

Small and Medium Enterprises in Thailand: Recent Trends

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ABSTRACT. This paper reviews the evolution of small and medium firms in Thailand in recent years. It shows that such firms did not preserve their share of total employment during the period 1987-96; indeed, their share fell from 60% to 52% over this period. Much of this decline was felt in the category of very small firms (with less than 10 workers). This aspect is explored further by looking at small firm employment shares in three sub-periods of varying overall economic growth rates. It is found that when overall economic growth is high, the share of small firms tends to contract possibly because many small firms become medium in size and others disband because their owners can find more remunerative employment in larger firms. In slower growth periods, the employment share of small firms appears to rise probably because larger firms may be taking in less new workers or even laying off workers. The paper also calculates productivity measures (technical efficiency and total factor productivity) and shows that different measures give different rankings by size of firm.

Introduction

Despite much local discussion of the important role of small and medium enterprises (SMEs) in economic development, there are not many studies available for the case of Thailand. This paper uses data made available recently to study the experience of SMEs in Thailand in the ten or so years before the major economic crisis of 1997. The data come from three main sources namely, the Ministry of Industry (MOI), the Ministry of Labor and Social Welfare (MOL), and the National Statistical Office of Thailand (NSO). The MOI and MOL provide time series data on number of industrial firms and employment classified by firm size. The NSO's industrial census provides data on output, inputs, and many characteristics of Thailand's disaggregated industries for 1997. The

data set classified by firm size is available upon request from the NSO.

This paper is divided into three sections. The first section reviews the evolution of SMEs in Thailand in terms of their number, employment, export capability and subcontracting activity. The second section examines their productivity using such measures as technical efficiency and total factor productivity (TFP). The third section provides information on constraints faced by SMEs as ascertained from surveys.

1. Recent evolution and characteristics of Thai SMEs

Growth

The data used for this study was obtained from the Ministry of Industry (MOI) and the Ministry of Labor (MOL). The data are available for firms of all sizes (including those with fewer than 10 workers) and they are available annually. Unfortunately, the data are reliable for only two variables: number of establishments and number of workers. Data on value and other factors of production are not available from these sources. Nevertheless, time series data from the above sources are able to provide useful information on the growth of firms by size and other contributions of SMEs to economic development.

The MOI data cover statistics of establishments which register with the Ministry of Industry as required by law. Some micro or cottage industries are exempt from registration. Thus, the number of establishments and employment of these industries from the MOI data could be underestimated. On the other hand, the MOL statistics are estimated from two sources of information. First is an annual survey conducted by the Department of Labor Protection and Welfare, and the survey

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covers establishments with 10 or more workers. The second is data from monthly inspections of firms of all sizes (including those micro industries with fewer than 10 workers) in all provinces of the Department of Labor Protection and the Department of Labor Safety. The following discussions will be based mainly on the MOL data set because the data cover a longer time series (from 1987 to 1996) than the MOI data. However, the MOI data set will be compared with the MOL¹

and the NSO data² to detect and explain possible discrepancies among the different data sources.

Tables Ia and Ib show that most industrial firms in Thailand were small and medium size. About 60 percent of the 92,100 industrial firms reported by the MOL in 1996 were micro industries employing fewer than 10 workers;³ 28 percent were small-sized firms; 10 percent were medium-sized firms; and only 2 percent were large firms.

From 1987 to 1996, the number of firms in the

TABLE Ia
Number of firms by size, 1987–96

Size of employment (persons)	Region, Whole Kingdom							
	1987	1989	1990	1992	1993	1994	1995	1996
1–9	31,990	36,189	34,991	41,924	43,510	47,051	49,527	54,991
10–49	9,641	12,853	12,694	17,391	18,330	20,601	23,573	25,912
50–299	2,576	3,726	3,900	5,752	6,367	7,385	8,599	9,094
> 300	537	854	1,027	1,499	1,649	1,844	2,007	2,098
Total	44,744	53,622	52,612	66,566	69,856	76,881	83,706	92,095

Source: Ministry of Labor and Social Welfare, Yearbook of Labor Statistics, various issues.

TABLE Ib
Share of firms by size, 1987–96 (percent)

Size of employment (persons)	Region, Whole Kingdom							
	1987	1989	1990	1992	1993	1994	1995	1996
1–9	71.50	67.49	66.51	62.98	62.29	61.20	59.17	59.71
10–49	21.55	23.97	24.13	26.13	26.24	26.80	28.16	28.14
50–299	5.76	6.95	7.41	8.64	9.11	9.61	10.27	9.87
> 300	1.20	1.59	1.95	2.25	2.36	2.40	2.40	2.28
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Computed from Table Ia.

TABLE Ic
Growth rates of firms by size, 1987–96 (percent)

Size of employment (persons)	Region, Whole Kingdom			
	1987–96	1987–90	1990–95	1995–96
1–9	6.02	2.99	6.95	10.47
10–49	10.99	9.17	12.38	9.46
50–299	14.02	13.82	15.81	5.60
> 300	15.14	21.61	13.40	4.43
Total	8.02	5.40	9.29	9.55

Source: Computed from Table Ia.

micro industry group declined whereas firms in other size groups increased.⁴ In fact, Table 1c shows that the growth rate of the number of firms was the highest for large-sized firms (growing at 15 percent a year) followed by medium-sized firms (14 percent), small firms (11 percent), and firms in micro industries (6 percent).⁵

If we break the 1987–96 period into three subperiods, namely, the high industrial growth period of 1987–90, the moderate growth period of 1990–95, and the slow growth period of 1995–96,⁶ Table 1c shows more useful detailed information about the growth rates of firms of different sizes. During the high growth period, the total number of firms grew at 5.4 percent with large firms growing the fastest at 22 percent, followed by medium firms (14 percent), small firms (9 percent), and firms in micro industries (3 percent). During the moderate growth period, the total number of firms grew at a rate faster than the previous period at 9.3 percent with medium firms growing the fastest at 16 percent, followed by large firms (13 percent), small firms (12 percent), and cottage firms (7 percent). During the slow growth period, before Thailand's financial crisis began in 1997, the total number of firms grew at 9.6 percent, about the same rate as in the previous period. However, in sharp contrast to the previous period, firms in the micro industries had the highest growth rate of 11 percent, followed by small firms (9 percent), medium firms (6 percent), and large firms (4 percent).

Therefore, during the high industrial growth period, the number of large firms grew the fastest, followed by firms of all other sizes in descending size order. The reason is probably that new firms that started up during the boom period were mostly medium or large size. Moreover, firms of all sizes expanded their production and employment, and they moved up in classification from a small-sized firm to a large-sized one. Specifically, a number of micro industries graduated into SMEs, and a number of SMEs in turn succeeded in growing to large-sized firms. During the moderate growth period, production and employment generated by either existing or new large firms slowed down. If new firms entered the industrial sector in this period, then they were mostly medium-sized ones. In the period of exceptionally slow industrial growth in 1995–96,

prior to the financial crisis, it turned out that the size cohort that grew the most rapidly was the group of micro and small industries. The number of medium and large firms starting their operations during this period could be very limited. If there were new firms, then they would be micro or small industries that were started up by retrenched former employees who become self-employed entrepreneurs for survival in difficult times.⁷

Employment generation

During 1987–96, SMEs employed about 45 percent of total industrial workers whereas large firms employed about 47 percent and micro industries employed about 8 percent. Over time, employment in micro industries and small-sized firms grew slower than employment in medium and large firms. As a result, we see from Tables IIa and IIb that in 1987 large firms employed about 40 percent of the total industrial labor force, medium-sized industries 29 percent, small-sized industries 20 percent, and micro industries employed 12 percent. In 1996, employment in the large firms increased to 48 percent of total industrial employment, and micro industries employed only 6 percent of total industrial employment. These tables thus show that the share of employment in micro and small industries declined whereas the share of employment in medium and large firms increased during 1987–96.

The growth of employment in the industrial sector also varied with industrial output growth. If we break the period 1987–96 into three subperiods of varying industrial growth rates, we find from Table IIc that during 1987–90 when industrial growth rate was the highest, employment in the industrial sector grew rapidly at an annual rate of 16.8 percent. During 1990–95, when industrial production growth slowed down, the employment growth also slowed down to 13.7 percent. Finally, during the period just before Thailand's economic crisis in 1997, as industrial growth dipped further, the growth of employment in the sector decelerated to only 5.9 percent.⁸

The next question is how did SMEs perform relative to large firms in terms of employment growth during the above three periods of varying industrial output growth and employment growth.

Table IIc shows that during the high growth

TABLE IIa
Employment by firm size, 1987–96 (number of workers)

Size of employment (persons)	Region, Whole Kingdom							
	1987	1989	1990	1992	1993	1994	1995	1996
1–9	114,799	132,112	131,793	164,393	172,423	189,456	201,325	218,435
10–49	195,016	265,546	252,756	347,875	369,090	420,801	486,031	534,120
50–299	283,510	417,217	437,502	661,708	735,886	846,231	986,099	1,050,336
> 300	395,430	688,424	813,244	1,198,816	1,299,378	1,428,251	1,568,274	1,634,765
Total	988,755	1,503,299	1,635,295	2,372,792	2,576,777	2,884,739	3,241,729	3,437,656

Source: Ministry of Labor and Social Welfare, Yearbook of Labor Statistics, various issues.

TABLE IIb
Share of employment by firm size, 1987–96 (percent)

Size of employment (persons)	Region, Whole Kingdom							
	1987	1989	1990	1992	1993	1994	1995	1996
1–9	11.61	8.79	8.06	6.93	6.69	6.57	6.21	6.35
10–49	19.72	17.66	15.46	14.66	14.32	14.59	14.99	15.54
50–299	28.67	27.75	26.75	27.89	28.56	29.33	30.42	30.55
> 300	39.99	45.79	49.73	50.52	50.43	49.51	48.38	47.55
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Source: Computed from Table IIa.

TABLE IIc
Growth rates of employment by firm size, 1987–96 (percent)

Size of employment (persons)	Region, Whole Kingdom			
	1987–96	1987–90	1990–95	1995–96
1–9	7.15	4.60	8.47	8.16
10–49	11.19	8.64	13.08	9.43
50–299	14.55	14.46	16.25	6.31
> 300	15.77	24.04	13.13	4.15
Total	13.85	16.77	13.69	5.87

Source: Computed from Table IIa.

period of 1987–90, employment in large firms grew the fastest at 24.0 percent a year, followed by the growth of employment in the medium-sized firms (14 percent), small-sized firms (9 percent), and micro industries (5 percent). During the slower growth period of 1990–95, employment in the medium-sized firms grew the fastest at 16 percent, followed by the employment growth of the large firms (13 percent), small firms (13 percent), and micro industries (8 percent). Finally,

during the stagnation period of 1995–96, employment grew at the fastest rate of 9 percent in the small industries, followed by the growth rate of micro industries at 8 percent. Employment in medium and large firms grew at rates of only 6 and 4 percent, respectively.

Therefore, the contribution of SMEs to employment growth seems to exhibit some relationship with industrial growth rates. During the high growth period, large and medium firms seem to

contribute more in terms of employment growth because many small firms graduated to become larger firms. The employment generation of a previously small firm became the contribution of a medium or a large firm. During the period of slowest growth or stagnation, not only did employment of large firms grow the slowest, but many firms also laid off workers and some even ceased operations altogether. In this situation, it is possible that we simultaneously observed the growth of many small firms and, in particular, firms of micro industries whose owners were former employees of a medium or a large firm. Many of these new business creators were formerly unemployed and possessed entrepreneurial ability or spirit to set up their own production for survival in their home towns during this difficult time. In this sense, we may view SMEs, particularly the small ones, as crisis shock absorbers that not only help provide employment during difficult times, but also prepare new entrepreneurs for graduating to run a larger firm when the economy recovers. It is interesting to note that during 1995–96 the growth rates of employment growth of micro and small industries were the highest in the northeast region and the provinces surrounding Bangkok, two areas that are the sources of most of Thailand's workers.

Despite the fact that as more new small firms started up and they became sources of employment during the stagnation period, the capacity of SMEs to generate employment during normal times needs further investigation. This is because for the whole period of 1987–96, the proportion of SME employment out of total employment was much lower than the proportion of the number of SME firms out of total industrial firms, suggesting that large firms absorb more employees than SMEs. However, although SMEs generate less employ-

ment per firm by definition, they may be considered to create greater employment if it can be shown that they are more labor-intensive and thus employ a greater number of workers per unit of capital input or investment.

Export capability

Table III shows the percentage distribution of the number of firms of 3-digit ISIC industries by export-output ratio and by size group in 1997. The data are obtained from the National Statistical Office's (NSO) unpublished database, and in the questionnaire exports are defined as both direct and indirect exports. On average over all industries, about 22 percent of firms exported some of their production while 78 percent produced only for the domestic market. Large firms exported proportionately more than small- and medium-sized firms. About 70 percent of large firms had some exports whereas only 40 and 10 percent of medium and small firms, respectively, exported some of their production.

Of all exporting firms, 52 percent exported less than 50 percent of their production; 42 percent exported more than 50 percent; and about 6 percent produced solely for the export market. This distribution of export-output ratios did not vary much across firm size groups. This means that although large firms were more likely to export than small- and medium-sized firms, exporting firms of any size were equally likely to have any export-output ratio.

Exporting industries where small- and medium-sized firms account for a high proportion of industry employment were textiles and textile products, garments, leather and leather products, furniture, chemical products, rubber and rubber products, plastic products, special purpose

TABLE III
Percentage distribution of firms by export percentage and by firm size group

Size	100%	> 50%	50%	< 50%	With export	Without export
S	1.92	2.22	0.69	4.33	9.16	90.84
M	10.28	11.81	1.86	15.47	39.42	60.58
L	17.90	26.08	1.57	24.63	70.18	29.82
Total	5.38	6.78	1.03	8.84	22.03	77.97

Source: Computed from NSO (1999).

machinery and equipment, insulated wire and cable, electrical equipment and components, precision instruments, watches and clocks, and miscellaneous products. They are mostly labor-intensive, traditional exporting industries.

Exporting industries where large firms dominate the industries' employment were office machinery and equipment, electronic parts and components, radio and television, electrical machinery, and transport equipment. Most of these industries are new exports in the last decade with production techniques more capital-intensive than the traditional ones.

Subcontracting and commission work

Small- and medium-sized firms generally have more subcontracting work than large firms. Data for 1999 show that on average across all industries, receipts from subcontracting work in small, medium, and large firms were 3.3, 2.8, and 1.4 of sales volume, respectively.⁹ Subcontracting work was concentrated in the following industries: textile products, clothing, leather products, wood products, furniture, paper products, publishing, printing, plastic products, nonmetallic mineral products, metal products, electrical machinery, and automobile parts.

Among industries, subcontracting work was most concentrated in clothing, wood products, plastic products, nonmetallic mineral products, and nonelectrical machinery and equipment. They were mostly labor-intensive and low-technology small- and medium-sized industries that produced either products that did not compete with imports or products for export.

There were some products in the groups of textile products, publishing and printing, electronic and electrical machinery and equipment, and transport equipment industries with subcontracting work available for small- and medium-sized firms. Larger-sized firms often performed commission work. Many of these products were in the so-called supporting industries where small- and medium-sized firms had linkages with large firms, but firms in the supporting industries were not necessarily small or medium sizes.

Examples of these supporting industries are found in automobile parts and electronic parts and components industries that produce intermediate

goods for further processing in large assembly plants of the automobile and electronics industries. For example, large firms, instead of producing parts and components in-house, will order them from a subcontracting firm so as to gain from the subcontractor's specialization and from the division of labor in the industry. These subcontracting firms are generally smaller than the parent firms that offer the production orders. In Thailand, a study by UNICO International Corporation (1995) found that just over 50 percent of these firms in Thailand were small- and medium-sized firms employing fewer than 200 workers. However, the other half were larger firms size. Before the crisis, firms in these supporting industries obtained much government promotion because high linkages between large and small- and medium-sized firms existed in these industries.

2. Capital intensity, technical efficiency, and TFP

The analysis of production techniques, technical efficiency, and total factor productivity (TFP) of small- and medium-sized firms is based on the NSO's 1997 census data. Output is denoted by either value of production or value-added. Material inputs include value of raw materials, purchased parts and components, and procurement of intermediate inputs. Labor input is represented by number of workers, and capital input is net book value of fixed assets. Fixed assets include buildings, machinery and equipment, vehicles, and office appliances. Wages include wages and salaries, benefits, and other payments to employees.

Table IV shows capital intensity, wage rate, labor productivity, and capital productivity by size category. On average across all industries, capital intensity, wage rate, and labor productivity (either output or value-added per worker) increased with size monotonically. But, as firm size increased, capital productivity (either output or value-added per unit of capital input) declined. In almost all industries, wage rate rose less than labor productivity as firm size increased.

In a majority of industries, small firms had the lowest capital intensity, lowest wage rate, lowest labor productivity, and highest capital productivity. Large firms had the opposite characteristics.

TABLE IV
Factor intensity, factor prices, and partial factor productivities by firm size group

Size	K/L	O/K	W/L	O/L	VA/L	VA/K
S	142,296.60	4.42	62,393.03	628,598.90	201,987.97	1.42
M	274,153.94	3.66	85,695.66	1,004,405.09	282,522.28	1.03
L	481,504.21	3.18	107,302.68	1,530,169.90	425,434.95	0.88
Total	394,333.28	3.31	96,928.71	1,303,541.25	366,749.90	0.93

Source: Computed from NSO (1999).

Note: O, for output; VA, value-added; M, material inputs; L, labor; K, capital; W, wage rate.

However, although medium-sized firms had higher capital intensity, wage rate, and labor productivity, but lower capital productivity than small-sized firms, the differences were smaller than the differences between the medium-size firms and the large firms.

In industries that are the most highly capital intensive, the capital intensity and the wage rates of small- and medium-sized firms were much lower than those of large firms. These industries were tobacco, beverages, paper and paper products, petroleum products, basic chemicals, glass and glass products, metal casting, fabricated metal products, and motor vehicles and most likely need scale economies to be efficient. In fact, the output of these industries was dominated by the production of large firms. In these industries, small- and medium-sized firms were able to coexist with large firms probably because the smaller size firms produced products of different characteristics or quality. In these industries, a study at a more disaggregated level of industrial classification will provide a better comparison of the characteristics of firms of different sizes.

There is another group of industries where capital-labor ratios did not vary much across size groups: textile products, clothing, footwear, leather products, wood and wood products, rubber products, plastic products, and furniture. Most of these industries were the least capital intensive and had above average export-output ratios. Because their capital intensity was not drastically different for firms of different sizes, large firms simply had large scale production and employment without significantly altering the production technique.

We examine how efficient Thailand's small- and medium-sized firms used their resources in the

production of their outputs by measuring both technical efficiency and total factor productivity of firms of different size groups by using the 1997 industrial census data disaggregated at the 3-digit ISIC level. Technical efficiency indices are estimated by using frontier translog production functions. Total factor productivity indices are in turn computed directly from the definition.

Our estimation of technical efficiency is based on the concept and the estimation of the production frontier: maximum possible output for a given set of inputs. A firm in an industry can produce on or below the production possibility frontier. An efficient firm produces on the frontier whereas a technically inefficient firm produces below the maximum output on the production frontier.

The production function is specified in the following form:

$$\begin{aligned} \ln Y = & \ln A + \alpha_K \ln K + \alpha_L \ln L + \\ & \alpha_M \ln M + \frac{1}{2} \beta_{KK} (\ln K)^2 + \\ & \frac{1}{2} \beta_{LL} (\ln L)^2 + \frac{1}{2} \beta_{MM} (\ln M)^2 + \\ & \gamma_{KL} (\ln K) (\ln L) + \gamma_{KM} (\ln K) (\ln M) + \\ & \gamma_{LM} (\ln L) (\ln M) + \ln u \end{aligned}$$

where Y denotes real output, and K , L , and M represent capital, labor, and intermediate inputs, respectively. A is a constant term, and u is the error term. The error term is assumed to have the Gamma distribution with mean and variance equal to n . Richmond (1974) has shown that firm-specific efficiency measurement can be estimated by $\hat{Y}/Y$ and the average efficiency of the industrial sector level is equal to 2^{-n} .

In estimating the above frontier production

functions, we use cross-sectional data of 59 industries where the data of each industry are separated into three groups by size: small, medium, and large. Therefore, we are able to estimate the frontier production functions of industries separately for each size category. In other words, for all industry there is a single frontier for each size category and in the case of all industries, for all size categories.¹⁰

Our estimation results show that technical efficiency level of Thailand's industries in 1997 was approximately equal to 87.7 percent. Firms of different sizes had different efficiency levels. The efficiency indices of small, medium, and large firms were 87.9, 87.3, and 86.1, respectively. Although it is not possible to compare the indices across size groups, we can infer the room for improving the efficiency level of each group of firms. The room for improvement for firms of each group was not much different. In other words, both small- and medium-sized firms did not seem to operate less closer to their best observed performance (or the production possibility frontier) than larger firms did. Therefore, no evidence that small- and medium-sized firms are technically inefficient is found in our study. The fact that small- and medium-sized firms had an average efficiency greater than 87 percent indicated that their observed output constituted more than 87 percent of their maximum potential output given by the best observed performance of the industries. However, there remains room for further improvement in the performance of these firms. All can increase their output up to 13 percent through more efficient use of their given inputs and, therefore, provide a greater contribution to industrial growth.

Another method for assessing industrial performance of firms of different size groups is by computing TFP indices. The following measurement is modified from Ho (1980).

$$\frac{TFP_{ij}}{TFP_i} = \prod_{k=1}^3 \left[\frac{PFP_{ijk}}{PFP_{ik}} \right]^{\alpha_{ijk}}, \quad \sum_{k=1}^3 \alpha_{ijk} = 1$$

where

TFP_{ij} is the total factor productivity of j -th size group in the i -th industry;
 $j = S, M, L$, and $i = 1, 2, \dots, 59$;

TFP_i is the total factor productivity of firms of all sizes in the i -th industry;

PFP_{ijk} is the partial factor productivity of the k -th factor input of products of firm of the j -th size group in the i -th industry;

k is raw materials, labor, and capital inputs;

PFP_{ik} is the partial factor productivity of the k -th factor input of firms of all size groups in the i -th industry

and α_{ijk} is the factor share of the k -th factor of production of firms of the j -th size group in the i -industry

When the relative TFP measure equals one, it means that the total factor productivity of firms in the i -th size group equals the average total factor productivity for all firms in the industry. If the ratio is greater than one, then it means that the relative TFP of firms of the relevant size is larger than the average TFP of the whole industry.

For the entire industrial sector, small firms had a relative TFP greater than one whereas both medium and large firms both had relative TFP measures just about equal to one. Table V shows that small firms' relative TFP index was the highest at 1.03, followed by the TFP of medium-sized firms equal to 1.0, and the TFP of large firms equal to 0.99.

Out of 59 industries, in 25 industries small firms had the highest TFP indices, followed by 19 and 15 for medium and large firms, respectively. This shows that both small- and medium-sized firms did not perform worse than large firms. However, a qualification needs to be made that the differences in TFP between small- and medium-sized firms and large firms comes from the fact that the capital productivity of small- and medium-sized firms was much greater than that of large firms. Note that the capital input is represented by the net book value of fixed assets that includes

TABLE V
Total factor productivity indices by firm size group

Size	O/M	O/L	O/K	TFP
S	1.47	628.6	4.42	1.03
M	1.39	1,004.4	3.66	1.00
L	1.39	1,530.2	3.18	0.99

Source: Computed from NSO (1999).

tangible fixed assets but excludes rented assets. As it is likely that there were more small firms with rented fixed assets for production than large firms, the estimated capital input used in the small firms could be underestimated and, hence, the TFP overestimated. Furthermore, if smaller firms had older assets than large firms, their low book value of fixed assets would underestimate capital inputs, and therefore overestimate TFP of small when compared with large firms.¹¹

If we divide industries into three groups (i.e., those predominated by small, medium, and large firms), and compute the relative TFP index of each group, then we obtain the results shown in Tables VI and VII. In the group of industries dominated by small firms, small firms had the highest TFP

index. In the group of medium-sized industries, both small- and medium-sized firms performed better than larger firms. Finally, in the group of large industries it was the large firms that performed the best. This follows very well with the expectation that in the various groups of industries, firms with the same size as the predominant size in the group should be more productive than others to explain why that size was found most often in that group.

Another interesting finding (see Table VIII) is that although in most industries TFP of small- and medium-sized firms were not lower than TFP of large firms, small-scale industries (industries dominated by small firms) had lower TFP than medium and large-scale industries. The medium-

TABLE VI
Total factor productivity indices by firm size group (three inputs)

Firm size	Small-scale industry				Medium-scale industry				Large-scale industry			
	O/M	O/L	O/K	TFP	O/M	O/L	O/K	TFP	O/M	O/L	O/K	TFP
S	1.52	689.5	4.31	1.08	1.44	556.3	5.19	1.01	1.43	640.6	3.69	0.97
M	1.38	1,120.2	4.05	1.04	1.39	903.9	4.28	1.01	1.41	1,078.2	2.8	0.95
L	1.33	1,920.2	3.04	0.99	1.36	1,229.8	3.75	1.00	1.42	1,596.2	3.01	1.01

Source: Computed from NSO (1999).

TABLE VII
Total factor productivity indices by firm size group (two inputs)

Firm size	Small-scale industry			Medium-scale industry			Large-scale industry		
	VA/L	VA/K	TFP	VA/L	VA/K	TFP	VA/L	VA/K	TFP
S	235.9	1.48	1.30	170.0	1.59	1.05	193.2	1.11	0.91
M	310.9	1.12	1.14	252.1	1.19	1.04	311.1	0.81	0.85
L	474.4	0.75	0.95	322.8	0.98	0.99	473.3	0.89	1.02

Source: Computed from NSO (1999).

TABLE VIII
Total factor productivity indices of small, medium, and large-scale industries

Industry	Three Inputs				Two Inputs		
	O/M	O/L	O/K	TFP	VA/L	VA/K	TFP
Small scale	1.36	1,403.3	3.32	0.99	372.2	0.88	0.96
Medium scale	1.37	1,046.7	3.94	1.00	282.1	1.06	1.00
Large scale	1.42	1,470.2	3.01	1.00	435.1	0.89	1.00

Source: Computed from NSO (1999).

scale industries had about the same level of TFP as the large industries.

If we further group the industries by trade category (export oriented, import substitution, and nonimport-substitution¹²) and compute the relative TFP index of each group, we find the results shown in Tables IX and X. In the group of export-oriented industries, small firms had the highest TFP index (1.09), followed by medium (1.02) and large firms (0.99), respectively. In both the groups of import-substitution and nonimport substitution industries, it was the large firms that had the highest relative TFP index, followed by the medium and small firms, respectively.

It should be noted that most nonexport-oriented industries are capital intensive, and firms in these industries probably need to expand their capacity to a certain size to become efficient. Meanwhile, export-oriented industries are very labor intensive, and the issue of firm size does not matter much. The export capabilities of these industries depend on their choice of production techniques rather than firm size.

3. Problems and needs of SMEs

Table XI shows a list of problems faced by firms of different sizes. About 65 percent of firms of all sizes admitted having problems in the areas of availability or prices of raw materials, labor, capital, demand, and government policies. The most frequent complaints were insufficient capital (high interest rates) and labor shortage (increased real wage rate), followed by marketing problems, uncertain government policies, and raw material shortages.

Small firms complained the most about the problem of insufficient capital. Their next most important problems were labor shortages and marketing. Medium-sized firms ranked insufficient capital and labor shortages as their first and second most important problems just as small firms did. However, they chose uncertain government policies as the third most important problem. Large firms mentioned labor shortages (high wages) as the most important problem, followed by uncertain government policies, and raw material shortages. The problems of insufficient capital and marketing were found to be less important when compared with small- and medium-sized firms.

TABLE IX
Total factor productivity indices of industries by trade category and by firm size group (three inputs)

Firm size	Export-oriented industry				Import-substitution industry				Non-import substitution industry			
	O/M	O/L	O/K	TFP	O/M	O/L	O/K	TFP	O/M	O/L	O/K	TFP
S	1.47	619.0	5.22	1.09	1.42	761.0	4.07	0.97	1.60	502.7	3.07	0.91
M	1.39	813.1	4.14	1.02	1.37	1,473.3	3.35	0.99	1.48	955.1	3.01	0.94
L	1.35	1,120.3	3.51	0.99	1.36	2,780.0	3.02	1.00	1.64	1,810.7	2.58	1.02

Source: Computed from NSO (1999).

TABLE X
Total factor productivity indices of industries by trade category and by firm size group (two inputs)

Firm size	Export-oriented industry			Import-substitution industry			Non-import substitution industry		
	VA/L	VA/K	TFP	VA/L	VA/K	TFP	VA/L	VA/K	TFP
S	198.3	1.67	1.34	223.4	1.19	0.90	189.0	1.15	0.77
M	228.8	1.17	1.06	398.3	0.91	0.96	308.2	0.97	0.84
L	291.4	0.91	0.97	736.3	0.80	1.02	706.8	1.01	1.06

Source: Computed from NSO (1999).

TABLE XI
Percentage distribution of number of firms by economic problem and by firm size group

Size	Labor shortage	Raw material shortage	Insufficient capital	Marketing	Uncertain government policies	Others
S	37.27	15.94	38.48	22.76	17.34	7.71
M	29.07	19.11	29.51	21.08	14.60	9.87
L	28.64	21.79	22.31	14.28	26.59	11.33

Source: Computed from NSO (1999).

In other words, problems of insufficient capital and marketing decreased with size. Problems of raw material shortages and adverse effects of government policies increased with size. However, the problem of labor shortages seemed to be considered as the first or the second most important by firms of all sizes.

This means that before Thailand's financial crisis, the problem of increased real wages (labor shortages) seemed to be a concern for firms of all industries and all sizes. The problems of unavailability of capital and marketing were more serious in small- and medium-sized firms than in large firms. Large firms were able to raise funds from commercial banks, financial institutions, and other sources more easily than small- and medium-sized firms. However, large firms faced problems of raw material prices (likely due to tariffs on intermediate products) and government policies and measures.

Although on average across all industries, the problem of government policies increased with size, there were only 31 out of 59 industries where the problem of government policies increased with size. For the rest of the industries, small- and medium-sized industries had problems with government policies just as large firms did.

Table XII shows the results of firm interviews

by NSO in 1996 regarding the various kinds of support industrial firms needed from the government. Most firms gave reduced interest rate or increased supply of cheaper loans the highest priority, followed by reduced import tariffs, marketing and export promotion, and provision of training courses. However, the order of importance is different for firms of different size groups. For small firms, the order of importance went from reduced interest rate (greater supply of loans) to reduced tariffs and then to marketing promotion. For medium-sized firms, it went from reduced tariffs to reduced interest rate (greater supply of loans) and then to marketing promotion. The government support measures that large firms needed the most were reduced tariffs, followed by reduced interest rates and the availability of training courses.

The order of the needs for government support of firms by size group seems to be consistent with their complaints about problems they faced during operations. That is, most small firms complained about the problems of high interest rates, and, therefore, what they needed the most from the government was to make plenty of loans available for them. As firm size increased, the problem of financing fell to second place in importance, but the problems of high tariffs (particularly on raw

TABLE XII
Percentage distribution of number of firms by need of support and by firm size group

Size	Training	National resource development	Import tax reduction	Interest rate reduction	Marketing promotion	Others
S	22.07	12.18	29.94	44.11	24.14	5.27
M	26.48	16.81	46.16	42.74	29.05	5.12
L	31.16	18.45	55.86	42.45	30.53	6.29

Source: Computed from NSO (1999).

materials) and labor training increased. Government support for marketing and export promotion seemed to be more urgently needed in small- and medium-sized firms than in large firms.

The need for training facilities was the most prominent in textiles, clothing, non-electrical machinery and equipment, electronic parts and components, electrical goods, motor vehicles, and other capital-intensive heavy industries. In addition this need was equally important in firms of all sizes in these industries. In other words, this need is industry-specific, and it is applicable to all firms of all sizes in the same industries.

At the other end, the need for lower interest rates or increased supply of loans seemed to be shared by all industries, but more urgently needed by small firms than by large firms. Finally, the need for tariff reduction was listed as important in all industries and all firm sizes.

4. Concluding remarks

Small- and medium-sized companies form the majority of the country's industrial firms. They are labor intensive, have low import content of raw material inputs, and can link with large firms by subcontracting work for them. Not all small- and medium-sized firms are less technically efficient or less productive than large firms. The number of small-sized firms is also found to grow the fastest during the slow real income growth period. In this sense, one might view SMEs, particularly the especially small ones, as a cushion against low employment during difficult times. SMEs could create employment for former employees of failed firms, and at the same time prepare new entrepreneurs who might graduate to run large firms in better times.

However, in normal times not all small- and medium-sized firms are capable of generating more employment than large firms. Rather, it depends on the production techniques firms use. For labor-intensive export-oriented industries, firms will be able to generate high employment regardless of size. For capital-intensive industries, most small firms are less productive than large firms, and their expansion will not be able to generate high employment despite the large number of small firms.

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Notes

¹ It should be noted that different data sources from the MOI, the MOL, and the NSO define firm size differently. The MOL classifies firms into four groups: 1–9, 10–49, 50–299, and more than 300 workers and defines them as micro, small, medium, and large firms, respectively. The MOI classifies the firms into three groups: 1–49, 50–199, and more than 200 workers. Finally, the NSO classifies the firms into three groups: 10–49, 50–199, and more than 200 workers. The figures from these sources also show many variations. The number of firms in the group of 1–49 workers from the MOL dataset is about 80 percent of the number of firms of the same size group from the MOI data source, but the numbers of workers of firms from the two sources are about equal. Strangely, both the number of firms and the number of workers of firms in the size group of more than 300 workers from the MOL are greater than the number of firms and the number of workers in the size group of more than 200 workers from the MOI data source. This alerts us to be cautious with the use of data from different sources. Moreover, we may interpret the discrepancies to mean that the number of firms and employment of the micro- and small-sized firms from the MOL data source could be understated. Meanwhile, the number of firms and employment of large firms could be overstated. Fortunately, in our study we are interested in growth rates of the number of firms and employment rather than the exact values. Therefore, these possible biases should not affect much of our discussion as long as they are systematic over time.

² The comparison of data from the MOL, the MOI, and the NSO shows that while the numbers of firms and employment of firms with more than 200 workers from the NSO are about the same as the number from the MOI, the number in the small and medium-sized groups from the NSO are only about 70 percent of the number from the MOI. This means that if the MOI dataset were used as the benchmark for all comparisons, the NSO data could be understated in the groups of small- and medium-sized firms. We need to be cautious with the use of these data in the measurement of levels.

³ We have mentioned earlier that while the employment figures of firms with size 1–50 workers for 1991–96 from the MOL dataset are close to the MOI figures, the number of establishments of firms of this size group from the MOL are

only about 80 percent as large as the number from the MOI data source. Therefore, it is possible to suspect that the number of firms of this size group from the MOL data source is underestimated. However, since the MOL dataset does not disaggregate the figures of firms with size 1-50 workers into micro industries (1-10 workers) and small-sized industries (10-50 workers), we are unable to know whether the underestimation of the MOL data comes from the group of micro industries or small-sized industries. Nevertheless, as Albert Berry commented as a discussant of this paper, the number of firms in the micro-industry category reported by the MOL seems rather low. We might postulate that the underestimation comes from figures in the micro-industry group.

⁴ See Cortes, Berry and Ishaq (1987) for a discussion on why factors such as economic growth, existence of scale economies, and infrastructural improvement might explain the decline of firms in this micro-industry group over time.

⁵ Owing to data limitations, we are, unfortunately, not able to decompose the growth of numbers of firms and employment of each size group into different sources of growth; that is, net creation of new firms (new firm entry minus the exit of existing firms) and number of firms graduating from a smaller size into a larger size group.

⁶ During 1987-90, industrial production grew the fastest of the overall period of 1987-96 at 16.6 percent a year. During 1990-95, industrial production grew at a slower rate than the previous subperiod, and the growth rate was 11.2 percent a year. Finally, during 1996-97, the period before Thailand's financial crisis, the growth rate declined to 7.3 percent. These growth rates are computed from the National Economic and Social Development Board real value-added figures obtained from Bank of Thailand (various issues).

⁷ According to Mead and Liedholm (1998), in times of recession firm exits increase and existing firms retrench workers. Usually the unemployed are forced to start new small businesses for survival despite the low rate of investment returns.

⁸ Notice that employment growth rates computed from the MOL dataset are relatively high when compared with the National Economic and Social Development Board's industrial production growth rates. However, we do not need to combine these growth rates in our present analysis. Here we are only concerned with the relationship between the fluctuations of output growth and the growth of number of firms and employment.

⁹ These figures of subcontracting work in total sales are lower than the figures in the Tambunlertchai and others (1986) study. However, while it is possible that the NSO figures could be underestimated, figures from this study could also be overestimated because their survey deliberately selected firms with subcontracting arrangements located in Bangkok and the neighboring provinces. The NSO figures are the average for all firms of all locations. It should also be noted here that Tambunlertchai and others (1986) find that subcontracting arrangements in Thailand started in the late 1970s, and there was little increase in the arrangements in the early 1980s. During the high output and export growth period in the decade before 1997, other studies suggest increases in subcontracting of small- and medium-sized firms from large export-oriented firms producing labor-intensive products such as garments, wood products, and jewelry. However, major industries such

as automobile and electrical machinery and electronics industries did not seem to be able to subcontract out a large fraction of their parts and components input to local suppliers. Wiboonchutikula (1993) finds that they continued to rely on imported materials because local firms had not solved the problems of quality, reliability, and timely delivery. A small fraction of inputs that they subcontracted out were mostly non-specialized products in the paper products, metal products, and plastic products industries.

¹⁰ A better study could be done if firm level data of each industry were available. Unfortunately, the NSO is reluctant to release these unpublished data for our study.

¹¹ I am indebted to Tom Connelly of Chulalongkorn University for suggesting an additional source of possible biases of TFP estimates of the small-sized firms.

¹² Import-substitution industries are defined as industries that import more than 10 percent of domestic utilization. Those that export more than 10 percent of their production are categorized as exportables. The rest of the traded goods are called nonimport-substitution industries.

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