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Bankruptcy Policy Reform and Total Factor Productivity Dynamics in Korea
Evidence from Microdata

Youngjae Lim and Chin Hee Hahn

9.1 Introduction

During the onset of the Korean financial crisis in 1997, an inefficient corporate bankruptcy system had a detrimental effect on Korea's economy. Prior to the crisis, in 1996 and the first three-quarters of 1997, many large-sized firms facing bankruptcy actively sought shelter under the court-administered rehabilitation procedures. However, the inadequacies of the bankruptcy system led to poor discipline in targeting the appropriate financially distressed firms to undergo the rehabilitation procedure. Meanwhile, before the outbreak of the economic crisis, the uncertainty and delay encountered in dealing with failing firms clearly added to the distortion of the resource allocation process in Korea's economy.

In other words, the exit barriers for large firms seemed to have decreased the efficiency of resource allocation before the onset of the crisis. Prior to the crisis, Korea's corporate bankruptcy system had a tendency to work as a de facto exit barrier. For example, before the reform, producers with persistently declining productivity were more likely to be accepted in some rehabilitation procedure if they were deemed as having high social value, such as a large output or employment share in the economy.

Hence, the natural course of action for postcrisis Korea was to undertake a sweeping reform of its corporate bankruptcy system. As was the case with other structural reforms in the corporate sector, reforming Korea's bankruptcy policy was pushed forward based on the belief that new reforms were essential in preventing recurrent economic crises from plaguing the econ-

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omy. Yet past experiences of crisis-hit countries suggest that there is a strong possibility that incomplete or weak reforms will often lead to recurrent economic crises. Despite this suggestion, to the best of our knowledge, there are few empirical studies that examine how bankruptcy reforms in postcrisis Korea affect the efficiency of resource reallocation and, ultimately, total factor productivity (TFP) growth in Korea's economy.[1]

Against this backdrop, our study aims at addressing the effects of bankruptcy policy reform by analyzing data at the firm or plant level. First, by employing firm-level panel data, the study examines how the postcrisis reforms in the bankruptcy policy affected the productivity dynamics of failing firms. The analysis focuses on bankruptcy procedures administered by the courts. These in-court settlements are necessary for failing firms faced with bankruptcy that are unsuccessful in securing an out-of-court settlement after exhausting all options. Maintaining discipline in in-court bankruptcy procedures would have far-reaching consequences on out-of-court bankruptcy procedures, since the discipline would act as an effective and credible deterrent for failing, but not yet bankrupt, firms.

We examine whether the firms accepted under the reformed court-administered rehabilitation procedures experienced less persistent problems in their prebankruptcy TFP compared to firms undergoing the same process before the reforms. We expect that, if the reform in the in-court bankruptcy procedures is successful, then only rehabilitation programs would accept firms with temporary difficulties, whereas failing firms with persistently declining productivity would be rejected. Successful reform of the corporate bankruptcy system would then imply an improvement in the efficiency of resource reallocation.

Second, to formulate an idea of how bankruptcy policy reform contributes to preventing prolonged economic stagnation, we examine how the reforms improved the efficiency of resource reallocation and, in turn, aggregate TFP growth.

Previous studies have documented that the resource reallocation process from exiting producers to entering producers explains a substantial por-

1. There are some recent studies that begin by examining the determinants of the divergent growth path of crisis-hit countries and (simply) suggest that policies such as bankruptcy policy reform are possible candidates. However, these studies do not use details of institutions at the micro level to analyze the effect of bankruptcy policy reform on the resource reallocation process of the economy. For instance, Hayashi and Prescott (2000) show that the Japanese economy's poor performance in the 1990s was due to failure to improve productivity and not the failure to accumulate inputs. Based on this finding and other evidence, they further suggest that the industrial policy of protecting failing or declining industries or firms by the Japanese government is the main culprit behind the "lost decade." Meanwhile, in a comparative study of Chile and Mexico, Bergoeing et al. (2001) show that the decade-long divergent growth paths of the two countries since the financial crisis in the early 1980s are predominantly driven by the differences in TFP growth rates. They suggest that policies such as the bankruptcy policy reform are candidates for explaining the different paths of the two countries.

tion of TFP changes at the aggregate level. Most of the studies find that exiting producers exhibit persistently declining productivity while entering producers that survive the market selection process exhibit rapidly increasing productivity (e.g., Foster, Haltiwanger, and Krizan 1998; Hahn 2000). This pattern suggests that policies that prevent the efficient reallocation of resources via entry and exit could be potentially very costly, with the cost possibly growing over time. On the contrary, bankruptcy policy reforms, which induce inefficient firms to exit with a lower cost and allocate released resources to efficient entrants or incumbents, would enhance the rate of aggregate productivity growth.

In this study, we use Korean manufacturing plant-level data to ask whether the productivity dynamics of entering and exiting producers hold in Korea. Specifically, we answer the following questions. What kinds of time profiles do the TFP numbers of exiting and entering producers exhibit? Given the pattern of productivity dynamics, how does the competitive process of entry and exit improve aggregate productivity? Can we expect the policies that improve the efficiency of resource reallocation, such as bankruptcy policy reform, to improve aggregate TFP instantaneously or over a period of time?

The outline of this study is as follows. Section 9.2 examines the effects of the postcrisis bankruptcy policy reform in Korea on the resource reallocation process using the firm-level data. In particular, we discuss the key elements in the postcrisis bankruptcy reforms and then proceed to analyze the TFP performance of failing firms entering the court-administered rehabilitation procedures before and after the reform. Section 9.3 examines the mechanism by which the reform improves the efficiency of resource reallocation or the performance of aggregate TFP. Our analysis uses plant-level panel data on the Korean manufacturing sector. Section 9.4 summarizes and concludes.

9.2 Bankruptcy Policy Reform and the Productivity Dynamics of Failing Firms

9.2.1 Corporate Bankruptcy System prior to the Economic Crisis

Exit Barriers for Large Firms

Past Korean economic growth was made possible by the growth or restructuring of existing firms rather than by the dynamic entry and exit process. During the period of development when profitable new markets were rapidly emerging, the inadequate corporate bankruptcy system did not significantly distort the resource allocation of the economy due to the ability of the economy to easily reallocate resources from declining sectors to emerging profitable sectors. Under these circumstances, through rationalization programs, the government played an active role in reallocating re-

sources from failing firms to other existing firms. At the same time, many of the failing firms were not filing for bankruptcy procedures overseen by the courts.[2]

In particular, most small and medium-sized bankrupt firms were effectively liquidated on a nonjudicial basis. A bankrupt firm's debt was usually collected on an individual basis under the Civil Procedure Act. Most of the bankrupt firm's assets were already subject to mortgage or security, consequently leaving little for unsecured creditors. Additional procedures for the collection of debt were not necessary.[3]

For large firms, however, the too-big-to-fail argument played a part in building exit barriers in the sense that inefficient firms were often allowed to operate through some explicit or hidden subsidies from the government. Several large-sized bankrupt firms were periodically bailed out through the government's various rationalization measures, undercutting Korea's formal bankruptcy procedures.

Since the early 1990s, however, Korea's inadequate corporate bankruptcy system began to distort the economy's resource allocation, which increasingly grew until the outbreak of the financial crisis in 1997. Since the early 1990s, some failing firms began to enter court-administered bankruptcy procedures, but the bankruptcy system was often abused by controlling shareholders of the failing firms.

By enacting the Rule on Corporate Reorganization Procedure in 1992, the Supreme Court began to shift toward improving judicial bankruptcy procedures. In particular, the new rule established conditions for initiating corporate reorganization proceedings. These conditions were high social value, financial distress, and potential for rehabilitation. Interestingly, however, economic efficiency was not a condition for corporate reorganization. The new rule tended to give preference to larger failing firms for in-court corporate bankruptcy settlements, thereby creating a de facto exit barrier for large firms. For example, producers with persistently declining productivity were more likely to be accepted in one of the rehabilitation procedures if they were deemed as having high social value such as a large output or employment share in the economy.

Exit Barriers from the Controlling Shareholders of Failing Firms

Prior to the economic crisis, the controlling shareholders of large failing firms often sought to take shelter under court-administered rehabilitation

2. One technical hurdle in enforcing judicial bankruptcy procedures was the Act on Special Measures for Unpaid Loans of Financial Institutions. The act gave the Korea Asset Management Corporation (KAMCO) the authority to hold auctions of the bankrupt firm's assets before the initiation of court procedures. The act basically nullified the Corporate Reorganization Act because the auction of assets by KAMCO effectively preempted the corporate reorganization process. In 1990, the Constitutional Court declared this provision unconstitutional, paving the way for the expanded use of judicial bankruptcy procedures.

3. See Nam, Oh, and Kim (1999) for the details on the Korean bankruptcy system prior to the 1990s.

procedures. However, the inadequacies of the bankruptcy system led to poor discipline in targeting the appropriate financially distressed firms to undergo the rehabilitation procedure. This problem was particularly accentuated given the growing number of distressed firms.

The frequent abuse of the corporate reorganization procedure, highlighted by several notorious cases involving controlling shareholders of failing firms, forced the court to amend the system in 1996. In particular, the court argued for wiping out shares held by controlling shareholders responsible for a firm's failure. The introduction of the amendment in 1996 produced an unintended consequence: Controlling shareholders of failing firms pursued other means that would allow them to retain their ownership and control. Controlling shareholders found a loophole in the bankruptcy proceedings through the composition procedure, which was originally designed for small and medium-sized firms with less complex capital structures. However, before the law's revision after the crisis, the composition procedure did not contain an explicit limit on a firm's size and enabled existing management of larger firms to retain control.

As shown in table 9.1, there was a dramatic rise in bankruptcy filings for the composition procedure. The number of cases increased from nine cases in 1996 to 322 in 1997 and to 728 in 1998. In the first three-quarters of 1997, before the onset of the crisis, many large firms on the verge of financial collapse sought to file for bankruptcy under the composition procedure. Kia Motors was among the many that filed for composition procedure. This firm deserves special attention. In the case of Kia Motors, the debtor and creditors initially sought to file for different procedures: Kia, the debtor, initially filed for composition procedure, but shortly thereafter creditors decided to file for corporate reorganization. In cases where involved parties file for different proceedings, as was the case with Kia Motors, corporate reorganization overrides a composition filing. In the end, the court accepted Kia Motors' bankruptcy filing for corporate reorganization, but the

Table 9.1 **Bankruptcy Filings before and after the Crisis (unit: number of cases, %)**

Bankruptcy Procedure	1995	1996	1997	1998	1999	2000	2001	2002
Reorganization	79	52	132	148	37	32	31	19
	(76.0)	(65.8)	(26.8)	(14.9)	(9.1)	(13.2)	(12.3)	(15.3)
Composition	13	9	322	728	140	78	51	23
	(12.5)	(11.4)	(65.5)	(73.3)	(34.4)	(32.2)	(20.2)	(18.6)
Liquidation	12	18	38	117	230	132	170	82
	(11.5)	(22.8)	(7.7)	(11.8)	(56.5)	(54.6)	(67.5)	(66.1)
Total	104	79	492	993	407	242	252	124
	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)	(100.0)

Source: Supreme Court of Korea (various issues).

Notes: The year 2002 covers January to October. Numbers in parentheses denote the percentage.

uncertainty and delay resulting from the inefficient bankruptcy system in dealing with large failing firms (such as Kia Motors) clearly worsened the situation of the economy.

9.2.2 Postcrisis Bankruptcy Policy Reforms

The economic crisis of 1997 placed tremendous strain on the existing corporate bankruptcy system for both in-court and out-of-court proceedings because of the soaring number and scale of bankruptcies. Table 9.1 shows that the filings for judicial bankruptcy procedures rose dramatically in 1997. The fallout from the economic crisis on the bankruptcy system was the main driving force in implementing revisions in the bankruptcy laws and procedures. In addition, the International Monetary Fund (IMF) and the International Bank for Reconstruction and Development (IBRD) required that improvements be made in the corporate bankruptcy system as a condition for the bailout package.

After the economic crisis, the Korean government implemented reform efforts to remove exit barriers along two separate lines: One involved the court-administered bankruptcy procedure, and the other included the prebankruptcy informal arrangements for corporate restructuring. Whereas the workout procedure had a significant impact on the corporate restructuring of larger failing firms, the court-administered procedures focused on the restructuring of medium-sized failing firms.

In this study, we focus on policy reform in the court-administered bankruptcy system. Except for small firms with less complex capital structures, the court-administered bankruptcy procedures would be the last resort for insolvent firms if the interested parties could not agree on the prebankruptcy informal arrangements for corporate restructuring. For prebankruptcy informal arrangements, one of the most effective disciplines should come from that of the court-administered bankruptcy procedures. In other words, during out-of-court informal settlements the incentives of interested parties would be directly affected by what they expect the outcome of the court-administered bankruptcy proceedings to be.

Bankruptcy Policy Reform in 1998: Economic Efficiency Criterion and the Removal of the Exit Barriers for Large Firms

The most crucial element in the postcrisis court-administered bankruptcy system was the court's establishment and tight enforcement of an economic efficiency criterion in selecting qualified firms for judicial bankruptcy procedures. Instead of being based on economic efficiency, the prereform system was based on high social value and prospects for rehabilitation. Presently, a comparison of a distressed firm's value as a going concern with its liquidation value is required to initiate judicial bankruptcy proceedings.

The new criterion greatly contributed to removing the de facto exit barrier placed on large firms that had existed in the in-court bankruptcy system prior to the crisis. Prior to the crisis, producers with persistently de-

clining productivity were more likely to be accepted into a rehabilitation procedure as long as they exhibited high social value such as a large output or employment share in the economy.

The reforms initiated in 1998 represented the most dramatic change in the system since the enactment of the corporate bankruptcy laws in 1962. However, in the wake of the crisis, in an effort to quickly implement the reforms, the government was not successful in initiating a fully comprehensive revision.[4] The shortcomings of the first reforms resulted in another round of revisions in 1999. The two revisions to the bankruptcy laws significantly expanded the role of the courts in the corporate bankruptcy process. If not for the workout procedure introduced as an out-of-court settlement in 1998, the role of the courts would have been much greater.

Besides the economic efficiency criterion, the 1998 reforms attempted to speed up bankruptcy proceedings. The revisions introduced time limits for critical steps in the proceedings, such as for the decision on stay, the report of debts and equities, the approval of the reorganization plan, and other related steps. Additional changes in the 1998 revision included the following. First, the reforms established mechanisms to induce a more active role for the creditors, such as introducing a creditor's conference. Second, to enhance the court's capacity to deal with a large volume of bankruptcy cases, the court receivership committee was introduced as a special advisor to oversee the critical steps in the proceedings. Third, the process of wiping out the shares of controlling shareholders was strengthened and made more transparent. Fourth, to prevent the abuse of the composition procedure, some critical enhancements were made to the Composition Act. For example, large firms with complex capital structures were not allowed to file bankruptcy under the composition procedure. Table 9.1 shows the impact resulting from changes to the Composition Act, as the number of composition filings decreased sharply from 728 in 1998 to 140 in 1999.

Bankruptcy Policy Reform in 1999: Mandatory Liquidation System

Despite these significant revisions in 1998, there was room for further reform, as mentioned previously. To some extent, in fact, the 1999 reforms filled the gap between the initial reform proposals and what was finally passed in the 1998 revisions. While the revisions were being developed in 1999, there was an initial debate on the inclusion of an automatic stay provision for the new law. Under an automatic stay, the debtors' assets would be automatically protected from creditors seeking to secure their claims. After strong arguments were presented for both sides on the issue of automatic stay, the final compromise was to speed up the initiation of the proceedings to within a month of the filing.

4. See Koo (1998) for the details on the bankruptcy policy reform in 1998. Right after the financial crisis broke out in December 1997, the bankruptcy policy reform was made in February 1998.

Although the automatic stay provision can enhance the rehabilitation of failing firms after bankruptcy, the debtor may choose to utilize the court in order to avoid a formal default and thereby evade criminal punishment under the Illegal Check Control Act. According to the Illegal Check Control Act, the managers or controlling owners of failing firms who issued bad checks are criminally liable. The objective of the act was to overcome the informational asymmetry between debtors and creditors. Creditors faced with highly unreliable accounting information would be less willing to facilitate loans to debtors without a credible means of recourse. As a result, debtors are forced to make a credible commitment to repayment by risking incarceration in the case of default.

The new revision also facilitated an efficient transition between corporate reorganization and liquidation. After the initiation decision, the court must compare the going-concern value of the firm with its liquidation value. If the liquidation value is larger than the going-concern value, the court must declare the liquidation of the firm. Donga Construction, which was liquidated in early 2001, was the first large firm to travel down this path. The mandatory liquidation provision could be considered as a reform that contributes to enhance the efficiency of bankruptcy system.

However, the mandatory liquidation provision created an unintended consequence. The possibility of liquidation instilled fear among failing firms to a point where many attempted to avoid the judicial rehabilitation procedures. Resolving this problem in the current judicial bankruptcy system remains one of the major future policy objectives in Korea.

9.2.3 Bankruptcy Policy Reform and the Productivity Dynamics of Bankruptcy Cohorts

Firms go bankrupt due to their inability to pay their debts. A critical element in designing a corporate bankruptcy system is the ability to distinguish (or to elicit information on) whether an insolvent firm's financial distress is temporary or persistent. One method by which to resolve this issue empirically is analyzing the productivity of insolvent firms. In the study, we construct TFP measures for the firms in our data set to evaluate the performance of the corporate bankruptcy system instituted after the economic crisis. We examine a failing firm's cross-sectional distribution of corporate bankruptcy and time series productivity before and after bankruptcy filing.

Use of Bankruptcy Procedures by Chaebol Category after the Crisis

Table 9.2 shows the composition of bankruptcy procedures applied to insolvent firms by *chaebol* category from 1997 to 1999. The table demonstrates the relative share of bankruptcy procedures among insolvent firms, weighted by the size of assets. The insolvent firms in a given year include only those that went bankrupt for the first time in that year and exclude

Table 9.2 **Insolvent Firms' Procedure by the *Chaebol* Category (unit: trillion won, %)**

	1997			1998				1999			
	No Procedure	Composition	Corporate Reorganization	No Procedure	Composition	Corporate Reorganization	Workout	No Procedure	Composition	Corporate Reorganization	Workout
1–30 largest *chaebols*	0.35	0.61	9.48	0.09983	0	0	5.669	0	0	0	3.455
	(3.38)	(5.80)	(90.82)	(1.73)	(0.00)	(0.00)	(98.27)	(0.00)	(0.00)	(0.00)	(100)
31–60 largest *chaebols*	0	0	0.19	0	0	0	5.713	0	0	0	0.5862
	(0.00)	(0.00)	(100)	(0.00)	(0.00)	(0.00)	(100)	(0.00)	(0.00)	(0.00)	(100)
61–300 largest *chaebols*	3.18	7.69	12.67	0.7850	1.560	6.795	13.05	0	1.081	0.2857	14.71
	(13.51)	(32.66)	(53.84)	(3.54)	(7.03)	(30.62)	(58.81)	(0.00)	(6.73)	(1.78)	(91.50)
Small *chaebols* and independent firms	3.95	1.32	8.27	2.090	1.638	1.469	3.354	0.4627	0.9036	0.4040	25.68
	(29.16)	(9.73)	(61.11)	(24.44)	(19.16)	(17.18)	(39.22)	(1.69)	(3.29)	(1.47)	(93.55)

Source: Lim (2003).

Notes: The frequencies are weighted by the asset size. Author's calculation for all the firms in the National Information and Credit Evaluation (NICE) data. Numbers in parentheses denote the percentage.

those from other years; hence, the table gives us the incidence of new bankruptcies in the specific year. By focusing on the year cohorts, we can control for various year-specific effects and single out the relationship between the various rehabilitation settlements and the size factor over time.

Once firms are insolvent, they can enter into either court-administered or out-of-court settlements, including corporate reorganization, composition, or workout procedures. But not all firms enter into one of these rehabilitation programs; instead, some are simply left bankrupt for a prolonged period of time. Firms under these circumstances are cut off from credit, which limits them to only cash transactions.

Table 9.2 shows the relative share of different types of settlements for new *chaebol* bankruptcies from 1997 to 1999. The firms that went bankrupt in 1997 show a clear pattern. For the top thirty *chaebols,* the majority (94 percent in terms of asset size) was accepted into corporate reorganization, whereas only a fraction (6 percent in terms of asset size) was accepted into composition. On the other hand, quite a significant proportion of small-sized *chaebols* entered into the composition program. A substantial portion of the independent firms (and a less substantial portion of small *chaebols*) did not qualify for any rehabilitation program after bankruptcy.

In 1998, the government introduced an out-of-court workout procedure. Table 9.2 shows that, for large *chaebols,* the workout program was the main method of settlement. Similarly, the workout program played an important role among independent firms. By 1999, the role of the workout program had increased significantly, and most of the new bankruptcies (in terms of asset size) were handled through the out-of-court workout procedure.

Examining the Pre-Exit Productivity of Bankruptcy Cohorts

Note that one of the most significant changes in the 1998 revision was the introduction of the economic efficiency criterion. The new revision required that the courts compare the going-concern value of the firm with its liquidation value for the initiation of judicial bankruptcy proceedings. A preliminary analysis shows that the firms that filed for bankruptcy between 1998 and 2000 experienced less persistent difficulties compared to firms filing in 1997. For the firms filing bankruptcy in 1997, their productivity was lower than solvent firms several years before they entered into one of the rehabilitation programs. Rehabilitation mechanisms applied to firms under these conditions are most likely doomed to failure from the start. Rehabilitation procedures must target firms that undergo bankruptcy due to temporary setbacks and that have high potential for recovery. These characteristics are present in the 1998–2000 cohorts. The introduction of the economic efficiency criterion in 1998 appears to have affected the types of firms targeted. Note that the 1998 reform was initiated at the beginning of the year.

These hypotheses can be tested statistically in the following manner. Tables 9.3 and 9.4 show regressions of productivity on a set of dummy

Table 9.3 **Productivity Dynamics of Bankruptcy Cohorts before and after Bankruptcy Policy Reform (firms undergoing corporate reorganization or composition)**

	Dependent Variable: Productivity				
Independent Variable	For the 1996 Cohort (1)	For the 1997 Cohort (2)	For the 1998 Cohort (3)	For the 1999 Cohort (4)	For the 2000 Cohort (5)
1993	–0.0687115	–0.0820866	–0.0069199	0.0251072	0.0092007
	(0.1739958)	(0.0596231)	(0.035766)	(0.0527104)	(0.0795996)
1994	–0.0629782	–0.0815479	–0.0366698	–0.0219148	–0.0277665
	(0.1739847)	(0.0602887)	(0.0347451)	(0.0500552)	(0.0750421)
1995	–0.0588727	–0.1367584**	–0.0390412	0.0127083	–0.0821738
	(0.1739736)	(0.0588782)	(0.0339194)	(0.0474052)	(0.0711893)
1996	–0.3647536	–0.1347013**	0.0070321	0.0317036	–0.0124563
	(0.02245488)	(0.0595412)	(0.0334223)	(0.0470457)	(0.0700231)
1997	–0.2869542	–0.2780865**	–0.0574577	–0.0368554	0.0304901
	(0.2245442)	(0.063298)	(0.0356012)	(0.0460487)	(0.0689116)
1998	–0.1409918	–0.2565868**	–0.3211885**	–0.1993039**	–0.003248
	(0.1739603)	(0.0650112)	(0.0447192)	(0.0648769)	(0.0711459)
1999	–0.1321559	–0.1544865**	–0.1599611**	–0.1475066**	–0.2036022**
	(0.2245506)	(0.0700572)	(0.0466198)	(0.0722738)	(0.091783)
2000	–0.1572699	–0.1793303**	–0.1627449**	–0.2222749**	–0.3875751**
	(0.2245766)	(0.0765336)	(0.0488477)	(0.0778949)	(0.1376069)
Year dummies included	Yes	Yes	Yes	Yes	Yes
Industry dummies included	Yes	Yes	Yes	Yes	Yes
No. of observations	40,205	40,476	41,025	40,588	40,373

Notes: Numbers in parentheses are standard errors. Independent variable = dummy variable denoting a specific cohort interacted with year and industry dummy.
**Significant at the 5 percent level.
*Significant at the 10 percent level.

Table 9.4 **Profitability Performance of the Bankruptcy Cohorts before and after Bankruptcy Policy Reform (firms undergoing corporate reorganization or composition)**

	Dependent Variable: Profitability				
Independent Variable	For the 1996 Cohort (1)	For the 1997 Cohort (2)	For the 1998 Cohort (3)	For the 1999 Cohort (4)	For the 2000 Cohort (5)
1993	–5.53285	–1.053267	1.02541	–2.983965	–4.046776
	(102.5908)	(35.0131)	(20.11472)	(28.94122)	(42.627)
1994	–5.593412	–2.923504	–0.1474853	–2.976718	–1.751188
	(102.5857)	(34.5993)	(19.65527)	(27.26436)	(39.96213)
1995	–3.757859	–4.626083	–0.618984	–2.501499	–7.389917
	(102.5831)	(34.20874)	(19.36783)	(26.70296)	(38.80357)
1996	–55.05091	–5.89941	–0.7878422	–2.480486	–2.169504
	(132.4078)	(34.98389)	(19.43056)	(26.52319)	(39.95305)
1997	–109.6434	–19.09772	–3.990996	–5.698947	–1.671837
	(102.5782)	(34.97537)	(20.27411)	(26.16555)	(38.25027)
1998	–3.665419	–29.41768	–32.68748	–31.58403	–13.42344
	(102.5801)	(37.19917)	(24.80246)	(36.19649)	(41.20706)
1999	–0.8003833	–12.61717	–5.174351	–15.59426	–19.05743
	(132.4098)	(36.73676)	(22.27227)	(31.50063)	(50.03865)
2000	–10.02233	–1.937577	–0.7337271	1.431097	–4.809503
	(132.4134)	(41.18623)	(24.02397)	(35.79111)	(59.18531)
2001	36.11783	9.827578	0.1038245	9.514607	–99.89773
	(132.4123)	(41.85452)	(25.12973)	(37.65765)	(61.25584)
Year dummies included	Yes	Yes	Yes	Yes	Yes
Industry dummies included	Yes	Yes	Yes	Yes	Yes
No. of observations	52,026	52,345	53,031	52,520	52,236

Notes: Numbers in parentheses are standard errors. Independent variable = dummy variable denoting a specific cohort interacted with year and industry dummy.

**Significant at the 5 percent level.

*Significant at the 10 percent level.

variables referring to the specific year bankruptcy cohort interacted with the year dummy. Only the particular cohort and the group of solvent firms are included in each regression. Therefore, the reported coefficients are the productivity differential between the specific bankruptcy cohort and the group of solvent firms.

Table 9.3 shows that for the 1997 (corporate reorganization or composition) bankruptcy cohort, the reported coefficients are negative from 1993 to 2000 and significant from 1995 to 2000. The 1996 bankruptcy cohort shows a similar pattern, but standard errors are large due to the small sample size of the 1996 cohort. On the other hand, for the pre-exit years of the 1998–2000 bankruptcy cohorts, the coefficients are small and significantly negative only around the time of bankruptcy.

Table 9.4 shows a similar pattern of results for the profitability variable. Profitability does not show a clear pattern for the pre-exit year productivity of failing firms. A possible interpretation of this result is that some explicit or hidden subsidies given to failing firms at the pre-exit years may have worked to blur the pattern of persistently declining productivity for the bankruptcy cohorts before the reform.

As discussed in section 9.2.2, the most crucial element in the postcrisis court-administered bankruptcy system was the implementation of an economic efficiency criterion. The court established and tightly enforced an economic efficiency criterion in selecting qualified failing firms for the judicial rehabilitation procedures. One of the key criteria for all judicial bankruptcy proceedings was to conduct a comparison of the value of a distressed firm as a going concern with its liquidation value.

Instead of economic efficiency, the prereform system was based on high social value and prospects for rehabilitation. Note that the prospects for rehabilitation could vary depending on the amount of subsidies from creditors and the government. In comparison to the prereform system, the new system removed the possibilities for interested parties (for example, controlling shareholders, labor union, or local/central governments) to be in the way of a failing firm's exit. In other words, the new system contributed toward removing the de facto exit barrier that benefited large firms under the in-court bankruptcy system prior to the crisis. Under the new system, producers with persistently declining productivity were less likely to be accepted into a rehabilitation procedure regardless of whether they exhibited high social value such as a large output or employment share in the economy.

9.3 Entry, Exit, and Aggregate Productivity Growth in Korea before and after the Crisis

In the previous section, it was found that firms accepted in the court-administered rehabilitation program after the reform had less persistent

problems in prebankruptcy TFP performance than firms in a similar situation before the reform. We interpret this finding as lending support to the argument that bankruptcy policy reform enhanced the efficiency of resource reallocation after the crisis.

How, then, is the bankruptcy policy reform likely to affect the aggregate TFP growth? To answer this question, we use plant-level data to examine how resource reallocation by the competitive process of entry and exit contributes to aggregate productivity growth.

Before proceeding any further, it may be helpful to provide a brief review of the relevant literature. Recently, a growing number of studies have explored the relationship between the resource reallocation process of entry and exit and aggregate TFP growth using plant- or firm-level data.[5] Most studies support the hypothesis that the process of entry and exit enhances the aggregate productivity. This phenomenon is the result of at least one of the following three effects: market selection, learning, and "shadow of death." The market selection effect is the part of the aggregate productivity gain that results from the survival of the efficient firms. The learning effect implies that surviving entrants become relatively more efficient over time. Finally, the "shadow of death" effect denotes the phenomenon that exiting plants exhibited relatively low productivity performance several years earlier.[6]

Can we expect that the same forces are at work in Korea's case? To answer this question, we will discuss what the actual patterns of plant entry and exit have been and whether the plant turnovers reflect productivity differential among plants. Our methodology is based on Hahn (2000).[7]

9.3.1 Patterns of Plant Entry and Exit in the Korean Manufacturing Industry

In Hahn (2000), there are two types of entry: birth and switch-in. Birth is defined as a plant that first appears in the data set. Switch-in occurs when a plant switches from one market to another from one period to the next. A market is defined at the five-digit industry level. A continuing plant is identified neither as birth nor as switch-in. Similarly, there are two types of exit: death and switch-out. Death is defined as a plant's disappearance from the data set in the next period, whereas switch-out occurs when a

5. For a recent survey of the empirical literature in this vein, see Tybout (1996b), Caves (1998), and Foster, Haltiwanger, and Krizan (2001).

6. With regard to the question of how much of the aggregate productivity growth is accounted for by entry and exit, however, the available evidence seems mixed. For example, Foster, Haltiwanger, and Krizan (2001) on the United States and Aw, Chen, and Roberts (2001) on Taiwan report a large role of entry and exit in aggregate productivity growth, while Baily, Hulten, and Campbell (1992) on the United States and Griliches and Regev (1995) on Israel find a minor role.

7. See Hahn (2000) for a more detailed discussion on the methodology.

Table 9.5 **Contribution of Plant Births (unit: %)**

	Under 5 Years							
	1–3		4–5		Total		Over 5 Years	
Year	Number of Plants	Current Output	Number of Plants	Current Output	Number of Plants	Current Output	Number of Plants	Current Output
1995	53.32	17.13	14.22	9.09	67.54	26.22	32.46	73.78
1996	47.60	15.36	18.68	11.11	66.29	26.46	33.71	73.54
1997	45.40	14.77	18.67	10.63	64.08	25.40	35.92	74.60
1998	39.45	12.77	18.63	8.68	58.08	21.45	41.92	78.55

Source: Hahn (2000).

Table 9.6 **Contribution of Plant Deaths (unit: %)**

	Within 5 Years						Survive More Than 5 Years	
	1–3		4–5		Total			
Year	Number of Plants	Current Output	Number of Plants	Current Output	Number of Plants	Current Output	Number of Plants	Current Output
1990	36.85	13.36	15.71	6.48	52.57	19.85	47.43	80.15
1991	37.41	14.52	17.11	7.62	54.52	22.14	45.48	77.86
1992	39.28	15.08	16.72	7.77	56.00	22.85	44.00	77.15
1993	43.71	14.92	20.23	9.13	63.93	24.05	36.07	75.95

Source: Hahn (2000).

plant moves out to another market in the next period. Under these working definitions, the actual patterns of entry and exit can be documented.

The contribution (in percent) of plant births and deaths are shown in table 9.5 and table 9.6, respectively. These statistics are in terms of output and number of plants. Specifically, table 9.5 illustrates what fraction of output or number of plants for each year is attributable to plants based on their age. Table 9.6 shows similar statistics for each year by group of plants that die within a certain time period. Overall, the numbers below suggest that plant turnover rate was quite high in the Korean manufacturing sector during the 1990–98 period.

According to table 9.5, plants less than five years of age accounted for more than 25 percent of manufacturing production, except for the crisis year of 1998. In 1998, the contribution from plants aged less than five years declined sharply to 21.5 percent. This decline is attributable not only to a fall in the birth rate but also to a rise in the closing of young plants, reflecting the severe recession. In terms of plant number, the importance of births becomes more pronounced; one- to five-year-old plants accounted for about 65 percent of the total plants for each year, except for 1998. The

larger contribution of young plants in terms of plant number indicates the relatively small size of those plants.

The new plant entry rate in Korea seems to be higher than most other countries for which similar studies are available. For example, plants aged less than five years account for about 25 percent of a given year's output in Korea; 13.6 to 18.5 percent in the United States; 18.3 to 20.8 percent in Colombia; and 15.0 to 15.7 percent in Chile.[8] Comparing the entry rate of Korea and Taiwan might be useful since, even though both countries were equally dynamic countries, these countries differed vastly in their industrial structure. That is, it is well known that Korea's past economic success relied heavily on *chaebols,* while Taiwan's success depended on small and medium-sized enterprises (SMEs). If Korean *chaebols* employed a more capital-intensive production structure requiring larger sunk setup costs than SMEs in Taiwan, then it could well be conjectured that, combined with policy related exit barriers, these costs worked as an entry barrier, thus lowering the entry rate in Korea. Consistent with this hypothesis, the entry rate in Korea reported by Hahn (2000) seems to be less pronounced compared to Taiwan's. In a similar study for Taiwan, Aw, Chen, and Roberts (2001) report that one- to five-year-old firms account for approximately one-third to one-half of the production in nine Taiwanese manufacturing industries in 1991.[9] Further study is required to shed more light on this issue.

The plant death rate is also high in the Korean manufacturing industry. This fact is not surprising given the high cross-sectional correlation between the entry and exit rates reported in the literature. Although there is some variation over the years, more than half the plants, representing about 20 percent of output, cease to exist within a span of five years. In 1993, the contribution of the plants that die within five years became significantly larger, reflecting the severe economic recession in 1998. The contribution of plant deaths in terms of plant number is much larger than in terms of output, indicating that the deaths are concentrated among the smaller plants.

Plant death conditional on birth (not reported) is even higher than the unconditional death rates reported above. In terms of both plant number and output, the death rate conditional on births is much higher than the unconditional death rate, especially during the first three years of operation. Thus, new plants seem to fail easily, especially during the first three

8. The observation year varies by country. See Dunne, Roberts, and Samuelson (1988) for the United States and Roberts (1996) and Tybout (1996a) for Colombia and Chile, respectively. The U.S. figure is based on firm-level data.

9. Unfortunately, a direct comparison of the two studies could be somewhat misleading because Hahn (2000) uses plant-level data while Aw, Chen, and Roberts (2001) use firm-level data. Nevertheless, relatively high entry rate in Taiwan seems to be a robust conclusion, since entry rate measured at plant level would be higher than at firm level insofar as there are multiplant firms.

Table 9.7 **Average Productivity of Plant Groups, 1990–98**

		Entry		Exit		
Year	Continuing	Birth	Switch-In	Death	Switch-Out	Total
1990	–0.005			–0.044	–0.026	–0.016
1991	0.046	–0.031	0.041	–0.003	0.050	0.026
1992	0.061	–0.005	0.061	0.018	0.068	0.046
1993	0.087	0.030	0.096	0.051	0.101	0.072
1994	0.132	0.056	0.141	0.101	0.144	0.118
1995	0.190	0.132	0.199	0.150	0.202	0.174
1996	0.197	0.143	0.208	0.160	0.214	0.185
1997	0.239	0.177	0.252	0.182	0.245	0.218
1998	0.256	0.200	0.267			0.249

Source: Hahn (2000).

Note: Unweighted averages.

years. This fact might be due to, among other factors, the low productivity of these plants on average during the early stages of operation. This result is consistent with the theories of firm dynamics such as Jovanovic (1982) and Hopenhayn (1992). Switch-ins and switch-outs (not reported) are also frequently observed in the Korean manufacturing sector. In terms of output, they are almost as important as births or deaths. Compared with births or deaths, switch-ins or switch-outs are generally bigger in size.

9.3.2 Productivity Differential among Plant Groups at a Point in Time

Having described the plant entry and exit rates in the Korean manufacturing sector, we proceed to the issue of whether plant turnovers reflect certain patterns of productivity differential. We first examine the relationship between plant turnover patterns and plant productivity, both at a point in time and over a period of time.[10]

Table 9.7 compares the unweighted mean productivity levels of plants that exist in a given year. We split the sample into five plant groups as defined earlier. The main findings are summarized as follows. First, plants that die in a given year are, on average, less productive than surviving plants in that year. Depending on the year, failed plants (deaths) are about 3 to 6 percent less productive than continuing plants. This result is consistent with heterogeneous plant- or firm-level models that predict that market selection forces sort out low-productivity plants from high-productivity plants.

Second, new plants (births) are on average less productive than continu-

10. Plant productivity level is measured according to chained-multilateral index number approach as developed in Good (1985) and Good, Nadiri, and Sickles (1997) and employed in Aw, Chen, and Roberts (2001). For details, see Hahn (2000).

ing plants in the first year that they are observed. Furthermore, new plants are even less productive than failed ones. In fact, the productivity of a typical birth-plant is the lowest among all groups of plants in every year. Initial low productivity of birth-plants relative to continuing or failed plants is not consistent with the presence of the simple vintage effect that implies that new plants are more productive than older plants. However, the result is not necessarily contradictory to the prediction of several recent models of plant dynamics, such as Jovanovic (1982) and Hopenhayn (1992). Potential entrants who are uncertain about their productivity but hold a positive outlook on their postentry productivity performance—that is, who expect they could catch up with the incumbents in terms of productivity sooner or later—may enter despite their initially low productivity. Of course, birth-plants are also heterogeneous in terms of productivity, as will be discussed below.

The initial low productivity level of birth-plants relative to incumbents is also documented by other studies, although these studies differ from ours in data and methodologies. For example, Aw, Chen, and Roberts (2001) report that, in the case of Taiwanese manufacturing firms, entrants in 1986 are between 0.6 percent and 6.9 percent less productive than incumbent firms depending on industry. Meanwhile, table 10 in Foster, Haltiwanger, and Krizan (2001) reports that there is no statistical difference between continuing plants and entering plants in terms of multifactor productivity in 1987, based on ten-year interval analysis of plant-level data on the U.S. manufacturing sector. However, the same table illustrates that the cohort of plants that entered during the past five-year period, rather than ten-year period, show lower productivity than continuing plants in 1987.[11]

Third, switch-in or switch-out plants have higher productivity than birth- or death-plants, respectively. The productivity of switch-ins or switch-outs is roughly comparable to continuing plants on average. Higher productivity of switch-ins relative to birth-plants is consistent with the idea that having experience in a related market is beneficial. Also, the finding that switch-outs have productivity levels comparable to continuing plants seems to suggest that high productivity plants have mobility. Finally, each new cohort of births is more productive than their previous cohorts. This finding conforms well to the presumption of recent research and development–based endogenous growth models, such as Grossman and Helpman (1991), in that potential entrants gain from externalities due to previous innovation.

These findings suggest that plant turnovers, especially entry by birth and exit by death, are not random events. In other words, the productivity of

11. They report, however, that, in terms of labor productivity, entering plants have lower productivity than continuing plants even at ten-year intervals.

birth- and death-plants is more likely to be located at the lower end of the productivity distribution. In particular, the lower productivity of failed plants relative to continuing plants indicates that market selection forces are at work as predicted by theoretical models of plant or firm dynamics. Market selection of low-productivity plants from surviving high-productivity plants is a process that enhances the aggregate level of productive efficiency.

The lower productivity of new plants relative to continuing plants or even failed plants is consistent with the prediction of theoretical models and is similar to the experience of other countries. However, this finding could cast doubt on the positive role of exit and entry on the aggregate efficiency gain. Specifically, the instantaneous effect of resource reallocation by plant deaths and births on aggregate productivity growth might be very small or even negative. This result might be especially true if the resources released by failed firms are entirely reallocated to birth-firms. Is this the end of the story? The answer is no. To further elucidate this point, we now discuss the dynamic aspects of the relationship between plant turnovers and productivity. Specifically, we discuss postentry and pre-exit performance of plants by focusing on market selection, learning, and the shadow-of-death effects.

9.3.3 Postentry Performance: Market Selection and Learning

To proceed, we exploit the longitudinal aspect of the data set to examine whether market selection forces sort out low-productivity plants among birth-plants. In our sample, there are eight cohorts of births according to birth year from 1991 to 1998. Focusing on a particular birth-year cohort has the advantage of controlling for the possible age effect on survival. For example, we examine whether plants that belong to the 1991 birth cohort but die in 1993 have lower productivity at the time of death compared to the other surviving members of the birth cohort. To do so, we regress plant productivity on a set of year dummies (not reported) and a dummy variable denoting whether the plant died after birth within the sample period interacted with year dummies. Thus, the estimated coefficients denote the productivity differential between failures and survivors at the time of death. The regression results for three birth cohorts are reported in table 9.8.

The table shows that, for each birth-year cohort reported, exiting plants demonstrate significantly lower productivity than surviving plants at the time of death. Depending on the cohort year or death year, deaths are less productive than surviving plants by about 3 to 6 percent. Thus, the evidence from the Korean manufacturing sector clearly supports the presence of a market selection effect: Market forces sort out plants on the basis of productivity.

As noted by Foster, Haltiwanger, and Krizan (2001), the entry and exit

Table 9.8 Market Selection among Birth Cohorts

	Births 1991	Births 1993	Births 1995
Deaths 1992	–0.065		
	(0.005)		
Deaths 1993	–0.044		
	(0.004)		
Deaths 1994	–0.036	–0.042	
	(0.004)	(0.003)	
Deaths 1995	–0.032	–0.032	
	(0.004)	(0.003)	
Deaths 1996	–0.048	–0.030	–0.053
	(0.004)	(0.003)	(0.003)
Deaths 1997	–0.038	–0.044	–0.039
	(0.003)	(0.002)	(0.002)

Source: Hahn (2000).
Note: Numbers in parentheses are standard errors.

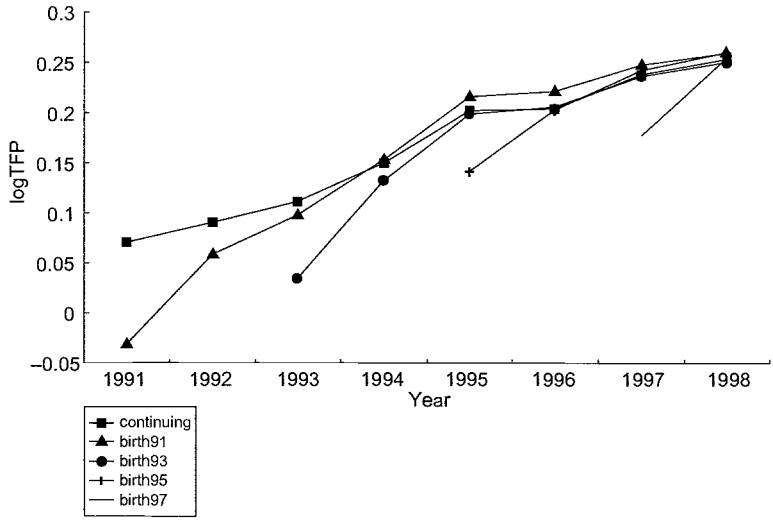

Fig. 9.1 Postentry productivity performance of surviving births: Learning
Source: Hahn (2000).

process also contributes to aggregate productivity growth through rapid learning of surviving entrants. In the Korean manufacturing sector, the learning effect is also observed. To illustrate the point, let us examine the productivity performance of the surviving members of the birth-plants relative to continuing plants. Figure 9.1 shows the average productivity of birth cohorts that survived until 1998 by birth-year compared to continuing plants in 1991 that also survived until 1998. Continuing plants increase their productivity steadily and improve their average productivity by about

23 percent during the 1991–98 period. Each birth-year cohort starts with a productivity disadvantage relative to continuing plants at the year of entry. However, every birth cohort exhibits a very rapid improvement in productivity following entry and catches up with continuing plants in terms of productivity level after several years. The initial productivity differential between birth- and continuing plants ranges from 6 to 10 percent depending on the birth-year. In the following year after entry, the productivity differential narrows to only about 0 to 3 percent. In the third year after entry, the productivity level of birth-plants is roughly the same as, or even slightly higher than, continuing plants. The 1991 birth cohort in particular, which has the longest time series, maintains a higher average productivity than continuing plants three years after entry. Thus, the results are clearly supportive of the presence of a rapid learning effect by surviving members of birth-plants, especially during the first several years after entry.

9.3.4 Pre-Exit Productivity Performance of Deaths: Shadow-of-Death Effect

In order to understand the connection between the micro process of entry and exit and the aggregate productivity growth, it would be ideal if we could examine the counterfactual phenomenon of what would have happened to the productivity performance of failed plants if they had survived. Unfortunately, this seems to be an impossible task. However, it could prove to be beneficial to examine predeath productivity performance of death-plants in order to formulate an idea of the counterfactual. The issue is whether plant deaths reflect a random or transitory event or a persistently bad productivity performance record.

Figure 9.2 shows the time series of the average productivity of plants that existed in 1990 grouped by the year of death compared to plants that survived throughout the sample period. There are two points to be noted here. First, there is a significant productivity gap not only at the time of death but also in the years preceding death between each death cohort and the group that survived until 1998, even though each death cohort experienced absolute productivity gain over time. This phenomenon suggests that plant deaths reflect underlying productivity differences that have existed for a long period of time. In other words, those differences are not just a result of a random or transitory event. To take an example from the 1997 death cohort, the productivity disadvantage relative to the surviving group is about 6.5 percent in 1997. However, the productivity differential dates back as early as 1990, when it is already as large as 3.7 percent. Similar results hold for other death cohorts. Thus, plant deaths seem to reflect not only a disadvantage in productivity at a point in time but also a persistently poor history of productivity.[12]

12. Hahn (2000) shows that these results remain largely intact when taking into account the industry composition effect.

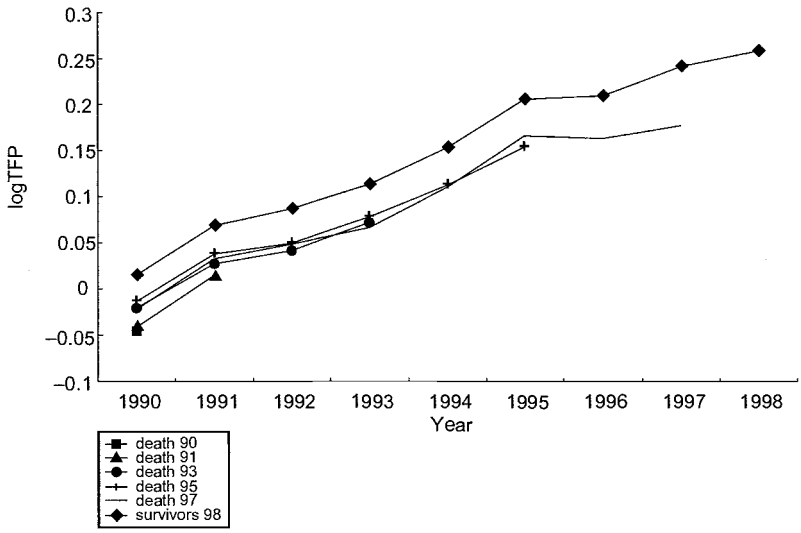

Fig. 9.2 Pre-exit productivity performance of deaths: Shadow of death
Source: Hahn (2000).

Second, the productivity differential between failed and surviving plants tends to widen, especially during the periods nearing the death year. For example, in the 1997 death cohort, the productivity differential fluctuates between 3.5 and 4.7 percent during 1990–96 period, but in 1997 it rises to 6.5 percent. Similar patterns are found for other death-year cohorts.

Thus far we have examined the predeath productivity performance of death cohorts relative to surviving groups of plants and have observed large and persistent productivity differences. The disparities often widen over time during the period near the death-year. However, such large and persistent productivity differences observed in figure 9.2 might reflect other uncontrolled factors that differ between survivors and failures, such as plant age. That is, younger plants may be less productive and suffer death more frequently than older plants. In order to control for this possible age effect on productivity and survival, we also looked at the predeath performance of plants that are born in the same year.

Figure 9.3 shows predeath productivity of a 1991 birth cohort that is further divided by the death-year compared to the 1991 births that survived until 1998. For comparison, the productivity performance of 1991 continuing plants that survived until 1998 is also shown. As expected, the persistence of productivity differential among 1991 births is somewhat less pronounced than suggested by figure 9.2. The 1991 birth-plants that die before 1998 do not demonstrate a noticeable productivity disadvantage in the early years of operation compared to the surviving group. Especially in the first year of operation (1991), there is virtually no productivity differential between surviving and failed plants.

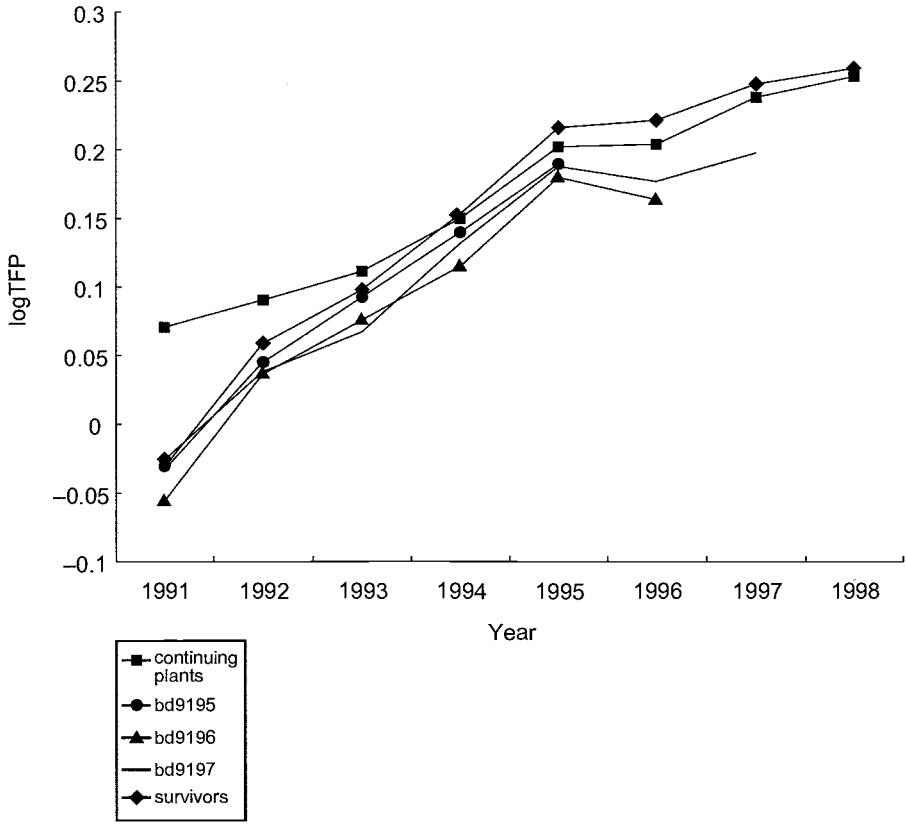

Fig. 9.3 Pre-exit productivity performance of deaths among 1991 births

However, as surviving members of 1991 births improve their productivity at a faster rate, a productivity gap begins to develop and persists over time. In addition, for each death-year cohort among the 1991 births, the productivity disadvantage relative to the continuing group becomes the largest in the last year they are observed. Thus, even if the possible age effect on productivity and survival is controlled for, plant deaths still reflect somewhat persistent productivity disadvantage that often widens during the period near death.

These findings seem to suggest that plant deaths reflect persistently poor productivity performance, which often worsens near the death year. In other words, low productivity of deaths is not just an outcome of random or transitory events.

9.3.5 Entry, Exit, and Aggregate Total Factor Productivity Growth

The empirical evidence we have presented is summarized as follows. Overall, plant deaths reflect persistently low productivity in the past. En-

tering plants may initially begin with a relatively low productivity level, but over time, they go through the process of market selection: The inefficient fail and the efficient survive. The surviving entrants experience rapid learning and become highly efficient over time.

This pattern of productivity dynamics suggests that the major effect of resource reallocation of entry and exit on aggregate productivity will emerge over time, even though the instantaneous gain may be small or even negative. The evidence also suggests that policies that inhibit the resource reallocation process of entry and exit of businesses are likely to be inefficient. In particular, although the cost of such policies may not appear immediately, it will materialize and grow over time in the form of forgone aggregate productivity gain. Alternatively, policies that improve the efficiency of resource reallocation, such as bankruptcy policy reform, may not improve aggregate TFP instantaneously. However, the benefits from such policies will most likely be realized over time.

9.4 Concluding Remarks

This study has found that failing firms, which are accepted in court-administered rehabilitation procedures after the bankruptcy reforms, had less persistent problems in prebankruptcy TFP performance compared to failed firms before the reforms. We interpret this finding as lending support to the argument that bankruptcy policy reform improved the efficiency of resource reallocation after the crisis.

To get an idea of how the bankruptcy policy reform affects the performance of aggregate TFP, we examined how the resource reallocation by the competitive process of entry and exit contributed to aggregate productivity growth based on evidence from plant-level data on the Korean manufacturing sector. The empirical analysis supports that, in Korea, exiting producers exhibit persistently declining productivity whereas entering producers that survive the market selection process show rapidly increasing productivity. These specific patterns of productivity dynamics suggest that policies that prevent resources from being reallocated efficiently via entry and exit could potentially be very costly, with the cost growing over time. Conversely, bankruptcy policy reform, which induces inefficient firms to exit and allocates the released resources to efficient entrants or incumbents, would contribute to increasing the rate of aggregate productivity growth.

Appendix

Data

Productivity Dynamics of Distressed Firms in Korea

Firm-Level Productivity Measure

We use detailed financial information on the firms that have external audit reports. According to the Act on External Audit of Joint-Stock Corporations, a firm with assets of seven billion won or more must issue audited financial statements. The data thus include all firms with assets of seven billion won or more. For these data, firm productivity is estimated using the chained-multilateral index number approach.

Data on Bankruptcy Filings by Distressed Firms

The information on corporate bankruptcy was gathered from various sources such as the courts, the Financial Supervisory Service, and the Bank of Korea.

Plant Productivity in Korean Manufacturing Sector

The data used for this section are from the unpublished plant-level database underlying the *Annual Report on Mining and Manufacturing Survey.* The data cover all plants with five or more employees in 580 manufacturing industries at the five-digit industry level. The data are an unbalanced panel with approximately 60,000 to 90,000 plants for each year during the 1990–98 period, so that the total number of observations is roughly 700,000. See Hahn (2000) for details in measurement of plant total productivity.

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Comment

Chong-Hyun Nam

This is a very interesting paper. First of all, I was impressed very much by the sheer size of the data set, which covers over 37,000 observations. Using this data set, the paper produces a number of powerful statistical results. I think they are not only revealing by themselves but also provide very useful information for the policymakers concerned.

I have only a couple of comments to make. My first comment is that the paper produces many invaluable statistical results in the tables and figures. And yet the paper tends to be too sketchy in interpreting and explaining those results.

The paper, for example, does not go very far in examining and evaluating the costs and benefits associated with those bankruptcy policy reforms and their consequences. The paper would gain a lot if it could try to dig into the implications of these statistical results, from the perspectives of both the firms and the government.

My second comment is that, despite a lot of data work, the paper seems to fall short of presenting a sensible bankruptcy policy reform package for Korea. If the authors ever want to come up with a sensible policy reform package, they will have to take into consideration the following two aspects very carefully.

One is that any policy reform package needs to properly reflect the sources of firm failures. In fact, firm failures can be brought on by a variety of reasons. Some may originate from shifts in comparative advantages due to changes in underlying factor compositions. Continued birth and death of the firms is then a natural consequence. For this case, only a freer entry and exit mechanism is to be desired.

Firm failures may also be caused by some unforeseen or unexpected factors such as financial or political crisis or temporary worldwide recessions induced by them. These factors are most likely to be beyond the control of individual firms, but they can drive many firms into bankruptcy that otherwise would have been healthy. Some kinds of social insurance program may be desired for this case.

Yet some failures may be purely due to lack of management talent or mismanagement on the part of owner-*cum*-managers in charge. A quick liquidation process may be desired for this kind of circumstances.

Another aspect that needs to be taken into consideration is that some firm failures may be closely related with some country-specific factors such as excessively powerful labor unions, lack of credit rating capability on the part of financial institutions, lack of transparency in related laws and regulations, or corrupted bureaucracy and unjust political influences. One

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may want to uncover the importance of these factors as a cause of firm failures in the case of Korea and use it in making a policy reform package. I believe the experience of many Korean firms that suffered from these factors can provide invaluable information on this matter.

Comment

Epictetus E. Patalinghug

Introduction

This study attempts (1) to examine the effect of postcrisis bankruptcy policy reform in Korea on the productivity of ailing firms, and (2) to examine how the reform would improve the performance of aggregate TFP over time. The following discussion will cover the following issues and how they are treated by the Lim-Hahn study: bankruptcy policy reforms, conceptual framework, and effect of entry and exit on productivity.

Bankruptcy Policy Reforms

The authors have adequately discussed how Korea's corporate bankruptcy system has evolved from court-administered procedures often abused by the controlling shareholders of failing firms to a court-administered system with a mandatory-liquidation provision feared by failing firms. The old system in which old bankrupt firms were periodically bailed out by the government was gradually replaced by the court-administered bankruptcy system.

The paper points out that after some restrictions were put on the composition procedure in 1998, large firms with complicated capital structures were not allowed to use this procedure. In 1997, large-sized *chaebols* preferred the corporate reorganization form of bankruptcy mechanism, and beginning in 1998 the same firms preferred the workout procedure. The authors' argument is that the rehabilitation procedure must target firms that undergo bankruptcy due to temporary setbacks and have high potential for recovery. Under this condition, bankruptcy policy reform will enhance the efficiency of resource allocation.

Conceptual Framework

The authors test the hypothesis whether there is a significant productivity difference between specific year bankruptcy cohorts and the group of solvent firms. However, the statistical tests to verify this hypothesis are not very conclusive. First, the statistical tests do not include firms that utilized

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the workout procedure. Second, even among firms undergoing corporate reorganization or composition, there is no clear pattern for the pre–exit year productivity of failing firms when profitability is used as the dependent variable (table 9.4). And third, the inconclusive result in table 9.4 is casually dismissed as probably being due to some explicit or hidden subsidies given to failing firms at the pre-exit years. Nevertheless, nowhere in this paper is there a discussion or documentation (based on past studies) of the magnitude of subsidies given to failing firms.

Effect of Entry and Exit on Productivity

In section 9.3 of the paper, the authors tackle the role of the process of entry and exit on aggregate productivity growth by examining whether plant deaths reflect temporary bad luck or persistently bad productivity performance in the past. The finding of the paper is that plant deaths reflect persistently bad productivity performance. It concludes that policies that hinder the process of entry and exit could be potentially very costly.

The pace of firm learning may be related to the nature of the Korean national innovation system. The link between learning and innovation (Lundvall 1992) may provide an explanation on the pattern of plant entry and exit in Korea.

In using the chained multilateral index in estimating plant-level TFP, the paper could have decomposed TFP into two components: (1) between-plant variations, and (2) within-plant variations. Aw, Chen, and Roberts (2001) not only decomposed firm-level productivity growth into several components (continuing firms, entering firms, exiting firms, and market share contribution) but went further and documented the cross-sectional differences in TFP between exporting and nonexporting firms. The paper could have broadened its perspective of the dynamics of Korean plants by documenting the productivity differentials between domestic-oriented plants and export-oriented plants.

Conclusion

This paper is very good at describing the bankruptcy policy reform experience of South Korea. The significant difference in the types of settlement (e.g., corporate reorganization, composition program, or workout program) availed by top *chaebols* compared to small *chaebols* is revealing. The relevance of the paper to other crisis-hit developing economies (e.g., Indonesia, Malaysia, Thailand, and the Philippines) is its description of a structured bargaining game among interested parties. For instance, the Korean courts mainly oversee the process according to predetermined rules. And court-administered procedure is biased against the controlling shareholders of ailing firms. In contrast, the courts in other countries (e.g., the Philippines and Indonesia) need some tutoring on how to implement the new provisions of their bankruptcy laws. Unlike the case of South Ko-

rea, bankruptcy laws in other crisis-hit countries are still biased in favor of the controlling shareholders of ailing firms. Finally, the paper likewise reveals that the workout (or out-of-court) procedure was the main form of settlement for large-sized *chaebols* in 1998 and 1999. This experience is also popularly used by ailing corporate groups in other crisis-hit countries because it conveniently allows the introduction of noneconomic (e.g., political) factors. The paper therefore is important in explaining how the design of the bankruptcy mechanisms in the Korean experience veers away from a tendency to rehabilitate ailing firms that do not have the potential for recovery. The paper is a very good addition to the literature on bankruptcy policy reforms in crisis-hit economies.

References

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