

## THE EFFECT OF INSTITUTIONAL MECHANISMS UNDER THE UNCERTAIN ENVIRONMENT: THE CASE OF THE VENTURE FIRM RECOGNITION SYSTEM IN SOUTH KOREA AND ITS IMPLICATIONS FOR THE FAILURE OF INSTITUTIONS

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*The attempt to expand small business enterprise in South Korea is in peril. After the 1997 financial crisis, while economic circumstances in the country were still highly uncertain, the government intervened in the diffusion of venture business firms, which were a newly emerging form of small business in South Korea. I argue that the Korean government's system of selecting prominent venture firms succeeded in increasing the number of venture businesses in Korea, but that, while trying to do so in a very short time, it also endorsed firms which were hardly promising. Using the Cox proportional hazard model as my main research tool, I find that when the criteria of endorsement are ambiguous, firms exposed to higher environmental uncertainty and showing poor market performance tend to acquire government's endorsement more quickly. Consequently, as the number of marginal firms among the endorsed venture businesses increased, it hurt the legitimacy of the government's initiatives to support venture business. The Korean government decided to scrap the system by 2006, earlier than previously planned.*

*Key Words: Venture Business Recognition System, Diffusion of Venture Firms, Uncertainty Legitimacy, Neo-Institutionalist Approach*

### INTRODUCTION

Like many other developing countries in the age of globalization, South Korea opened its economy, and has tried to follow internationally accepted standards. Usually, these efforts are materialized by the adoption of new institutions, as they are often regarded as having verified their efficiency in the developed countries. However, the success of imported institutions is unconvincing at most, and sometimes even ends with failure. Why then is it so difficult for developing countries to incorporate stable economic institutions? Critics often point to defects in the system itself. Although it seems plausible at first glance, it only partially explains what happens. The problem is that institutions successful in their original place often fail in the new environment. Therefore, more important are the timing and context where imported institutions are put to work, as well as the response of the people.

In this paper, I will trace the argument against the case of the Korean gov-

ernment's policy on venture business. In actuality, this system is not an imported one, but, in a sense, it represents new policies adopted after the 1997 Asian economic crisis. Contrary to its direct support of companies in the past, the Korean government only tried to promote these policies indirectly. More specifically, the Korean government gave formal recognition to promising small venture firms, and thus virtually gave signals of trustworthiness. Also, since this system was initiated during the crisis, it affords a good opportunity to observe the effects of environmental uncertainty on the institutional system.

The system worked as intended, bringing up over 10,000 recognized venture firms in less than 3 years. Yet, ironically, it was at this time that criticisms about the system began to emerge publicly. Too many recognized firms reflect malfunctions of the screening process. Neo-institutionalists assert that when the institutional environment is firmly established, organizations try to embed themselves in it, since such a maneuver dubs them as legitimate members in the given field. Therefore, as times goes on, the number of firms having formal recognition has increased. Until this point, the theory predicts what occurred with the venture firm recognition system of the Korean government. However, what followed next was the fact that the increase in the number of recognized firms began to undermine belief in the system's ability to only select competent firms. The purpose of this article is to explain the latter part of the process with two other factors, which are uncertainty in economic circumstances, and, as a result of uncertainty, organizations' strategic and even opportunistic reaction toward institutions.

#### THE EFFECT OF INSTITUTIONAL LEGITIMACY ON ORGANIZATIONAL SURVIVAL

Thus far, many sociologists have emphasized the importance of institutional settings in explaining the economic activities of firms (Hirsch, 1975; Zucker, 1986; Dobbin, 1995; Dobbin and Dowd, 1997). Especially, Dobbin and Dowd (1997) demonstrated that the changes in regulatory policies for the railroad industry in 19<sup>th</sup> century America were crucial factors explaining the ups and downs in the number of railroad firms each year. Also, neo-institutional economist Douglass North (1990) underscored the regulatory aspect of institution. Yet, the effect of an economic institution is not always in its regulatory power; rather, in many cases, institutional measures are designed to affect a firm's behavior in an indirect and subtle way.

One of the indirect effects of the institutional system is its role as a general third-party guarantor in the exchange system. Often in reality, people barely

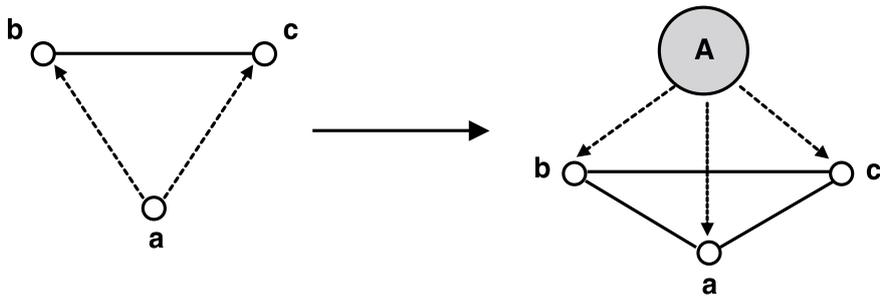


FIGURE 1. ESTABLISHING GENERAL TRUST BY INSTITUTIONAL MEANS

knowing each other can make a deal on the basis of the guarantee of an intermediary who knows both of them, and also on whom they can rely. Even when none of the actors in the exchange system know each other, transactions can occur based on the guarantees for them given by an institutional actor, as A in Figure 1. We can regard this as a generalized version of the third-party trust system (Coleman, 1988).

In this case, effort is not made to directly regulate economic activities of firms by an institutional device. Instead, it is meant to elevate the overall trustworthiness of firms embedded in the given institutional environment, and therefore to raise the possibilities of exchanges among them. Podolny (1993) showed that the investment bank which holds a higher position in the status order among similar firms realized higher profits. Likewise, the fact that a company has been granted an institutional guarantee will heighten its reputation in the market, and thus give it more opportunities to make deals to its advantage.

The potential of institutional recognition to improve the reputation of its beneficiary is closely related to the concept of institutional legitimacy in neo-institutionalism in sociology, and explains why firms are trying to secure institutional recognitions. This mechanism works on two levels. On the level of the organizational field (DiMaggio, 1991), the prevalence of a certain form of organization in a specific area makes people accept it as normal, and prevents them from questioning its *raison d'être* (Meyer and Rowan, 1977). In such a case, the widespread organizational form is taken as proper, and organizations that adopt it will be acknowledged as legitimate members in the field. This is called legitimacy effect.

Meanwhile, on the level of individual organizations, it is effective to adopt the legitimate form or practices. By actively embracing them, new organizations can quickly secure their own legitimacy, and existing organi-

zations can strengthen their foothold in their territory. Therefore, once firmly grounded, the process of institutionalization propels the diffusion of organizations with a legitimate form, and as time goes on, the forms of organizations in a certain organizational field tend to converge on a typical one. This process is called "institutional isomorphism" (DiMaggio and Powell, 1983).

Legitimacy effect and accompanying institutional isomorphism are expected to be conducive to the survival of those organizations that adopt a widely recognized form of organization. In organizational ecology, Hannan and Freeman (1989) maintain that legitimacy effect raised the rate of survival. While, in the end, the increase of organizations with a similar form would lower the rate of survival due to intensified competition among them, at an early stage, it tends to heighten the possibility of organizational survival. This is because the prevalence of a certain organizational form legitimated organizations with similar features.

In other studies which more directly relate the neo-institutionalist approach with organizational ecology, Baum and Oliver (1991, 1992) show that the rate of survival of organizations was higher after they were closely linked to the institutional environment. In studies of local day care centers in Canada, their ties to the institutional environment, such as recognitions from local government or relations with other non-profit organizations, were found to increase their survival rate not only by providing necessary resources, but also by formally recognizing and legitimating their existence.

When there is a stable institutional environment to rely on, firms will try to embed themselves into it. If this is not the case, central or local governments will try to arrange it to promote economic activities within their jurisdiction. Once an institutional system is set up, the number of firms with ties to it will also increase.

#### THE DIFFUSION OF AN INSTITUTIONALIZED ORGANIZATIONAL FORM AND ITS NEGATIVE IMPLICATIONS ABOUT INSTITUTIONAL LEGITIMACY: EFFECTS OF UNCERTAINTY AND STRATEGIC RESPONSE OF FIRMS TO THE INSTITUTION

Thus far, it was predicted that once a new institutional system is established, an organization will attempt to link itself to the system, and as time goes on, the number of formally recognized organizations would soon increase. Two factors seem to determine the degree of the diffusion of institutionalized organizational forms. One factor is the social context upon which a new institutional system is put into work. The second is the indi-

vidual firms' response to it.

The social context upon which an institution is introduced profoundly affects the impact of the institution, since it would delimit and sometimes change motivations of individual organizations. Even with institutions with similar contents, actors' responses to them could be different, depending on the characteristics of the environment they are surrounded by.

Among diverse aspects of environmental context, uncertainty has long been attracting organizational and economic sociologists (March and Simon, 1958). Uncertainty in the environment is detrimental to organizations since it disrupts the free flow of information among them, and thus reduces opportunities of exchanges. There are several proposed ways to cope with this problem. In neo-institutional economic theories, the problems of uncertainty are considered solved by replacing market transactions with exchanges within hierarchies (Williamson, 1975). Sociologists, disregarding this solution as too simple and functionalistic, proposed other social mechanisms including social network, power, culture, and institution (Granovetter, 1985; Perrow, 1986; Powell, 1990; Beckert, 1996; Kim, 1999).

The positive effect of institutional recognition on organizational survival implies the possibility of controlling uncertainty through institutional devices. DiMaggio and Powell (1983) supposed that firms under uncertainty would follow the dominant organizational form in the field, as it must be difficult for them to find out the most efficient form for them under uncertainty. If this occurs, it will lead to mimetic isomorphism. Again, Baum and Oliver (1991, 1992) show that ties to the institutional environment could raise the rate of survival of individual organizations.

It is inferred from the results of previous studies that the rise of uncertainty will push firms to act more strategically to quickly secure institutional recognition. In other words, firms exposed to uncertainty will actively pursue institutional recognitions. Especially if it is a newly founded firm, institutional recognition can reduce two different types of uncertainty, which are ego-centric and alter-centric uncertainties (Podolny, 2001). Administrative and financial supports accompanying institutional recognition, however slight they may be, can be helpful for a new firm striving to survive through the early stages of its life cycle. At the same time, it needs to assure potential investors of its positive prospects and trustworthiness. Also in this regard, the fact that it has obtained institutional recognition can be highly beneficial.

Asserting that rising uncertainty will motivate strategic actions by firms to win institutional recognition should not be misunderstood as meaning that any firm will have it by merely intensifying its efforts. Any recognition

system has its deciding rules and screening mechanisms to filter out acceptable and non-acceptable applicants. Therefore, even under growing uncertainty, it will be firms yielding positive outcomes that can attain institutional approval. Nonetheless, it is also apparent that the threat from outside will compel firms in a mire condition to actively pursue institutional approval, and it is those marginal firms that are in urgent need of it. In this case, we can imagine that they will try to circumvent regular and stricter screening procedures in the system, and attempt to achieve institutional recognition through more lenient or even sometimes problematic means. Particularly, when the authority in charge has little experience with institutional approaches in the past, or when the system is imported from outside (this is the case in most of the developing countries), it is probable that there are loopholes in the system open to abuses by marginal firms aiming for formal approval.

It is good news to firms under uncertainty that they can overcome it through institutional recognitions. Paradoxically, however, this fact can be a threat to the institution itself. Generally, firms most vulnerable to uncertainty are least sound and marginally profitable ones. When the overall level of uncertainty in the market is heightened, these marginal firms are likely to attempt to obtain institutional supports by whatever means they have. Of course, every recognition system has its own screening procedures sorting them out. Yet, if there are loopholes in the process through which these firms can circumvent its strict screening system, it will not be wholly impossible for them to acquire formal recognitions. As a result, if the proportion of marginal firms that are endowed with institutional recognitions is increasing, people will become aware of it, and in the end, begin to doubt the validity of the institution itself. In this case, the attempt to raise the overall level of trust in the market by institutional means end up as "the misuse of trust" (Chang, 2001).

From discussions until now, we can propose two research hypotheses.

Hypothesis 1: *Firms exposed to uncertainty will acquire institutional recognition more quickly than otherwise.*

Hypothesis 2: *Faced with higher uncertainty, firms showing poor profitability will try to achieve institutional recognition utilizing loopholes in the system.*

In the next section, we will examine the case of the venture firm recognition system of the Korean government. Under this system, a firm meeting certain requirements was officially acknowledged as a venture firm. For

companies within this system, what mattered seemed to be the improvement of their reputation in the market after recognition by the government, rather than the small, practical supports accompanying it. Paradoxically, the validity of the system soon faced severe criticisms when the number of recognized firms reached its highest point. Two factors are considered in this section: uncertainty and the strategic reaction of organizations might have worked in this case. First, the system was introduced when economic uncertainty was high, after the Korean economic crisis in 1997. Second, there were some categories of recognition vulnerable to the tactical maneuvers of marginal firms.

## VENTURE FIRMS RECOGNITION SYSTEM

### *The policy for Venture firms of the Korean Government*

In the Korean economy dominated by large firms (often called Chaebols), small and technology-intensive venture firms seem to represent a new generation of firms. They began to appear in the early 1980s in fields such as computers, information and telecommunication, medical devices and S/W. Despite their early appearance, the Chaebol-oriented policies of the Korean government remained a block to their steady growth.

This situation drastically changed after the 1997 economic crisis (Lee and Kim, 2000). Increased societal interest in the information and telecommunication industry and skepticism about the government's economic policies favoring large Chaebols, regarded as a main culprit of the 1997 economic crisis, altered people's evaluations of venture firms in Korea. Nonetheless, investments in new technology often involve high levels of risk-taking, and thus the likelihood of success is very low. Therefore, investors were unwilling to put their resources in the firms without proper institutional supports. Under these circumstances, the Korean government's policy to back up venture firms provided financial and other administrative supports to them, and more significantly gave assurance to investors that these firms had enough potential to make their investments in those firms profitable.

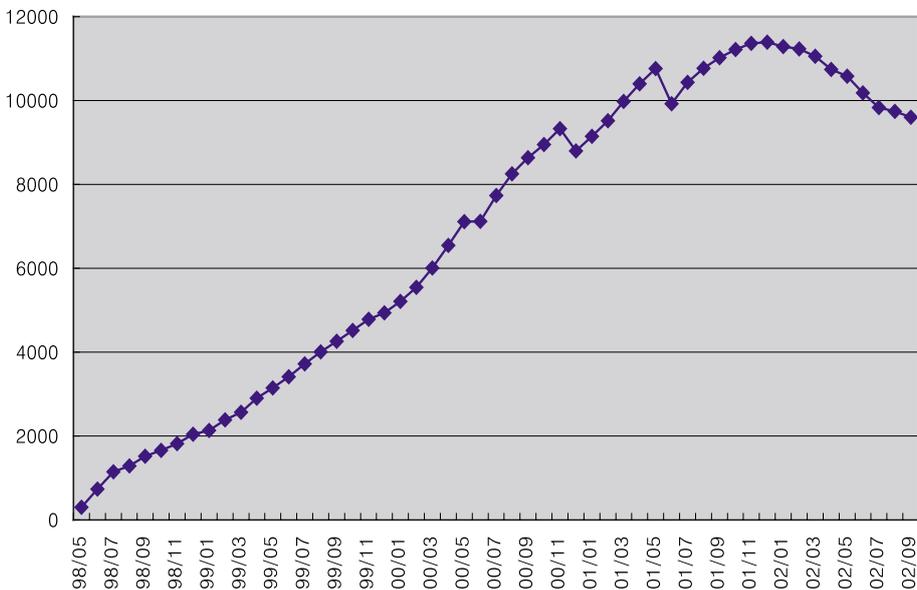
The most important and prominent feature of the Korean government's policy for venture firms is its venture firm recognition system. Under this system, small firms, which satisfy conditions set forth by the law (the Act on Special Measures for the Promotion of Venture Business of 1997), would be formally certified as venture firms by the government. Once formally recognized, they are entitled to diverse institutional benefits including tax cuts, subsidies for technological developments and so on. Above all, however, the

fact that a firm is given formal recognition by the government works as a positive signal in the market, and thus can improve its reputation among other firms and investors.

In actuality, firms themselves also seem to view the benefits of the venture firm-recognition system in this way. About 50% of 5,880 venture firms surveyed in 2001 pointed to 'the improvement of the firm's publicity,' and not to other financial and administrative supports<sup>1</sup> as the main benefit of the system.

### *The Rapid Increase of Venture Firms: A Success of Institution?*

The Korean government's efforts to promote venture firms by its recognition system seem to contribute to the rise of venture business in Korea after the early 1990s. The figure below shows the number of recognized firms in each month starting from January, 1998. As we see in the graph, within less than 3 years since the start of the recognition system, more than ten thou-



**FIGURE 2.** THE NUMBER OF FORMALLY RECOGNIZED VENTURE FIRMS IN KOREA

Source: Small and Medium Business Administration (<http://www.smba.go.kr>)

<sup>1</sup> Publicity, 50.40%; Tax cut, 22.25%; Financial support, 11.35%; Raising employees morale, 6.67%; Other, 6.41.

sand firms had formal recognition.

This increase is quite drastic, considering the rather short time period since the start of the system. Can we then regard this result as a sign of the success of the Korean government's attempt to nurture venture firms through institutional means? On the one hand, the Korean government seemed to achieve its goal with the system. It quickly discovered and recognized firms qualified for institutional supports, and thus partly contributed to the boom of venture businesses in Korea in the late 1990s. Further, the recognition system formally delimited the boundary of venture firms. This fact is of enormous importance to firms themselves and their investors since, before that, the boundary was unclear to most of them. As illustrated by Zuckerman (1999), firms with clear industrial categories proved more profitable in the stock market. On the other hand, this rapid increase in the number of recognized venture firms gave rise to concerns about the quality of recognized firms. The purpose of the system was to filter out promising firms from other small firms. This function of the system reduces the burden on investors who, without such a system, have to find promising firms by themselves. Nonetheless, when there are too many formally recognized firms in the market, the fact that a firm is formally recognized by the government does not tell much about it. If formal recognition is recklessly granted to any firm applying for it, the function of the system to select reliable firms can be severely impaired.

The following events seemed to give weight to the second opinion regarding the venture firm recognition system. As soon as the number of venture firms reached 10,000, criticisms about the system emerged in the mass media. The point was that the certificate was given to firms that did not satisfy requirements for it. Responding to these criticisms, the authority in charge of the recognition system, the Small and Medium Business Administration, raised the required standards for recognitions and applied

**TABLE 1.** MONTHLY FLUCTUATIONS OF THE NUMBER OF VENTURE FIRMS IN KOREA

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
1998	-	-	-	-	304	427	413	140	230	145	160	223	2,042
1999	91	252	182	334	243	269	310	285	248	259	268	151	4,934
2000	278	334	458	543	563	7	618	519	384	311	382	-533	8,798
2001	350	370	460	420	364	-839	508	341	250	198	145	27	11,392
2002	-106	-52	-176	-319	-158	-399	-349	-91	-141	-	-	-	9,570

Source: Venturenet (<http://www.venturenet.or.kr>)

them more strictly than before. As a result, the number of certified venture firms decreased since early 2002<sup>2</sup> (see the table below).

It seems paradoxical that the system was criticized at the moment it achieved its own goal. Most of the criticisms in the media referred to the mismanagement of the system as the main reason for its failure: its inability to properly screen applicants. However, this alone does not explain the increase of applicants in the first place, and it only partially accounts for the failure of the venture firm recognition system in Korea.

Previous studies on venture firms in Korea usually highlight the market performance and CEOs' characteristics in explaining the success of these firms (Lee and Choi, 2001; Ahn and Kim, 2002; Lee, 2002). Even when environmental factors were considered, they were mainly the degree of competition and rate of concentration in the industrial sector, or characteristics of relationships among them (Kim and Han, 1999; Oh, 2002). Most works on institutional factors tried to present suggestions to promote venture business, and therefore studies empirically testing the effects of different institutional settings are rare. This bias in the research of venture companies in Korea came from tendencies to focus on their efficiency and efficacy, and consequently led to underestimating their institutional environment.

In this paper, we argue that the process of the proliferation of an institutionalized organizational form lies behind the drastic increase of recognized venture firms in Korea. Yet, two other factors, the uncertainty and strategic response of organizations, added variations to the process, and can even undermine the validity of an institution. A closer look into the venture firm recognition system supported these contentions. First, the system began just before the foreign currency crisis in Korea, and continued throughout large-scale economic transformations in the aftermath of the crisis. The reform package of the IMF has enforced overall restructuring of the Korean economy, including the corporate, financial and public sectors. Firms faced with such rapid transitions are likely to experience enormous uncertainty, since it meant sudden changes in the rules regulating their behavior. Furthermore, most of the venture firms were young and small sized firms, and therefore only barely capable of controlling environmental uncertainty. Hence, at that time, small firms in Korea must have been eager to acquire institutional recognition, which was, in this case, venture firm recognition by the Korean government.

<sup>2</sup> This partial tendency seems to be due to the fact that for some firms the period for venture firm recognitions had expired. However, before the changes in the recognition rules, the rate of re-application for venture firm recognition was more than 60%, but after that it decreased to 30%. It seems that more rigid rules discouraged once recognized firms from re-applying.

In addition, there were categories of venture business recognition that seemed to have given opportunities to attain governmental endorsement to even marginally qualified firms. To be certified by the government, firms had to satisfy given conditions in one of the following categories: 1) ratio of expenditures on R&D to sales, 2) the proportion of sales of products from patent or new technologies certified by the government, 3) funding from venture capital, and 4) venture business evaluation. The first two categories stressed the technological competency of applicant firms. To be recognized as a venture business in those categories, firms had to satisfy clearly defined necessary conditions: expenditure on R&D as more than 5% of the firm's annual sales, or sales of goods or services based on patented or otherwise certified technologies exceeding 50% of annual sales or 25% of exports. Therefore, these categories presented more reliable means for screening out more promising firms.

To the contrary, the other two categories only require the approval of third-party agencies. Firms could achieve governmental recognition through the evaluation of business items by inspecting bodies designated by the Small and Medium Business Administration (the fourth category). Since there were many inspecting bodies in diverse areas that applied their own standards in deciding eligible firms, it was difficult to have consistency in the selecting criteria. In addition, in the third category, firms that had more than 10% of their capital from venture capital were also qualified for

**TABLE 2.** DESCRIPTIVE STATISTICS OF INDEPENDENT VARIABLES

	N. of obs.	Mean	Std. dev.	Min.	Max.
Economic crisis	2621	0.388	0.487	0	1
Net profit (10 billion won)	2621	0.042	0.161	-0.913	4.330
Economic crisis × net profit	2621	0.017	0.125	-0.715	4.330
LN(asset)	2621	7.468	1.423	2.303	11.295
LN(N of emp.)	2621	3.166	0.973	0	6.907
Age (months)	2621	64.837	81.400	0	1073
Proportion of RND	2621	2.281	1.213	0	6.687
N of patents	2621	0.907	2.897	0	65
Ind. sector	2621	0.593	0.491	0	1

<sup>3</sup> This seemed quite true during the heyday of the so-called venture bubble. Some CEOs of venture firms I interviewed also mentioned this.

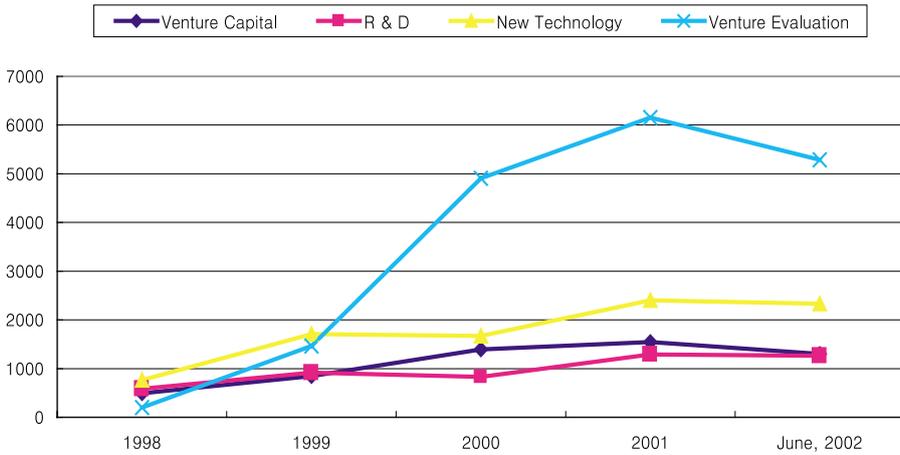


FIGURE 3. THE NUMBER OF VENTURE FIRMS BY THE CATEGORIES OF RECOGNITION

recognition. However, since venture business was booming in the late 1990s and early 2000s, it was easy for venture companies to find venture capitalists willing to invest in them.<sup>3</sup> Therefore, firms without a strong technological background could have tried to acquire venture business recognition by utilizing the latter categories. This seems to have been more likely under the Korean government's active efforts to boost venture business at that time.

The figure below shows the annual number of recognized venture firms in each category. Together, the latter two categories account for more than 50% of total recognized firms after 2000. The last category, venture business evaluation, is especially noticeable in the graph. Firms belonging to this category seem to cause the drastic increase of recognized firms, and also their accompanying decline.

## METHOD AND DATA

### *Estimation*<sup>4</sup>

In empirical tests, we will analyze the effects of independent variables on the probability of firm's achieving venture firm recognition. Doing so, we view the process as the movement of a firm among a set of qualitatively different states; that is non-recognized to recognized firm. Since we are model-

<sup>4</sup> Models used in this paper are based on those used by Yee Jaeyool in his 1993 article (Yee, 1993).

ing changes, they are treated as transition rates. The transition rate from state  $j$  at time  $t$  to state  $k$  at time  $t+1$  is defined as follows:

$$r_{jk}(t) = \lim_{\Delta t \rightarrow 0} \frac{\Pr[t < T < t + \Delta t, Y(T) = k / T \leq t, Y(t) = j]}{\Delta t}$$

Then, if we construct a probability of moving from  $i$  regardless of the destination  $k$ , it becomes a hazard rate:

$$h(t) = \lim_{\Delta t \rightarrow 0} \frac{\Pr[t < T < t + \Delta t | T \leq t]}{\Delta t}$$

In the test, a firm is assumed to be recognized as either of the two categories of venture firm recognition. One is by investment from venture capital or venture business evaluation, the other is by investment on R&D, or patented or other accredited new technology. In this case, we also have to calculate the probability of ending in each destination when transition occurs. Therefore, the overall transition rate is partitioned into two parts as below:

$$r_{jk}(t, t + 1) = h(t, t + 1) \cdot m_{jk}$$

where  $h(t, t + 1)$  is the overall rate of leaving state  $j$ , and  $m_{jk}$  is the conditional transition probability defined as the probability of moving from  $j$  to  $k$ , provided that a shift occurs.

I will use the Cox proportional hazards model to estimate the hazard rate that a firm will move from the state of non-recognition to recognition. In the Cox proportional hazards regression model (Cox, 1972), the hazard rate for the  $j$ th subject in the data is given as below.

$$h(t | \mathbf{x}_j) = h_0(t) \exp(\mathbf{x}_j, \mathbf{b}_x)$$

The merit of this model is that it makes no assumptions about the shape of the hazard over time, thus reducing the possibilities that the results of analysis will be affected by predetermined assumptions, and not by the data itself. The baseline hazard rate  $h_0$  is left not estimated, and just assumed to be the same for all cases under analysis.

The conditional transition probability,  $m_{jk}$  is estimated by using a logit regression model. It takes the following form:

$$\log \frac{m(t)}{1 - m(t)} = x_j \beta_x$$

### *Measurement*

Recognition as a venture firm: we examined the length of time spent to gain venture firm recognition, and then transformed it into monthly annual spells. From a 30-month time frame covered, the 2,606 cases yield 53,615 monthly spells at risk. Firms are included in the risk set when the recognition system begins (July, 1997), or when they come into market, in case they were founded after the beginning of the system, and excluded once they acquire recognition.

Types of venture firm recognition: The type is coded as 1 if a firm was recognized as investment from venture capital or venture business evaluation categories (TYPE1), and 0 if by investments on R&D, or patented or other acknowledged new technologies (TYPE2). TYPE2 categories place more emphasis on the firm's technological potential, and present strict conditions for qualification, while TYPE1 categories only require approval by diverse third-party agencies with their own criteria for recognition, thus leaving room for even barely qualifying firms to be endorsed.

Degree of uncertainty: At first, to measure the effect of different levels of uncertainty on the acquirement of venture firm recognition, we tried to divide the point of time when a firm obtained recognition into two periods, before the 1997 economic crisis in Korea and after the crisis. However, the crisis occurred only four months after the beginning of the recognition system,<sup>5</sup> so it is hard to find out the effect of the different levels of uncertainty in two periods on the rate of winning recognition. Therefore, instead of dividing the period itself, we partitioned firms into two groups. One is the group of firms that existed before the economic crisis, and the other is that of firms founded afterwards. According to Stinchcombe (1965), organizations just set up are most vulnerable to disturbances from outside: this is called 'the liability of newness.' Thus, firms founded in the aftermath of the 1997 economic crisis would be subject to uncertainties caused both by the unstable economic environment and by their immaturity. To the contrary, old and established firms could better resist such fluctuating situations than younger firms. Thus, we can predict that firms just beginning their lives

<sup>5</sup> The venture firm recognition system began in July 1997, and the economic crisis occurred in November, 1997.

under economic conditions following the crisis would try to gain governmental recognition to secure their survival. For estimation, we made a dummy variable that has a value of 1 for firms founded after the crisis, and 0 for cases otherwise.

Market performance of a firm: Uncertainty in the environment pushed organizations to move strategically to secure their viability against the problems caused by environmental uncertainty. This has two implications for our models. First, as predicted under higher uncertainty, even the firms that had been previously indifferent to venture company recognition would seek to achieve it. In this case, firms showing better market performance could win recognition more quickly than marginal firms. However, facing uncertainty, marginally profitable firms were more eager to gain recognition than competent firms were. From the prior discussion, it seems that these companies would try to be formally recognized by satisfying more lenient requirements. Thus, second, it is expected that, under uncertain circumstances, the probability of a firm being recognized as TYPE1 will be high when it shows poor market performance.

These predictions imply an interaction effect between a firm's market performance and the level of uncertainty in each model. To see if this was the case, interaction terms between them were included in the test. A firm's market performance was measured by its ordinary profit and annual sales when it was officially recognized. The latter was logged because its distribution was skewed toward the higher values.

Control Variables: Several other variables were included that were assumed to have an effect on the dependent variable. First, the size effect of a firm was controlled by inserting its capital and its number of employees when it was officially registered as a venture firm. It is expected that firms with more resources will obtain governmental recognition more quickly. All these variables were used as logged forms.

The firm's age is also relevant. As was previously stated, younger firms were most vulnerable to uncertainty, so they would try to gain institutional recognition sooner than already established firms. Thus, the firm's age at the time of obtaining recognition, counted by months, was included in the analysis. It is also important to control for the firm's age, since most firms founded after the 1997 economic crisis are younger than those founded before it.

Considering the aim of the system to support firms developing or using cutting edge technologies, the proportion of annual R&D expenditure to annual sales and the number of patents<sup>6</sup> were also included. As a matter of course, firms investing much on R&D and having their own patents will

TABLE 3. CORRELATION MATRIX

	1	2	3	4	5	6	7	8
Economic crisis								
Net profit	0.010							
Economic crisis × net profit	0.171*	0.759*						
LN(asset)	-0.309*	0.304*	0.137*					
LN(N of emp.)	-0.293*	0.234*	0.065*	0.712*				
Age	-0.532*	0.074*	-0.086*	0.383*	0.372*			
Proportion of RND	0.329*	-0.094*	-0.000	-0.391*	-0.400*	-0.330*		
N of patents	-0.053*	0.014	-0.022	0.091*	0.061*	0.128*	-0.029	
Ind. sector	0.166*	0.047*	0.069*	-0.056*	-0.011	-0.224*	0.217*	-0.091*

\* $p < .05$

gain recognition more quickly. If this is not the case, however, especially in the categories of recognition explicitly demanding considerable investments on development of new technologies, it can be regarded as another reason for criticisms of the system.

Finally, the industrial sector of the firm was considered. Other things being equal, firms in the information technology industry and other technology-intensive sectors will obtain recognition more easily than firms in conventional sectors, since the main purpose of the Korean government's venture firm policies was to support and promote firms in the former areas.

### Data

The data used in this paper are from the general survey of venture firms by the Small and Medium Business Administration in 2000. The sample includes 6,368 firms out of a total 6,667<sup>7</sup> recognized venture firms.

There are two points to be mentioned about the data set. First, because the survey was only about firms acquiring venture firm recognition, it completely excluded cases of firms that failed to do so. Thus, there is apparent bias in the data-set. Nonetheless, since it is the most comprehensive data-set of venture companies in Korea, and it is extremely hard to construct more

<sup>6</sup> Similar to the firm's capital and the number of employees, the proportion of R&D expenditure is that of the year when a firm was recognized. As for the number of patents, there is no comparable data about it in each year. As a result, the number of firm's patents in 2000 was used.

<sup>7</sup> This is the number of all firms that have acquired venture firm recognition by June 2000, excluding firms still in the stage of foundation.

complete data-sets with a similar size,<sup>8</sup> we decided to proceed with this one until more thorough materials are available. Second, due to the missing values problem, only 2,621 of the total 6,667 cases were actually used in the test. To check if there were any considerable differences between the two sets, we compared means of the variables of each set. Except for the firm's age at the time of acquiring recognition, there were no significant differences, and even in case of the firm's age, the difference was less than 12 months. The descriptive statistics of variables used in the models and the correlation matrix are shown below.

## RESULTS OF THE ANALYSIS

The results of the data analysis are reported in the table below. The first column shows the overall hazard rate from the state of a non-recognized firm, which is the probability of obtaining recognition without regard to its category. The second and third columns show type-specific shift rates. The second table shows the transition rate from a non-recognized to a recognized firm as TYPE1, and the third column shows the rate from a non-recognized to a recognized firm as TYPE2. The last column is the conditional odds; it shows the ratio between the probability of being recognized as TYPE1 or as TYPE2, given that a transition in the firm's state occurs.

In the first column, the coefficient of the dummy variable indicating firms founded after the economic crisis is 1.690, and is also statistically significant ( $p < .001$ ). This means that post-crisis firms are recognized more quickly than pre-crisis firms.<sup>9</sup> In terms of a firm's market performance, generally less profitable companies will achieve recognition more quickly (the coefficient is -0.940 and statistically significant at  $p < .001$ ). However, the tendency is weakened in the case of post-crisis firms. For these firms, the coefficient is reduced to -0.407 (-0.940 + 0.533 ( $p < .10$ )). Although the coefficient of the interaction term is only marginally significant, this result partly supports our first prediction that the degree of uncertainty changes the motivation of each firm, and pushes them into seeking institutional recognition more actively. It can be inferred that once faced with higher uncertainty, firms

<sup>8</sup> In some articles regarding Korean venture companies, the authors used sampling techniques, and thus avoided similar problems. However, since the returning rate of the questionnaire was quite low (less than 20% in most cases), the actual number of cases used in empirical tests was no more than 200 cases, or even less than that.

<sup>9</sup> The following relation exists between transition rate,  $r$  and waiting time to the change,  $T$ :

$$r \propto \frac{1}{T}$$

**TABLE 4.** PARAMETER ESTIMATES OF HAZARD RATE, TYPE-SPECIFIC SHIFT RATES FOR TYPE1 AND TYPE2 CATEGORIES OF RECOGNITION, AND CONDITIONAL ODDS BETWEEN TYPE1 AND TYPE2 RECOGNITION

	Hazard rate from a non recognized - firm	Transition rate from a non- recognized to a recognized firm as TYPE1	Transition rate from a non- recognized to a recognized firm as TYPE2 category	Conditional odds between TYPE1 and TYPE2 recognition
Economic crisis <sup>†</sup>	1.690**** (0.056)	2.423**** (0.098)	1.201**** (0.074)	1.128**** (0.109)
Net profit	-0.940**** (0.257)	-0.060 (0.337)	-1.475**** (0.364)	0.915* (0.473)
Economic crisis × net profit	0.533* (0.314)	-0.502 (0.409)	1.006** (0.508)	-1.304** (0.566)
LN(asset)	0.006 (0.021)	0.161**** (0.032)	-0.111**** (0.028)	0.305**** (0.046)
LN(N of emp.)	-0.058* (0.031)	-0.057 (0.048)	-0.042 (0.039)	0.007 (0.065)
Age <sup>††</sup>	-0.001*** (0.000)	-0.005**** (0.001)	0.000 (0.000)	-0.004**** (0.001)
Proportion of R&D expenditure to sales	0.072**** (0.019)	0.087*** (0.029)	0.055** (0.026)	0.035 (0.040)
N of patents	0.025**** (0.006)	-0.026 (0.017)	0.036**** (0.006)	-0.121**** (0.026)
Ind. sector <sup>†††</sup>	0.013 (0.042)	0.113* (0.066)	-0.062 (0.054)	0.177* (0.091)
Constant			-2.959****	(0.321)
Log-likelihood	-17495.808	-7086.074	-10250.076	-1617.3751
N with event	2621	1107	1514	
N	54061	54061	54061	2621
Conditional probability	1.00	0.42	0.58	

<sup>†</sup> 1 for firms founded after the 1997 foreign currency crisis; 0 for other firms.

<sup>††</sup> counted by months.

<sup>†††</sup> 1 for firms in information technology sector and precision machinery industry; 0 for firms in conventional manufacturing sectors and others.

\* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ , \*\*\*\* $p < .001$

showing good market performance will concentrate their efforts to obtain recognition more quickly.

Similar patterns are found in the second and third columns. By compar-

ing the values of coefficients in two models, however, we can find interesting differences between them. First, the coefficient of the dummy variable in the second column (2.423 ( $p < .001$ )) is higher than that in the third column (1.201 ( $p < .001$ )). It implies that firms recognized as TYPE1 are more sensitive to environmental uncertainty than those recognized as TYPE2. However, as for firms' profitability, we fail to find in the second column the same pattern as found in the first column, while we see that in the third column. Thus, in terms of market performance, it is firms recognized as TYPE2 that seem to be more sensitive to uncertainty.

This inconsistency is somewhat solved if we examine the final column. It shows the conditional odds between TYPE1 recognition and TYPE2 recognition, given that a shift occurs. First, the coefficient of the dummy variable indicating a post-crisis firm is 1.128 ( $p < .001$ ). This means that if it is a firm founded after the crisis, it has a higher probability of being formally recognized as TYPE1. The change in the coefficient of the firms' net profit is more interesting. As for firms set up before the crisis, those yielding larger profits have higher probabilities of recognition as TYPE1 (the coefficient is 0.915 and is also statistically significant at  $p < .10$ ). For firms founded after the crisis, however, the direction of the trend is changed. Now, it is firms showing poor profit that have higher probabilities of TYPE1 recognition (0.915-1.304 ( $p < .05$ ) = -0.389). This seems to partly explain why, in the second model, we fail to find a similar pattern that occurred in the first and third models. This change means that exposed to higher uncertainty, firms with poor market performance will also be actively seeking venture firm recognition utilizing its TYPE1 category. Therefore, it supports our second prediction that marginal firms facing high uncertainty will try to win institutional recognition, satisfying more lenient requirements in its screening procedures.

Before we move on, there are several comments about other control variables. The firm's size, in terms of its assets, has different effects on the models for TYPE1 and TYPE2 categories. In the TYPE1 category, larger firms obtain recognition more quickly, whereas, in the TYPE2 category, smaller firms do so. The number of employees has a significant effect only in the model of the overall transition rate, where smaller firms win recognition more quickly. As for age, younger companies acquire recognition quickly, and this result complies with 'the liability of newness' hypothesis. In all three models of shift rates, firms that invest heavily in R&D show a higher rate, but the effects of the number of patents turn out to be different depending on the categories of recognition. Finally, the effect of the firms' industrial sector is noticed in the second and third columns. Among companies recognized as TYPE1, those in the information technology industry and

other technology-intensive sectors will obtain recognition more quickly, and the probability of TYPE1 recognition is higher when a firm is in these sectors.

## DISCUSSION

The venture business policy of the Korean government became the focus of criticism at the very moment when the number of recognized venture-firms in Korea was record breaking. We have argued that the failure of the venture-firm recognition system was triggered by greater uncertainty accompanying the 1997 economic crisis in Korea, and was also exacerbated by firms' strategic actions responding to their utilizing the recognition system. Neo-institutionalists assert that organizations adopting institutionalized organizational forms would raise their chances of survival by obtaining legitimacy, and that this process resulted in the prevalence of the organizational form in the field.

In a sense, these predictions turned out to be true in that the number of venture-firms approved by the Korean government drastically increased. However, neo-institutionalist approaches so far have not considered how this process would affect the source of legitimacy, the institution itself. The case of the venture-firm recognition system of the Korean government showed that the excessive increase of firms given institutional recognition has undermined the validity of the system. Our assertion in this paper was that uncertainty in the market propelled firms' strategic maneuvers to acquire governmental recognition, which in turn has accelerated the diffusion of recognized venture-firms. However, if firms showing meager performance manage to obtain governmental recognition, taking advantage of this trend favoring small firms, and as the proportion of those marginal firms among recognized firms are increasing, then the reliability of the system will be severely disrupted.

It is easy to predict that marginal firms will attempt to attain institutional recognition by satisfying more lenient requirements of the system. The problem is that without proper means to curb this behavior, the validity of the system will be jeopardized. When most organizations in the field have achieved recognition, the fact that a certain organization is recognized will not improve its reputation in the market as much, as when this is not the case. This explains why the venture firm recognition system of the Korean government was widely criticized when the number of recognized venture firms was around its highest point. In this case, it seems that there was a trade-off between two contradicting policy goals. On the one hand, the sys-

tem has to find and give venture firm status to as many promising firms as possible. On the other hand, if it has allowed recognition to too many firms, including marginal ones, then venture firm recognition will no longer be regarded as a useful means of locating competent firms.

Empirical tests using 2,621 firms supported some of our predictions. Regrettably, due to the limitations of the data, the scope of analyses was restricted to firms recognized only until 2000, and therefore missed the other periods when the number of venture-firms was on a rapidly increasing trend. Yet, given the fact that the anticipated patterns were found even at the earlier stage, it is highly likely that similar processes have still been at work, or have even accelerated since then.

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