers more and sustaining an image of an labor and environmentally conscious producer. One Tiruppur firm supplying to a labor conscious Scandinavian buyer for the past ten years has helped establish two free schools in Tiruppur with the help of its buyer. Even government agencies, like the Handloom Board that has de-facto nurtured this image have experienced a boost in export orders from overseas buyers who worry about child labor and worker exploitation.

At the other end, we find that incentive programs are essential to pass the benefits of this image on to their workers. Most successful firms have some incentive-based program, and those that don’t are either experimenting with, or formulating such plans. While remuneration generally takes a monetary form, a number of firms have successfully experimented with more intangible forms of recognition, such as an award or other forms of recognition. Incentive plans follow both the individual as well as the group format - with some innovative firms combining both methods. One innovative leather firm created a two-part individual and group incentive plan that helped increase productivity: production workers were given color-coded nametags that represented their pay scale (based on individual output). For example, people with blue nametags are rewarded with a higher wage than those with red nametags. The firm found that this highly transparent program was motivating production workers to compete against one another on an individual basis. At the group level, this firm has three assembly lines - with each “team” competing against the other.

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8 Interview with Dr. ZS, Chennai, July 30, 2001
9 Interview with Mr. B.J, Tiruppur, July 5, 2001
10 Interview with representatives of AC, Chennai, July 25, 2001
11 Interview with representatives of KS., Chennai, June 13, 2001
These findings resonate with recent research on workplace practices and their effect on productivity. One US-based study found that (a) what is associated with higher productivity is not so much whether or not an employer adopts a particular work practice (or incentive system), but rather how that work practice is implemented within the firm. For example, adopting a TQM system has an insignificant or even negative impact on productivity unless the proportion of workers involved in regular decision-making within the plant is also high. (b) Similarly—a finding that is particularly relevant to Tamil Nadu’s textile industry—is that firms with more traditional unionized labor-management relations with little or no direct participation of employees in decision-making have substantially lower productivity than unionized plants that have adopted new workplace practices including incentive-based compensation. (c) Finally, this study finds that the establishment of practices that encourage workers to think and interact in order to improve the production process are strongly associated with increased firm productivity (Black and Lynch 1997).

Specifically with regard to the adoption of IT in the firm, the study finds that productivity increases are associated quite directly with the greater diffusion of IT, e.g., computers, among non-managerial production workers: although the proportion of managerial workers who use computers is found to have no impact on labor productivity, the greater the proportion of non-managerial workers who use computers, the higher is plant productivity. Similarly, while higher employee turnover is associated with lower firm productivity, the opposite is true for time spent on providing workers with off the job training: the proportion of time spent training workers off-the-job (e.g., via technical institutes and community colleges) raised firm productivity in the manufacturing sector (Black and Lynch 1997).

11. What do “good practices” look like? Findings about specific sources of productivity improvement, and cross-sectoral commonalities.

Several themes stand out from the firms we interviewed which indicate specific practices that successful and well performing forms appear to have adopted. Some of these practices are more important in some sectors than others, but taken together they present an important portrait of Tamil Nadu’s best performing firms.

(a) Perhaps the most definitive “good practice” that correlates with success in all sectors is a firm’s is the one that is non-economic: it is commitment to “constant improvement.” While there may be failed experiments along the way, such a strategy appears to invite success - at least relative to the competition. From a financial standpoint, constant improvement takes the form of reinvesting profits back into the firm. Even when this impetus is top-down, successful firms have succeeded in diffusing this attitude throughout the firm.

(b) Adopting the latest most efficient technology strategically. Where possible, the more progressive and innovative garment firms, for example, have all shifted to using IT-supported technologies such as CAD-CAM computer equipment for laying out patterns.

12 Mr. V. C, Interview, Chennai, July 26, 2001
Such sophisticated equipment allows firms to reduce fabric waste when cutting out pieces; firms using such equipment now realize nearly 85-90% usage of the fabric.\(^{13}\) A striking feature of these firms is that they do not rely on new technologies as a panacea for growth, but embed the technology in a host of other good practices—organizational as well as behavioral.

(c) **Decentralization in decision-making**, primarily surrounding quality control. One leather firm in particular puts all employees “on an equal footing…and there is absolute transparency.”\(^ {14}\) While not consistent across all successful firms across all sectors, in general the industry leaders have some form of incentive plan for employees. Some of the more successful firms have managed to convince their production workers that they also have a vested interest in how the firm does. One manager summed it up by saying that one must “treat your staff as if they are family… as if it’s their own company.”\(^ {15}\) Such paternalistic management strategies tend to elicit greater productivity and better quality outputs regardless of sector. This strategy has helped the more successful firms maintain quality; management and quality control personnel cannot be everywhere at all times. As one manager put it, he’s trying to “teach his people to think - to anticipate and correct problems.”\(^ {16}\) Such quality-oriented ideology is often transmitted to production and non-production workers alike through in-house training programs and training facilities - another common trait of highly successful firms.

(d) Traits (a) through (c) if summed up together seem contradictory: the issue of contract labor; new equipment; dedication and commitment to employees, efforts to make them part of the team; and incentive programs. Yet a common thread is that there is a relentless desire to improve among these firms, and a deep dedication to their product, as well as to lower costs as the markets seems to demand. This combination may not match our expectation that “all good things should go together.”

(e) Many **successful new firms are generally those established or supported with the aid of the buyer**. In some cases, international buyers have come to Tamil Nadu and - directly or indirectly – and set up dedicated supplier firms. Through such practices, buyers have successfully introduced internationally accepted systems of production and human resources—a pattern that is often found in the literature on productivity improvement and international exposure.

(f) **Timeliness in delivery** of product and “beating, not just meeting deadlines.” “If the buyer wants the product by 6:00 PM, we make sure it’s delivered by 5:30.”\(^ {17}\)

(g) **Accessibility between buyer and producer is paramount**. International buyers require up-to-the-minute updates. This requires constant and transparent communication from the producer. The more successful firms (including in the small scale sector) make themselves available at all hours to take calls: “even when sleeping, it’s o.k. to call…”

\(^ {13}\) Interview with representatives of ACLtd., Chennai, July 20, 2001
\(^ {14}\) Interview with M and R.R., Chennai, July 10, 2001
\(^ {15}\) K.S.S Interview, Chennai, July 9, 2001
\(^ {16}\) N.K.D Interveiw, Chennai, July 10, 2001
\(^ {17}\) S. Manoj, Interview with Angel Agencies Pvt./Crown Labels, Tekie Industrial Estate, Tiruppur, July 3, 2001
Buyers tend to appreciate constant and accurate updates - even if the news is negative. Although they often can arise during production, buyers try to avoid unforeseen surprises. When they occur, the more successful firms notify the buyer immediately and try to offer solution options. Buyers appreciate such updates tend to stick by those suppliers who keep them constantly apprised of their job.

(h) **Diversified buyer base.** The more successful firms across all sectors tend not to rely upon one or two major buyers. This is consistent with the view that dependence on a sole buyer is risky for a supplier, especially if they are small. Yet, there are some striking examples in Tamil Nadu of just the opposite circumstance: instances where some of the most successful firms are those that have relied on a single buyer, for example, the Prem Group of industries in Tiruppur. The surprising finding, then, was that whether a firm had a single primary buyer, or multiple buyers did not seem to be the key predictor of a supportive, long-term and quality-and learning oriented relationship. More important was whether or not the buyer cared about and valued something other than low price, and was willing to work with the supplier to implement that alternative vision of the “good firm.”

(i) **Equally important is a simplified supplier base:** Maintaining quality consistency and managing delivery logistics is much more of a challenge for those firms with a large and ponderous supplier base. Drawing from a few yet highly reliable buyers allows more successful firms to improve productivity and lower costs. Management spends less time devoted to such needs and quality is easier to monitor.

(j) Good performance is also associated with the practice of being proactive rather than reactive to both opportunities and challenges. Rather than wait for problems to arise, the more successful firms tend to anticipate and resolve potential trouble spots or weak links in procurement, production and delivery before they occur. This benchmarking process at the more successful firms tends to be methodical and includes all staff levels and is often tied to an incentive program.

(k) **While the bigger picture is important, the most successful firms across all sectors tend to also focus on detail.** Consider the textile industry in Tamil Nadu where energy costs have been rising by 10% annually. Firms have been able to limit costs by implementing numerous small changes that collectively save on expenses. One firm, for example, formerly used spindles on its machines that weighed 435 grams. They found that by converting to lighter weight spindles they could recoup the installation cost within 2-3 years through energy savings. Other small details include converting incandescent bulbs with fluorescent and changing out high horsepower motors with those requiring less power. Individually, such changes may not make any appreciable difference, but collectively such practices can help firms to realize some noticeable savings.

(l) **Flexibility and quick adaptability are clearly key:** Ambattur Clothing, for example, makes use of a skills matrix of its tailors. The firm tracks each worker’s specific skills.

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18 Mr. M, Interview, Tiruppur, July 4, 2001
19 Interview with representatives of The LM., Coimbatore, July 5, 2001
and provides cross training to make them more adaptable to future clothing orders.\textsuperscript{20} Another firm maintains a similar approach: they rely largely on a specialized workforce but utilize one group of employees cross-trained in all facets of production. These people are used to fill in wherever and whenever there is a personnel gap or special need in the production line.\textsuperscript{21}

(m) Whether they are large or small, the more successful firms seem to possess more than just a \textit{willingness to learn}. Rather, they have a proactive and very zealous desire to seek out best practices in the industry, to adopt and adapt where possible, and to even improve beyond that which they have learned. A number of small-scale firms have, for example, arranged visits with competitor firms abroad (often with the help of their buyers). Others, such as Ambattur Clothing, possess commitment to constant improvement; management asks anyone and everyone they meet for constructive feedback on their operation. This passion to excel must come from the very top, but it must also filter down for adoption to all staff levels; One highly successful firm in the auto part sector has thoroughly dedicated itself to “being the world’s best manufacturer of quality push-rods.”\textsuperscript{22} Despite current and forthcoming challenges, even the smallest of firms with such outlooks tend to exude confidence that will likely continue to attract buyers.

(n) \textbf{Marketing} remains a critical component, and the more successful firms devote significant time and effort to it. Some of the smaller firms may lack the sophistication and know-how, yet the more successful small firms make some effort. Use of the Internet for locating new buyers is used by some firms, but not all. Although some remain skeptical, adoption of such communication tools as e-mail are now considered essential.

(o) \textbf{Treating Standards as a disciplining mechanism and a learning tool}: The ISO designations that so many buyers now require of their suppliers, have been helpful for successful firms to learn from. Firm owners may possess the desire and wherewithal to excel and compete in the global markets, but they don’t always know how to go about it or how to prioritize the necessary steps. \textit{International} standards, such as ISO and other labor and environmental standards help provide much-needed guidance – virtually a checklist to follow. It is clear, however, that more is needed than just meeting these milestones. The more successful firms across all sectors seem to have a very strong, ongoing commitment to develop their product and expand their market share.

(p) \textbf{How do successful firms cut costs?} For many smaller firms, the main expenses are (1) electricity, (2) labor and (3) Input costs. Sources of improved performance come from \textit{streamlining of logistics and transportation}: a thorough analysis of routes, schedules,
changes in trucking and subcontract ties; and Waste elimination programs, energy audits. Other changes include:

(1) Automation and the adoption of newer technologies; but rarely in isolation from broader changes. For Tiruppur based firms financing was much less a problem than what the members of SIDBI generally said about the lack of credit for small firms.

(2) A focus on building an image of reliability and consistency—prices, quality and timely delivery.

(3) A focus on soft technologies – logistics, and trucking, waste elimination, energy audits – efforts to economize on capital and cut costs.

Human capital and organizational changes: Employee incentives, suggestions, skill development, and also the use of labor saving technologies. One firm said its good labor relations allowed it encourage its workers to take time off without pay during slow weeks in ways that are mutually negotiated with the firms and do not violate state regulations or alienate labor unions. Other firms are substituting technology in administrative and coordination tasks, replacing workers. One firm reported how it used to have 3 people in is accounting office, but was able to cut costs by replacing two employees with a computer. It has similar output as before at lower costs.

(q) Is there a sequence of events that has led to increased productivity among the more successful firms? Discussions with firm owners suggested that the first really critical step was their desire and/or need to engage in the export market. Prior to this, there seem to have been fewer real incentives to be highly productive or efficient: the export markets demanded such improvements where it was less critical for domestic production. This desire to export necessitated the acquisition of modern and efficient methods of production - technology and equipment.

Then during the 1990s, there appear to be two additional factors - acting almost in tandem - that led to increased productivity among production workers. First, firm owners and operators quickly realized that the level of quality being demanded by the global markets could not necessarily be satisfied through technological upgrades alone. Individual employees still held the key. There was thus a natural concern on the part of firm owners/operators to improve the quality of workmanship and service by their employees; this led to various quality training schemes. Second, during the past decade there has been a growing awareness among buyer nations of workers’ rights and conditions. I believe that this trend precipitated various “open door” and/or participatory programs and motivation schemes for employees, which seem to have led to further productivity increases. All of these factors are quite difficult to separate, though, in that they pretty much occurred simultaneously. Further, most successful firms who intended to export made the decision to use the ISO certification process early enough, and this provided the guidelines (both tangible and intangible) for improving productivity and quality.

Section 4: Conclusions: Some final thoughts on the link between good practices and outside institutions:
We conclude the paper by examining the relationship between two key institutions, business associations and government, and good performance by firms in Tamil Nadu, and what issues the above discussion raises for policy.

**Associations - their role and effectiveness (or lack thereof)**

A primary role of business associations in Tamil Nadu has been to help influence government policy on behalf of their constituents. Some associations have played a much wider and quite effective role in preparing their member firms for the changing competitive pressures they now face. In the leather sector, for example, CLE has consistently played a much more diverse role than merely lobbying the government. In recent years it has played a powerful role in conjunction with CLRI and the industry to manage the two recent crises that the leather sector faced—the banning of PCPs by Germany and the ruling by the Supreme Court to install effluent treatment plants in the tanning sector. TANSTIA, similarly has played an increasingly progressive role in helping small firms adapt to a changing world.

But associations in other sectors can do more. Especially in taming the often-cutthroat competition that can lead to under-cutting and a spiral of unhealthy decline.23 Local associations can do much to diffuse the destructive aspects of fierce competition and help to encourage both inter and intra-sectoral linkages and the sharing of innovative ideas and approaches to common problems. For example, at the annual Small and Tiny Industry Convention (STICON) in Madurai, there was a great opportunity for firms of all sectors to interact and to form linkages by sharing common ideas and best practices from across the world. Such ideas can only be shared and learned via frequent and frank interactions (both formal and informal) between firms in all sectors.

Associations can play the role of trainer or provider of know-how. This can be done directly or via contracted field-specific experts. For example, Tekic Industrial Park in Tiruppur facilitates new skills training for its membership through the Industrial Training Institute. Associations can potentially fund such programs through government sponsorship and/or appropriate external sources, such as the World Bank, USAID or even major domestic and international buyers.

Access to capital remains in high demand among small producers. Associations could potentially help to negotiate, arrange or facilitate financing packages for members - either group rates. At a minimum, they can help to disseminate information concerning the most favorable rates then available through various sources.

**Productivity Improvements and the Role of the State**

We were repeatedly struck in our field interviews about how many firms appreciated what government had done in several areas to improve Tamil Nadu’s business environment: improved roads were the most often cited example of where the government had been of help. Interest rates—even access to capital—modernization funds, land availability and education and training were also areas that firms felt were

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23 S. M, Interview, Tiruppur, July 3, 2001
less of a problem at the present time. But many problems remain, and firms want
government to both do more, to be more strategic, and also be less visible. The most
aggravating problem cited by virtually all firms was hardly a surprise: it was the
“plethora of laws which can only be observed by default.” This was closely followed by
“antiquated” labor laws, and problems with ports and electricity.

The striking, but not uncommon, feature about most of the complaints that firms had
was the unpredictability and uncertainty surrounding government action. For example,
nearly all respondents felt that there are far too many separate interactions with too many
separate agencies that firms were required to undertake on a regular basis, and this is
costly for business. But more than the number of agency interactions required to operate
most debilitating was when rules and policies were changed without notice or warning.
Similarly, firms that complained about access to credit said that high interest rates were
not such an issue, more debilitating were the bureaucratic delays in disbursing funds.

Many firms emphasized the need to streamline all certification processes into a one-top-shop
interaction with the state government. When asked about Guidance’s role in this regard, firms
thought Guidance’s role was different. Agencies like Guidance were doing an important job of
providing centralized information about production rules and regulations, but the common
perception was that Guidance was set up more to market the state to prospective firms that
wanted to locate in Tamil Nadu; it was not a single-window agency for firms that were already
located in the state.

Several firms stressed the need for the government to communicate any changes in its policies
not only to business associations, but also to all relevant government agencies who themselves
often remain unaware of current policy. Some made suggestions about new ways in which the
state could help firms comply with new and emerging regulations, such as those related to WTO
agreements. One firm for example, suggested an important way in which government could help
provide more effective training for small-scale firms: Providing a subsidy to small firms for
hiring professional consultants, such as in marketing, to help interested firms prepare themselves
for WTO compliance.  

There seems to be a very real need for government to improve its coordination and
communication between various agencies. For example, some firms reported how they felt that
while the work of the Pollution Control Board was essential, implementation could be smoother.
Once policy has been set, it is important that the new laws are effectively communicated down to
all levels within an agency. One firm, for example, found that they were being charged for
imports from Korea despite the official policy negating such charges. This same firm also found
that in order to expedite their imports and exports, they had to submit photocopies of the relevant
legislation to customs officials because these agents seemed to lack the latest applicable
version.

The most vocal complaints emerged around problems with ports. Most firms complained
especially vigorously about Chennai port. The port was too bureaucratic; the decisions made by
local inspections teams were arbitrary and time consuming. Often these delays led to the loss of

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24 Mr. W.R. P Interview, Chennai, July 11, 2001
25 MJ interview, Chennai, July 21, 2001
a whole order simply because it could not be shipped on time even though it was manufactured on time. One firm reported how shipments are often held at the Port for at least a week in the Port’s go downs before it is loaded. This delay is to allow customs officials sufficient time to do the inspections. From the perspective of the firm, the actual dispatch of the goods from the Port happen two or three weeks after the goods leave the factory. This made it harder for them to plan Just-in-time deliveries and respond to last minute changes by their clients. Many firms reported resorting to the use of smaller ports (Tuticorin) even if they are further away than Chennai.

What explains this problem at Chennai Port, other than the standard explanations of bureaucratic ineptness? One insightful explanation came from a government official. The official said that Chennai port was originally designed to handle bulk freight—such as minerals, resource-based goods (coal, iron and steel), and grain. Now, the major emphasis is on container shipping. Therefore, the equipment at the port was a major problem because it was not suited to the new functions of the Port. Overhauling all the basic equipment is a costly process. Several critics have called for the privatization of the Port as one option. But from our interviews, it does not appear that privatization is enough to solve the problem; it does not automatically lead to good or ensure good performance. One government official noted that freight forwarding and clearing had indeed been privatized in the Chennai port. Despite this, performance did not improve, because, according to him, the problem is inadequate capacity and unsuitable equipment. However, partial privatization does not generate any incentives for the private operator to enlarge its capacity or add new equipment. “Why should a freight forwarder invest in expensive equipment such as forklifts that might improve port efficiency? It is cheaper for them to simply hire a group of 20 men to do the same work. It may be primitive and slow, but it is cheaper for the forwarders to operate this way” (Interview, 2001). Clearly, there are deeper state-center issues involved here, than the panacea of privatization would suggest.

In many ways, the government appeared to follow industry rather than industry following the lead of policy-makers. In the past, the government encouraged the formation of industrial estates. It was striking how many firms that are doing well—across sectors—are located in industrial estates. Despite complaints about municipal garbage collection and infrastructure problems, most firm acknowledge the importance to them of being part of the industrial estate. Not the least of which is access to estate-wide services such as day care centers and creches that the government now requires of all firms beyond a certain size threshold. However, despite recent efforts by the state to provide new industrial estates, it appears that there is a shift toward greater involvement of the private sector in which various industry sectors may have surpassed government’s lead. For example, Infosys recently located one of its major facilities in the “Silicon Valley” of Tamil Nadu (near Chennai). Infosys was not following the government’s lead nor locating in the area as a result of government incentives. Infosys had moved to the outskirts of Chennai to find more affordable land for its facilities. After the firm moved there, the government came in with infrastructure support. One difficulty, of this “catch-up” for example, is that the roads to this “Silicon Valley” are now inadequate to handle the traffic coming to this region. Further, Infosys and other IT firms in this area have had to pressure the government to extend bus service to this area. A more negotiated relationship may have averted these negative externalities, or at least alerted the
government to a need to provide new serviced land for firms looking to expand in less expensive areas near the city.

Tekic in Tiruppur, and the Mahindra estate in Chennai are recent examples of efforts by the private sector to fill what they perceive is a gap in the provision of serviced land. This competition between government (SIPCOT and SIDCO) sponsored industrial estates and private sector providers may indeed be a healthy sign, provided the government can capitalize on the momentum and try to fill the most glaring hole in the industrial estate system—of helping to locate small and tiny firms in well functioning sites near their large suppliers.
References


Transcripts of 42 interviews conducted in Chennai, Tiruppur and Coimbatore in May – August 2001 by Jeffrey Goebel and Meenu Tewari.