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Small Manufacturing Enterprises in Developing Countries

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Emphasis is often placed on the promotion of small enterprises in developing countries, particularly as a means of improving the lot of unskilled workers. This focus raises questions about the relationship between establishment size and the pattern and efficiency of factor use, and about the nature and effects of price differentials in factor markets. This article goes some way toward answering these questions with data from surveys of small manufacturing enterprises in India and Colombia sponsored by the World Bank and relevant material from other countries. The article also examines India's long-standing policy, unusual among developing countries, of providing special support and protection for small enterprises. Analyses based on disaggregated data found that small firms are not reliably more labor-intensive than their larger counterparts; nor are they consistently more technically efficient in their use of resources. In light of these findings and an analysis of factor markets, this article discusses the general implications of the research results for industrial policy in developing countries.

This article is about the relationship between the size distribution of manufacturing industry in developing countries and the nature and efficiency of production processes. It does not purport to be a comprehensive survey of analyses of this relationship. Rather, it discusses the findings of World Bank surveys conducted in India, and assesses their broad implications with additional information provided by associated studies in other developing countries and relevant experience in developed countries.

Concern here is not with the concentration of economic power, and hence

The author, a consultant to the World Bank, is at the University of Oxford. This article is based largely on the book *Small Manufacturing Enterprises: A Comparative Study of India and Other Countries* by I. M. D. Little, Dipak Mazumdar, and John M. Page (forthcoming). The analysis and results reported on here are predominantly the work of Mazumdar and Page, although they are not responsible for the interpretations and conclusions reached. These are the author's; and in addition to the specific research results reported here, they draw on direct observations over many years of economic policies and development in developing countries. Other major outputs based on the same research are Anderson and Khambata (1981); Anderson (1982a, 1982b); Cortes, Berry, and Ishaq (forthcoming); Ho (1980); Mazumdar (1984a, 1984b); and Page (1979, 1984). References given in the present article are mainly to Little, Mazumdar, and Page (forthcoming) and occasionally to Cortes, Berry, and Ishaq (forthcoming). These works must be consulted for original sources.

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with the size distribution of *firms* and patterns of ownership, but with the size distribution of plants or establishments. However, the terms "enterprise" and "firm" are also often used; in the vast majority of cases small establishments in developing countries are independent firms.

The central issues discussed here are whether smaller enterprises use resources more efficiently than larger enterprises, and if so, for what size ranges this is true, and what might constitute an appropriate approach to industrial policy. This amounts to a concern for the best use of a country's productive resources, including labor. Any inquiry into the efficiency of resource use is an exercise in applied welfare economics. It should not need to be stressed that this framework of analysis and the concept of efficiency of resource use are not in conflict with concern for the poor.

The best use of a country's resources involves more than the efficient allocation of a given stock of capital and labor. Savings and the training of workers and entrepreneurs may influence and be influenced by the size distribution of industrial enterprises. These dynamic relations were not the central concern of the research, but where some light was thrown on them or more generally on the determinants of growth or efficiency, this is mentioned.

India has had by far the most varied and forceful set of industrial policies aimed at helping small-scale enterprises of any developing country. These policies are described, and their results assessed, below.

What do we mean by small? Size is most commonly measured by the number of workers. In industrial countries small-scale often means less than 200–300 workers. In developing countries, however, the average plant size is smaller, and "small" will generally be taken to mean 1–49 workers. Sometimes much finer distinctions are necessary, both up and down the scale, and will be introduced as required. Size may also be measured by capital employed, and for some purposes this may be a more appropriate measure. It is used for policy purposes in India, but even there size distributions by capital employed are rarely available. Both the availability of statistics and the fact that employment size is more easily envisaged make it the dominant measure.

I. Increasing the Demand for Unskilled Labor

The central issue examined is whether the promotion of small-scale enterprises (SSEs) in developing countries is a good means of reducing poverty and inequality, insofar as it would result in an increased demand for unskilled labor. This was not a major concern of development policy until the late 1960s, when international institutions and some private development propagandists claimed to discover massive and rising unemployment in developing countries. The International Labour Organisation's (ILO's) World Employment Program was then launched. The concern for employment was soon linked to advocacy of SSEs, which were believed to offer much more employment than larger firms for any given investment.

As a part of this trend, the ILO's Kenya mission took up and popularized the concept of the "informal" sector. Discussion of how it should be defined, and of its role, has filled thousands of pages. But whatever exactly it was, it was accepted that it was labor-intensive, that it provided goods and services by the poor for the poor, and that it should be encouraged rather than being regarded as an unproductive slough that development would and should eliminate. However, I have not found the informal sector to be a concept that is of either analytic or operational value, and I do not use it.

Apart from the informal sector, there was much conceptual and analytic confusion as it came to be recognized that unemployment was not closely related to inequality or poverty, and that the evidence for any general increase in unemployment was weak and even false. One need not follow the changes in emphasis in international forums from unemployment to inequality to poverty. It suffices to say that a consensus has formed within the international development establishment in favor of a pattern of development that is more demanding of unskilled labor, and that the case for this does not depend on evidence of either unemployment or underemployment. Essentially the case made is that in developing countries a minority of people work with a lot of capital (or land) while a large majority work with very little indeed and can thus earn very little. If new investment called for more participating labor, more work would be done, real wages would rise, or both would occur. In any case, unskilled (or initially unskilled) workers would benefit. This is a consensus with which I am in full agreement.

Thus the main argument for encouraging small-scale enterprise development as a means of reducing poverty and inequality rests on the increased demand for unskilled labor that is supposed to follow.[1] It is clear, however, that output and, more specifically, the productivity of unskilled labor must also be considered. If small enterprises used both more capital and more labor per unit of output than larger enterprises, then investment in small enterprises would result in a smaller increase in output than investment in large enterprises and there would be no clear case for special investment in SSEs. Similarly, it is not sufficient to show that SSEs use more labor and no more capital per unit of output than do larger enterprises. This being so, one could as well employ more workers to do nothing in large factories (as is indeed often done) as employ them "productively" in SSEs. Labor almost always and everywhere has some opportunity cost—that is, if not employed wherever it is, it would somehow earn some money and produce something elsewhere. There is thus no escaping the fact that the case for promoting any particular type of enterprise is that it uses factors more efficiently, given their social costs. The so-called employment case *for* SSEs must rest on this. There will certainly be a strong case *against* SSEs if they are shown to use both more capital and more labor per unit of output: if such is the case, then one

1. It is also argued that SSEs produce goods that are more appropriate for the poor than do larger enterprises. The significance of this argument is recognized, but it is not discussed in depth in this article.

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could only advocate the promotion of SSEs in order to increase the demand for labor if there were no way of increasing labor demand without reducing output—which is in general false.

Hence, to establish a case for special encouragement of SSEs, it must be claimed that (1) smaller enterprises are both relatively labor-intensive (low capital-labor ratio, K/L) and have relatively high capital productivity (output-capital ratio, O/K), low labor productivity (output-labor ratio, O/L) being implied; and (2) that these characteristics represent a more efficient use of capital and labor. If production functions are homothetic and profits are maximized,[2] then the first claim implies that small firms face a lower price of labor relative to capital than larger firms. Further, it implies that these resources are more efficiently employed if this lower relative price of labor is closer to its relative shadow price than is that faced by larger enterprises. This assumption implies distortions in capital or labor markets, or in both.

The above paragraph raises questions that are discussed in the next four sections. First, what are the facts concerning relative factor proportions and productivities? Second, if small and large enterprises face different wages should this be regarded as a distortion? Third, are capital costs similarly distorted? Fourth, are the facts about factor proportions and productivities consistent with differences in factor prices? Before turning to these questions I conclude the present section by pointing out that any case for reform to support SSEs will be strengthened if it can be shown that government policies, whether macroeconomic or industrial, have discriminated against small enterprises.

With the exception of India (the policies of which are examined in a later section), developing-country governments have shown little real (as opposed to cosmetic) concern for SSEs. Industrialization has been promoted in three main ways: first, by regulating trade; second, by legislating investment incentives; and third, by directly undertaking public sector investments, often with foreign aid or commercial loans. All of these policies have discriminated against SSEs. Foreign trade and payment controls have discriminated, since large firms are better placed to obtain import permits for capital equipment, components, and raw materials and are also better able to obtain the tariff rebates that are intended to alleviate some of the harmful effects of high protection. Investment incentive laws have sometimes actively discriminated against the small, by restricting their tax concessions to firms of some minimum, generally large, size. Where there has been no such overt discrimination, small firms have nevertheless often been ignorant of the concessions obtainable or unable to handle the paperwork needed to make an effective case to the public office concerned.

Selective credit controls combined with low, controlled real interest rates have the consequence that banks have not been able to compensate for the higher cost

2. In homothetic production functions, if relative factor prices are the same for large and small firms, then relative factor proportions will also be the same. Evidence presented in section II of this article suggests that production functions are homothetic for at least some of the industries surveyed. The possibility of differences in firms' technical efficiency should also be recognized (see section VI).

of small loans by charging more (higher collateral requirements not necessarily being a feasible alternative). The limited credit has therefore been allocated to large clients. Finally, when governments have directly promoted industrial investments, they have favored the large project even when it would be owned and operated by a private enterprise, whether foreign, local, or a joint venture.

Bias can also arise because the problems of dealing with the tax authorities and with governmental regulations weigh more heavily upon small firms, even in the absence of trade controls and industrial promotion. However, the hand of the law and the tax collector may often fail to reach the very small (say, less than ten workers) in most developing countries. When this is so, nonenforcement of taxes and of some regulations such as those governing minimum wages or working conditions will constitute a bias *in favor* of the very small (though this in turn may sometimes be outweighed by harassment of the small under zoning regulations in urban areas). Thus, taxes and regulations are likely to weigh more heavily on the small modern factory employing ten to fifty workers than on either the large factory or household/workshop activities.

Government concern for SSEs should be reflected in measures to offset the disadvantages imposed upon them, even if this does not involve major liberalizations of trade and industrialization regimes so as to remove these biases "at source." Indeed, in most countries, some such measures have been implemented. Some credit institution has usually been set up to lend to small and medium-size enterprises (the medium-size being favored in practice for the reasons already given). Industrial extension schemes, management training institutes, and industrial estates (the latter not always mainly for the small) have been started in many countries, often supported by the United Nations Development Programme, ILO, or some bilateral aid agency. Even where these have had some success, however, their reach has invariably been very limited, if only because of the difficulty of communicating their existence to all possible recipients. This applies also to the provision of institutional credit. Small firms (less than fifty employees) get very little of the credit reserved for the medium-size and small, and the very small (less than ten) almost never get any medium- or long-term loans. Except in the case of India, where some exceptional measures protect traditional industries, it is safe to conclude that the measures targeted to favor small enterprises have negligible positive impact relative to the negative impact of the general economic policies of governments.

However, the question remains open as to whether a bias against the small also amounts to a bias in favor of capital-intensive development. The contrasting experiences of India on the one hand, and the Republic of Korea and Taiwan on the other, suggest the opposite. India has done much to preserve and encourage small enterprises, and its industrial development has been very capital-intensive. Korea and Taiwan have done very little for the small, and tiny manufacturing enterprises have almost vanished. Medium-size and large enterprises accounted for the bulk of the extremely rapid rise in employment in these economies. For instance in Korea between 1963 and 1975 there was a rise in manufac-

turing employment of over 1 million persons, 86 percent of which was accounted for by firms with over 100 employees. The smallest census size group, 5–9 workers, showed no rise (Ho 1980). Moreover, large-scale industrialization was compatible with capital-output ratios that were among the lowest achieved by any economy.

To summarize, the prima facie case for policy interventions in favor of SSEs as a means of raising overall welfare in developing economies must rest on evidence that small units on average use factor inputs more productively than their larger counterparts, so that a shift of resources in favor of smaller units would yield a net increase in output, as well as an increase in the demand for unskilled labor. This is not to deny that income distribution is an important consideration; indeed, an increase in the demand for unskilled labor is probably one of the most effective means of improving distribution. However, this topic and the related claim that small enterprises produce goods more appropriate for the poor than do large enterprises are not considered in this article.[3]

II. Firm Size, Factor Proportions, and Productivity—Some Findings

I now address the first of the questions posed in the previous section: how do factor proportions and productivities actually vary with size? I first consider manufacturing in the aggregate and summarize evidence from industrial censuses for Japan and eleven developing countries.[4] With only a few anomalies, capital intensity and labor productivity rise with size. But capital productivity quite often behaves unexpectedly. In Japan, it rises from the smallest size class (1–9 workers) to peak in the range of 20–49 workers (Ohkawa and Tajima 1976). In many developing countries, the figures behave erratically, but there is some evidence of a similar peak coming in the range 20–200 workers. For instance, in Korea capital productivity is virtually constant for 5–49 workers, rises dramatically in the range 50–199, and then falls again, though not to the level found in small enterprises (Ho 1980).

However, such aggregated figures, even if reliable, are of limited interest. For policy purposes, it is important to know whether small units survive and are labor-intensive because they produce the great bulk of a limited range of goods that are technologically unsuited to large-scale, capital-intensive production or whether a very wide range of goods is produced in both small, labor-intensive and large, capital-intensive units. In the former case, significantly more small-scale production could be engineered only by a change in demand in favor of the sorts of things that can be efficiently made by small units. In the latter case, a large relative shift to small units may be both possible and desirable without

3. They are dealt with, though not systematically, in Little, Mazumdar, and Page (forthcoming), especially in chap. 13.

4. For more detail and sources see Little, Mazumdar, and Page (forthcoming), chap. 7. The eleven developing countries are Brazil, Chile, Colombia, India, Malaysia, Mexico, Pakistan, Paraguay, the Philippines, Sri Lanka, and Venezuela.

such a change in demand. In narrowly defined industries, it is likely that the products of large and small firms are or could be highly competitive, though this is by no means always the case.

For this reason, more disaggregated figures obtained from censuses and surveys in India, Korea, the Philippines, and Taiwan were examined; industry classifications ranged from the two-digit to the five-digit standard industrial classification (SIC) level. The greater the disaggregation, the less frequently were smaller enterprises found to be more labor-intensive, and to have lower labor and higher capital productivities (Little, Mazumdar, and Page, forthcoming, chap. 7).

In India, disaggregation to the level of 32 industries produced evidence that factories in the range 10–49 workers (10–99 if no power was used) were more labor-intensive than larger ones in a high proportion of cases (Mehta 1969). But analysis at the much greater level of disaggregation possible in Korea (373 industries in the 1975 survey) showed that the incidence of highest labor intensity is almost even throughout the range of size classes from 5–499 workers. Moreover, highest *capital* intensity was as often found in the range 5–50 workers as in the range 50 plus (Ho 1980).[5] The moral is obvious. Even if one were constructing a policy purely to favor labor intensity, it would be essential to discriminate finely between industries. However, no such policy ignoring output could be sensible.

The crudest possible scale which might yet have claim to measure efficiency in a labor-abundant economy is capital productivity. The results here are not favorable to either the very small or the very large, even for manufacturing as a whole. In all the economies examined, capital productivity for manufacturing (taken in the aggregate) peaks in the range 20–200 workers. The highly disaggregated Korean figures produce the results that capital productivity peaks within the range 50–500 workers in two-thirds of the industries.[6] Further analysis of the figures shows that capital intensity was lower and capital productivity higher in the range 100–99 workers as compared with the range 20–49 workers in about half of the 139 industries for which this comparison could be made. A Reserve Bank of India survey (1979) of small industries (defined by capital) suggested that enterprises employing over 20 workers (the "large-small") have higher capital productivity than the "small-small."

In Korea, in many industries, smaller size groups were "dominated" by their larger counterparts, that is, they used both more labor and more capital per unit of output. Where this is not the case, it is useful to shadow price the inputs. (Shadow pricing is also desirable because of variation in labor skills.) Using actual wages as shadows[7] and a uniform 20 percent as the opportunity cost of

5. All the Korean figures derive from the census of 1968.

6. The relatively low capital productivity of large firms, especially the very large (say, over 2,000 workers), that is often observed may have little to do with size as such. The large size classes are likely to include a relatively high proportion of firms whose prices are controlled, and a high proportion of public sector firms.

7. It is widely agreed that the labor market in Korea is such that wages closely map opportunity costs.

capital, it was found that in only 32 of 138 cases was social cost lowest per unit of value added for small enterprises (less than 50 workers); only 7 of these cases were in the smallest size class (5–9 workers).[8]

The evidence thus far reviewed is very unfavorable for the SSE case.[9] It is, however, to some extent misleading. The smaller size categories include some cases in which capital intensity is abnormally high and productivity low. Thus a large firm measured by normal employment will fall into a smaller size category in a bad year, and a sick or dying firm may have only a skeleton staff. The smaller sizes also include start-ups that have installed most of their equipment but have not yet reached planned employment levels. There is some evidence that, when size is measured by capital, the factor proportions and productivities behave in a more orderly manner, and that the small thus defined would show up better, but census data are not normally available on this basis.

Partly for the above reasons, and out of some general distrust of census figures, a number of narrowly defined industries were intensively surveyed in India under the World Bank research program. These yielded further and less biased evidence concerning the variability of factor proportions and productivities with size than that provided by censuses. The very intensive inquiries made of the enterprises should also have resulted in these survey figures being more reliable than those of censuses. The industries studied included shoes, soap, printing, machine tools, and metal casting. In general it was found that the intragroup variations were so large that mean differences between groups were rarely statistically significant.

Survey findings for establishments ranked by the number of employees are shown in table 1. Some comments can be made on the results for particular industries. In printing, the relatively low capital productivity of the two largest size categories, which is not offset by relatively high labor productivity, suggests that these establishments are technically inefficient relative to their more labor-intensive, smaller counterparts. Machine tools was the only industry in which a statistically significant difference was found between the factor productivities of very small firms (less than 10 workers) and those of larger firms. The soap sample was restricted to firms using no power, and the associated uniformity of technique accounts for the similarity of capital intensities and factor productivities across size categories. Similarly, in shoes technology is probably a better guide to capital intensity and factor productivities than is size, with the marked difference in findings for establishments with more than 100 workers reflecting the use of factory rather than traditional handicraft methods. In metal casting, the size-groups with over 50 workers had both higher capital and higher labor productivity, but the intragroup variation was too large for this to be statistically significant.

8. For this comparison the number of industries was reduced by excluding those with entries in less than four size classes, as well as those for which considerable heterogeneity of output was suspected.

9. This article has reported mainly Korean figures. Other broadly confirmatory evidence is given in Little, Mazumdar, and Page (forthcoming, chap. 7).

Table 1. *Factor-Output and Capital-Labor Ratios in Firms in Five Indian Industries, by Number of Employees*

Size (N = number of workers)	*Printing*			*Machine tools*			*Soap*			*Shoes*			*Metal casting*		
	Y/L	*Y/K*	*K/L*	*Y/L*	*Y/K*	*K/L*	*Y/L*	*Y/K*	*K/L*	*Y/L*	*Y/K*	*K/L*	*Y/L*	*Y/K*	*K/L*
$N < 5$	8.92	4.86	1.84	—	—	—	10.80	2.47	4.37	5.23	14.28	0.37	3.20	10.67	0.30
$5 \leq N < 10$	12.15	3.51	3.46	4.16	1.11	3.75	9.33	2.20	4.24	5.61	29.87	0.19	13.91	4.97	2.80
$10 \leq N < 25$	14.18	3.26	4.35	6.73	2.66	2.53	9.78	2.04	4.79	5.67	16.20	0.35	12.32	5.77	2.14
$25 \leq N < 50$	14.56	3.51	4.15	7.84	3.28	2.39	11.19	1.98	5.65	6.30	13.13	0.48	14.44	7.63	1.89
$50 \leq N < 100$	11.59	1.24	9.35	7.44	2.57	2.90	10.92	2.93	3.73	—	—	—	19.40	29.96	0.65
$N \geq 100$	13.81	1.21	11.41	12.31	2.13	5.78	11.10	2.74	4.05	15.32	4.93	3.11	22.47	8.59	2.62

— Not available.

Note: Y/L and K/L are in thousands of rupees per worker. Y/K is a pure number.

Source: Little, Mazumdar, and Page (forthcoming, table 11-1).

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Similarly, high intragroup variation was found in two surveys of small and medium-size firms in the metalworking and food processing industries conducted in Colombia (see Cortes, Berry, and Ishaq, forthcoming). In metalworking, capital intensity was lowest and capital productivity highest in the range 41–60 workers, and labor productivity was also higher than in the small size groups. In food processing, capital intensity was lowest and capital productivity highest in the size group 16–29 workers. Labor productivity was lower in the 16–29 worker group than in the 8–15 and 30 plus groups, but higher than in the smallest size class (1–7 workers). The authors of these surveys also estimated a social cost-benefit ratio, which was best in the largest size classes (61 plus workers in metalworking and 30 plus in food processing) (Cortes, Berry, and Ishaq, forthcoming, chap. 3).

When establishments are ranked by capital (measured as the undiscounted cost of fixed capital at 1979–80 prices), the factor proportions and productivities vary with size in a manner that is closer to expectations than when employment is used as the size discriminator. In the two Colombian surveys, the ratios behaved exactly as expected: capital intensity and labor productivity rose with size, and capital productivity fell. This confirms what has been found to be true in some other surveys or censuses, for example, in Japan (Kaneda 1980). However, in the Indian surveys (see table 2) substantial irregularities occurred, and the differences between size groups were frequently insignificant, intragroup variation remaining high. Shoes was the only industry except for the largest size class, in which there was a regular rise of capital intensity and labor productivity with capital size and a regular fall in capital productivity.

The surveys also distinguished between skilled and unskilled workers. In the cases of machine tools, shoes, and metal casting, there was a distinct tendency for the proportion of unskilled workers to rise as the size of firms rose above twenty-five workers. In soap there was little variation, while in printing the results were highly erratic (probably reflecting difficulties with the classification of workers).

As between the industries, printing was the most capital-intensive. It may be noted that for these five industries, intraindustry differences in capital intensity were of the same order of magnitude as interindustry differences. However, this similarity certainly does not carry over to the whole range of industries, as witnessed by Samuel Ho's examination of the Korean and Taiwanese censuses. In Korea, some industries were more than a hundred times as capital-intensive as others, while within industries the difference between size classes seldom exceeded three times.

This is an important observation. It suggests that, to achieve a more labor-intensive manufacturing industry, there is far more mileage to be obtained by changing the industry mix by altering the pattern of demand than by influencing the size distribution within industries. It should be noted, however, that this argument rests on observation of *average* intensities and productivities. *Marginal* values will clearly be important in determining optimal policies.

Table 2. *Factor-Output and Capital-Labor Ratios in Firms in Five Indian Industries, by Value of Fixed Assets*

Size (K = thousands of rupees)	*Printing*			*Machine tools*			*Soap*			*Shoes*			*Metal casting*		
	Y/L	*Y/K*	*K/L*	*Y/L*	*Y/K*	*K/L*	*Y/L*	*Y/K*	*K/L*	*Y/L*	*Y/K*	*K/L*	*Y/L*	*Y/K*	*K/L*
$K < 1$	—	—	—	—	—	—	—	—	—	3.77	42.30	0.09	—	—	—
$1 \leq K < 5$	6.08	4.81	1.26	—	—	—	—	—	—	4.76	18.41	0.26	3.20	10.67	0.30
$5 \leq K < 10$	8.38	5.40	1.55	—	—	—	9.86	4.20	2.35	6.13	9.72	0.63	—	—	—
$10 \leq K < 20$	10.83	5.77	1.88	—	—	—	9.11	3.82	2.39	7.37	9.42	0.78	5.84	6.84	0.85
$20 \leq K < 50$	13.02	3.98	3.27	6.25	3.17	1.97	8.39	2.35	3.15	10.84	8.64	1.26	12.74	10.72	1.19
$50 \leq K < 100$	14.40	3.52	4.09	7.38	3.25	2.27	10.06	1.41	7.14	10.88	6.26	1.74	23.06	8.91	2.59
$100 \leq K < 200$	13.00	1.44	9.03	6.45	2.08	3.10	12.08	1.61	7.50	—	—	—	12.12	6.45	1.88
$200 \leq K < 500$	17.24	1.57	10.98	8.41	1.79	4.70	10.79	2.75	3.92	—	—	—	27.82	8.44	3.30
$500 \leq K < 1{,}000$	15.13	1.42	10.66	10.63	2.22	4.79	13.03	2.41	5.41	14.45	3.35	4.31	21.26	7.83	2.72
$K \geq 1{,}000$	12.71	1.09	11.66	15.91	1.80	8.84	—	—	—	15.98	6.11	2.62	25.96	2.72	9.54

— Not available.

Note: Y/L and K/L are in thousands of rupees per worker. Y/K is a pure number.

Source: Little, Mazumdar, and Page (forthcoming, table 11-2).

The Indian surveys provided data at the firm level that permitted analysis of variations in inputs and outputs going well beyond the simple relationships of size, factor proportions, and productivities that have thus far been described.[10] The analysis was based on the fitting of three factor translog production functions of the average and frontier type. The three factors were capital and skilled and unskilled labor.[11] It is convenient to record some of the more interesting econometric findings at this point.

Technical efficiency was investigated by measuring the ratio of the factor inputs of a hypothetical best practice or "frontier" firm to those of the actual firm (both having the same factor proportions). There was no significant relationship between firm size and efficiency except in the case of machine tools, in which it was positive. This was true whether or not one controlled for various other potential determinants of technical efficiency (these other determinants are discussed in section VI).

It has often been argued that the relative prices of factors of production have little bearing on the methods of production employed, and hence that they are largely irrelevant so far as employment is concerned. Even if this were not so, however, the substitutability of factors would be an important issue. In all four industries for which estimates could be made,[12] the elasticity of substitution was highest for the ratio of skilled to unskilled labor (averaging 3.1, taken at the mean size), next highest for the ratio of skilled labor to capital (averaging 2.0), and lowest for the ratio of unskilled labor to capital (0.7). There was no significant variation of substitutability with size.

Tests were made for homotheticity and constant returns to scale. With a homothetic production function, the scale of operations will not affect the capital-labor ratio, provided relative factor prices remain the same. In the case of machine tools, metal casting, and soap, the hypotheses of homotheticity and constant returns to scale could not be rejected. In printing and shoes, size tended to favor capital intensity, while returns to scale were variable. In no case was there strong evidence of increasing returns.

In summary, enough evidence has been presented to show that size, especially when measured by the number of employees, is a very poor indicator of those characteristics of firms that may be of interest to policymakers. If one were searching solely for labor intensity, then it would be better to study techniques than size. Of course, traditional or handicraft techniques are highly labor-intensive, and units are generally (though not always) very small. But very small modern factories or workshops may be very capital-intensive. This was pointed out long ago by Dhar and Lydall (1961).

10. Surveys were also made for powerlooms and handlooms, but the data generated did not permit interesting size comparisons within these weaving methods because of insufficient variation in size of enterprise, insufficient variation in capital-labor ratios, or both.

11. The analysis is discussed in depth in Little, Mazumdar, and Page (forthcoming, chaps. 9–12).

12. Soap had to be excluded because the unrestricted translog function was insufficiently well-behaved to permit reliable estimates of the elasticity of substitution.

Small size certainly does not indicate high capital productivity. Indeed, the figures suggest that small firms rather often have both low capital and low labor productivity. Capital productivity and total factor productivity peak in the medium size range of 50–500 workers in most industries. However, census and survey returns based on annual figures tend to bias results against the small. Where firms can be ranked by capital employed, the results tend to be rather more as expected (capital intensity and labor productivity rising, and capital productivity falling monotonically, with size), but nevertheless usually with such variance within size groups as to make intergroup comparisons statistically insignificant. It should, moreover, be noted that when firms are grouped by capital size, there is a bias *in favor* of the small. This is because small groups, at least in censuses, will include firms with highly depreciated capital.

Our own enterprise surveys were almost free of the biases referred to. Sick firms with skeleton staffs were not observed. At least a year's operation was required, and there was no surprising preponderance of very young firms. The *undepreciated* value of capital was used in the Indian surveys, and commercial value in the Colombian surveys. These surveys did not provide evidence that small firms employ resources more efficiently (either technically or from a social point of view) than large firms, nor even that they are reliably more labor-intensive. If our research can be held to suggest anything about size and economic or social desirability, it is that beauty is to be found mostly in the middle of the size distribution.

III. Labor Markets

One of the arguments in support of small-scale enterprises has been that they pay low wages that are closer to the social cost of labor than the higher wages paid by large enterprises. While doubt has already been cast on whether small enterprises will in fact be more labor-intensive—as theory suggests they should be if paying lower wages—this argument is worth examining in its own right.

Before proceeding it must be noted that the social cost of skilled workers is greater than that of the unskilled. There is no prima facie distortion unless labor of similar skills is paid differently for similar work in enterprises of different sizes. The crudest control is to restrict comparisons when possible to those classified as either skilled or unskilled. Further to this, allowance can sometimes be made for differences in age, sex, job experience, and education. In the following, differences in skills that have been controlled for when making comparisons will be noted.

For manufacturing *in the aggregate,* there is no doubt that small enterprises (say, with less than 50 workers) pay lower wages than large enterprises (say, with more than 500 workers), and that the differentials are too great to be plausibly attributed to differences in skill or capability. These differentials vary by country and are smaller the more developed the country. In the countries for which evidence was readily available, they were greatest in India and Indonesia (on the

order of 100 percent for similar workers); much lower in Korea, Malaysia, and Colombia (30–50 percent); and still less in the industrial countries (25–30 percent).[13] There are "natural" (that is, noninstitutional) reasons for differentials which apply more strongly in developing countries and therefore explain country differences, at least in part. In general, differentials are not distortions to the extent that they are explained by these noninstitutional reasons.

The most important natural reason is that a stable labor force that can acquire firm-specific and industry-specific skills is relatively important for large firms, and for industries in which large firms predominate. One reason for this is that large firms are, in the aggregate, relatively capital-intensive.[14] Machinery and equipment would be wasted and even damaged if associated with an unstable labor force, and there is evidence that labor turnover is higher in small firms. Another reason is that large firms usually produce higher-quality products, and that the scale of their marketing requires the goodwill associated with branded products of uniform quality. A relatively skilled and reliable labor force is needed if these desiderata are to be achieved.

Relatively high wages must be paid to get the reliable labor force which large firms want. This is particularly the case in the poorest countries. Mazumdar (1984b) has argued that large wage differentials existed in the Bombay cotton mills before there was any institutional reason for this, such as the strength of trade unions or governmental influence. The mills needed to attract permanent migrants, who had a higher supply price than transient workers. Small units, especially in handicrafts, services, and construction, had a comparative advantage in the use of cheap, transient labor; in countries such as India and Indonesia there is still a large supply of transient migrants, which keeps wages very low and turnover high in such activities. In countries like Colombia, Korea, and Malaysia, the urban labor force is more settled, and it is relevant that differentials have narrowed considerably in Korea with the very rapid growth of demand for urban labor (whereas they appear to be widening in India).

In the developed countries, labor forces are generally more skilled and homogeneous. But even where transient migration is a thing of the past, and the labor force is literate and manually adept, large firms demanding firm-specific skills may still need to pay relatively high wages to achieve the stability they require. Finally, it may be that even a stable labor force will increase its productivity if paid more, in which case the lowest wage that is required for stability may not be the least-cost wage (the so-called efficiency wage argument).

Indeed, there are so many natural economic reasons for wage differentials,

13. The general survey of this evidence, in Little, Mazumdar, and Page (forthcoming, chap. 4), is derived from Deshpande (1979), India (1979), *Indian Labor Journal* (1981), and Mazumdar (1984b), for India; Manning (1979) and World Bank (1979) for Indonesia; Park (1981) for Korea; Mazumdar (1981) for Malaysia; Cortes, Berry, and Ishaq (forthcoming); and Mohan (1981) for Colombia; and Lester (1967) and Wilkinson (1973) for developed countries.

14. It is hard to separate the influence of size from that of capital intensity. Small, capital-intensive firms are also likely to pay relatively high wages.

Table 3. *Average Annual Wage of Unskilled Workers in Firms in Five Indian Industries*
(rupees)

Size (N = number of workers)	*Printing*	*Machine tools*	*Soap*	*Shoes*	*Powerlooms*
$N \leq 10$	2,364	2,172	2,664	—	—
$10 < N \leq 25$	2,436	2,316	2,832	2,256	1,140
$25 < N \leq 50$	2,604	2,700	2,964	3,000	1,428
$N > 50$	2,292	2,544	3,240	—	2,244

Source: Little, Mazumdar, and Page (forthcoming, table 14-3).

including the relative disutility of jobs, that it is only if there is evidence that they are produced or widened by trade unions or by governmental pressure or legislation that there is a prima facie case for saying that higher-paid workers are, from a social point of view, paid relatively too much. In India there is some evidence that government intervention helped to create a labor aristocracy in the textile industry in the interwar period, although quite large wage differentials clearly existed long before. There is also evidence that labor legislation and the awards of industrial tribunals have widened differentials, especially for large firms, in the postwar period (Subramanian 1979). In Colombia, as in other Latin American countries, the proportion of fringe benefits rises sharply with size, and this is probably a distortion that results from legislation (Cortes, Berry, and Ishaq, forthcoming). In the other countries mentioned there seems to be little or no institutional influence operating. An exception may be that foreign firms usually pay relatively high wages, and it is difficult to attribute this to anything other than government influence or political prudence.

Although wages rise with size, they do not always do so in a smooth fashion. There is some evidence of a wage cliff at around 200 workers. For instance, in India the Annual Survey of Industry (1978–79) shows a wage jump at 200 workers, and Mazumdar (1984b) found some evidence of a cliff in his Bombay labor survey (after controlling for the quality of labor). In Colombia also, evidence was found of a cliff at 200 workers (Cortes, Berry, and Ishaq, forthcoming). Such a cliff could be an indication of institutional forces coming into play, a suggestion supported by the fact that the Korean data show a rather steady progression of wages with size (see Ho 1980, sec. V). However, the evidence is weak.

So far, I have been considering industry or manufacturing as a whole. The only disaggregated data available come from the research surveys. As can be seen from table 3, only in powerlooms was there a very large differential, with firms with over 50 workers paying about double those with 11–25 workers. Very large differentials seem to be a feature of the Indian textile industry.

In the two World Bank surveys of metalworking and food processing firms in Colombia, earnings of unskilled workers, including fringe benefits, were 30–50

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