

Adapting to Radical Change: Strategy and Environment in Piece-Rate Adoption During China's Transition

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Abstract

Adaptation to radical change is central to research in organization theory, and some of the most dramatic examples of environmental change have occurred recently in transition economies such as China. I take advantage of change during China's economic reform to study the relative importance of organizational and environmental factors in producing innovative managerial response. I find that strategic choice predicted innovation in the early stages of reform, but environmental factors increased in salience over time. Intrafirm support, Communist Party connections, and a market orientation produced innovation early in reform. Simple imitation of others was also salient in early years. As reform progressed, managers increasingly imitated other profitable firms and drew on their own experience. My results inform an understanding of both the process by which innovation occurs and firm behavior in transition economies.

(Chinese Firms; Chinese Transition; Environmental Change; Corporate Strategy)

An ability to adapt to radical change is a key determinant of competitive advantage and organizational survival (D'Aveni 1994, Richardson 1996, Volberda 1996), and the changes taking place in transition economies offer a unique opportunity to study the adaptation process. Instead of long, relatively stable periods in which firms established and maintained competitive advantage, environments in many contexts are increasingly characterized by short periods of competitive dominance marred by frequent disruptions that hinder performance and survival capabilities (D'Aveni 1994, Ilinitich et al. 1998). While awareness of the importance of organizational adaptation has intensified, the factors that facilitate or hinder adaptation have attracted little attention. Some of the most dramatic political and economic changes in recent years

have occurred in transition economies, and the early stages of transition may be particularly instructive in the understanding of the adaptation process. Early in reform, basic institutional arrangements governing economic behavior are dismantled, environmental uncertainty intensifies, and managerial response is particularly visible.

This study takes advantage of China's economic transition to explore the relative role of organizational and environmental influences in managerial innovation. I integrate ideas from strategic choice and institutional theory to propose that the dynamics of adoption change in relative salience over time and that different combinations of influences are salient at different stages in the spread of a new practice. I argue that in the early stages of change, strategic choice by managers will be relatively salient. Manager traits, connections, and orientations are likely to be particularly important at this stage of the change process. Over time, however, mimetic processes and firm experience are likely to become increasingly relevant. Moreover, because change seldom occurs instantaneously, the interaction between old and new practices influences both the adoption of the new practice and the nature of emergent organizational strategies.

To study adaptation, I explore the process by which Chinese firms adopted piece-rate wages, a quintessential market-oriented labor practice. China's transition is an ideal context for this study because it had a clear beginning and was radical relative to the changes explored in previous literature. Yet China's reform was gradual compared to other transition economies, making it possible to isolate and observe firm response. I focus on piece rates as an illustrative example of a widely adopted market practice that was a clear departure from socialist labor practices. Piece rates were abandoned during the socialist era, but Chinese reformers granted state-owned firms permission to use them in the first years of reform. State officials monitored and directed firm activities during

transition, but piece-rate use was left to manager discretion from early in reform. Piece rates accounted for a lower percentage of total employee compensation in China than in other transition economies, but more than 40% of formerly state-owned firms in China used them by 1989 (CASS/UCSD 1990). In the next sections, I provide additional background on China's reform, propose a series of hypotheses to explain the adoption of piece rates, and use longitudinal (1980–1989) data on 769 formerly state-owned firms to test the hypotheses.

The Adoption of Piece Rates During China's Transition

Prior to reform, organizations in China were all state owned and were part of a system of redistribution and central planning (Groves et al. 1994). The hierarchical planning system included multiple layers from central ministries, to provinces, municipalities, counties, and townships, with each level redistributing resources in its jurisdiction (Nee 1992, Guthrie 1997). All industrial profits in China were remitted to the state after fixed deductions were taken by the factory, and central planners redistributed these profits according to long-term state plans (Walder 1992, Jefferson and Rawski 1994). The state controlled the allocation of all resources, including labor. State agencies permanently assigned workers to factories, factories could not fire workers, and wages, promotions, and bonuses were dictated from above (Naughton 1995).

In 1978, the state initiated large-scale industrial reform and began to reduce its role in firms to that of a shareholder with limited liability and authority (Dong and Hu 1995). State control was not eliminated immediately, but its role gradually began to loosen. Profit retention was introduced (Naughton 1995, p. 100), the "factory manager responsibility system" gave managers authority over the organization, and most organizations adopted long-term managerial contracts (Groves et al. 1995). Firms also began to hire temporary and contract workers, and labor migration began to increase (Korzec 1988, Howard 1991). Worker bonuses and welfare funds grew rapidly (Naughton 1995, p. 103), and managers started to make other decisions about hiring, promoting, and firing workers (Groves et al. 1994, 1995).

Responding to these changes, firms also began to introduce wholly new strategies, such as piece wages. Linking pay to output was somewhat common in earlier historical periods, but the use of incentive-based compensation schemes was prohibited following China's 1949 communist takeover (Naughton 1995). Beginning in 1978, firms were again allowed to use piece wages, and by the late 1980s, their use had become taken for

granted. Their use was less common in China than in European transition economies, but piece wages were used widely in China even in the first years of reform (Naughton 1995, p. 343). As early as 1981, nearly 70% of firms used them, and up to 20% of some firms' total wage bill was accounted for by piece wages in some regions and sectors (CASS/UCSD 1990). The use of piece wages varied regionally and by industry, and as with other strategic decisions in China (Naughton 1995), it is likely that social processes (such as diffusion) affected the adoption of this new strategy.

At the same time, because firms continued to use socialist labor practices, the adoption of piece rates created a dual system of socialist and capitalist labor practices within firms (Keister 2000). Reformers pushed for the development of a socialist market economy, and organizations correspondingly began to adopt capitalist practices such as the use of piece rates while retaining socialist methods of hiring, firing, and compensating workers (often because the state required it). The state continued to regulate labor practices, but as managerial authority over the operation of firms expanded, reformers transferred responsibility for many of these practices to the firm (Naughton 1995). Most firms continued to employ permanent workers through the end of the 1980s, but in 1984, all new employees were considered contract workers (those who had been hired previously as permanent employees were still guaranteed lifetime employment). Likewise, most organizations continued to accept workers allocated by state agencies even while beginning to acquire workers from newly developing markets (Dong and Hu 1995). The continued use of socialist-oriented labor practices reflected coercion to some degree, but it was also a voluntary risk-reduction strategy on the part of organizational decision makers (Keister 1998).

Perspectives on Managerial Innovation

Under what conditions would a Chinese state-owned firm decide to adopt an innovative labor practice in the first decade of reform? Strategy research undertaken primarily in developed market economies suggests that two predominant explanations account for this type of behavior: a strategic choice explanation and an institutional explanation. The first set of factors, the strategic choice factors, are internal in nature. Penrose (1959), Nelson and Winter (1982), Barney (1986 and 1991), and a host of others (Tichy 1983, Dutton and Duncan 1987, Ginsberg 1988, Barnett 1993) have argued that factors internal to the firm determine the nature and timing of innovative actions. The relative factors include knowledge of the managers and firm, organizational routines, and related capabilities.

From this perspective, firms' unique knowledge and capabilities allow managers to undertake new activities that, under the right set of internal and external conditions, can improve performance and the firm's long-term competitive position. A central concern is the nature of the capabilities that are relevant and how these develop and change over time (Ginsberg 1988). Managerial innovation occurs when the firm has the necessary internal resources and capabilities to change and the change appears to be in the firm's advantage, given available information (Kelly and Amburgey 1991).

Alternatively, external environmental factors may create an incentive for altering organizational structures and strategic orientations. Institutional theory, in particular, focuses on the relationship between a firm and external organizations and pressures. Institutional ideas are more commonly used to study similarities among organizations than as a lens for understanding structural change in organizations (Meyer and Rowan 1977, DiMaggio and Powell 1983, Buchko 1994). In some of the works that identify the basic ideas underlying the approach, however, institutionalization is both a *process* and a *property* variable that is usefully extended to discuss change (Zucker 1977, DiMaggio and Powell 1983). In these works, institutional theory distinguishes radical from incremental change (Dougherty 1994, Greenwood and Hinings 1996), identifies the contextual conditions under which change occurs (Leblebici et al. 1991, Oliver 1991), and identifies the conditions under which ideas are diffused among organizations (Tolbert and Zucker 1983, Strang and Meyer 1993, Haunschild and Miner 1997). Managerial innovation may result, for example, from external normative pressure, a need for legitimacy, or simply exposure.

In reality, the process by which organizations adapt to change is likely to be a function of multiple interacting influences including both organizational and environmental factors, and change is likely to be fueled by a different mix of influences at different stages of the process. Tolbert and Zucker (1996) propose that the adoption of new practices begins with innovation and flows through habituation, objectification, and sedimentation. While their model does not explicitly identify internal strategic factors as relevant in the early stages, the factors that lead to early experimentation are, indeed, internal and consistent with strategic choice arguments. Moreover, institutional arguments suggest that environmental factors become more salient over time and interact with internal factors to create a combination of influences on change. Incorporating organizational and environmental factors at different points in the change process suggests that a dual system is likely to develop within the organization as the

old strategy is slowly abandoned and replaced by the new strategy.

Organization Factors

In the early stages of change, organizations largely act independently to generate new structural arrangements in response to specific problems (Kelly and Amburgey 1991). At this stage, manager and firm traits are particularly salient determinants of adoption of new practices (Tolbert and Zucker 1996). One internal factor that was important in Chinese firms in the early stages of reform, and that likely affected innovative behavior, was the degree to which workers supported management (Naughton 1994). While this would not be considered a firm capability in most western organizations, managers with internal support, or mobilizing advantage, were more likely to be able to effectively implement new ideas (Pettigrew 1973). The factory manager responsibility system gave managers control of many decisions, but for decades workers had participated in running enterprises and making critical decisions (Naughton 1995). This practice was unlikely to change immediately given the group orientation that was pervasive in Chinese firms (Child 1972).

An important indicator of worker support for managers was being elected by the workers. Managers who had worker support were more able to adopt and implement innovative practices than those who were at odds with workers. Support was particularly important in the early stages of reform because prereform norms of the importance of workers were still recent, manager confidence was relatively low given the move to markets, and firm action was largely independent of the actions of other firms (Naughton 1994). Workers supported the use of piece rates, in particular, because such a pay scheme had the potential to dramatically increase their wages. The importance of worker support likely declined as boards of directors increasingly played a role in manager appointment, but it was an important indicator of managers' abilities to institute change in the early stages of reform. For this reason, I expect that:

HYPOTHESIS 1. Worker support will increase the use of piece rates in the early stages of reform but will have no effect on piece-rate use as reform progresses.

Another managerial trait that was likely to influence innovative behavior during China's reform was the manager's orientation toward using market means of compensation rather than socialist means. The adoption of piece rates was more likely by managers who were market-oriented, given the meritocratic nature of the practice. Reforming the economic system forced managers to

begin relying less on strategies such as cultivating bargaining position with superiors and more on profit maximization and improving competitive advantage. Managers who were members of the Communist Party were likely to be less market oriented than those who were not party members. Likewise, managers who demonstrated a general openness to market practices were more likely to be early innovators. Unlike the importance of intrafirm support, however, party connections and a market orientation likely influenced the use of piece rates throughout the first decade of reform. During that decade, both political and economic forces shaped firm behavior as managers learned to balance and take advantage of their ties to both the existing politically dominated system and the new market-based system. Thus, I expect that:

HYPOTHESIS 2. Communist Party connections will decrease the use of piece rates in the early stages of reform, but will become less important as reform progresses.

HYPOTHESIS 3. A market orientation will increase the use of piece rates in the early stages of reform and will become more important as reform progresses.

Labor Market Development

Market conditions also likely affected the adoption of new strategies. Managers prefer certainty because predictable environments are high in munificence and stability (Pfeffer and Salancik 1978, Dess and Beard 1984, Keats and Hitt 1988). In times of high uncertainty, managers strive to reduce both the uncertainty itself and the perception of uncertainty (Aguilar 1967, Rumelt 1974, Fahey and Narayanan 1986). Managers are also likely to imitate others and to innovate when uncertainty is high (DiMaggio and Powell 1983, O'Neill et al. 1998). Uncertainty is particularly salient in transition economies where the revolutionary pace of change makes even the most basic transactions uncertain (Keister 2001). In the early stages of reform in China, markets were just beginning to develop. As a result, infrastructure was in poor condition, it was difficult to distribute goods outside the local area, and stock markets were not reliable sources of capital (Gong 1995, Karmel 1994, Li 1995, Spiegel 1994).

Because labor markets were just forming, labor surpluses and shortages also plagued firms (Keister 2001). The degree to which labor markets were developed would likely affect the adoption of an innovative labor strategy, such as piece rates, as managers were more likely to innovate where the labor supply was uncertain. The use of piece rates, in particular, was likely greater where markets were poorly developed as it is a particularly innovative

strategy that was perceived as necessary under highly uncertain conditions. The importance of market development declined over time, however, as markets developed and uncertainty declined. For these reasons, I expect that:

HYPOTHESIS 4. Poorly developed labor markets will increase the use of piece rates in the early stages of reform but will have no effect on piece-rate use as reform progresses.

Exposure

Exposure to other firms using innovative labor practices also likely affected managerial innovation. The diffusion of practices results from a variety of pressures including regulatory agencies, government agencies, laws, courts, professions, interest groups, and public opinion (Meyer and Rowan 1977, Scott 1987, Zucker 1987). Uncertainty has also been shown to affect diffusion (Haunschild and Miner 1997, O'Neill et al. 1998). When a practice is new, it is likely that any imitation that does occur is frequency, or pure imitation, based (Tolbert and Zucker 1996). In general, organizations imitate the actions that have been taken by large numbers of other organizations because the legitimacy of the practice is enhanced (DiMaggio and Powell 1983, Tolbert and Zucker 1983). Imitative behavior occurs both actively (Meyer and Rowan 1977) and less deliberately as the practice becomes taken for granted (Zucker 1977, March 1981). There is also evidence that frequency of use of a practice by other organizations may serve as an indicator of the technical value of a practice (Abrahamson and Rosenkopf 1993).

In the early stages of China's reform, simple exposure to other firms using the practice was what was relevant for motivating change. The impetus for innovation was largely internal, as I have argued above, and simple exposure suggests little more than managers may have decided to use the innovative practice simply because they saw others using it. Reflecting a culture that still contained elements of a period in which anything associated with market economics was taboo, piece rates were an uncommon compensation practice in China before reform (Naughton 1995). As a result, managers may not have thought to try such a practice in the early stages unless they witnessed their colleagues using the strategy. Simply being exposed to others using the new strategy was likely sufficient to lead to use of the strategy in the focal firm.

As time passed, however, simple imitation is likely to have been replaced by active imitation of successful (i.e., profitable) others and acquiescence to other external pressures. Researchers have shown that under such conditions, the exposure effect will be greatest when the focal organization is exposed to use by successful or large others (DiMaggio and Powell 1983, Ibarra 1992, Haunschild

and Miner 1997). Specifically, organizations modeled themselves after others they perceived to be more legitimate or successful, such as those that were more profitable (DiMaggio and Powell 1983, p. 152). Such targeted mimetic behavior is more likely after a practice has been tried for some time and managers have recognized that others are using it. Moreover, if the use of the practice is responsible for the firm's profits, imitation is even more likely. In China, managerial efforts to improve combined with exposure to the behavior and resulting success or failure of other firms likely increased the nature of mimetic processes. Time increased the likelihood that firms would have had contact with others using different practices, and labor reforms such as those that took effect in 1984 increasingly made firms aware of practices that had not been apparent before. Over time, managers became aware of the impact that early adoption appeared to have on the financial success of innovative firms, and pressure to adopt market-oriented practices used by successful firms to maintain or increase legitimacy also likely increased. Thus, I expect that:

HYPOTHESIS 5. Simple exposure to other organizations using piece rates will increase piece-rate use in the early stages of reform.

HYPOTHESIS 6. Exposure to other organizations using piece rates profitably will increase piece-rate use in the later stages of reform.

Experience

Literature on organizational learning suggests that past success influences an organization's receptivity to change (Levinthal and March 1981, O'Neill, et al. 1998). Yet there is also evidence that organizations with a history of success are unlikely to adopt new strategies because they overinvest in past decisions and either stagnate or fail to innovate because inertia propels them in the same direction (O'Neill et al. 1998). It is most common to see success lead initially to more innovation and then later to stagnation. Because the use of piece rates was relatively new in China in the period under investigation, there was not sufficient time for past success to begin to have a negative effect. Thus, a firm's successful past use of the practice during reform in China was likely to have a strictly increasing effect on use of the new strategy. Moreover, Chinese managers were accustomed to responding to bureaucratic incentives rather than internalizing and reacting to the financial performance of the firm. During reform, however, this is likely to have changed. Particularly as reform progressed, managers were likely to have begun internalizing and repeating behaviors that improved efficiency and financial performance. Likewise,

the cost associated with using alternative strategies is likely to affect use of the innovative strategy. In the Chinese firms, the cost associated with using state-sanctioned labor practices, in particular, is likely to have impacted use of piece rates (Pfeffer and Salancik 1978, pp. 272–273). As a result, firms developed pluralistic labor systems in which permanent state-assigned workers and workers hired on developing labor markets worked in the same factories, perhaps even in the same jobs. This suggests that both success with the new strategy and the costs of the old affected change. Thus, I expect that:

HYPOTHESIS 7. The greater the benefit of using piece rates early in reform, the more likely a firm will be to use piece rates in the later stages of reform.

HYPOTHESIS 8. The greater the cost of using alternative labor compensation strategies early in reform, the more likely a firm will be to use piece rates in the later stages of reform.

Research Design

Data

I tested these ideas using yearly 1980–1989 panel data on 769 enterprises in four provinces (Sichuan, Jiangsu, Jilin, and Shanxi). The data were collected retrospectively in 1990 by the Institute of Economics of the Chinese Academy of Social Science (CASS) and researchers from the University of Michigan, Oxford, and the University of California, San Diego. The Chinese Provincial System Reform Commission (PSRC), the agency that implemented reform, attempted interviews with 800 enterprises, and 769 were completed. Interviews were with both the general manager and financial officer in each firm. Response rates were high because sampled firms were formerly state-owned enterprises that had regular contact with the PSRC. The questionnaire had two parts: (1) 70 questions about the ownership structure, manager selection, contracts, bonuses, relations with state offices, and strategy; and (2) 321 quantitative questions, answered by the enterprise's accountant, covering enterprise operations from 1980 to 1989.

To reduce errors in the recalled data, interviewers relied largely on official company records to gather data about workforce size, hiring practices, and other quantitative information. Because manager turnover was minimal during this period, managers were able to recall information that was not available in company records better than in most contexts. Still, all the firms in the sample were state owned, and large firms were overly represented. The sample includes the core of the traditional state-run economy during the period in question,

and compared with small nonstate firms that had begun to emerge, change is likely to have been somewhat modest. The sample appears to represent the state-run sector reasonably well on dimensions other than size (Groves et al. 1994 and 1995, Naughton 1994 and 1995). Output per worker in the sample data for 1980 was just 6% below the national average, and by 1989 output per worker was 3% below national estimates. Between 1980 and 1989, real output in the sample increased 67%, compared to a 52% increase for state-run firms nationally (Groves et al. 1994, 1995).

Firms in China were all owned by the state prior to reform. With the advent of reform in 1978, however, the state reduced its role to that of a shareholder with limited liability and authority. Of course, the state retained considerable influence over firms, but managers had increasing responsibility for the operation of their companies. Some argue that understanding change in firms in China requires a focus on the nonstate sector, but as Naughton (1995, p. 21) observed, this is a misinformed view more common among journalists than among scholars familiar with China. In reality, there is considerable evidence of improvements in performance in the state sector, and there is considerable interdependence among the state and nonstate sectors that makes such a distinction naïve at best.

The hypothesis tests require that I evaluate the effects of a set of covariates on the use of piece rates dynamically, but that I allow the effects to vary within three time periods. The tests also require that I model the effects of organizational exposure to the use of piece rates by other organizations. To accomplish this, I used a logistic regression algorithm to estimate spatial diffusion effects models on pooled cross-section, time-series data. I estimated separate equations for 1978–1983, 1984–1986, and 1987–1989. Specifying a single spline function or a full interaction of time with the independent variables produced results that are substantively equivalent to those I reported. I used 1984 and 1987 as breaking points for several reasons. First, to explore Hypotheses 1 through 3, enough time would have had to elapse to allow managers to have had time to begin to adopt piece rates. My interviews with managers suggested that by that year, they had indeed had time to consider using new practices. Second, by 1984, sufficient time had lapsed for the initial uncertainty of market development to have begun to subside, if only slightly. This allowed me to explore the effects of market development posed in Hypothesis 4. In addition, reformers instituted major labor reforms in 1984, which brought additional attention to labor issues. This encouraged managers to reconsider practices during that year, provided them with additional information

about the practices being used in other firms, and likely altered the processes by which decision makers approached new labor practices. Similarly, by 1987, sufficient time had passed for firms to have been exposed to the practices of their peers, to internalize the information they had gathered, and to revise their own practices in response. In exploring the hypotheses empirically, I tested them using various breaks in the 1980–1989 time period, and the results were extremely robust across trials.

Diffusion Analysis

I propose that an organization is more likely to use piece rates in each period if it was exposed to other organizations that used the practice. I argue that in the early stages of reform, there was a positive effect of the simple number of other organizations using the practice, but that in later stages, the diffusion effect was likely stronger if those firms that had already adopted the practice were financially successful. Organizations can be close spatially if they are located near each other geographically or if there are structural reasons for them to have contact (e.g., they are in the same industry). In each case, there are three characteristics that a model of strategy diffusion must have (Tolnay et al. 1996). First, the model must account for the potential impact of use of the practice by all other organizations, but second, the model should account for the likelihood that the diffusion effect between any two organizations is weaker as the distance (geographic or social) increases. Third, the model needs to distinguish between diffusion effects and effects due to heterogeneity (Coleman 1964, Taibleson 1974, Eaton and Fortin 1978). That is, because there is a tendency for organizations that are located in the same region or that are otherwise structurally similar to share many characteristics, it is important to avoid interpreting a spurious effect of region as a diffusion effect.

To capture each of these traits of a spatial diffusion model, I follow Tolnay et al. (1996, pp. 796–799) and Anselin (1988) in using a technique that deals with each of these difficulties. The technique requires solutions to two equations. The first equation is used to determine the effect of use of the strategy by each organization on all other organizations (called exposure). The equation takes the form:

$$E_i = \beta_0 + \sum \beta_k X_{ki} + \varepsilon_i, \quad (1)$$

where E_i = the proportion of total wages paid as piece wages by each organization (i); β_0 = the intercept; X_{ki} = the set of k independent variables that describe organization i and the region in which it is located (e.g., economic conditions); β_k = the estimated effect of the k independent variables on the use of piece wages; ε_i =

the disturbance term for Equation (1). Using Equation (1), I then obtained predicted values (E_i^*) for each organization that indicate the expected use of piece rates, given characteristics of the organization and the region in which the organization was located. For each pair of firms, I then divided the predicted value by the geographic distance between the two organizations. The potential for exposure for each organization i to practices used by all other organizations is:

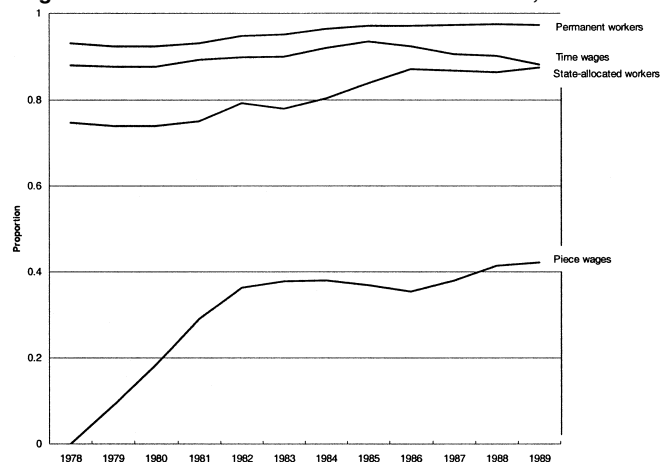
$$\text{Exp}_i = \Sigma(E_j^*/D_{ij}), \quad (2)$$

where Exp_i = the exposure for organization i ; E_j^* = the predicted use of piece rates for organization j , based on parameter estimates in Equation (1); D_{ij} = the (greater circular) geographic distance between the headquarters for organizations i and j . This measure uses the latitude and longitude for each firm and takes the curve of the earth into account in calculating the distance between the two points. Finally, I used Exp_i as a predictor variable, in addition to the original set of social and economic characteristics used in Equation (1) in the final logistic regression equation. The logistic regression equation is estimated by maximizing a likelihood equation that does not assume nonautocorrelation. Estimating the diffusion effects by industry, rather than geography, produced similar results. To test whether exposure is greater when organization j is larger or more profitable, I created two separate indicators of exposure (using the above method) that are weighted by (1) j 's actual profits, and (2) the number of workers in organization j at year end. This method is similar to Land and Deane's (1992) two-stage least squares method but does not require the use of instrumental variables x .

Variables

Use of Piece Wages. The dependent variable is a dichotomous indicator of whether the firm used piece wages in a given year. Models predicting the ratio of piece wages to total wages as a function of the exogenous variables produced similar results. Because I wanted to capture a commitment to using the strategy, I coded only those firms in which more than 5% of total wages were paid as piece wages as using this method of compensating workers.¹ Figure 1 graphs the proportion of firms using piece wages from 1978 through 1989. The figure also includes graphs of the proportion of these firms that continued to use socialist labor practices, including those employing greater than 25% of total workers as permanent workers, those paying more than 25% of total wages as time wages to permanent state employees, and those continuing to hire state-assigned workers. The figure suggests

Figure 1 Transition in Labor Practices in China, 1978–1989



Note. Permanent workers refers to the proportion of firms in which permanent (or lifetime) workers accounted for greater than 25% of total year-end workers. Time wages refers to the proportion of firms in which time wages to permanent employees accounted for more than 25% of total wages. State-allocated workers refers to the proportion of firms that had new workers in the given year that were assigned by the state. Piece wages refers to the proportion of firms in which more than 5% of total wages were paid as piece wages. Estimates for 1980–1989 are from the CASS/UCSD Survey of 769 State-Owned Industrial Firms (CASS/UCSD 1990), estimates for 1978–1979 are primarily from the Survey of Chinese Business Groups and are consistent with estimates from the CASS/UCSD.

that while the use of piece rates increased drastically between 1978 and 1983, and gradually after that, firms did not abandon socialist labor practices during that time. This supports the notion that firms retained socialist labor practices even while adopting and institutionalizing market-oriented labor practices, creating pluralism in labor practices within organizations that mirrored pluralism in the external institutional environment. While not included in the figure, the data do indicate that the percentage of total wages paid as piece wages by firms using this compensation method also increased during this time. In 1980, in firms that had adopted piece rates at all, an average of 16% of total wages was paid as piece wages. This number increased steadily to 27% by 1989. In firms that paid more than 5% of their wages as piece wages, the average percent of wages paid this way increased from 23% to 31% over the decade.

Organization Traits. To explore the effect of worker support on innovation, I included a dummy variable (lagged one year) indicating whether the general manager was elected by the organization's workers. In the early stages of reform, it is possible that an elected manager was not the democratically elected official implied by this

definition. Indeed, there were cases in which a single candidate, hand picked by upper authorities, ran for the position. In other cases, only a small number of hand-picked “worker representatives” were allowed to vote. However, if this were true, it would be most likely to occur in medium- and large-sized state-owned manufacturing firms in the 1980s because the state was more involved in these firms. There was no evidence of a relationship between the manager-elected variable and either industry or size. Other indicators of worker support, such as indicators of the use of bonuses, were correlated with the variable I used in the analysis. I only include a single indicator to avoid multicollinearity.

I used the general manager’s report from the quantitative data to create a variable coded one if s/he was *Communist Party Secretary*; if the manager did not hold this office, I coded this variable 0. I measured party connections as holding the secretary office because party secretaries generally have a higher degree of commitment to the Communist Party than ordinary members and thus tend to be more reluctant to use innovative, market-based strategies. While there were factions within the Communist Party, and while a manager’s affiliation with a particular faction might contain information relevant to ascertaining the manager’s disposition toward markets, affiliation with a particular faction was not an official designation that I could control. I created a scale from the quantitative data to indicate the degree to which the manager is *oriented toward market behavior*. The scale is the sum of positive responses to two series of questions regarding strategic management behavior. The *first* series of questions asked the manager about methods of influencing superiors to provide resources. I include these measures because they indicate the manager’s commitment to improving firm competitiveness as opposed to cultivating favoritism among superiors as a means of obtaining the resources needed in the firm. I added one to the scale if the manager indicated that her/his strategy was to improve production in order to be more competitive in securing state-controlled resources; I also added one to the scale if the manager’s strategy was to improve management practice to secure resources. Alternative strategies included such approaches as “making use of connections to improve bargaining position with superiors.” The *second* series asked about the importance of several factors in determining output levels. I added one if the manager indicated that demand, market forecasts, or a desire to maximize profits determined organization output.

Market Traits. I included two indicators of market development (each lagged one year). I included a measure

of the degree to which labor markets were developed to test Hypothesis 4. I also included an indicator of the degree to which nonlabor markets (including production markets, consumer markets, and financial markets) were developed to control for the effects of market development in other markets. This measure controls for the likelihood that market development other than development of labor markets is likely to affect uncertainty and managers’ willingness to innovate. I coded both from a direct question to managers asking whether each type of market was developed. Both were dichotomous indicators coded one to indicate *poor* market development.²

Experience with Labor Practices. I included two variables indicating the relationship between firm profits and prior use of (1) piece rates and (2) socialist labor practices. I created both variables as the residuals of generalized least-squares regression equations predicting profits as a function of lagged use of piece rates (for the first variable) and employment of state workers (for the second variable), along with the standard control variables included in the equations presented below. The first variable was an indicator of the degree to which the organization’s profits differed from what we would expect by chance as a function of the use of piece rates in the prior time period (i.e., lagged one year). This variable can be interpreted as the benefit to financial performance of using piece wages. The second variable was a similar indicator of the degree to which profits differed from chance as a function of the continued employment of permanent, state-appointed workers in the prior time period (i.e., lagged one year). This variable can be interpreted as the cost of using state workers. Table 1 includes summary statistics for this and other variables.

Age. Age was the number of years since the organization was founded. The squared version of age captured nonlinearities in the relationship.

Industry. I included dichotomous indicators of whether the organization was in mining, textiles, manufacturing, or utilities industries. I used the standard 39-category listing of Chinese industrial sectors (Naughton 1995, People’s Republic of China 1995) to code the four separate dummy variables 1 if the firm was in the industry. I included indicators for industries that managers identified in qualitative interviews as more likely to use piece rates.

Manager’s Education. Prior research indicates that managers’ education affects strategic behavior (Pettigrew 1973, DiMaggio and Powell 1983, Mizruchi and Stearns 1994). DiMaggio and Powell (1983) suggest that formal education is a source of normative isomorphic behavior because universities are vehicles for the promulgation of

Table 1 Descriptive Statistics and Correlations^a

Variable	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
(1) Adopted piece rates ^b	0.42	0.44																				
(2) Manager elected	0.04	0.21	0.02																			
(3) Party secretary	0.21	0.41	-0.06	0.04																		
(4) Market oriented	3.48	1.69	0.06	0.02	-0.07																	
(5) Age	25.63	14.79	0.02	-0.05	0.01	-0.00																
(6) Labor market devel.	0.71	0.45	-0.11	-0.02	0.00	-0.12	0.08															
(7) Other market devel.	0.70	0.46	-0.02	-0.07	-0.04	0.28	-0.03	-0.13														
(8) Exposure	0.22	0.07	0.03	-0.06	-0.02	0.07	0.21	0.09	0.06													
(9) Exposure*profits	88.52	42.92	0.07	-0.04	-0.02	-0.02	0.19	0.05	0.09	0.82												
(10) Benefit of past use ^c	0.00	1423.76	0.09	-0.00	-0.00	-0.00	0.08	-0.03	-0.05	0.03	0.01											
(11) Cost of alternative ^c	0.00	1553.71	0.03	0.00	-0.00	-0.00	0.08	-0.03	-0.05	0.02	0.00	-0.09										
(12) Mining	0.04	0.20	0.12	0.04	0.02	0.02	-0.01	0.03	-0.08	-0.04	-0.07	-0.03	-0.10									
(13) Textiles	0.14	0.34	0.28	-0.01	-0.00	-0.00	0.08	0.04	-0.06	0.06	0.05	0.02	-0.03	-0.08								
(14) Manufacturing	0.14	0.35	0.07	0.01	-0.11	-0.11	-0.03	0.01	0.01	0.03	0.03	-0.01	-0.01	-0.08	-0.15							
(15) Utilities	0.08	0.27	-0.11	0.01	0.00	0.00	-0.10	-0.03	0.08	-0.01	0.00	0.01	0.01	-0.06	-0.11	-0.12						
(16) Municipal ownership	0.71	0.45	0.01	-0.01	0.00	0.00	0.12	0.06	0.07	0.20	0.21	-0.02	-0.02	-0.07	0.07	0.10						
(17) College graduate	0.70	0.46	-0.06	-0.07	-0.12	-0.12	-0.01	-0.00	0.10	0.06	0.08	0.04	0.04	-0.06	-0.03	-0.02	0.07	0.02				
(18) Airport	0.23	0.42	0.02	-0.06	-0.05	-0.05	0.09	0.03	0.07	-0.26	-0.10	0.00	0.00	-0.04	-0.15	0.03	0.11	0.02	0.10			
(19) Railroad	0.54	0.50	-0.13	-0.08	-0.07	-0.07	0.21	0.09	0.07	0.18	0.22	0.00	0.00	-0.05	0.02	-0.03	0.16	0.16	0.15	0.51		
(20) Number of workers	1852.36	5140.02	0.12	-0.04	-0.06	-0.06	0.12	0.07	-0.05	-0.05	-0.06	0.00	0.00	-0.10	0.00	-0.02	-0.03	-0.15	0.08	0.00	0.02	
(21) Cumulative profits ^d	321.22	1752.96	0.01	-0.03	-0.04	-0.04	0.15	0.03	-0.07	0.01	-0.01	0.25	0.12	0.24	-0.00	-0.01	-0.02	-0.11	0.08	-0.03	0.02	0.04

^aN = 7,570. Correlations with an absolute value exceeding 0.03 are significant at $p = 0.05$, and correlations exceeding 0.02 are significant at $p = 0.01$.

^bPiece wages refers to the proportion of firms in which more than 5% of total wages were paid as piece wages in 1989. Proportion for other years included in the analyses range from 0 through 0.42.

^cCalculated as the residuals of a regression equation, zero by definition.

^d10,000 yuan (8.2 dollar) = approximately one U.S. dollar).

professional norms about managerial behavior, and managers both actively and passively model their behavior after others with the same orientations. Education and training thus create a pool of people who possess similar orientations and who are likely to use strategic practices that are also similar (Perrow 1972). I included a dummy variable indicating whether the general manager graduated from college, and I expect that the effect will become stronger in later time periods when the use of piece rates has become recognized as a viable strategy (due to the normative influence of education).

Local Infrastructure. Region of location is significant in China for many reasons. During reform, regional variations in development, particularly in the presence of the infrastructure necessary to get goods to markets, affected the behavior of firms. I included controls for access to an airport or a commercial train station (dummy variables developed using municipal-level data). I did not control for region explicitly because region dummies, defined in various ways, did not improve the fit of the models. Descriptive exploration strongly suggested that the indicators for market conditions and local infrastructure captured the effect of region and improved model fit more than explicit regional controls.

Firm Size. As larger firms tend to have more resources, size matters. I controlled for firm size using the number of workers at year end (lagged one year). Using measures of assets that were highly correlated with the number of workers produced substantially similar results; I chose to use number of workers to indicate size because it is relevant to the dependent variable.

Cumulative Profits. I controlled for profitability because more profitable firms may have had the financial resources to experiment with innovative strategies more than firms with less favorable financial records. Rather than controlling for simple profits, however, I controlled for cumulative actual profits. In particular, I calculated the average actual profits, not profits remitted to the state, over all years prior to the current year to indicate profitability during the time it might have used piece rates. Cumulative profits, therefore, change each year but account for all past years included in the study, and I lag the variable by one year. My rationale for controlling for cumulative profits is that firms began to retain an increasing proportion of their profits, and many experienced significant changes (either positive or negative) in their performance. Cumulative profits captures the history of the firm's performance, which is likely to have been more volatile during this period of China's history than it would be in other places or times.

Results

Organization Traits Influenced Adoption

Researchers have demonstrated that an ability to adapt to radical environmental change is critical to organizational survival and competitive advantage, but we know little about the process by which firms adapt. The coefficient estimates in Table 2 provide some insight into this process. Model 1, for 1978 to 1983, includes all test variables except the exposure (diffusion) variable that I added in Model 2. I included both models to demonstrate that adding the exposure variable improves model fit without changing the effects of other variables. Hypothesis 1 predicted that having a manager who was elected by the workers increased the likelihood of the use of piece rates in the early stages of adoption. The parameter estimate for the variable indicating that the manager was elected is positive and significant in Model 1, providing some support for the hypothesis. The sample size is large because the data are pooled, cross-section time series, and firm years is the unit of analysis. The full sample size is 7,690 (769 firms*10 years); the sample size indicated in Table 2 is smaller because of missing values.

In Model 2, which includes the spatial exposure measure, the indicator of worker support is still significant. However, in models of piece-rate use in later years, intraorganizational support is no longer a significant determinant of piece-rate use. While the significance level is relatively weak, the pattern is consistent with the prediction of the first hypothesis. In the early stages of reform, organizations and their decision makers acted independently to a large extent. Innovative firms adopted market-oriented practices relatively quickly, and those managers that had worker support were better able to effectively attempt new practices. As time passed, other processes became salient and worker support was no longer a crucial influence on innovative behavior. It is important to note, however, that the weak significance of this variable suggests that other processes—including social processes—are clearly more important than the model suggests from the beginning of the change process. This does not exclude the importance of firm traits; it just highlights the importance of the social.

Hypothesis 2 proposed that Communist Party connections decreased the likelihood that a firm used piece rates. Consistent with this conjecture, the coefficient estimate for the variable indicating that the manager was a Communist Party secretary is negative and significant. Similarly, Hypothesis 3 suggested that market-oriented organizations were more likely to use piece rates in the early stage of reform. As this hypothesis predicted, the variable indicating that the firm was market oriented is positive

Table 2 Results of Logistic Regression Analysis for Adoption of Piece Rates

	1978–1983			1984–1986			1987–1989												
	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6			
	β	SE		β	SE		β	SE		β	SE		β	SE		β	SE		
Organization Traits																			
Manager elected	0.417 [†]	0.248		0.463 [†]	0.250		-0.070	0.273		0.005	0.278		-0.251	0.271		0.316	0.396		
Party secretary	-0.397**	0.145		-0.400**	0.146		-0.296*	0.146		-0.246 [†]	0.148		-0.292*	0.142		-0.166	0.170		
Market oriented	0.060 [†]	0.034		0.054 [†]	0.034		0.129***	0.036		0.124***	0.036		0.181***	0.035		0.192***	0.042		
Market Development																			
Poor labor markets	0.286*	0.126		0.241*	0.126		-0.028	0.126		-0.103	0.128		-0.114	0.123		-0.071	0.148		
Poor other markets	0.173*	0.123		0.140*	0.124		0.051	0.128		0.035	0.131		-0.096	0.125		-0.071	0.152		
Exposure	-																		
Exposure	-			4.243***	0.992		-			-			-			-			
Exposure*profits	-			-			-			0.008***	0.002		-			0.003**	0.002		
Experience																			
Benefit of past use	-			-			-			0.001***	0.000		-			0.012***	0.001		
Cost of alternative	-			-			-			-			-			0.011***	0.001		
Control Variables																			
Age	0.054***	0.012		0.048***	0.012		0.035***	0.011		0.032**	0.011		0.037**	0.012		0.027*	0.014		
Age ²	-0.001***	0.000		-0.001***	0.000		0.000*	0.000		0.000*	0.000		0.000*	0.000		0.000*	0.000		
Mining	2.031***	0.224		2.039***	0.223		1.753***	0.246		1.700***	0.249		1.749***	0.251		1.862***	0.306		
Textiles	2.024***	0.150		2.038***	0.150		1.934***	0.155		1.975***	0.157		2.020***	0.161		2.012***	0.197		
Manufacturing	1.057***	0.144		0.997***	0.145		0.755***	0.155		0.686***	0.159		0.895***	0.150		0.832***	0.183		
Utilities	-0.786**	0.305		-0.796**	0.305		-0.336	0.271		-0.339	0.273		-0.332	0.268		-0.334	0.289		
Municipal owner	0.426**	0.132		0.376**	0.134		0.061	0.130		0.066	0.135		0.338	0.129		0.319*	0.156		
College graduate	-0.170	0.118		-0.207	0.120		-0.295*	0.123		-0.380**	0.125		-0.267*	0.121		-0.436*	0.148		
Airport	0.877***	0.157		1.212***	0.179		0.649***	0.165		0.639***	0.173		1.086***	0.174		1.203***	0.205		
Railroad	-0.449**	0.141		-0.686***	0.156		-0.588***	0.146		-0.782***	0.155		-1.345***	0.155		-1.426***	0.185		
Workforce size	0.000***	0.000		0.000***	0.000		0.000***	0.000		0.000***	0.000		0.000***	0.000		0.000***	0.000		
Cumulative profits	-0.000	0.000		-0.000*	0.000		0.000	0.000		-0.001***	0.000		0.000***	0.000		-0.001***	0.000		
Log likelihood	2,281***			2,713***			2,058***			2,377***			2,007***			2,106***			
N	4,216			4,216			2,153			2,153			2,150			2,150			

[†] $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

and significant. In contrast to the finding that the significance of intraorganizational support decreased over time, both party connections and a market orientation continued to influence the use of piece rates throughout the first decade of reform. Literature on the impact of China's reform on social processes, including literature that has explored both individual- and organization-level impacts, has emphasized that both market and political processes continued to shape the nature of China's economy in the early stages of reform. Some debate has ensued regarding which influences were more salient in the early stages of reform, and researchers have continued to explore the relative importance of both economic and political processes (Nee 1992, Walder 1992, 1995). The findings reported in this table suggest that both economic and political influences were salient throughout the early stages of reform in the formation of organizational strategy. The continued importance of these influences through the end of the decade underscores the importance of political connections and ease of adjusting to emerging markets and contrasts these with the fleeting significance of worker support. Managers speaking of worker backing have explained that they gained confidence as reform progressed. They once felt they needed worker support, but many learned that being efficient was more important (Keister 2000).

Market Development Influenced Early Piece-Rate Use

Hypothesis 4 predicted that organizations located in areas where labor markets were poorly developed were more likely to use piece rates in the early stages of adoption of the practice. This suggests that environmental uncertainty increases the likelihood that an organization will independently adopt innovative strategies. Consistent with this prediction, the coefficient estimate for the variable measuring labor market development is positive and significant. During China's economic transition, emerging markets and managers' lack of experience with markets increased levels of uncertainty and prompted managers to make decisions that may not have occurred in prior times. The results in Table 2 suggest that when uncertainty was at its peak in the early stages of reform, some potential good resulted. Namely, uncertainty was positively correlated with innovation. While the connection is not as apparent, development in nonlabor markets (i.e., product, consumer, and financial markets) also increased the use of innovative labor practices because managers faced greater uncertainty and were willing to take greater risks. Organizations located in areas in which other markets were poorly developed would be more likely to use the innovative practice early in reform.

While these results have implications for organization theory, they also contribute to understanding organizational decision making during economic transition, and the process of transition more generally. Research on market transition has been accumulating in recent years, but most evidence about how transition occurs is derived from research on individuals or economic aggregates (Nee 1996, Xie and Hannum 1996, Bian 1997, Zhou et al. 1997). Important exceptions exist (Nee 1992, Guthrie 1997), but direct observations of the economic choices made by actors during transition are rare (Oberschall 1996). My results concern one of the most fundamental economic decisions made during transition—the decision to adopt an innovative practice—and these findings suggest that uncertainty was an important motivator of innovation in the early stages of reform.

Exposure Effects Differed in Early and Late Reform

Hypothesis 5 predicted that social processes external to the firm also affect innovation. This hypothesis anticipated that the greater an organization's exposure to the use of piece rates by other organizations, the more likely the focal organization would be to use the practice. Model 2 includes the same covariates as Model 1, including the control variables, but this model also includes the exposure measure (not weighted by profits). The implication of this hypothesis is that contact with others using the practice increased the likelihood that the focal firm adopted the strategy. The coefficient estimates in Model 2 for the other test variables and the control variables are essentially unchanged. Yet the coefficient estimate for the exposure variable is relatively strong, in the predicted direction (positive), and highly significant.

By the mid-1980s, many organizations had tried using piece rates and had sufficient data to estimate whether using the new strategy had a positive effect on their profitability. Model 3 includes the organizational traits, market traits, and control variables. Model 4 adds the variable indicating the effect of past use of the strategy by the focal firm and the exposure variable. The Model 3 estimates indicate that the effect of intraorganizational support and market traits were no longer important influences on the use of piece rates. The Model 4 estimates demonstrate that the basic process is the same but adding the exposure and experience variables improves model fit. In short, exposure to other profitable users of the strategy increased use in this period, indicating that firms internalized and acted on the effect of piece rates and financial outcomes. It is possible that this indicates that there was a smaller number of possible converts over time. While this might be true in later time periods, in the time period I study, at most 40% of sampled firms used piece rates, suggesting

that there were still plenty of potential converts. This finding also suggests that the exposure results are not simply an artifact of reformers allowing firms located in certain areas to use certain strategies at the same time.³ Historically, piece rates were not regulated in this way. Even if use of the strategy had been controlled geographically, the fact that firms were more likely to adopt a strategy that was consistent with that used by their profitable peers (rather than just any nearby firm) suggests social influence. I include only the variable weighted by profits because the variable is highly correlated with the exposure variable weighted by firm size. Substituting the firm-size-weighted exposure variable produces equivalent coefficient estimates.

Similarly, the firm's own experience using the strategy affected continued use by the mid-1980s. The residual from the GLS regression equation predicting the effect of past use of piece rates on profitability (i.e., the variable indicating how far the predicted profits of the organization differ from what would be expected by chance) is a positive and highly significant predictor of the use of piece rates. This suggests, as Hypothesis 7 predicts, that the better the organization's past success with the practice (i.e., the greater the impact on the firm's profits), the more likely the organization would be to use the strategy again. Not only does this suggest learning on the part of the organization, but it also suggests that the managers of these firms were becoming attuned to profitability considerations.

As the use of piece rates became taken for granted, at the end of the 1980s, the processes that lead firms to use the strategy once again changed. Models 5 and 6 include coefficient estimates for equations predicting the use of piece rates between 1987 and 1989. Model 5 includes all test variables and control variables included in the models for previous time periods, excluding the exposure and past-use indicators. Model 6 adds the exposure and past-use variables and also adds an indicator of the effect of continued use of socialist labor practices (i.e., the cost of pluralism variable). The results of these models indicate that the basic processes that led to the use of piece rates in this time period were similar to those that affected use in the previous time period with an important exception: the effect of the continued use of socialist labor practices. Specifically, the industry, market orientation, exposure, and benefits of past use remain constant. What changes is the effect of the cost of continuing to employ permanent, state-appointed workers. The coefficient estimate for the "cost of alternatives" variable is positive, consistent with Hypothesis 8. This suggests that the degree to which an organization continues to use other practices,

particularly when those strategies negatively impact financial performance, affects how likely the firm is to use new strategies. Over time, we would expect that firms that continued to pay costs associated with outdated practices would find a way, even in the face of state coercion, to abandon the ineffective strategies.

Discussion and Conclusions

Understanding organizational adaptation to change has become a major focus of research in organizational theory, and studies in this area have provided important insights into the importance of change and organizational traits that improve responsiveness. The process by which firms change, however, has received relatively little attention. This paper took advantage of the dramatic change that occurred during China's economic transition to explore the relative importance of organizational and environmental factors in inducing innovation during transition. I focused on the adoption of piece rates, an example of a market-oriented practice that diffused widely during transition. I found that in the early stages of China's reform, two interacting systems coexisted in firms: an innovative market-oriented system and a planning-oriented system from before reform. My results suggest that strategic choice factors influence adoption of the innovation in the early stages of reform. In China, the important influences on strategy at that point in the change process included worker support of managers, manager connections with the Communist Party, and a market orientation. In the early stages of change, simple imitation affected innovation as well. However, an important theme that was evident in my results was that the relative importance of various processes changed over time. As reform progressed, simple imitation gave way to imitation of specific, usually profitable others, and internalization of the firm's own experience with the new practice became important. The importance of more internally focused factors that mattered early in reform declined.

Of course, it is important to note the limitations of my study. Perhaps the foremost limitation is the setting. While China's transition offers important advantages for a study of firm response to radical change, China is by no means a representative context and Chinese state-owned enterprises are by no means representative organizations. The degree to which the state continued to monitor and influence firm practices and the economy, more generally, is likely to have shaped the nature of managerial innovation in ways that are not evident in this study and that are not generalizable to other times or settings. Likewise, while the data I employ were gathered

systematically and included a large number of typical Chinese firms, data on Chinese firms are almost always limited to some degree. For example, my intention to measure concepts such as worker support was necessarily limited by the nature of the data. The results suggest only moderate significance for the indicator of worker support that I did use, and it is possible that a variable that coincided more precisely with the concept I intended to measure would have produced more certain findings. Missing values were not particularly problematic in these data relative to other data on Chinese firms, but again, the difficulty in accessing Chinese managers inevitably produces more missing data than is desirable. Once again, my results may have been stronger—or other findings may have emerged—had the data been more complete.

It is also important to note that because organizations differ across cultures and because what is relevant even within one culture varies over time, the particular internal and external factors that are relevant in a given setting are likely to vary. Factors that were important in China, such as worker support of managers and manager's Communist Party affiliation, would be different in another setting.

It is also important to address the time period in which I conducted this study. Studying change in the early stages of reform provides a unique look at the decisions managers made, and the factors that influenced those decisions, at a critical point in the change process. Observing managerial innovation in the early stages of reform offers a glimpse into the complex and rapidly changing set of influences that interacted to determine how managers would behave. At the same time, reform continued beyond 1989, and managerial response to internal and external influences naturally continued as well. There is preliminary evidence that firms continued to adopt piece rates in China during the 1990s and into the next century, but these patterns have yet to be substantiated. Prior research on the adoption of managerial innovations also cautions against assuming that signaling intent to adopt an innovation, initiating the use of the new practice, and incorporating the practice into the standard repertoire of the firm are quite different activities (Zajac and Westphal 1995). Indeed, there is evidence that *symbolic* adoption differs in important ways from *substantive* adoption of an innovation. While the evidence during the early stages of China's reform was that firms that adopted piece-rate wages actually began to integrate them into the set of labor strategies they actually used, this may have changed as time passed. As managers became more cognizant, for example, of the use of piece wages in the West and the potential implications for performance of the practice,

they may have become more inclined to signal use without substantively using the practice.

While my interest was not specifically in the institutionalization of the piece-rates practice, the institutional model was useful in understanding the influences of firm, manager, and contextual characteristics as a strategy becomes taken for granted. The model was also useful because of its emphasis on process and its underlying assumption that influences on firm and manager behavior will vary as the time during which a new strategy has been used increases. I did adapt the model slightly for two reasons. First, unlike firms in the West, where the model was developed, firms in China had to contend with an extremely strong state presence. The state's role dissipated during the decade covered by the analyses, accounting for some of the changes in process over time, but it was relatively strong throughout the 1980s. Second, the change that organizations in China faced during reform was much more revolutionary than the change Tolbert and Zucker had in mind when they developed their model. As a result, pluralism in the use of labor strategies developed in many organizations as managers adopted new strategies but did not stop using older socialist strategies immediately. The result was the simultaneous use in many firms of piece-wage workers and permanent state-assigned workers, often in the same jobs.

These results provide insight into the behavior of organizations in China during a unique time period. Generalizing from the findings to other firms in transition economies seems plausible, but in fact, the findings can be generalized to organizations in other contexts as well. The study began with the observation that the complexity of changes that firms face has increased in recent decades and has increased interest among researchers in the process by which organizations adapt to this change. While there are certainly characteristics of the Chinese case that make it unique, many of the findings are useful as research attempts to understand these more general processes. In particular, the notion that uncertainty and social diffusion processes matter but that they matter differently at different points in the diffusion process is relevant in nearly all contexts. Likewise, the finding that pluralism in the organization has important effects on the adoption process is relevant across time and context, as all organizations are pluralistic to some degree. Finally, my findings highlighted the importance of including notions of process in understanding firm behavior.

Acknowledgments

The author is grateful for comments from Beth Crosa, Bill Form, David Jacobs, Jin Lu, Randy Hodson, Jim Moody, and three very helpful anonymous reviewers. She appreciates funding from the National Science Foundation (SBR-9633121 and SES-9875147), the U.S. Department of Education, the Cornell University East Asia Program, the University Research

Council at the University of North Carolina, and the College of Social and Behavior Sciences at The Ohio State University.

Endnotes

¹I chose a 5% threshold because it suggests a commitment to using the new practice but does not overlook firms that were still experimenting with the strategy. In initial trials, I explored different definitions of the dependent variable, including 10, 15, and 25% thresholds and found that the results were largely consistent. At the 25% threshold, the results of the early trials were not as apparent as at the other thresholds, but the substance of the results was unchanged across definitions.

²An alternative would be to use objective indicators such as a ratio of workers employed by state firms to workers employed by private firms to indicate labor market development (Lawrence and Lorsch 1976, Nee 1996). Managers' reports, however, have the advantage of being from the same data set used to create other measures, whereas the ratio would use data from other published sources. Moreover, managers' reports have been shown to be highly accurate (Child 1972, Downey and Slocum 1975, Starbuck 1976). I found comparable results with both types. The correlation between the subjective and objective labor market measures was 0.88. The correlation between the two measures of other market development was 0.85.

³The unweighted indicator (the exposure variable included in Model 2) significantly improved model fit. However, the weighted indicator explained a greater proportion of the variance in the dependent variable and also improved model fit more considerably. Because the two indicators were, by definition, highly correlated, I do not include both in the same equation. The effects of the other variables are consistent in models including both the weighted and unweighted exposure variables.

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