

Small and Medium Enterprises in Korea: Achievements, Constraints and Policy Issues

Jeffrey B. Nugent
Seung-Jae Yhee

ABSTRACT. This paper provides an overview of the evolution of the small and medium enterprise sector in Korea during the past quarter century. It shows how the industrial structure of Korea has changed dramatically over this period reflecting much greater shares in employment and value added by SMEs. It reviews the evidence on SME dynamism showing that SMEs have contributed to the enormous transformations that have taken place in the Korean economy since 1975, especially with regard to exports, foreign investment and productivity performance. It discusses the role of subcontracting as well as that of government and non-governmental institutions in supporting SME development. Finally, it examines the link between variations in the economic importance of SMEs, as measured by their shares in employment, and aspects of growth and inequality to assess whether SMEs function as business cycle shock absorbers and inequality-reducing mechanisms.

Introduction

Virtually nowhere has the relative role of small and medium enterprises (SMEs) in the country changed as much over time as in South Korea (henceforth Korea). The role of its SMEs has gone through at least two very distinct phases, one of sharp decline (from the early 1960s to about 1976), and one in which that role has been gradually increasing (from 1976 to at least quite recently). With the currency and monetary crisis of 1997–99, and a relative decline in investment in SMEs since the mid-1990s, however, it is quite possible that the latter trend has been stalled and beginning to be reversed once again. Whether this is only a temporary stall or a turning point to

another period of relative SME decline remains to be seen and may hinge on the way in which the crisis is resolved.

SMEs dominated the manufacturing sector of the economy in the early 1960s but by the mid-1970s, Korea had become known for the extreme dominance in economic and public policy of its large *chaebol* (conglomerate) firms in the economy. Indeed, it had become so much large firm and *chaebol*-oriented that Korea has often been contrasted with other East Asian economies like Japan and Taiwan where SMEs have continued to play a comparatively much more important role.¹ Less well known is that since the mid-to-late 1970s there has been a steady decline in the dominance of large firms and a corresponding rise in the role of SMEs in all aspects of manufacturing activity. The dramatic rise of the *chaebol* and the Korean economy as a whole has been closely linked to an especially cozy relation between government and business and to the country's development strategy.

Whether Korea's economic development has been helped or hurt by the country's development strategy is still hotly debated, as is of course the extent to which the financial and currency crisis of the last two years can be attributed to the excessive power and international borrowing of the *chaebol*. Even more controversial is what, if anything, should be done to correct the widely perceived excesses of the *chaebol* and government policies in support of them. Meanwhile, gradually and especially since the early 1980s, the Korean government has instituted a whole host of policies designed to assist SMEs. But, there is little evidence to date as to whether these policies have had any significant effects and, if so, whether or not these policies have been cost-effective in

Department of Economics
University of Southern California
University Park
Los Angeles, CA 80089
U.S.A.
E-mail: nugent@rcf.usc.edu



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social terms. Coinciding with the resurgence in SME shares in manufacturing employment and exports, as will be demonstrated in Section 7, there has been a decline in income inequality. If it could be shown that SME support policies were effective and that the trends in SME shares and income inequality were related, lower inequality could indeed be one social benefit of such policies.

The purpose of this study is to identify achievements, problems, and policy issues concerning Korea's SMEs. Attempts are made to deal with dynamic issues despite the lack of access to a panel dataset well suited for analyzing such issues. The Korean experience is bound to have important lessons for other developing countries for several reasons. First, because of the extremely rapid growth of the South Korean economy (averaging over 8 percent per annum in the last 35 years). Second, because of the country's tremendous success in penetrating international markets in manufacturing and in acquiring and developing new technology. Third, because the aforementioned success has been accomplished without an appreciable increase in income inequality. Fourth, because of the several changes in role and importance of SMEs in the economy. Finally, the Korean experience is useful because of the country's important changes in policy regimes.

This study is divided into seven sections. Section 1 provides an overview of the changing importance and roles of SMEs over time. Section 2 treats productivity and growth therein over time by size of establishment (or firm) and by sector. Section 3 is devoted to firm dynamics and dynamic issues. Sections 4 and 5 are devoted to external sources of support for SMEs: Section 4 to support available through subcontracting relationships with private firms, and Section 5 to support from governmental and other nonprofit institutions, sectoral associations, and government policies. The possible roles of SMEs as shock absorbers in business cycle fluctuations and in mitigating income inequality are discussed in Section 6. Finally, our conclusions, including the lessons for other developing countries, are given in Section 7.

1. Changing importance and roles of SMEs over time

In virtually all dimensions, the role of SMEs in the Korean economy has been ever-changing. In general, and in most dimensions, there have been at least two and possibly three or four distinct and opposing trends. First, an upward trend (in the share of SMEs in both establishments and employment at least) in the 1950s; second, a declining trend in the SME share from the early 1960s to the mid-to-late 1970s; third, an again rising trend until the mid-1990s; and, since then, a stalling or even possibly a reversal in that trend. Evidence for the first and the last of these possible trends, however, is much weaker than for the others.

The basic trends can be observed in Table I. This table presents the size shares of both SMEs and large establishments (LEs)² in terms of number of establishments, employment, value added, and production in the manufacturing sector. As noted by the break in the table and as explained in the note to the table, the official size cutoff between SMEs and LEs changed from 200 employees to 300 after 1973, making the top part of the table not exactly comparable to the bottom part.³ There are also some differences in the years of the turning points among the different dimensions. For example, in the case of number of establishments, the first turning point occurred only in 1966, whereas for employment it occurred in 1960. Similarly, the second turning point occurred only in 1975 for both numbers of establishments and employment but in 1970 for both value added and production. In the case of both value added and production, moreover, a new trend reversal of declining SME shares seems to have occurred since 1993 or 1994 but not yet for employment. If, as before, the turning points in the SME shares of value added and production precede that in employment, these declines in SME shares in value added and production could presage a decline in the SME share of employment by the turn of the century.

Another shortcoming of the figures presented in Table I is that they exclude very small plants with one to four workers. The omission of this size class of plants has to be considered throughout this study as well as in comparisons with SME statistics for those countries that include very small

TABLE I
SME shares in number of establishments, employment, value added, and gross production in manufacturing 1952–96, in percent

	Manufacturing establishments		Manufacturing employment		Manufacturing value-added		Manufacturing production	
	Small and medium (5–300)	Large (300+)	Small and medium (5–300)	Large (300+)	Small and medium (5–300)	Large (300+)	Small and medium (5–300)	Large (300+)
1952	95.8	4.2	61.5	38.5				
1955	97.2	2.8	63.3	36.7				
1960	97.6	2.4	67.7	32.3	57.0	43.0		
1966	98.3	1.7	60.3	39.7	42.5	57.5	45.6	54.4
1970	97.1	2.9	49.0	51.0	28.5	71.5	30.3	69.7
1973	97.0	3.0	46.3	53.7	33.9	66.1	33.8	66.2
1975	96.2	3.8	45.7	54.3	31.7	68.3	30.7	69.3
1980	96.6	3.4	49.6	50.4	35.2	64.8	31.9	68.1
1985	97.5	2.5	56.1	43.9	37.6	62.4	35.4	64.6
1990	96.1	3.9	61.7	38.3	44.3	55.7	42.7	57.3
1991	98.5	1.5	63.5	36.5	45.8	54.2	44.6	55.4
1992	98.6	1.4	65.8	34.2	47.6	52.4	45.8	54.2
1993	98.9	1.1	68.9	31.1	50.3	49.7	47.8	52.2
1994	99.0	1.0	69.1	30.9	49.2	50.8	47.9	52.1
1996	99.1	0.9	69.2	30.8	47.2	52.8	46.8	53.2
1997	99.1	0.9	69.3	30.7	46.5	53.5	46.3	53.7

Note: Definition of small and medium-sized enterprise changed: 5–200 workers before 1973 and 5–300 thereafter.

Source: National Statistics Office, Report of the Mining and Manufacturing Census and Survey, various years, Korean Federation of Small Business, Central Cooperative.

establishments. Only very occasionally (e.g., in the 1973 Manufacturing Census) have the Korean statistical agencies tried to capture this segment of manufacturing. One reason for this is that many such plants appear to be in reality closer to repair and other services than manufacturing. Another reason for the omission is that the share of economic activity accounted for by establishments of one to four workers is fairly small (about 2 percent of manufacturing value added according to Ho (1980)) and believed to have remained fairly constant over time. In any case, Nugent (1989) demonstrated (on the basis of the very limited information available on very small plants) that their inclusion would not have changed the aforementioned overall trends in the size distribution of Korean manufacturing establishments.⁴

Yet, despite these qualifications, the first three of the aforementioned trends are much in evidence. For example with respect to employment, the SME share rose from 61.5 percent in 1952 to 67.7 percent in 1960, then fell to 45.7 percent in 1975, and finally rose again to 69.3 percent in 1997. These are remarkably strong

shifts in employment structure: a decline of more than 20 percent in manufacturing employment between 1960 and 1975, followed by a rise of almost 25 percent by 1997. Much of the decline in the SME share between 1960 and 1975 could have been due to the growth or graduation of SMEs into LEs (especially since the number of enterprises was only slightly growing during this period).⁵ After 1975, there is no evidence that LEs decreased in size sufficiently to become SMEs, but instead evidence of an acceleration in the growth rate of new firms.⁶ Hence, the post-1975 trend seems to have been a genuine shift in employment to SMEs, many of which are new.

In principle, the aforementioned trends could have been due to substantial changes in the size shares of firms near the cutoff between SMEs and LEs. Yet, as mentioned in footnote 3, in fact, the trends are not sensitive to the choice of cutoff. Table II shows why. In particular, the shares of the two largest size classes of SMEs in the total employment of SMEs (i.e., those with 100–199 and 200–299 employees, respectively) were also falling between 1978 and 1997 (from 25.5 percent

TABLE II
Size shares of employment among SMEs in manufacturing over time, in percent

Year/Size	5–9	10–19	20–49	50–99	100–199	200–299	Total
1960	17.69	20.57	27.52	14.14	14.08	6.00	100
1966	20.48	18.04	20.99	15.80	15.54	9.15	100
1973	14.08	12.40	18.07	17.80	22.43	15.22	100
1978	7.35	9.22	19.32	19.81	25.55	18.74	100
1986	6.68	11.44	24.07	22.14	22.10	13.58	100
1992	9.96	15.68	28.25	19.56	16.88	9.67	100
1993	12.16	17.15	27.85	18.70	15.48	8.66	100
1994	12.34	17.17	27.67	18.65	15.44	8.72	100
1996	14.28	17.66	26.83	17.76	14.97	8.50	100
1997	15.11	16.94	26.23	17.79	15.48	8.47	100

Source: Economic Planning Board, Report of the Mining and Manufacturing Census and Surveys, various years.

and 18.7 percent in 1978 to 15.1 percent and 8.5 percent, respectively, in 1997). Also, the size classes whose shares in employment have been rising the most have been those in establishments with 5–49 employees. Since 1978 the share of this group (i.e., the three smallest size groups in Table II) rose from 35.9 percent of the SME total in 1978 to 58.7 percent in 1996. Hence, it is clear that the upward trend in the SME share in manufacturing employment since 1978 is primarily due to the rising share of small SMEs (those with fewer than 50 employees) rather than to the growth of relatively small SMEs into medium sized ones. Consistent with the virtual disappearance of any trend in the share of SMEs in total employment between 1996 and 1997, even within SMEs there was an increase in the share of establishments of 100 or more workers between 1996 and 1997.

Prior to 1978 the shares within SMEs of the two largest size classes (i.e., those with 100 or more

workers) increased sharply from 20 percent in 1960 to 44.2 percent in 1978. Within the two smallest size classes, however, there was considerable volatility in the pre-1978 period.

What about the SME share in exports? Unfortunately, data on exports are not contained in the Reports on the Mining and Manufacturing Census (or Survey) from which all the data reported in the preceding tables are taken. There is also a conceptual problem in exports in the Korean context, given that much of the exporting by SMEs is done indirectly through subcontracting relationships with other manufacturing firms and trading firms. Because the distinction between direct exports and indirect exports is far from sharp, different managers in the same objective circumstances may well respond differently to questions regarding the amount of exports in total sales.⁷

The only data over time on the SME share in exports are presented in Table III. Note that the

TABLE III
SME share of Korean commodity exports (1965–95), in percent

Year	1965	1970	1975	1980	1981	1982	1983	1984	1985	1986
SME share	23	32.2	34.5	32.1	31	22.3	20.2	25.5	27.8	35.2
Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	
SME share	37.7	38.1	38.6	45.5	39.4	40	42.8	42.4	39.6	

Source: Korean Federation of Small Business (81–92), Korea Trade Association (65–80), Annual Report on SMEs, each year, SME Department, Ministry of Commerce and Industry, and Monthly Bulletin, 1997/99, Bank of Korea (93–95).

data for 1965–80 and 1981–95 come from different sources (which could possibly be inconsistent), and, even were they to come from the same source, for reasons given above, managers may not respond consistently one to another or even over time to a request for exports. From Table III one can see much more in the way of fluctuations of SME shares than in the case of employment and value added. Yet, even so, one can detect several reversals in trends: a rising share of SMEs in exports from 1965–75, a sharp decline 1975–83, a sharp rise until 1990, and fluctuations but also probably another decline after that.

What is the composition of SME exports? Table IV presents a breakdown of SME exports into product groups. Though such information is provided here only for 1993–95, even during these few years, one can see considerable change. By 1995 electronics had become the most important export, followed closely by textiles. Other rapidly growing exports are chemicals, primary metals, and metal products and machinery. Going back further, one should realize that even in the late 1960s, electronics, chemicals, and machinery exports were essentially nonexistent. Instead, exports were concentrated on light manufactures such as wigs, plywood, and very simple textiles. Manufactures as a whole accounted for but 6 percent of total exports in 1960, but 76 percent by 1970 and 96 percent in 1996.

While good time series data on such investment abroad does not exist and in any case is of relatively recent origin, Table V shows that foreign direct investment (FDI) by Korean SMEs has been quite significant and rising not only absolutely but also relative to LEs. Between 1990 and 1994, for

TABLE IV
Exports of SMEs by sector (in million \$US)

	1993	1994	1995
Food, beverage products	2,313	2,593	2,971
Chemical	1,403	2,091	2,593
Plastic, rubber, and fur	2,249	2,648	3,308
Nonmetal minerals	761	887	876
Textiles	10,885	12,353	13,561
Other light industry	2,842	2,837	2,878
Primary metal and metal products	1,612	2,089	3,176
Electronics and electric equipment	9,330	10,981	14,371
Machinery	3,243	3,655	5,003
Others	560	639	767

Source: Annual Report on SMEs, each year, SME Department, Ministry of Commerce and Industry.

example, both the number of “cases” (i.e., all firms making direct investment abroad and the value of such FDI) more than tripled. Yet, FDI by SMEs rose by well over five times in both numbers and values during the same period. As a result, the proportion of cases of outward FDI made by SMEs rose to almost two-thirds and that in value terms to over one-fifth.⁸ This rapid growth in FDI, especially by SMEs, is significant in two important respects: (1) It represents another dimension (outward capital flows) in which Korea has begun to assume the characteristics of a highly developed country. (2) It is also representative of the way in which the country’s productive structure (including its increasingly important SME sector) has been allowed to adjust to its rapidly changing comparative advantage.

TABLE V
Foreign direct investment of all firms and SMEs (in million \$US)

		1990	1991	1992	1993	1994
Total (all firms)	Number	2,297	3,324	4,421	5,432	7,497
	Cases	1,226	1,646	2,109	2,725	4,132
SMEs	Number	286	483	721	1,027	1,517
	Cases	455	731	1,086	1,596	2,715
% of SMEs	Number	12.5	14.5	16.3	18.9	20.2
	Cases	37.1	44.4	51.5	58.6	65.7

Source: Annual Report on SMEs, each year, Federation of SME Cooperation.

TABLE VI
Productivity growth rates and other indexes of SMEs and LEs compared, 1979-97 (in percent)

Growth indicator	1979	1980	1981	1982	1983	1985	1989	1990	1991	1992	1993	1994	1995	1996	1997
Growth rate of value added per capita	SMEs 30.1 LEs 25.86	12.5 21.23	15.02 38.4	20.59 6.8	-4.17 17.23	11.4 8.5	18.2 18.7	21.1 17.9	17 17.2	9.7 11.8	12.04 15.17	14.86 18.9	10.36 21.93	8.76 -2.08	3.34 5.67
Growth rate of employment-cost per capita	SMEs 33.85 LEs 22.56	13.14 23.2	13 23.87	19.71 11.09	0.5 16.27	7.27 6.03	21.2 25.7	19.9 18.7	17.9 19.4	15.4 10.5	9.88 11.1	13.41 16.62	11.05 13.48	11.9 12.19	5.37 3.85
Growth rate of capital per capita	SMEs 2.23 LEs 4.56	2.71 6.61	3.39 9.78	4.83 11.03	3.47 12.42	4.78 14.45	9.8 26.43	12.15 32.96	13.66 40.46	16.15 49.02	20.29 64.2	23.92 68.89	26.03 78.02	30.32 89.37	37.71 113.31
Growth rate of total assets per capita	SMEs 6.99 LEs 12.6	8.96 18.21	10.21 26.37	14.2 28.16	10.78 32.17	14.46 39.64	29.72 69.04	34.9 88.3	39.37 114.01	46.59 137.61	54.47 167.73	64.4 182.59	72.87 216.4	85.62 250.05	111.66 322.43
Ratio of gross value added to total assets	SMEs 41.3 LEs 29.5	36.2 24.8	36.5 23.7	31.8 23.7	40 24.3	36.7 23.9	36.2 27.9	35.1 25.2	35.5 24.2	34.1 22.4	33.47 21.69	33.75 23.15	32.93 24.7	30.91 20.84	27.08 17.32
Ratio of gross value added to total sales	SMEs 25.9 LEs 25	23.9 20.1	22.8 20.2	22.4 20.8	24.4 20.8	23.7 21	25.2 27.3	25.8 26.2	26 26.3	26.3 25.6	26.84 25.78	26.07 26.43	24.93 27.01	24.83 24.17	23.06 21.32
Ratio of employment costs to gross value added	SMEs 61.3 LEs 47.8	61.7 48.6	60.6 43.5	60.1 45.3	63.1 44.9	61 44.7	61.5 48.4	61.9 48.8	64.6 49.4	67.4 49.5	64.95 46.85	62.59 46.54	64.64 41.71	64.57 48.27	62.58 47.04

Source: Analysis of Firm's Management, each year, Bank of Korea.

2. Productivity change and its analysis

Simple measures of productivity growth such as output or value added per worker are easy to carry out and not controversial. Table VI presents some comparisons between SMEs and LEs engaged in manufacturing for the years 1979–97. Despite the fact that capital per worker (capital intensity) was about three times as high among LEs as among SMEs at the beginning of the period, LEs tended to accumulate capital per capita at about three times the rate of SMEs throughout these years. This is reflected in the much higher growth rates of capital (i.e., equity capital) per capita and total assets per capita among LEs than among SMEs. Despite facing somewhat lower wage rates than LEs, and some fluctuations from year to year, the average growth rates of wage rates (employment costs per capita) were quite similar between SMEs and LEs. The greater labor intensity of production in SMEs is reflected in a 15–22 percent differential in the share of labor costs in value added in favor of SMEs. Despite the higher capital intensity and hence also labor productivity of LEs at the beginning of the period, the growth rates of labor productivity (value added per capita) of SMEs actually exceeded those of LEs in several years, especially in the early part of the period (1979, 1982, and 1985). The table also shows that, because of the greater labor-intensity of SMEs, capital productivity (i.e., value added per unit of total assets) of SMEs consistently exceeded that of LEs.

The somewhat poorer relative performance of SMEs in the 1990s compared to the 1980s in value added per capita and assets per capita could well presage a future reversal of the rise in the SME shares in manufacturing sales, value added, and employment that has been occurring since the mid-to-late 1970s.

While labor productivity was growing relatively rapidly in both SMEs and LEs, in both cases this growth was to a large extent the result of rising capital intensity. The concept of total factor productivity (TFP) permits a distinction to be made between the growth of capital and technological change. Yet, inasmuch as numerous assumptions and judgments have to be employed in the calculation of TFP, such results are often quite controversial. In the case of Korea, the calculations have

been especially controversial, in part because the wide variations in TFP growth rates for manufacturing have been obtained in different studies. Among these are Nishimizu and Robinson (1984), Chenery and others (1986), Kim and Lau (1994), Kim (1995), Young (1995), Hong and Kim (1996),⁹ Kwack (1997), and Nam (1999). One of these (Kim, 1995) has estimated TFP growth over a 20-year period to be *negative* while others have found TFP growth rates for virtually the same period to be as high as 6 percent per annum.

The widely varying results have to be attributed to differences in one or more of the following points: (1) sources of output data and price deflators; (2) the measure of output (gross production or value added) in the former case including materials and energy as an inputs;¹⁰ (3) the assumed form of the production function (Cobb-Douglas, CES, translog); (4) the nature of any adjustments made for the quality of labor or capital; (5) the extent to which economies of scale are accounted for; (6) the assumed character of technological change (neutral or otherwise, embodied or not); (7) adjustments in working hours, capital utilization rates, price markups, etc.; and (8) the level of aggregation. Not surprisingly, the studies that most seriously attempt to correct for changing quality of labor and capital, allow for price markups, and incorporate economies of scale are those in which TFP growth tends to be lowest and those which make no such adjustments tend to be among the highest. Whether or not one should make such adjustments and corrections depends of course on the purpose of the study.

Table VII presents several of the estimates of the average annual rate of TFP growth for these sectors obtained by these different authors. Several observations can be made. First, as expected, the extremes obtained were those of Nishimizu and Robinson (1984) on the high end, who made no adjustment for changes in input quality, and Kim (1995) “adjusted” at the low end who did make such adjustments.¹¹ Second, there is universal agreement that TFP growth was highest in metal products and machinery, a sector in which SMEs have been consistently under-represented. Third, according to a majority (three of the five) of studies, the simple average of TFP growth rates in sectors in which SMEs were over-represented (given in the top part of Table VII) is lower than

TABLE VII
Estimates of average annual rates of sectoral TFP growth by different authors in sectors in which SMEs are over represented and under represented compared

Source of estimates	Coverage	Textiles, apparel, leather	Wood and wood products	Paper, printing, publishing	Nonmetallic minerals	Average of SME over-represented sectors
Nishimizu and Robinson (1984)	1960–1977	2.98	5.25	4.52	4.53	4.32
Hong and Kim (1996)	1967–1993	1.78	1.36	1.74	2.28	1.79
Nam (1999)	1971–1996	2.45	–1.09	2.58	n.a.	1.33
Kim (1995) unadjusted ^a	1966–1988	1.41	1.23	1.58	1.59	1.45
Kim (1995) adjusted ^b	1966–1988	0.70	0.39	–1.50	0.28	–0.03

Source of estimates		Chemicals	Basic metals	Metal products and machinery	Average of SME under-represented
Nishimizu and Robinson (1984)	1960–1977	2.54	1.87	6.02	3.48
Hong and Kim (1996)	1967–1993	1.52	1.02	2.48	1.67
Nam (1999)	1971–1996	1.21	3.23	5.81	3.42
Kim (1995) unadjusted ^a	1966–1988	1.56	0.75	2.34	1.55
Kim (1995) adjusted ^b	1966–1988	0.57	–0.30	1.02	0.43

Notes: Where subsectors had to be aggregated to obtain the sectors reported here, this was done by taking unweighted means.

^a Unadjusted estimates have been corrected for changes in the quality of labor, working hours, and in effective rates of depreciation not taken into consideration in the other studies.

^b Adjusted also for economies of scale and for imperfection in competition (markup).

that of the SME under-represented sectors (given in the bottom half of the table). The variation in estimates is particularly disconcerting in the case of wood and wood products, a sector in which one would not expect to have much measurement error and the assignment of the contributions of different factors to growth relatively straightforward.

Despite the variability, especially at the subsectoral, most of the estimates for Korea have been in the 2.5 percent to 3 percent per annum range, still putting Korea ahead of most other countries in TFP growth. Notably, such an estimate was also obtained by Young (1995), who is best known for pointing out that TFP growth was generally much lower in East Asia than had been presumed in earlier studies.¹² Hence, despite some disagreements, and as long as one does not attempt to control for quality of labor and other inputs as in Kim (1995), there would seem to have been a near general consensus that TFP growth in Korean manufacturing has been relatively high when compared with other countries.

Because these results are still far from repre-

senting the growth path of TFP in individual enterprises, in Tables VIII and IX we report results generated by taking advantage of the largest known available dataset on individual SMEs, namely, the aforementioned SME Survey carried out by KIET in 1990. Our work with this dataset follows two stages. First, we estimate sector-specific Cobb-Douglas production functions for light industry, heavy industry, and electronics and also for manufacturing as a whole. Second, the sector-specific parameter estimates for these functions α and β are then used to generate firm-specific indexes of technical efficiency or TFP (via frontier production functions) based on aggregate or sectoral production functions. The TFP indexes are calculated from the formula: $Y/(K^\alpha N^\beta)$

In the top part of Table VIII are the mean, median, and trimmed mean values of TFP based on the aggregate function for each of four size classes of SMEs in that survey. As is well known, the means are rather sensitive to outliers, which may be of dubious reliability. Hence, the values shown for the median and trimmed means are

TABLE VIII
Total factor productivity of sampled SMEs, 1989

	Number of observations	Mean	Median	Trimmed mean ^a
Size group (INXMAN)				
1. 5–49	414	3.500	0.910	1.180
2. 50–99	195	1.962	1.078	1.273
3. 100–199	147	2.908	1.157	1.385
4. 200–299	164	1.262	0.913	1.012
Industry type				
1. Light industry	318	2.170	0.974	1.126
2. Heavy industry	453	3.245	1.083	1.349
3. Electronics	148	2.046	0.740	0.920

^a Trimmed mean is the mean without upper and lower 5 percent of the TFP indexes in the sample.

Source: Korea Institute for Industrial Economics and Trade (KIET) SME Survey.

TABLE IX
Regression estimates of TFP indexes by sector

Variable	Light industry		Heavy industry		Electronic industry	
	<i>R</i> -square	0.1867	<i>R</i> -square	0.1393	<i>R</i> -square	0.1055
	Adj <i>R</i> -sq	0.1625	Adj <i>R</i> -sq	0.1217	Adj <i>R</i> -sq	0.0468
	Parameter estimate	<i>t</i> -value	Parameter estimate	<i>t</i> -value	Parameter estimate	<i>t</i> -value
INTERCEP	–1.3444	–4.075	–0.4681	–1.689	–0.4927	–0.978
FIRMAGE	0.0310	2.364	0.0545	3.793	0.0336	1.391
FIMAGESQ	–0.0007	–2.532	–0.0012	–3.428	–0.0005	–1.035
EQU	0.8358	6.228	0.6387	5.866	0.2557	1.189
DFPART	–0.5013	–1.682	–0.0127	–0.066	0.1705	0.694
INXMAN	0.3280	1.143	–0.5527	–2.193	–0.1620	–0.398
INXMANSQ	–0.1094	–1.947	0.0699	1.337	0.0000	0
SITUFUND	0.2077	3.009	0.2151	3.785	0.2053	2.049
YOUNGCHN	0.0680	0.508	–0.2804	–2.684	–0.1006	–0.574
HOKANG	–0.0038	–0.026	–0.3159	–2.527	–0.5268	–2.399

Source: Based on KIET Sample SME Survey of 1990.

probably more reliable than the means. While there is no distinct pattern in the results across size classes for the untrimmed mean TFP indexes, for both the median and trimmed mean there are. In particular, TFP rises with size through the 101–200 size class but then declines with size after that. In the lower portion of the table are the same calculations by industry, once again based on the aggregate production function. By all three measures, TFP is lower in electronics than in the other sectors, quite the opposite of most of the findings concerning TFP growth.

If the three sectors have different TFP indexes,

they might also have different production functions, which is the rationale for estimating the sector-specific production functions. In Table IX we present the results of regressions of the sector-specific TFP on a number of different firm characteristics, including the age of the firm (FIRMAGE) and its square (FIMAGESQ), size (measured in terms of numbers of workers according to the INXMAN index defined in Table VIII) and its square,¹³ a dummy variable for corporate form (EQU), a dummy variable for having a foreign partner (DFPART), the degree of satisfaction with the funding situation

(SITUFUND),¹⁴ and, finally, dummy variables for the two least developed regions (labeled YOUNGCHN and HOKANG).

Note that there are in fact considerable differences in these relationships between sectors. While age and its square both have highly significant effects on TFP in the light and heavy industries, they do not in electronics. The same holds true for the EQU and to a lesser extent the size variables INXMAN and INXMANSQ. DFPART, on the other hand, plays a role only in light industry. Location of the plant in the lesser developed regions has no influence on TFP in light industry but has significant negative influences on TFP in the other sectors. By contrast, SITUFUND is positively and significantly related to TFP in each sector and indeed has a positive coefficient of almost the same magnitude in each case. While this could be interpreted as revealing the pervasive influence of freedom from financial constraints (due in part to the fungibility of money), as was noted previously, it may not be entirely exogenous.¹⁵ Since as a firm ages it also tends to grow, a typical firm in both light and heavy industries would derive the initially positive but diminishing effects of both age and size.

A study of TFP based on the more complete census data by using the production frontier methodology is Yoo (1991, 1992). That study used sector-specific production functions to estimate sector-specific production frontiers and indexes of technical inefficiency. It did so separately for each year between 1978 and 1988 on the basis of actual census tapes and empirically estimated the determinants of variations in technical efficiency across industries. Disappointingly, however, Yoo's results showed (1) little stability in the results over time, (2) considerable sensitivity of the results to the use of different measures of technical efficiency/inefficiency, and (3) lower explanatory power of the hypothesized determinants of technical efficiency than in other studies (e.g., Caves and Associates, 1992; Caves and Barton, 1990). In the latter respect, Yoo found technical efficiency to be *positively* related to industrial concentration, the fuel-intensity of production, the degree of product specialization by firms in the industry, and the relative size of plants in the industry. He also found it to be *negatively* related to an index of input price inefficiency and the

relative importance of both multi-plant shipments in the industry and the subcontracting of inputs. The latter finding was opposite to that found in a comparable Japanese study.¹⁶ He also showed that technical efficiency was higher if plants with fewer than twenty employees were excluded, thereby confirming the hypothesis that very small firms have lower technical efficiency than all others.

A related study is that of Pai Kim (1996), which goes into greater detail for fewer (11) industries and years (two) with somewhat improved methodology (a full frontier production function with gamma density and estimated with maximum likelihood following the approach of Greene (1980)). It focuses on differences in the cross-section results for technical efficiency between 1978 and 1989. In particular, the study found that the heavily interventionist LE-oriented HCI policy of the 1970s had the effect of raising the production frontier of HCI sectors (and especially of LEs in those sectors) but also the degree of technical inefficiency of these sectors relative to the more sector-neutral economic policies of the 1980s. While the HCI policy allowed LEs to increase their production frontiers, the large amounts of credit and other resources provided on a discriminatory basis to the HCI sector and especially to LEs in the sector allowed more inefficient firms to survive.

These studies underscore the conclusion of endogenous growth theory that TFP growth does not simply arrive as "manna from heaven" but as a result of appropriate choices with respect to organizational form and product variety,¹⁷ national and international competition, intersectoral resource allocation, labor training, and R&D. Attention at present is confined (and necessarily very briefly) to the latter four factors.

The extent to which increasing openness or international competition has contributed to TFP growth, like many other issues in Korean growth and public policy, remains very controversial. Several studies, such as Nishimizu and Robinson (1984), Dollar and Sokoloff (1990), and Nam (1999) have found positive and significant effects on TFP growth of their openness or international competition measures (export growth), thus supporting the hypothesis that TFP growth is positively affected by trade liberalization. Yet, the authors of these studies did nothing to remove

possible endogeneity in their openness measures. Hence, their results could be due to reversed causality or to common causation by another variable. Notably, those studies, such as Kim (1995), that use more exogenous measures of openness (e.g., measures of protection)¹⁸ obtain weaker and more mixed results for openness.

The contributions of the intersectoral allocation of resources to aggregate TFP growth and the role of government policy in such allocation have been equally controversial. Many have criticized the government's HCI strategy as being premature and hence detrimental to growth, suggesting that Korean growth would have been even greater without this heavy-handed policy. Others,¹⁹ however, have argued that, in hindsight, the priority to HCI policy has been very successful in raising TFP growth because it expanded the sectors with the highest TFP growth, namely, electronics, machinery, and chemicals (as was previously noted). One way to test for this is to compare the weighted average of the sectoral TFP growth rates with the aggregate TFP growth rate. Nam (1999) makes such a comparison and finds that the former substantially exceeded the latter, suggesting that intersectoral resource allocation was inefficient.

Of greater relevance to TFP growth in SMEs relative to LEs are the last two factors, namely, R&D and labor training and expertise. Because of their greater difficulty in recruiting skilled labor and in internalizing externalities arising from either R&D and labor training (because of their smaller size and aforementioned higher labor turnover rates), SMEs are clearly at a distinct disadvantage in both these means of raising TFP. In particular, despite having less total manpower than SMEs, LEs had five times as many Ph.D.s, over seven times as many M.A.s, and over four times as many research technicians and R&D expenditures as SMEs in 1990. SMEs, nevertheless, have made at least some progress in both respects. Indeed, as shown in Table X, by 1990 over 10 percent of SMEs had established programs of R&D. Yet, the table also shows that between 1990 and 1997 the percentage of firms with R&D expenditures fell significantly to 8 percent. This reduction would seem to be the result of two factors. First, there was a change in the size structure of firms in favor of very small SMEs

(with fewer than 20 employees) that only rarely engage in R&D and away from the largest SMEs among whom R&D programs are relatively common. Second, there were some significant declines in the propensity to engage in R&D within some of the size groups, namely, those with 5–9, 10–19, and 200–299 workers.²⁰

Of particular interest are two recent studies. One by Chang et al. (1994) shows the social rate of return to R&D expenditures to be far higher than the private rate of return in several sectors including electronics. This is not surprising in view of the fact that many of the benefits may take the form of externalities. The other by Lee (1995) is more surprising in finding that the effect of R&D expenditures on labor productivity appears to be greater for SMEs than for LEs. The latter finding could have several explanations, for example, diminishing returns to R&D or the beneficial effects of cooperation between LEs and SMEs, perhaps through the extensive subcontracting relations to be discussed in Section 5.

Given the obvious disadvantages of SMEs relative to LEs in training, acquiring skilled personnel and R&D, and new more sophisticated equipment, how is it that Korean SMEs have managed to do as well as they have in productivity growth? The answer is that much of the technology acquisition in SMEs has come from imitation and the advantages of being a follower. For example, if the technology is relatively simple, SMEs can reverse-engineer, copy, or purchase second-hand equipment from LEs at home or abroad. With increasing compliance by Korea with international property rights conventions, and the increasing complexity of technology, however, these simple processes of technology acquisition are becoming less feasible, suggesting that future productivity growth of SMEs may depend more heavily on external sources of support, the subject of Sections 4 and 5.

3. Firm dynamics

By linking the plant identifiers in the different Manufacturing Censuses (or Surveys) produced formerly by the Economic Planning Board, it is in principle possible to follow individual plants and their behavior over time, and in particular to measure entry and death rates of plants by size,

TABLE X
The incidence of R&D plans and expenditures across different sizes of SMEs in manufacturing, selected years 1990–97

Firm size	1990			1993			1995			1996			1997		
	N	R&D %	R&D costs	N	R&D %	R&D costs	N	R&D %	R&D costs	N	R&D %	R&D costs	N	R&D %	R&D costs
Total	64,365	10.5	188,874	73,364	7.7	441,782	78,797	8.3	436,810	84,374	8.4	500,490	85,947	8.0	476,227
5–9	19,537	3.2	7,753	26,994	2.1	25,042	29,492	2.6	11,228	33,807	1.8	13,687	37,870	1.6	6,197
10–19	18,909	7.9	11,506	21,236	3.3	19,501	24,312	5.9	66,903	25,064	7.4	68,028	24,657	7.7	34,514
20–49	16,801	11.9	60,329	16,958	12.5	117,483	17,537	14.3	145,571	17,451	14.0	120,879	16,194	14.8	94,685
50–99	5,651	23.8	46,250	5,243	23.3	117,211	5,087	19.4	66,165	5,201	22.2	101,905	4,427	22.4	82,382
100–199	2,621	33.9	38,333	2,234	32.4	93,928	1,867	32.7	90,402	2,195	33.6	118,998	2,130	34.8	132,327
200–299	846	50.8	24,702	699	43.6	68,617	502	41	56,542	656	45.7	76,992	669	39.5	126,123
Small	38,446	5.5	19,260	48,230	2.6	44,542	71,341	6.6	223,702	76,322	6.4	202,595	78,721	6.2	135,395
Medium	25,919	17.9	169,614	25,134	17.4	397,239	7,456	24.2	213,108	8,052	27.2	297,895	7,226	27.6	340,832

Notes: R&D % is the percentage of SMEs with R&D programs; R&D costs are in millions of won.

Source: Survey of Small and Medium Enterprises, each year, Small and Medium Enterprise Authority and the Federation of Small and Medium Enterprises.

sector, and vintage cohort. Nevertheless, the statistical authorities in Korea have proved very resistant to providing researchers with the necessary identifiers. Fortunately, there has been one notable exception, reflected in the unpublished Ph.D. dissertation of Chung (1998). Even in this case the identifiers and data were made available for only three censuses, namely, for 1983, 1988, and 1993, all somewhat after the major growth phase of the Korean economy.

Table XI shows the exit, entry, and net entry rates calculated by Chung for 17 individual sectors and for manufacturing as a whole. The rates are calculated according to the formulas given in the notes to this table. From the bottom row of the table, it can be seen that 53 percent of the manufacturing plants operating and reporting in 1983 did not report in 1988, but on the other hand 69 percent of those reporting in 1988 did not report in 1993. The former is identified as the exit rate

and the latter as the entry rate. Since there could be other reasons why a plant might not report in a given year, these rates may represent overestimates of the true exit and entry rates. The corresponding exit and entry rates for the period 1988–93 were even higher, 61 percent and 74 percent, respectively. The net entry rate of 53 percent, however, was slightly higher in the first period than that in the second period (49 percent).

The table also shows that there is considerable variation from sector to sector, exit and entry rates both being especially high in apparel, leather, fabricated metals, electronics, and furniture.²¹ Net entry rates were high in electric machinery, non-electric machinery transport equipment, and precision instruments in both periods and high in leather and electronics between 1983 and 1988 but not between 1988 and 1993. By contrast, net entry rates were high in fabricated metals in the 1988–93 period but not in the 1983–88 period. Net

TABLE XI
Exit, entry, and net entry rates of manufacturing plants between 1983 and 1988 and 1988 and 1993

Sector	1983–88			1988–93		
	Exit	Entry	Net entry	Exit	Entry	Net entry
15. Food	0.36	0.39	0.05	0.41	0.52	0.25
17. Textiles	0.49	0.65	0.46	0.59	0.68	0.28
18. Apparel	0.63	0.78	0.67	0.71	0.79	0.38
19. Leather	0.64	0.80	0.84	0.73	0.78	0.23
20. Wood products	0.47	0.53	0.14	0.54	0.65	0.31
21. Paper, printing	0.46	0.64	0.50	0.57	0.72	0.52
24. Chemicals	0.63	0.60	–0.09	0.47	0.62	0.40
25. Plastics	0.57	0.76	0.82	0.62	0.75	0.54
26. Nonmetals	0.44	0.52	0.18	0.48	0.63	0.41
27. Basic metals	0.56	0.69	0.42	0.62	0.70	0.27
28. Fabricated metals	0.64	0.76	0.50	0.64	0.83	1.07
29. Nonelectric machinery	0.56	0.77	0.96	0.63	0.80	0.85
30. Electronics	0.57	0.84	1.59	0.70	0.78	0.38
31. Electric machinery	0.54	0.78	1.07	0.66	0.82	0.86
33. Precision instruments	0.55	0.77	0.99	0.65	0.80	0.77
34. Transport equipment	0.57	0.79	1.03	0.65	0.80	0.76
36. Furniture	0.59	0.76	0.70	0.70	0.76	0.27
Total	0.53	0.69	0.53	0.61	0.74	0.49

Notes:

1. The exit rates are calculated as the number of plants that reported in census year t but not reporting in census year $t + 1$ divided by the total number of plants reporting in census year t .
2. The entry rates are calculated as the number of plants reporting in year $t + 1$ but not reporting in year t divided by the total number of plants in year $t + 1$.
3. The net entry rates are calculated as the number of entrants in year $t + 1$ less the number of exits in year $t + 1$ divided by the total number of plants reporting in year t .

Source: Chung (1998, Table 3.1).

entry rates were relatively low in food, textiles, wood products, basic metals, and chemicals, and in the latter case even negative between 1983 and 1988.

Table XII shows the corresponding calculations for exit, entry, and net entry rates when the entries and exits are weighted by the number of employees. While the patterns are rather similar across sectors and over time, they are rather consistently lower than those shown in Table XI, suggesting that both entry and exit rates are higher among smaller plants. This is consistent with the evidence for the United States and many other countries provided in the studies surveyed by Caves (1998). Note that whereas there was only one instance (chemicals in 1983–88) with a negative net entry rate with the unweighted data of Table XI, when the employment-weighted data are used, small declines are observed for 1988–93 in textiles, apparel, leather, electronics, and furniture, all relatively early developed labor-intensive industries.

Chung (1998) also calculates indexes of total factor productivity based on the somewhat more sophisticated version of the TFP indexes computed

in Section 2 provided by Good, Nadiri, and Sickles (1996). He does so for both the new entrants and incumbents in each sector for both 1988 and 1993 on the basis of data for gross output, materials inputs, and productive factors. These calculations yield industry-specific TFP distributions for both entrants and incumbent plants. From these distributions, various measures of the characteristics of the distributions can be constructed. For new entrants he calculates the standard error (a commonly used measure of dispersion). For incumbent plants, he calculates the change in the TFP index in period $t + 1$ conditional on that in period t . Finally, he also calculates for each of the 17 sectors the median capital-labor ratio at the beginning of each period.

In each case, he finds relatively consistent differences across sectors from one period to another. For example, in each year the probability that a plant characterized by a low quartile TFP index in period t would be able to make the transition to a relatively higher quartile productivity index in period $t + 1$ is relatively high in nonmetals, food, wood products, and chemicals but low in leather, electronics, plastics, transport equipment,

TABLE XII
Employment shares of entrants, exits, and net entrants by sector and period

Sector	1983–88			1988–93		
	Exit	Entry	Net entry	Exit	Entry	Net entry
15. Food	0.22	0.28	0.13	0.24	0.35	0.08
17. Textiles	0.27	0.41	0.21	0.33	0.40	–0.02
18. Apparel	0.41	0.60	0.36	0.56	0.61	–0.11
19. Leather	0.29	0.50	0.38	0.62	0.54	–0.36
20. Wood products	0.43	0.45	0.02	0.47	0.55	0.08
21. Paper, printing	0.33	0.47	0.33	0.37	0.47	0.15
24. Chemicals	0.42	0.33	–0.08	0.19	0.37	0.25
25. Plastics	0.41	0.56	0.56	0.42	0.55	0.19
26. Nonmetals	0.26	0.39	0.21	0.27	0.47	0.26
27. Basic metals	0.21	0.33	0.21	0.25	0.31	0.05
28. Fabricated metals	0.46	0.59	0.33	0.49	0.64	0.25
29. Nonelectric machinery	0.42	0.56	0.56	0.44	0.60	0.26
30. Electronics	0.25	0.44	0.73	0.33	0.36	–0.03
31. Electric machinery	0.33	0.49	0.49	0.41	0.57	0.24
33. Precision instruments	0.35	0.56	0.71	0.51	0.64	0.06
34. Transport equipment	0.29	0.37	0.34	0.23	0.38	0.25
36. Furniture	0.38	0.53	0.40	0.48	0.53	–0.09
Total	0.32	0.46	0.32	0.38	0.47	0.05

Notes: For definitions of entry, exit, and net entry rates see notes to Table XI.

Source: Chung (1998, Table 3.3).

precision instruments, and electrical machinery. Likewise, the dispersion of TFP indexes of new entrants tends to be consistently higher in textiles, food, chemicals, apparel, and nonmetals than in sectors such as wood products, basic metals, plastics, transport equipment, and electrical machinery. Finally, capital intensity is consistently high over time in food, chemicals, basic metals, machinery, and transport equipment but low in apparel, leather, furniture, electronics, and precision instruments.

Naturally, some of these industry characteristics could be expected to affect the entry and exit rates of plants across industries. In particular, Caves (1998) and others have suggested that greater capital intensity would represent higher sunk costs, thereby lowering both entry and exit rates. Similarly, the higher the rate of growth in output (a proxy for favorable demand conditions), the higher would be the entry rate and the lower the exit rate. The greater the likelihood that incumbent plants would experience increases in their relative TFP indexes, the lower the entry and exit rates should be. Finally, the greater the dispersion of TFP among entrants, reflecting perhaps less complete information on appropriate technology, the lower the entry and exit rate that might be expected.

Table XIII from Chung (1998) provides some simple tests of these suppositions in the form of the simple correlation coefficients between the

entry and exit rates and each of these other measures. Some, but by no means all, of these hypotheses receive some support from these results. For example, capital intensity is (as hypothesized) negatively related to most of the measures of both entry and exit rates. Similarly, again as expected, output growth is positively related to most measures of entry rates but negatively related to exit rates.²² While the likelihood of improvement in relative TFP scores has (as expected) consistently negative effects on entry and exit rates, none of these correlations is statistically significant. Finally, as expected the correlation between the dispersion (standard error) of the productivity indexes and both entry and exit rates is consistently negative.

Another issue of relevance to firm dynamics is the nature of the frequently observed positive relation between exports and productivity. This is of special relevance to Korean manufacturing plants and firms, given the importance of exports to the development of Korean manufacturing industries. Does higher productivity or growth in productivity lead to exports or does experience in exporting lead to improved productivity? The same dataset is of course suitable for answering these questions. To this end, Aw et al. (1999) show that, in each of five sectors (textiles, apparel, plastics, electrical machinery and electronics, and transport equipment) and for each of the three years (1983, 1988, and 1993), the average pro-

TABLE XIII
Simple correlation coefficients (and Spearman rank correlations in second row) between exit and entry rates and the average age of exiting firms and each of four possible determinants

	Capital intensity	Productivity improvement of incumbents	Productivity dispersion of entrants	Output growth rate
Entry rate (un-weighted)	-0.25*	-0.91	-0.34	0.31
	-0.29	-0.84	-0.32	0.33
Employment-weighted entry rate	-0.29	-0.55	-0.23*	0.05*
	-0.22*	-0.54	-0.20*	-0.11*
Exit rate (un-weighted)	-0.21*	-0.68	-0.24*	-0.13*
	-0.18*	-0.49	-0.11*	-0.08*
Employment-weighted exit rate	-0.32	-0.45	-0.14*	-0.41
	-0.23	-0.41	-0.21*	-0.28*
Average age of exiting firms	0.44	0.70	0.28*	-0.16
	0.52	0.67	0.17*	-0.20

Source: Chung (1998, Table 3.9).

Note: * indicates statistical significance at the 5 per cent level.

ductivity of exporting firms is significantly higher than that of nonexporters. The difference is greatest for textiles, followed by apparel and transport equipment. With a few exceptions, however, there are no such significant differences in productivity between firms of different export propensities (low, medium, and high). Only in the textile and transport equipment sectors is there evidence that plants exporting more than 75 percent of their total production have significantly higher productivity than plants that export less, and even in these cases the productivity differentials are rather narrow.²³

Unlike Taiwan where these authors found significantly higher productivity among plants that enter export markets than among those that do not in all five sectors, for Korean manufacturing plants, the differentials exist but are statistically significant only in textiles and transport equipment. They also find some year t productivity differentials between plants that exit the export market in the next period ($t + 1$) and those that remain in the market. These differences are in favor of the export survivors in four of the five sectors, and the differences are statistically significant in three of them (textiles, plastics, and

electrical machinery). Finally, comparing continuous exporters with continuous nonexporters, they find sizable and statistically significant differences in favor of continuous exporters in four of the five sectors (all except electrical machinery) but neither significant widening nor narrowing of these differentials over time. In general, while there is strong evidence of a correlation between productivity and export experience in Korea as in Taiwan, the evidence in support of either high productivity inducing subsequent export entry or export experience raising subsequent productivity is weaker in Korea than in Taiwan.

Over time, besides increasing in size, surviving SMEs change in a number of other respects. Table XIV presents the means of various other characteristics and performance indicators for SMEs of different age groups. The results show that the longer the firms are in existence, the more likely they are to (1) be of corporate form (EQU), (2) have a foreign partner (DFPART), (3) be larger in size (no matter whether measured in terms of labor (MAN89), capital (ASS89), or sales (SAL89), (4) export more (EXP89) or be more likely be an exporter (DEXP), and (5) have greater R&D expenditures (RSH89), more researchers on the

TABLE XIV
Average firm characteristics and performance indicators variables by firm age

Variable	Label	First quartile		Second quartile		Third quartile		Fourth quartile	
		N	Mean	N	Mean	N	Mean	N	Mean
FIRMAGE	Firm age in 1989	275	3.269	276	7.467	275	13.556	276	25.257
EQU	Corporate	275	0.564	276	0.612	275	0.651	276	0.728
DFPART	Foreign partner	275	0.033	276	0.047	275	0.04	276	0.094
RFPART	Foreign share in equity	275	1.422	276	2.688	275	1.6	276	4.514
CAP89	Equity capital (billion won)	241	0.048	253	0.155	255	0.124	254	0.285
ASS89	Total asset(billion won)	201	0.188	235	0.645	243	0.502	243	1.295
MAN89	Number of workers	272	62.14	272	90.82	270	124.94	270	286.95
SAL89	Sales (billion won)	215	3.452	248	6.301	253	12.205	257	18.596
EXP89	Export (million U.S.\$)	275	0.526	276	1.545	275	2.065	276	3.311
DEXP	Export dummy	275	0.164	276	0.417	275	0.415	276	0.486
RSH89	R&D costs (billion won)	275	0.026	276	0.03	275	0.038	276	0.095
NORSH	Numbers of researchers	275	1.142	276	1.645	275	2.36	276	6.243
RANDDD	R&D department	275	0.204	276	0.243	275	0.269	276	0.413
RESINS	Research institute	275	0.04	276	0.036	275	0.065	276	0.159
NOPATENT	Number of patents	275	1.76	276	1.674	275	1.669	276	1.547
LIGHT	Light industry	275	0.382	276	0.388	275	0.313	276	0.355
HEAVY	Heavy industry	275	0.473	276	0.467	275	0.513	276	0.486
ELECT	Electronics	275	0.145	276	0.145	275	0.175	276	0.156

Source: Korean Institute for Industry and Trade (KIET) SME sample survey of 1990.

staff (NORSH), or a research institute. A somewhat surprising finding, however, is that the number of patents (NPATENT) declines with firm age. One explanation for this might be that patenting is more common in high tech firms which also might be typically younger.

Additional insights as to firm dynamics can be gained from case studies. Linsu Kim (1997) provides several interesting ones of SMEs that have successfully managed to fill leading positions in niche markets. One of these is of an SME paper board manufacturer founded and managed by an ex naval engineer. In contrast to the typical LE manager, the manager of this SME did not acquire a modern turnkey plant designed and developed abroad, but rather designed his own plant after considerable reading of technical literature and several visits to Japanese factories. He then bought used equipment for the plant from Japan. Although very cheap, the used equipment was missing parts that the new SME had to design and make. Yet, after much trial and error, being himself the master of his chosen technology, this entrepreneur was in a better position than his competitors to increase his capacity, improve the technology to overcome its observed shortcomings, and modify it to adjust to changing circumstances. After 15 years of experience like this and through extra knowledge gained through membership in an American technical institute for paper, he decided to start a new plant based on equipment designed jointly with local machine producers. In each of these steps, the use of his experience reduced his investment costs to a fraction of the cost of new imported machinery. At no time did this paper-board manufacturer have to rely on licensing of foreign technology or machinery. Since the learning was done by the entrepreneur himself, none of the benefits of this learning leaked out to others, thereby avoiding an important disincentive for investments in training and R&D by SMEs.

Another of Kim's case studies of successful SMEs is that of a metal pipe manufacturer which made its big technological breakthrough by hiring one superb, experienced engineer from an existing LE in the country, having him train others on the job, and then buying the machinery he recommended from abroad. Yet, within a year of its introduction, the team of engineers was able to

improve on the imported (Japanese) model. Its success was attributed to the way its engineering team and others in the firm learned from their own experience.

Still another case is that of the Medison Company, a producer of ultrasonic scanners used in hospitals and medical laboratories. Medison was formed when a team of university and government researchers hooked up with a venture capitalist. The government played three key roles in Medison's success. First, it provided four years of sponsored R&D funding to the researchers before the company's establishment. Second, it provided government-backed venture capital financing. Finally, it provided temporary tariff protection allowing the firm to penetrate domestic markets (rural hospitals which could not afford to buy imported scanners inclusive of the tariffs). Working under the time pressure to be competitive in a relatively short period of time and learning from their experience to date, the research team soon managed to design and produce scanners of much higher quality for export markets.

Even these few case studies illustrate a variety of ways in which, by learning from experience, internalizing its benefits, hiring foreign or other experienced consultants, taking advantage of the expertise of equipment suppliers and hard work by conscientious and talented entrepreneurs, SMEs can overcome the various constraints on their development. From the technical side, this may be getting more difficult, suggesting that government or other external support may be needed in the future, especially in high-tech sectors. In the case of marketing and finance, however, there is little reason to see why these difficulties should get more serious over time, except perhaps in the case in which a relatively young and capital-intensive SME attempts to pioneer in the penetration of international markets in that activity.²⁴

4. External sources of support: private firms through subcontracting

Especially for SMEs in countries like Korea that are rapidly moving up the technology scale and enforcing intellectual property rights, access to successful LEs and other firms can be an important means of overcoming the various constraints

on their development, at least under the right circumstances.

The purpose of this section is to examine the role of subcontracting relationships in SMEs, both currently and over time. How pervasive is subcontracting? How does it vary in extent and character across subsectors of manufacturing? To what extent do these relationships satisfy the SMEs participating in them? What problems arise? These are among the questions to be addressed. Subcontracting relations can go in either or both of two directions: "in" when a firm receives orders and "out" when the firm places or gives out orders.

To examine the extent to which SMEs are engaged in subcontracting of any type and the direction of these subcontracting relations by size of firm, turn to Table XV. Note that the overall incidence of subcontracting increases moderately by size (calculated by subtracting the entries in the last column "no contracting" from 100 percent). Specifically, 65.6 percent of firms with five to nine workers are involved in subcontracting of some kind, compared with 83.2 percent of those of size 200–299. This moderate increase, however, is the resultant of two opposing trends with respect to size: first, the percentage of firms involved in "subcontracting in only," which falls with size; and, second, the percentage of firms that either "subcontract out only" or "subcontract both in and out," which rises with size. Contrary to popular perception, Korean SMEs do about as much contracting out as they do contracting in. The smallest ones, however, are considerably more likely to contract in than out.

Generally speaking, Korea is a relatively late-

comer to subcontracting, except in a few relatively old industries such as the aforementioned case of woven textiles. Korea has long aspired to have a deeper, more multi-tiered subcontracting system than the one it has, the Japanese automobile industry serving as a model.²⁵ Such a system is believed to be transaction cost-efficient in that, at each level, the principal needs to contract with only a few contractors, each of which, in turn, can contract with a small number of others (subcontractors), etc., down the various tiers in the overall contractual structure. With only a few firms with which to relate directly, more attention can be devoted to detail, the monitoring of performance is facilitated, and the basis for cooperation between the two parties is believed to be enhanced (less likelihood of the benefits of this cooperation leaking out in externalities). Levy (1991) compared the character of subcontracting in Korea with that in Taiwan. Just as in the case of comparisons to Japan, Taiwan's subcontracting system was found to be both deeper and more transaction cost-efficient than that of Korea in the footwear industry. Levy (1991) attributed this to Taiwan's stronger family networks, higher income, and greater length of experience in production and exports.

Table XVI shows how the importance of subcontracting has changed over time. The biggest change was between the 1980s and the 1990s, in large part due to the rise of auto parts and other suppliers of assembling industries. Since 1991, the percentage of SMEs engaged in subcontracting has fluctuated somewhat around a mean of a little over 70 percent. Of the firms engaged in subcontracting, their dependence on subcontracting for

TABLE XV
Incidence of subcontracting by SMEs in manufacturing by direction and by size, 1997

Firm size group (by number of workers)	Number of SMEs	Subcontracting out only (%)	Subcontracting in only (%)	Either or both directions (%)	No subcontracting (%)
All sizes	85,947	14.1	19.7	37.9	28.3
5–9	37,870	12.9	22.4	30.3	34.4
10–19	24,657	10.2	20.7	43.2	25.9
20–49	16,194	18.0	15.6	44.6	21.8
50–99	4,427	24.9	12.4	45.6	17.1
100–199	2,130	28.5	7.7	42.5	21.3
200–299	669	29.9	7.2	46.1	16.8

Source: Small and Medium Enterprise Authority and Federation of Small and Medium Enterprises (1998).

TABLE XVI
Variations in the incidence of subcontracting over time and across size groups of SMEs in manufacturing

Year	Any subcontracting	0–20%	20–40%	40–60%	60–80%	80–100%
1986	42.5	4	5.4	5.4	6.1	79.1
1991	73.6	1.6	1.6	3	5.4	88.4
1992	73.4	1.6	1.5	3.3	4.1	89.5
1993	65.4	3.2	3.8	4.1	5.4	83.5
1995	72.1	3.8	3.4	4.8	7.1	80.9
1996	73.6	2.7	2.7	5.1	11.8	77.7
1997	71.7	6.1	4.1	3	7.2	79.6

Source: The Survey of Small & Medium Enterprises, each year, Small & Medium Enterprise Authority, Federation of Small & Medium Enterprises.

orders is quite high, though perhaps declining slightly since 1992. Many SMEs engaged in “subcontracting in” like the technological support and other benefits of subcontracting, but, on the other hand, would like also to develop their own sales channels so as to obtain higher prices for their products if they can get them.

Tables XVII and XVIII reveal the ways in which both the benefits and the problems of the subcontracting from the perspectives of the SMEs, themselves, have varied over time. From Table XVII it can be seen that the provision of raw materials, technology, and product design are by far the most frequently cited types of support received. Of these, the provision of raw materials (typical of light industries, such as textiles and leather) is of declining importance while technology is of rising importance. Also on the rise are management and to a lesser extent financial support. Other forms of support mentioned by a minority of

SMEs involved in contracting in are equipment loan, loan guarantees, manpower, capital, and joint development of parts.

Table XVIII, on the other hand, reports the frequencies of various problems encountered in these relationships for SMEs which contract in. The most frequently identified of these problems is too low a price for the work. Korean contractors, like their counterparts in Japan, are notorious for insisting that the subcontractors each year produce the product for less (forcing firms to increase productivity). Note, moreover, that the frequency of such reports has increased between 1986 and 1997 from 40 percent to over 60 percent. The second and even more rapidly growing problem is delay in payment, having risen from 18.5 percent of the firms in 1986 to 53.3 percent in 1997. Other increasingly cited problems are “demand for too high quality,” “inconvenient timing of orders,” and “too short delivery times.”

TABLE XVII
Percentages of subcontracting in SMEs reporting support received in their subcontracting relations, by type for selected years between 1993 and 1997

Year	Type of support received									
	Tech-nology	Manage-ment	Finan-cial	Loan guarantee	Raw materials	Loan of equipment	Product design	Capital	Loan of manpower	Joint develop-ment of parts
1993	37.2	11.5	9.2	5.3	56.4	9.4	37.2	3.4	7.6	n.a.
1995	43.7	15.7	13.4	8.7	53.8	12.8	40.7	1.9	5.0	10.0
1996	44.1	16.9	14.8	7.2	47.9	19.4	33.4	2.1	4.2	11.0
1997	50.4	24.7	12.4	6.8	34.2	9.4	32.6	2.8	5.8	n.a.

Note: Multiple entries were possible for each respondent.

Source: Survey of Small and Medium Enterprises, Table 47 for each year, Small and Medium Enterprise Authority and Federation of Small and Medium Enterprises.

TABLE XVIII

Percentages of subcontracting in SMEs reporting problems in their subcontracting relations, by type for selected years between 1986 and 1997

Year	Type of problem							
	Demand for too high quality	Delay in receiving goods	Too low price for work	Delay in payment	Inconvenient time of order	Too short delivery time	Change in the contracting enterprise	Others
1986	13.9	n.a.	40.0	18.2	15.5	10.9	n.a.	1.5
1991	11.7	n.a.	39.7	22.9	17.3	5.8	n.a.	2.6
1993	25.7	3.6	74.6	41.6	35.1	32.9	20.5	1.7
1995	30.8	6.7	75.4	40.7	44.5	35.0	23.1	2.8
1996	32.0	7.0	68.4	44.9	48.3	34.2	26.2	4.2
1997	33.1	6.9	61.3	53.3	41.5	29.6	22.7	5.7

Note: Multiple entries were possible for each respondent.

Source: *Survey of Small and Medium Enterprises*, Table 48 for each year, Small and Medium Enterprise Authority and Federation of Small and Medium Enterprises.

Since as yet we have not attempted to examine the possible effects of subcontracting on performance, in Table XIX, we relate TFP to “subcontracting in” by using the same KIET sample of SMEs in 1990 used previously. Table XIX compares the sector-specific trimmed means of TFP of SMEs with and without “subcontracting in” for 11 sectors and for the full sample.²⁶ For eight of the 11 subsectors as well as for them all combined, the trimmed mean TFP index is higher with subcontracting than without it. Moreover, for five of the eight subsectors in which the TFP score

is higher with subcontracting than without it, the difference is statistically significant at the 5 percent level. Only in clothing, fur, leather, and shoes is the mean TFP index for the SMEs *without* subcontracting significantly higher than for those *with* subcontracting.²⁷

5. External sources of support: government and nongovernmental institutions

Private firms through subcontracting relationships are of course by no means the only source of

TABLE XIX

The relation between “Contracting In” and TFP in the KIET sample of SMEs in 1990 in different subsectors of manufacturing

Subsector of manufacturing	Number Subcontracting in		Subcontracting in	
	<i>N</i>	TFP Index (trimmed mean)	<i>N</i>	TFP Index (trimmed mean)
Food manufacturing	42	0.140	22	0.144
Textiles	17	0.142	27	0.125
Clothing, fur, and leather, shoes	15	0.181	27	0.098
Wood and wood products	25	0.291	25	0.206
Paper and printing	19	0.166	17	0.227
Chemicals, petroleum, rubber, and plastics	74	0.210	45	0.229
Nonmetallic minerals	11	0.150	21	0.185
Basic metals	32	0.129	27	0.188
Metal structures and products	19	0.136	19	0.215
Machinery and transport equipment	54	0.164	70	0.620
Electrical machinery and other	47	0.113	91	0.114
Total manufacturing	356	0.167	392	0.242

Source: Computed from KIET SME Survey.

external support for SMEs. Indeed, in Korea there has been a proliferation of institutions and policies aimed at providing technical, marketing, financial, or other forms of assistance to SMEs. As was already mentioned, there has been considerable change in the orientation of government policies with respect to SMEs over time. In the 1960s and early 1970s, in the pursuit of rapid economic development, and in the absence of market and other institutions capable of providing access to small and new firms, SMEs were relatively neglected. Policy was directed to providing the credit and other support to the “winners,” those firms, perhaps originally small, but which had managed to succeed in export markets and hence which had grown to be very large. Firms and sectors were assigned ambitious growth quotas. Failure to meet these quotas could result in the loss of access to highly subsidized policy loans or other penalties. SMEs, on the other hand, had access primarily only to credit on the informal or curb market at interest rates perhaps double those in the formal credit market.

When in the 1970s the government’s development plan assigned top priority to heavy and chemical industries or HCI (industries usually characterized as having economies of scale and capital-intensive) and exports, SMEs were put in an even more unfavorable position. An SME bank had been set up, but loan repayment rates were quite low, transaction costs very high and hence making little difference for SMEs in general. Even in the late 1960s, however, some seeds were set for the beginnings of an effective SME support system. The Korean Credit Guarantee Fund (KCGF) was created to facilitate the provision of bank credit to SMEs. A special trading corporation was set up for assisting SMEs in export marketing. The beginnings of the SME reservation scheme and of another to foster vertical integration (subcontracting) with LEs were established in the mid-1970s, and in 1979 the Small and Medium Industry Promotion Corporation (SMIPC) was established for the purpose of providing technical assistance and training programs to SMEs.

In the 1980s the shift toward a stronger SME support system and policies aimed at overcoming the earlier neglect of SMEs accelerated. The new constitution stipulated that the protection and

promotion of SMEs should be included among the basic responsibilities of the government. A series of laws was passed to turn this broad objective into a body of law. Many specific-purpose credit funds were set up, for example, to help rural industries, to foster venture capital designed to assist small high tech startups, to foster collective or cooperative activities among SMEs, to help older SMEs update their technology, and, as was mentioned previously, even to help existing SMEs to relocate some of their operations abroad. An ambitious system for identifying and providing various kinds of support for “promising SMEs” was established, and, even more important, both commercial banks (city banks) and rural local banks were required to allocate minimum specified percentages of their loans to SMEs. Such quotas were even forced on nonbank financial institutions, such as insurance companies. Various tax breaks to SMEs (accelerated depreciation allowances, deductions from taxable income, tax moratoria, and tax rate reductions) for special purposes were also implemented.²⁸

The 1980s and 1990s have also seen a proliferation of technical research centers, institutes, standards centers, productivity centers, and a design and packaging center organized as either government or nonprofit agencies. Although not developed exclusively for use by SMEs, several of these agencies were in fact fairly heavily used by SMEs. Moreover, as the internal capabilities of LEs increased with accumulated experience and staff additions, LEs had less need to rely on those external agencies, such as the Korean Overseas Trading Association (KOTRA), which had earlier catered almost exclusively to LEs. Some of the new centers have also proliferated into networks of either regional general-purpose agencies or national but highly specialized ones.

Nevertheless, because of the large number of programs and agencies, the lack of data on both their benefits and costs, and the likelihood that their effects would appear only in the relatively long run and leak out in the form of externalities, the proper evaluation of these programs and organizations is quite a challenge. Kim and Nugent (1999), as part of a broader multi-country study designed and led by Brian Levy of the World Bank, made a serious, though largely qualitative, attempt to evaluate the usefulness of these

programs in a relatively small sample (122) of mostly exporting SMEs. Four different subsectors were chosen to reflect different environmental conditions, stages in the product cycle, and other subsector characteristics. While no attempt was made to obtain cost of program data, the use by and usefulness to the sample firms of each of three different types of SME support was investigated. For each general type of support an attempt was made to distinguish those specific forms and specific delivering agencies that were more highly evaluated from those that were not.

In general, the following conclusions were obtained:

1. When and where somewhat comparable support was available from both private commercial sources and from government or other nonprofit agencies, the services of the commercial services were more highly evaluated. Among the reasons were that the support from nonprofit agencies was often too general to be of great use or too difficult to access.
2. The use of nonprofits would be less and the services less well evaluated when there existed reasonably accessible support from subcontracting arrangements.
3. Subcontracting arrangements tended to be used most frequently and evaluated most highly by relatively small SMEs. The best subcontracting arrangements were those that had evolved relatively slowly in communities where informational networks were especially strong, such as the aforementioned Taegu area for woven textiles. In this case, contracting firms (both LEs and SMEs) were a frequently used and highly evaluated source of each major type of support. In the case of the more recently developed and government-encouraged subcontracting relations in the auto parts subsector, contracting firms (generally LEs) were a frequently used and highly evaluated source of technology support but of neither financial nor marketing support. Since subcontracting arrangements were not especially highly evaluated by sample SMEs in the electronic parts and components subsector, even when created and well established, subcontracting relations need not be a cure-all for the constraints that SMEs face.
4. Since use of collective support (especially in the case of technical support) rises with size and other indicators of internal capabilities of SMEs, it is clear that inadequate capabilities within the firm can make it difficult for SMEs to access collective support.
5. Both foreign and domestic equipment suppliers are important and highly evaluated sources of ideas about product and process improvement. Individual consultants and university researchers are another potentially useful though somewhat less frequently used private source of technological information and support.
6. In the case of marketing, foreign buyers are another important source of external support. Yet, foreign buyers may not be available to SMEs until the country has become a relatively important source of subsector exports. Hence, it is relatively early in the subsector's export experience in sectors without dense subcontracting networks (as exist in woven textiles) and for relatively large firms that have the ability to access collective sources of support that nonprofit agencies have played a well-evaluated role. As in the case of technology support, the principal shortcoming of such support is its excessive generality.
7. While financial support from public agencies tends to come at a substantially lower interest rates, nevertheless, its usefulness is rarely indicated to be superior to that from commercial sources. Two reasons for this seem to be the narrow scope and eligibility requirements of such programs and delays in obtaining the funds.
8. In good times and in the absence of the severe financial repression of the nonbank and other financial markets that took place in the early 1970s, Korean SME exporters have had access to a relatively wide range of financial support. This reflects the high priority that was given to exports in the country's economic development plans. In bad times, SMEs are likely to be the first to be squeezed financially, with nonrenewal of loans, and lengthening delays in payment by their clients. As is the case elsewhere, however, external sources of financial support are rarely available to SMEs at startup.

9. The low use and usefulness evaluations of support from nonprofit agencies are frequently attributed to the excessively general character of such support or to its irrelevance or inaccessibility to SMEs. Hence, increased use and usefulness of nonprofit sources of support will clearly depend on improvements in the ability of nonprofit agencies to supply the type of services needed and in an easily accessible and timely manner. This requires that the supplying agencies have good governance systems. The ingredients of good governance seemed to be (1) a well-functioning system of performance evaluation by principals, (2) a strong human resource base allowing the agencies to supply high quality services, (3) "voice"²⁹ or other means of participation by the SME clients of such agencies, and (4) a market test.³⁰ In many agencies, one or more of these crucial ingredients seemed to be missing. In general, those agencies coming closest to satisfying all four of these ingredients were the most highly evaluated.
10. An especially low cost and widely used and highly evaluated source of support, typically supplied by external, largely nonprofit, sources, was trade fairs, especially international ones.

The sample from which these findings emerged is not only small but also, being limited to largely exporting firms in a small number of subsectors, is clearly far from representative of Korean SMEs in general. For this reason, to compare the use and usefulness of subcontracting and noncommercial sources of external support in a larger and more representative sample of Korean SMEs, in Tables XX and XXI we make use of the same 1990 SME Survey carried out by KIET that has been used in several of the preceding tables.

Table XX provides the means of the support variables from both subcontracting and nonprofit agencies for each of four age-of-firm groups. As can be seen from the entries for FIRMAGE in the top row of the table, the youngest group of SMEs has an average of a little over three years, and the oldest an average of a little more than 25 years. Two rows of entries are given for the subcontracting relations, DSUBIN, a dummy variable for being involved in subcontracting in, and

DHELPPFA, a dummy variable from receiving any form of help from that relation. While DSUBIN declines only ever so slightly with age, DHELPPFA declines more sharply and more regularly with age. Clearly, the likelihood of help is smaller than that for subcontracting in, suggesting that in only about half the cases do recipient firms feel that they have received help from the relation. Nevertheless, about a quarter of all the youngest firms receive such help, and half of those who are involved in subcontracting. Among the oldest group less than one-sixth of the sample SMEs received such help, which is only one-third of the number engaged in subcontracting in.

For government and other nonprofit agencies quite a few different agencies and types of support are listed. Only a few of them have ever been used by more than 10 percent of the firms. The most frequently used have been special government policy loans (POLFIN), general bank finance (GENFIN), credit guarantees (CREDIGU), the Korea Productivity Center (HPROD), the SME Promotion Corporation (SMEBSEV), and several types of tax incentives, deductions for specific purposes (ITAXDUD), tax incentives on prefunds such as feasibility studies (PREFUND), and special depreciation allowances (SPEDEP). Notice that, regardless of frequency of use, or the specific program or supplying agency, use tends to rise with age of the firm. There are but two exceptions to this rule, CREDIGU and KOTRADE, for which there is no consistent pattern. Since the natural thing would be for the likelihood of use to increase with the time the firm has been in existence, these two exceptional cases would seem to indicate that these two agencies have been especially successful in becoming accessible and useful to newer firms. In only a few cases have we put usefulness scores, those variable names beginning with the letter "E."³¹ The scores for EKOTRA indicate that the youngest firms found KOTRA to be slightly more useful than the older firms, though in general the averages (based on a five point) scale were not very high and, indeed, considerably lower than those for EGENFIN (general bank credit). For the more policy-dictated funds (POLFIN), although use rises sharply with age, the usefulness of such funds (as indicated by EPOLFIN) shows that those relatively new SMEs that did use such funds found them just as useful as did older SMEs.

TABLE XX
Use of external support by source and by age of SME firm group, 1990

Variable	Label	Means for variables by firm age							
		First quartile		Second quartile		Third quartile		Fourth quartile	
		N	Mean	N	Mean	N	Mean	N	Mean
FIRMAGE	Firm age in 1989	275	3.269	276	7.467	275	13.556	276	25.257
<i>Support from contractor through subcontracting relations</i>									
DSUBIN	Subcontract-in	275	0.513	276	0.467	275	0.52	276	0.446
DHELPPFA	Help from contractor	275	0.247	276	0.196	275	0.167	276	0.156
<i>Support from government and other nonprofit agencies</i>									
SUBSIDY		275	0.029	276	0.029	275	0.047	276	0.087
POLFIN	Policy funds	275	0.258	276	0.551	275	0.818	276	1.033
EPOLFIN	Effectiveness of policy funds	50	3.277	84	3.153	116	3.223	131	3.253
GENFIN	General funds	275	0.207	276	0.322	275	0.455	276	0.5
CREDIGU	Use of credit guarantee	255	1.98	245	2.253	263	2.384	251	2.096
TAXDED	Tax deductions	275	0.255	276	0.446	275	0.705	276	1.033
ITAXDUD	Other tax benefits	275	0.069	276	0.188	275	0.258	276	0.239
PREFUND	Tax incentive on prefunds	275	0.091	276	0.315	275	0.553	276	0.801
SPEDEP	Special depreciation	275	0.065	276	0.181	275	0.338	276	0.46
GEYUL	Vertical Integration	275	0.011	276	0.011	275	0.047	276	0.047
SMEBSEV	SME Promotion Corp.	275	0.269	276	0.417	275	0.76	276	0.721
SMECP	SME Federation	275	0.036	276	0.054	275	0.08	276	0.116
HPROD	Korea Product Center	275	0.116	276	0.145	275	0.215	276	0.373
HDISIGN	Korea Design Center	275	0	276	0.022	275	0.025	276	0.047
EKOTRA	Effective:KOTRA	10	2.85	15	3.033	28	2.75	36	2.861
KOTRADE	Korea Trade Promotion Corp.	275	0.044	276	0.033	275	0.033	276	0.051
KIET	KIET	275	0.073	276	0.098	275	0.185	276	0.225
PROTEC	Institute product technology	275	0.051	276	0.033	275	0.036	276	0.094

Source: Korea Industry and Trade Institute (KIET) Sample SME Survey of 1990.

Table XXI provides the corresponding means on many of the same variables (and a few others) for each of four firm size groups. With respect to subcontracting, note that DHELPPFA tends to rise with size, even though it fell with FIRMAGE. This presumably reflects the fact that some of the larger SMEs are auto parts producers that receive considerable technical assistance from the large auto assemblers. Since as noted in the top row of the table, firm size and age are positively related, this implies that subcontracting help is most frequently received by young firms regardless of size even though young firms tend to be small. As with firm age, use of all the support variables except the credit guarantee system (CREDIGU) and KOTRADE rise fairly sharply with age. In both of the latter cases, the pattern is of the Inverted-U (nonlinear) form. Once again there is little

systematic variation in the usefulness scores by size. There is considerable variation in usefulness across types of support, from a low of 0 for the Quality Testing Office to well over 3.0 for the financial support variables CREDIGU and GENFIN. Given the multiplicity of different sources and types of SME support in Korea, of particular interest may be the scores given to the overall evaluations SATISSUP and EFFSUP. The scores for EFFSUP indicate that the supports offered are generally viewed as useful (with well above average score, rising with size of firm). At the same time, however, the relatively low scores for SATISSUP indicate that not all SME needs are satisfied by the programs.

From both the small sample of exporting SMEs and the larger sample of all SMEs, it is clear that financial support of virtually every type, but

TABLE XXI
Use of external support by size of SME

Variable	Label	Means of variables by number of employees							
		< 50		50–99		100–200		200–299	
		N	Mean	N	Mean	N	Mean	N	Mean
FIRMAGE	Firm age in 1989	537	9.657	222	11.982	164	14.89	179	18.832
<i>Support from contractor through subcontracting relations</i>									
DSUBIN	Subcontract-in	554	0.458	225	0.507	167	0.545	180	0.533
DHELPPFA		554	0.157	225	0.209	167	0.251	180	0.233
<i>Support from government and other nonprofit agencies</i>									
KNOWSUP	Know of SME support?	547	2.771	223	3.13	167	3.275	178	3.242
MUCHSUP	How much use of SME support?	544	2.063	222	2.554	166	2.651	174	2.575
SATISSUP	Satisfied with SME support?	502	2.315	213	2.61	164	2.646	163	2.706
EFFSUP	SME support effective?	512	3.012	216	3.37	163	3.509	170	3.618
SUBSIDY		554	0.02	225	0.062	167	0.072	180	0.094
POLFIN	Policy funds	554	0.247	225	0.733	167	1.066	180	1.456
GENFIN	General funds	554	0.132	225	0.409	167	0.557	180	0.878
EGENFIN	Effectiveness of GENFIN	55	3.145	62	3.401	61	3.417	100	3.318
CREDIGU	Use of credit guarantee	498	1.902	206	2.505	161	2.516	171	2.281
ECREDIGU	Effectiveness of CREDIGU	440	3.155	188	3.479	156	3.481	160	3.431
TAXDED	Tax deductions	554	0.184	225	0.631	167	0.976	180	1.55
ITAXDUD		554	0.054	225	0.249	167	0.311	180	0.411
TAXRED	Tax reductions	554	0.141	225	0.276	167	0.437	180	0.506
PREFUND	Tax incentive on prefunds	554	0.092	225	0.396	167	0.743	180	1.289
SPEDEP	Special depreciation	554	0.076	225	0.249	167	0.413	180	0.694
GEYUL	Vertical Integration	554	0.005	225	0.027	167	0.066	180	0.067
DEMANSUP	iyang+unigsme+useofsme+collcon	554	0.034	225	0.053	167	0.066	180	0.061
SMEBSEV	SME Promotion Corp.	554	0.298	225	0.684	167	1	180	0.75
EXPERI	Quality test office	554	0.058	225	0.12	167	0.138	180	0.128
EEXPERI	Effectiveness of EXPERI	32	0	27	0	23	0	23	0
SMECP	SME Federation	554	0.025	225	0.08	167	0.15	180	0.144
HPROD	Korea Product Center	554	0.042	225	0.187	167	0.425	180	0.561
HDSIGN	Korea Design Center	554	0.004	225	0.018	167	0.042	180	0.072
KOTRA	KOTRA	554	0.056	225	0.178	167	0.228	180	0.233
KOTRADE	Korea Trade Promotion Corp.	554	0.022	225	0.062	167	0.054	180	0.05
KIET	KIET	554	0.083	225	0.142	167	0.257	180	0.25
PROTEC	Institute product technology	554	0.009	225	0.107	167	0.096	180	0.1

Source: Korea Industry and Trade Institute (KIET) Sample SME Survey of 1990.

especially general commercial bank loans, are very highly evaluated and widely used. Some of these are made possible by guarantees on loans to SMEs from the Korean Credit Guarantee Fund (KCGF) and other smaller and more specialized agencies. The KCGF whose guarantees go almost exclusively to SMEs grew rapidly; its outstanding guarantees grew (in nominal terms) by 10-fold between 1976 and 1984 and by almost another 15-fold by 1998. Expansion of the KCGF has been heavily dependent on new infusions of govern-

ment funds since the fees have generally been insufficient to cover losses and other sources of funds have been quite small. The time path of KCGF expansion indicates rather clearly that its expansion is financial problem-driven. The two most severe recessions during the period were between 1979 and 1981 and again 1997 and 1998. The guarantees accepted almost tripled between 1979 and 1981 and more than tripled between 1996 and 1998. Defaults also exploded as a percentage of outstanding guarantees on both these

occasions from 1.1 percent in 1979 to 4 percent in 1981 and almost 9 percent in 1982, and from 7 percent in 1996 to almost 20 percent in 1998. As a result, with fees held constant throughout the period, the compensation ratio, defined as the amount of fees collected in a particular year divided by the defaults for which the KCGF must compensate the banks, plummeted from around 150 percent in the mid-1970s to 11 percent in 1982. After that, with good times, the compensation ratio recovered to about 30 percent by 1990 but since then has fallen farther, hitting a new low of about 7.5 percent in 1998.

Another important factor contributing to the availability of external finance to SMEs has been the policy of the government to impose gradually increasing minimal credit allocations to SMEs on commercial and regional banks, and to a lesser extent on some other financial institutions. As shown in Table XXII, the result of these two measures has been a strong upward trend (at least until 1996) in the percentage of commercial bank loans allocated to SMEs. But since bank loans are but one of several important external sources of enterprise finance, by no means does this tell the whole story. Other important sources are various kinds of nonbank financial institutions. Since these (less regulated) institutions have been increasingly bought up and controlled by chaebol, the bulk of such funds has been directed to LEs. Bond markets and equity markets have also developed, but again almost exclusively for the benefit of LEs.³²

To conclude, when times are good SMEs can obtain technological or marketing help from sub-contracting relations with private firms, and especially when technology is simple, can obtain external support from private consultants, observation, reverse engineering, equipment suppliers,

and local networks. When there is a recession or financial crisis, however, SMEs may be the first firms screened out by banks. Whereas LEs can usually borrow long-term even in bad years, if they can borrow at all, SMEs have to borrow short-term often at high interest rates from nonbank financial institutions. Moreover, also in bad times, they tend to get squeezed from lengthening delays in payment by their customers, against which they are quite powerless to act.

Over time, as technology gets more complex and SMEs enter into product niches in which there is less accumulated experience, they are also likely to become more dependent on external sources of marketing and technological support. Attempts by nonprofit agencies to supply such support are often plagued by difficulties in access, and by a mismatch between the kinds of services provided and those desired by users. With the right incentive structure and governance characteristics, such agencies are capable of providing such assistance quite efficiently. Despite the proliferation of programs in support of SMEs, and the ostensible change in government priorities in favor of SMEs, in view of the continuing close relationship between chaebol and the government, many analysts doubt that the change really amounts to anything very substantial.³³ Because of its fungibility and the lengthening payment delays that SMEs are subjected to in recessions, access to finance is especially highly evaluated though often unavailable to SMEs in such times.

6. SMEs as business cycle shock absorbers and inequality-reducing devices

Two interesting claims have been made concerning the benefits of SMEs in an economy. First,

TABLE XXII
Share of SME loans in total credit extended by commercial banks, 1979–95

	1979	1985	1988	1989	1990	1991	1992	1993	1994	1995.6
Total loans	71.7	257.9	356.2	462	540.2	649	745	834.1	992.9	1,054.4
Loans to SMEs	27	111	171.3	231.3	300	368.5	419.7	494.2	583.4	632.2
SME Share (%)	37.7	43.1	48.1	50.1	55.5	56.3	56.3	59.3	58.8	60.0

Unit: Won 100 million

Source: Annual Report on SME, each year, Federation of SME Cooperation Annual Report on Regional Economy, each year, Bank of Korea.

the claim that SMEs serve as shock absorbers, without which business cycles would be more serious and without which necessary structural adjustments would not have been made. Second, that the greater the relative importance of SMEs in the economy, the lower income inequality is likely to be. Does the Korean experience lend any credibility to such claims?

Shock absorber hypothesis

The shock absorber hypothesis applied to the Korean case would go something like this: Business cycle adjustments in fast growing economies such as Korea involve structural adjustments. If these structural adjustments are made quickly and smoothly, business cycle swings may be rather small and the downward phases not very painful to the economy as a whole. On the other hand, if the needed structural adjustments are postponed or undertaken only very slowly, business cycle troughs might last for some time and be rather deep. Since SMEs typically experience both higher failure rates and (among surviving SMEs) higher labor turnover rates than LEs, if the firm structure is heavily tilted to SMEs, such adjustments are likely to occur more smoothly and quickly than if the firm structure were tilted to LEs and *chaebol*.

When Korean SME entrepreneurs are faced with changed circumstances and severe financial or other crises, and therefore have to close their businesses promptly, they may already have ideas of other types of business better suited to the changed circumstances. Instead of engaging in collective action to protect their old businesses (if it is not already too late), as might be more typical of LEs, they are more likely to start new businesses. In the latter case, therefore, as soon as conditions improve, new firms are created that can be expected to go through the various phases of growth outlined before. The failure of individual SMEs is unlikely to gain much attention of policy makers to offer protection. Even if many SMEs were to fail at the same time, then the large size and heterogeneous character of their group and other factors make it unlikely that they would be able to succeed in the kind of collective action that would bring them protection in their old activities. Typically also, SME entrepreneurs have invested

much less capital per unit of activity than their LE counterparts, and hence face lower costs of “exit” than LEs. On the other hand, even when only one or two *chaebol* are threatened with bankruptcy, especially those in the same industry, they might be expected to push for, and to be more successful in obtaining, protection of that industry, impeding the necessary adjustments. While in Korea such protection has only been very temporary, at the very least such an event induces a considerable debate in and out of government about the best way to cope with the crisis. Government has often been involved in bringing about mergers and selectively granting credit allowing the most important of such firms to survive the crisis, but thereby postponing or totally avoiding meaningful structural adjustment.

Is this plausible in the Korean context? In preceding sections we have seen that Korean SMEs have indeed experienced high failure rates, high labor turnover rates, and no evidence of SMEs engaging in collective action. The one notable special concession made to SMEs in the two most severe recessions has been substantial infusions of government capital to the KCGF. Yet, in view of the substantial number of startups that also occur in these recessions, some of these infusions can be interpreted as helping the new businesses to get started instead of only allowing troubled SMEs to survive. The process can be facilitated if Korean SME entrepreneurs have the foresight to originally invest in the type of capital that could be converted easily to the new business. Yet, this is precisely the type of strategy that many SME entrepreneurs adopt. What is probably not true, however, is that there has been any *large* difference in this respect between SMEs and *chaebol* and LEs. This is because, quite frequently, the Korean government has used bankruptcies in LEs as an opportunity to obtain greater rationalization of the industry, pushing *chaebol* firms to swap assets so as to concentrate more on those business activities for which they are best suited and experienced.³⁴ Even so, however, there is likely to be an important difference in the speed of adjustment in the two cases, necessarily rapid for SMEs, but more deliberate in the case of LEs.

On the side of the workers also, because of the historically higher labor turnover rates and lower asset specificity of the human capital in SMEs,

any increase in turnover caused by SME bankruptcies should not increase structural unemployment to the extent that it would if the bankruptcies occurred in LEs. In general, therefore, the hypothesis would seem plausible qualitatively but unlikely to have a large quantitative effect.

Because of Taiwan's greater SME orientation relative to Korea, one might be tempted to use a Taiwan–Korea comparison of business cycle variability to provide evidence. In the East Asian currency and financial crisis of 1997 and 1998, Korea suffered a much greater recession than did Taiwan, thus strongly supporting the hypothesis. But, since Taiwan did not have the currency crisis that Korea did, it would be dangerous to make much of such a comparison without first trying to account for other differences between the two countries.

Alternatively, could one make use of the different business cycle episodes of Korea itself to see whether the intensity of business cycles varied with the SME shares in manufacturing or other activity? Unfortunately, a test of this sort would be equally difficult to carry out. It would require a full-fledged model of the business cycle with the SME share a critical variable interacting with others and from which it would be possible to conduct a counterfactual simulation. The empirical validity of such a model would require a number of observations on both business cycle severity and SME shares. The fact that Korea has enjoyed such sustained and rapid growth that business cycles have been relatively few and mild (until 1997) further impedes such a test. Hence, despite the fact that the shock absorber hypothesis seems plausible in the Korean context, it is probably weak and empirical evidence on it very difficult to obtain.

The best that can be done in this respect is some very casual empiricism. The quicker than expected seeming recovery of the Korean economy from the currency and financial crisis of 1997 might be at least *partly* attributed to the greater role that SMEs play in the economy now relative to 15 years before in the crisis of 1979–81. Something of an anomaly is the fact that between 1996 and 1997 the exit rate among LEs was actually greater than that among SMEs. To some extent, the anomaly might be explained by the crisis-stimulated pressure of an outside agency (the International

Monetary Fund) to provide special funds in support of SMEs. It would appear highly likely, however, that, when the 1998 data on SMEs become available, both the failure rate and the new firm creation rate will be found to be higher among SMEs than among LEs by a considerable margin.

Income inequality-dampening hypothesis

Again applied to the Korean case, the inequality-dampening hypothesis would be something like what follows. SMEs are more labor intensive than LEs and have narrower wage differentials across workers. Wages are also distributed more equally than profits, rent, and other components of national income. Hence, as the SME sector expands relative to the LE sector of the economy, *ceteris paribus*, (1) the share of labor in national income should rise, (2) inequality among wage earners should decrease, and (3) overall income inequality should decrease.

Is the hypothesis plausible for Korea? It is generally the case that the wage bill is higher relative to other components of value added in SMEs than in LEs and SMEs exhibit greater labor intensity. Nugent (1989) showed that the dispersion of wages across workers is also lower in SMEs than in LEs.³⁵ Likewise, virtually all studies in Korea or anywhere else have shown wage income to be more equally distributed than other components of national income. For this reason, the conditions for the hypothesis to be valid seem to be satisfied. Is there any evidence?

Comparable time series data on measures of income inequality are notoriously hard to come by. Among the factors limiting comparability are changes over time or from one survey to another in the questionnaires used, response rates, the timing of the survey within a calendar year, various factors contributing to under-reporting such as changes in income tax rates or fears that the responses will be turned over to tax authorities, and assumptions for converting income in kind into value terms or for dealing with open-ended income groups. There is also the issue of the best measure to use of income inequality and the sensitivity of inequality rankings to the choice of measure. The existing literature on income distribution in Korea shows clearly that the validity

and comparability of various estimates of income inequality are at least as full of controversy in Korea as elsewhere.

Though the results of many alternative income distribution studies are sometimes cited, the most widely cited and perhaps the most comparable time series on income inequality are the observations on the Gini coefficients for Korea contained in Deininger and Squire (1996). Although another index might be preferable since the Gini coefficient puts more weight on observations in the middle of the distribution than other measures, this is probably the best that can be done and for this reason are presented in Table XXIII. Also shown in the table are the shares of SMEs in manufacturing. At least in rough terms, the data would seem to support the hypothesized relationship. While the SME share in manufacturing employment was rising between 1952 and 1960, the Gini coefficient was rising. Then, between 1960 and 1975 while the SME share was falling, the Gini coefficient measure of income inequality was rising quite sharply. After 1975 when, as we have seen, the SME share was rising, the Gini coefficient was falling. Hence, not only is the hypothesis plausible for Korean conditions, but also there is at least some empirical evidence to support the hypothesis.³⁶

Clearly, however, such a simple test does not rule out the possibility that there may have been other factors responsible for these two different trends in income inequality. Indeed, one distinct alternative would be a version of the Ranis-Fei-Lewis model concerning surplus labor. This model assumes a dual economy with different incomes per capita or wage rates in the two sectors.³⁷ According to this hypothesis, at first, growth of the manufacturing sector increases income inequality since it pulls people out of the low but homogeneous income sector into the high income,

high variance sector. Over time, however, as more and more people enter the high income sector, intersectoral income differentials decline. Moreover, when the surplus labor in the traditional (non-manufacturing) sector disappears, the wage rate will rise in the traditional sector, further reducing income inequality. Kuznets (1955) also emphasized the role of human capital growth on income inequality. The rapid expansion of education (with the demand structure for labor of different skills held constant) should at some point tend to decrease income inequality within the high income, high variability sector. Since all these processes would seem to have been occurring in Korea simultaneously, without further research it is unclear as to which of these three explanations best explains the changes over time in Korea's income inequality.

7. Conclusions and lessons for other developing countries

In many respects, the South Korean experience with SMEs in manufacturing has been somewhat similar to other countries. For example, many of the constraints on their development seem to have been similar. Their strategies for overcoming these difficulties would also seem to have been similar in many respects. For example, developing subcontracting relationships and conserving on capital requirements by using used, borrowed, or rented capital and land are two such strategies. Their comparative characteristics vis-à-vis LEs are also rather similar; for example, their use of more labor intensive technologies, similar sectoral composition of output, concentration on a single product, the dominance of single-establishment firms, the relatively high level of education of SME entrepreneurs, and means of technology acquisition (through imitation, backward engineering, etc.).

TABLE XXIII
Relation between SME shares in manufacturing employment and Gini coefficient (based on household income)

	1952	1960	1966	1970	1975	1980	1985	1988	1996
Share of SMEs in manufacturing employment	61.5	67.7	60.3	49.0	45.7	49.6	56.1	60.0	69.2
Gini coefficient	34.0 (1953)	32.0 (1961)	34.2	33.3	39.1	38.6	34.5	33.6	n.a.

Source: SME shares in manufacturing employment from Table I; Gini coefficients from Deininger and Squire (1996)

Although the data on dynamic patterns are unfortunately quite limited, they too seem to be similar to those in other countries. For example, the failure rates would appear to be very high in the first few years, declining gradually thereafter, and be higher for small SMEs than for large ones. Also, technical efficiency or TFP growth of SMEs would seem to have lagged substantially behind that of LEs.

Nevertheless, there are also some distinctive features of the Korean experience. One of these is the several trend reversals in the relative importance of SMEs over time and the determinants and effects of these changes. Another is the extremely rapid growth of the manufacturing sector, and lying behind this, the high rates of accumulation of both physical and human capital. Korea was also one of the earliest countries to make a substantial transition from a strategy of import substitution to increasing openness and export-led development. Two other very distinctive features are the unusually great importance of *chaebol* or conglomerate firms (with their many subsidiaries), and the increasingly large network of government and other nonprofit sources of external support to SMEs in marketing, technology, and finance. Indeed, it is the experience of Korea with respect to these somewhat distinguishing features that is of greater use in drawing lessons for other developing countries and for future research. For this reason in what follows we concentrate on these.

Changing trends in the importance of SMEs and their determinants and effects

As was already mentioned, since the 1950s the share of SMEs in manufacturing employment and value added first rose until the mid 1960s, then fell substantially to a low in the mid 1970s, then rose again to a high in the mid-1990s, and perhaps may have been declining since then. There is no single explanation for these changes but rather a combination of factors, including variations in the degree of financial repression, in mandatory minimum credit allocations to SMEs, in exports, in the various support mechanisms, and to some extent also in the sectoral composition of output, some of which was the result of interventionist government policies.³⁸

While the generally high and sustained growth of the economy and differences relative to other countries make it difficult to sharply distinguish the effects of these various trend reversals in the relative importance of SMEs, two possibilities would seem to be (1) variations in the overall degree of income inequality that vary inversely with the SME shares in manufacturing employment and value added, and (2) the fact that the financial crisis of 1997–98 was less severe than expected because the greater importance of SMEs at this time relative to earlier years (i.e., the shock absorber hypothesis). Both of these hypotheses deserve further investigation.

Especially rapid growth of capital and human capital in general and manufacturing in particular

The considerably more rapid growth of physical and human capital in the Korean economy has implied both a rapidly changing structure of the economy, including a rising share of manufacturing, and changing comparative advantage from labor intensive to human capital and technology intensive goods. As a result, labor markets have progressively tightened, causing wage rate growth rates among the highest in the world. The increasing tightness of labor and rapidly rising wage rates have forced even SMEs to adjust in various ways, most important, by technology upgrading, but also in some cases by relocating their labor intensive operations to lower income countries of the region through outward flows of FDI. Support from government financial institutions and to a lesser extent from technological centers has helped SMEs in both types of adjustment. Even more important has been government discipline to limit the duration of protection and to see to it that support was offered primarily to those firms that could prove their competitiveness by exporting. Likewise, the priority given to exports in the drive for rapid growth meant that SMEs had to find ways of penetrating international markets. In some cases, this could be accomplished through subcontracting with LEs or with large trading firms. In other cases, it required the efforts of the firms themselves to increase their marketing expertise, and in still other cases, to access to nonprofit marketing organizations.

Relative importance of the chaebol

Although to some extent the relative importance of *chaebol* varied inversely with that of SMEs, throughout the period conglomerate-type firms have been relatively more important than in other countries. At first, this may have been the result of government policies aimed at maximizing growth at the expense of virtually all other goals. In particular, the *chaebol* organizational form made it possible for LEs to be as or even more flexible than SMEs, allowing LEs to enter new sectors and acquire new technologies even faster than SMEs, one of whose advantages is usually said to be greater flexibility. Later on, however, as government policy changed to one of greater concern for excessive concentration of industry and interest in promoting SMEs, more emphasis was placed on establishing complementarities between SMEs and LEs (and *chaebol*) through the promotion of subcontracting and other linkages between SMEs and LEs. In recent years, however, government policy has been increasingly oriented toward assuring SMEs of access to finance, markets, and technology independent of *chaebol* and LEs.

Transition to increasing openness of the economy

Though it is sometimes said that liberalization of product and other markets is a *sine qua non* for a healthy SME sector, the initial period of greater liberalization in the Korean economy coincided with the decreasing importance of the SME sector. During this period since credit and other resource allocations were heavily biased in favor of firms whose production and exports had grown rapidly, this encouraged mergers and buyouts of SMEs and was reflected in a sharply increasing LE share in manufacturing activity. Yet, as expertise in exports grew, and somewhat more neutral economic policies were adopted after the mid-1970s, the effect of increasing openness was no longer the same. Additional external sources of support from both private and public sources for SMEs in their efforts to sell abroad became available over time. Given that LEs increasingly had their own expertise and experience to assist them, over time existing agencies became more interested and able to help SMEs.

Proliferation of external support mechanisms from nonprofit sources

The steady growth and proliferation of Korea's external support systems has posed two problems for evaluation. First, since many of the programs have been developed simultaneously, it is difficult to attribute results to any particular program. Second, a comprehensive and comparative evaluation of their effectiveness is made (perhaps prohibitively) expensive. This study reports the results of some recent surveys based on the subjective evaluations of the programs of the various agencies by SME entrepreneurs. For the most part, nonprofit sources of support are rated as less effective than private commercial sources of support. Among the reasons for this are (1) the excessive generality of the information, training, and other support provided; (2) difficulties that SMEs may have in accessing such support or taking advantage of it effectively; and (3) the deficient characteristics of good governance by these support providers. All three of these shortcomings are interrelated. In the case of Korea, some components of good governance (e.g., competitive recruitment, managerial oversight, monitoring, and clearly defined objectives) are generally well provided for. Yet, the provision of "voice" or some other mechanism for ensuring that the support providers supply primarily those services that SMEs most want was generally rather weak. In qualitative terms, the agencies whose programs received the highest subjective evaluation scores were those with the best governance characteristics. This underscores the importance of governance in government and other nonprofit support providers. Several of the most consistently highly evaluated services of support providers are international trade fairs (in the case of marketing), easily accessible information on technical and other standards in foreign markets, financial support of various kinds (because of its fungibility), and credit guarantees that in turn have increased the access and improved the timeliness of that access to bank loans. In the past the most important sources of technical support have been informal mechanisms of consultants, university professors, equipment suppliers, imitation, and reverse engineering.

Problems and future prospects

Both private (subcontracting) relations with *chaebol* and other firms and government and other nonprofit agencies have helped SME achieve a growing importance in manufacturing employment, sales, value added, and exports over the last 20 years. Nevertheless, evidence has been presented in the form of recent SME share data and productivity trends to suggest that the relative importance of SMEs in many of these respects may now be reversing. It would seem that SMEs are currently facing increasing problems in a number of respects.

First, the increasing technological sophistication of production for foreign as well as domestic markets in the face of increasing openness of the economy and rapidly rising labor costs implies that the traditional means of technological acquisition and basis for comparative advantage for SMEs are no longer viable. This may require more in the way of public provision of quite specific kinds of technological information and training that will be a challenge to supply on a cost-effective basis.

Second, because of the rapid changes in the composition of output even within the SME sector itself, today's and tomorrow's SMEs are less likely to have experience in marketing.

Third, given the importance of healthy financial institutions and of SME access to them, the recent financial crisis has greatly clouded the future prospects of SMEs. Bankruptcies among both LEs and SMEs have rendered many financial institutions sick or totally nonviable. Even worse for SMEs is that because the fee structure of credit guarantees has remained constant despite the rapidly increasing loan default rates, the country's credit guarantee system that almost exclusively serves SMEs is no longer viable. Changes in the fee structure are urgently needed.

Fourth, given the time-consuming nature of court actions in defense of contracts and the continuously increasing delays in payment experienced by SMEs, SMEs seem increasingly powerless to take actions that would assure themselves of timely payment for the products and services they provide, often to LEs through subcontracting relations. The most effective solution to this problem would seem to be the provision of an

electronic system for reporting payment arrears by individual companies and greater competition among contractors so that reputation for timely payment could be considered by SMEs in choosing their contracting partners.

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Notes

¹ One of the most well-known studies of this sort is Scitovsky (1986).

² Since the vast majority of firms in Korea are single-establishment firms, the same trends apply as far as firms are concerned. What is rather special about Korea, however, is that conglomeration of firms is quite common, some of the largest conglomerates (known as *chaebol*) controlling large portions of GDP.

³ As demonstrated in Nugent (1989), however, the same trends would appear regardless of the particular size cutoff used between 100 and 500 workers.

⁴ The patterns within the food sector, however, where such establishments are plentiful might have been affected.

⁵ Between 1966 and 1975 the number of manufacturing establishments with five or more employees grew only from 22,718 to 22,787.

⁶ Between 1975 and 1996 the number of manufacturing establishments with five or more employees more than quadrupled from 22,787 to 98,119. (See Table V.)

⁷ Part of the ambiguity arises from the following points: While direct exports are those taken from the factory gate to the port of embarkation for export, in many cases these exports are channeled to a contractor who actually does the exporting. The contractor may be an assembling firm, such as an automobile assembling firm, which buys parts and then exports the car. The parts may therefore be an indirect export and the automobile a direct export, but this also introduces double counting. The parts producers may also think of themselves

as exporting by virtue of their receiving certain tax or credit preferences for exporting.

⁸ Most of this FDI by SMEs has been to low wage countries in the region, such as China, Vietnam, and Indonesia. Despite many political barriers, in recent years, there has even been some investment in North Korea.

⁹ These authors measured TFP growth in each of 36 manufacturing sectors and for various time periods. Nevertheless, over the period 1967–93 TFP averaged well over 2 percent per annum.

¹⁰ The use of value added instead of gross production requires the additional assumption that time, capital, labor, and any other inputs are separable from raw material and intermediate inputs, an assumption which was rejected in most sectors for the United States (Jorgenson, Gollop and Fraumeni, 1987).

¹¹ They also made allowances for imperfect competition and markup whereas the former authors did not.

¹² Young (1995) showed, however, that manufacturing was something of an exception for Korea, the rate of TFP growth for the whole economy, being quite low.

¹³ The reason for introducing this quadratic term is of course to capture the non-linearity in the relationship suggested by the results given in top portion of Table XVIII.

¹⁴ While this factor might also depend on TFP, the purpose of its introduction is to control for short-run differences in the flow of funds or financial constraints.

¹⁵ As a result, the direction of causation could in this case be going from TFP to SITUFUND rather than the other way around.

¹⁶ See Uekusa and Torii (1987).

¹⁷ For an interesting exploration of the effect of differences in sector- and time-specific product differentiation or variety on comparative sectoral TFP growth between Taiwan and Korea see Feenstra and others (1997).

¹⁸ From the point of view of endogenous policy or political economy even these measures may not be exogenous and hence these, too, could yield biased results. Such measures, moreover, may capture only one dimension of openness, ignoring other components that could be more important (such as offsetting policies to support exports).

¹⁹ See especially Pack and Westphal (1986) and Lim (1998).

²⁰ See Korea Industrial Technology Promotion Association (1991), Lim (1998).

²¹ Both entry and exit rates were relatively low in food, wood products, and nonmetals in both periods.

²² Note, however, that some of these relationships are rather sensitive to the particular measures of entry and exit.

²³ See Aw, Chung and Roberts (1999, Tables I and II).

²⁴ Clearly, in such a case the firm would not be able to take advantage of the experience of other more pioneering firms.

²⁵ See especially Kang and Park (1990) and Kim (1991).

²⁶ These TFP indexes are those computed separately for each sector, thereby allowing the production functions (from which the TFP indexes were constructed) to vary from one sector to another.

²⁷ The reader is cautioned that these results do not necessarily imply that causality is one way, going from subcontracting to the TFP index.

²⁸ For further details of the government programs and

policies in support of SMEs see Seong (1995), Kim (1997), and Kim and Nugent (1999)

²⁹ “Voice” occurs in this context when both a client can complain to the supplier agency when the services are deemed to be of low quality or not relevant to the SME’s needs and the complaint may result in corrective action by the agency.

³⁰ By market test is meant that a cost of service is paid for in a fee so that continued use of the service by the client SME suggests that the value of the service exceeds its cost.

³¹ The reason for the exclusion of the others was the lack of variation across age groups.

³² Indeed, as the currency and financial crisis of 1997–98 emerged, the share of LEs in corporate bond issues rose from 89 percent in 1996 to 99 percent by 1998 (International Monetary Fund, 1998).

³³ For example, critics point to the fact that, even after the financial crisis, *chaebol* firms are allegedly stronger than ever before and that the new Small and Medium Enterprise Authority does not have a budget to match its responsibilities.

³⁴ Moreover, the IMF program for Korea broke new ground by putting considerable emphasis on *chaebol* restructuring, setting up a broad Corporate Restructuring Agreement among 200 financial institutions, including the *chaebol*-owned nonbank financial institutions. The Coordinating Committee of this institution, moreover, was empowered to impose debt workout programs on firms and banks (International Monetary Fund, 1998).

³⁵ Berry and Mazumdar (1991) and Mazumdar (1998) have shown this to be the case rather generally for a number of countries.

³⁶ Needless to say, in view of the large number of alternative sources of data on income distribution in Korea, the use of alternative data sources could well lead to a quite different relationship than that depicted here.

³⁷ See Ranis and Fei (1961) for an exposition of the model and Berry and Urrutia (1976) for a careful application of the model to income distribution over time.

³⁸ For more details see Nugent (1996).

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