DOES EMPLOYEE OWNERSHIP ENHANCE FIRM SURVIVAL?

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ABSTRACT

Research on employee ownership has focused on questions of productivity, profitability, and employee attitudes and behavior, while there has been little attention to the most basic measure of performance: survival of the company. This study uses data on all U.S. public companies as of 1988, following them through 2001 to examine how employee ownership is related to survival. Estimation using Weibull survival models shows that companies with employee ownership stakes of 5% or more were only 76% as likely as firms without employee ownership to disappear in this period, compared both to all other public companies and to a closely matched sample without employee ownership. While employee ownership is associated with higher productivity, the greater survival rate of these companies is not explained by higher productivity, financial strength, or compensation flexibility. Rather, the higher survival is linked to their greater employment stability, suggesting that employee ownership companies may provide greater employment security as part of an effort to build a more cooperative culture, which can increase employee commitment, training, and willingness to make adjustments when economic difficulties occur These results indicate that employee ownership may have an important role to play in increasing job and income security, and decreasing levels of unemployment. Given

the fundamental importance of these issues for economic well being,
further research on the role of employee ownership would be especially
valuable.

1. INTRODUCTION

An employee-owned company is a comparatively rare form of organization. Such
organizations, however, have coexisted with conventional capitalistic companies
since the worker cooperatives of the 19th century (Logue & Yates, 1999). The
most popular employee ownership plan in America today is the Employee
Stock Ownership Plan (ESOP), first legislatively created by the 1974 Employee
Retirement Incomes Security Act (ERISA). While a few ESOPs have been
created through employee buyouts of financially distressed companies or as part
of union wage concessions, such distress situations account for no more than 4%
of ESOP adoptions (Blasi et al., 1996; U.S. GAO, 1987). Rather, most ESOPs are
adopted for practical reasons such as productivity improvement, tax advantages,
turnover reduction, transfer of major owner's stocks, fund raising, defense
against hostile takeovers, and provision of employee benefits (Kruse & Blasi,
1997). Employee ownership is also available by other means, including defined
contribution pension plans such as deferred profit-sharing and 401(k) plans, and
stock purchase plans and stock option programs (Blasi & Kruse, 1991; Sesil
et al., 2002).

While there are over 60 studies in the past 25 years on the effects of employee
ownership on firm performance and employee attitudes and behavior, there is
little research on firm survival and employment behavior (Kruse, 2002). This
paper focuses on the impact of employee ownership on firm survival using data
on U.S. publicly traded companies. We construct a sample of all publicly-traded
companies as of 1988, and follow them through 2001 in order to examine whether
employee ownership companies are more likely to survive than other companies,
and if so, why. We combine the most common forms of employee ownership in
the U.S., counting any ownership of employer stock through an ESOP, deferred
profit-sharing plan, 401(k) plan, or other broad-based defined contribution plan
(excluding direct stock purchase plans, and plans limited to top managers).

Section 2 of the paper arranges theoretical arguments for and against employee
ownership, and Section 3 reviews prior literature about employee ownership and
its impacts on firms and employees. Section 4 proposes a new model based on
prior theory and research. Section 5 explains the data and methodology used in
this paper. The results are presented and discussed in Section 6, and a final section
summarizes the findings and suggests implications for future study.

2. THEORIES ABOUT EMPLOYEE OWNERSHIP

The early debates about employee ownership were centered theoretically on worker cooperatives, but since the 1980s the focus of the debates has moved to employee ownership of stock more generally. This section classifies arguments related to employee ownership into those predicting negative effects and those predicting positive effects. (For a fuller treatment of these and other arguments, see Dow, 2003.)

2.1. *Arguments Against Employee Ownership*

The arguments of opponents of employee ownership can be divided into those emphasizing inefficiency or degeneration. The focus here is on arguments predicting inefficiency, since efficiency can be a major factor in firm survival (while degeneration of employee-owned companies to conventional capitalist firms is unlikely to be a major factor in firm survival, apart from any efficiency effects).

Alchian and Demsetz (1972) argue for the inefficiency of team production or mutually owned enterprises, due to the so-called free-rider problem or $1/n$ problem. According to Alchian and Demsetz, an employee-owner has an incentive to shirk, because while he enjoys the full utility from shirking he gets only $1/n$ of the extra profit from his additional effort. Since all employees in the company have the same incentive, an employee-owned company is essentially an inefficient organization. This argument can also be expressed in terms of game theory. According to "Prisoner's Dilemma" logic, even though they can get more income or profit if all of them work cooperatively, each employee will not cooperate because he can get more utility when he shirks while other employees work hard. But if all of employees behave in the same way, each employee gets less utility than when they work cooperatively. Because employees in an employee-owned company have an incentive not to work cooperatively, the organization has inherent inefficiency. Because of this problem, individual incentive schemes are argued to be superior in motivating employees to work hard and retaining more able employees.

Another argument against employee ownership is based on the collective decision making problem arising in jointly owned enterprises (Blair et al., 2000). Joint owners may have difficulty arriving at decisions because of the circularity of collective decision-making. Also, an employee-owned company cannot cope with an emergency that demands a prompt decision, because collective decision-making consumes too much time. Hausmann (1996) argues that governance arrangements are more efficient when financial providers with homogeneous interests have control rights of the company.

Inefficiency of employee-owned companies may also occur through managerial incentives, according to principal-agent theory. Because the share of economic surplus returned to non-employee owners decreases in the employee-owned company, the owners or the managers of the company have a weaker incentive to monitor workers (Sesil et al., 2003). Alchian and Demsetz (1972) argue that a monitor should be able to demand residual returns in compensation for effective monitoring. Judging from this logic, an employee-owned company is an inefficient organization, because residual returns go to employee-owners and the incentive of owners or managers to monitor employees decreases.

Worker risk aversion is another factor that may affect the performance of employee-owned firms. If workers are generally risk averse, an employee-owned firm may have a difficult time attracting a high-quality labor supply, causing firm performance to suffer and increasing the likelihood that a firm will fail. In addition, risk aversion may lead employees to favor very cautious investment strategies, which could lead to underperformance.

Along with potential difficulties in attracting workers, other environmental forces can hurt the survival prospects of employee-owned firms. In particular, it has often been pointed out that worker cooperatives can experience a disadvantage in capital markets. According to Craig and Pencavel (1995), the share prices of plywood co-ops tend to be undervalued and it is difficult for the co-ops to obtain long-term financing. This rare and unusual organizational form may make it difficult for cooperatives to obtain funding agencies, suppliers, or workers (Staber, 1993). Ben-Ner also points out that "legal, organizational and financial expertise related to worker-owned firms is more scarce and expensive (1988, p. 290)." If cooperatives face such difficulties, they will be less likely to survive, or may "degenerate" into conventional firms in order to obtain financing and outside help.

Apart from the above arguments, some neoclassical economic theories predict that employee ownership is an unstable form and tends to disappear over time as firms degenerate to conventional capitalist firms. For example, in trying to maximize their current income, members of worker cooperatives have an incentive to hire new employees instead of add members, so that over time the proportion of members will decrease. Another argument is that if a worker cooperative does well, member shares will become more expensive and new members may not be able to afford to buy the shares, so retiring members are not replaced by new members (the "paradox of growth"). In cooperatives where capital is collectively owned, members may increase their current income at the expense of investment, although this problem disappears if individuals own tradable shares (in which the future value of investments is capitalized). These degeneration arguments are generally based on particular institutional arrangements in worker cooperatives, and are sensitive to alternative arrangements (see Dow, 2003). Because the

arguments have very limited applicability to employer stock owned through ESOPs and other pension plans, our focus remains on the efficiency arguments.

2.2. Arguments for Employee Ownership

Proponents of employee ownership argue that employee ownership can increase efficiency by giving employees incentives to work harder and smarter and to co-operate with the management and each other. Employee ownership makes the interests of employees correspond with those of the company. Because higher stock prices and more dividends mean more income for employees, employee ownership can motivate employees to work voluntarily harder (Kruse & Blasi, 2000; Windier & Marens, 1997). Therefore, it can be more effective than other pay systems, especially in an industry or company where centralized monitoring of employees is more costly, and worker cooperation is indispensable to success. The $1/n$ problem might be mitigated or solved by peer pressure not to shirk, lowering monitoring costs (Blair et al., 2000). The "Prisoner's Dilemma" can be solved by a cooperative strategy based on repeated playing of the game (Weitzman & Kruse, 1990). For individual incentive systems, in contrast, employees have little or no motivation to cooperate with each other and remarkable resources must be allocated for job evaluation (Weiss, 1987).

In contrast to the prediction of opponents that employee ownership can raise decision-making costs, proponents note that a cooperative culture in an employee-owned company may reduce bargaining costs and conflict costs, which many conventional companies cannot commonly avoid. The coincidence of interests within the company helps mitigate possible conflicts between the company and its employees (Ben-Ner, 1988). Also, such a culture facilitates employee involvement in day-to-day work, which is important because front line workers know their jobs best. The voluntary involvement can help improve the production process and quality of products, and bring down the product defect rates.

An additional argument for employee ownership is based on human capital theory. If a cooperative culture and sense of ownership cause an employee-owned company to have fewer layoffs and lower quit rates, it is likely that firm-specific human capital will increase. The tendency toward long-term employment makes the company invest more in training its employees. Accordingly, employment stability in an employee-owned company can facilitate investment in human capital and skill accumulation, which improves firm performance of the employee-owned company.

The above arguments regarding relative efficiency depend upon workplace culture and relations in employee-owned firms. One key factor may be worker participation in decision-making: if employee-owners are excluded from

decision-making, the company might not enjoy improved attitudes and worker effort. Moreover, if the relationship between employee-owners and management is hostile, employee ownership may not facilitate better work effort and accumulation of human capital, and may increase bargaining costs.

As noted earlier, worker risk aversion may make employees leery of accepting lower pay in exchange for ownership stakes. This is unlikely to be a large problem in practice, as several studies indicate that company stock tends to come on top of, rather than in place of, regular compensation in U.S. employee ownership companies (Kruse, 2002). Also, while worker cooperatives seem to experience difficulty in borrowing new capital (Ben-Ner, 1988; Craig & Pencavel,-1995), this problem is alleviated in ESOP companies due to a well-developed system of legal support, experts, and familiarity by investors and lending institutions.

In sum, points of view about employee ownership vary from extreme pessimism to excessive optimism. The pessimistic views lead to the prediction that employee-owned companies will have low rates of survival. The next section reviews the empirical literature related to these theories.

3. EXISTING FINDINGS

3.1. Firm Performance

Much of the existing literature dealing with employee ownership focuses on firm performance such as productivity or profitability. Some studies focuson ESOPs (using cross-sectional or pre/post-adoption comparisons), while some focus on worker cooperatives (measuring the effects of different cooperative features), and others examine other forms or combinations of employee ownership. A review of 32 studies in Kruse and Blasi (1997) and Kruse (2002) reached the following main conclusions:

(1) Studies are split between favorable and neutral findings on the relationship between employee ownership and firm performance. While most studies could not establish a significant difference, meta-analysis of the ESOP studies found a significant overall positive relationship (Kruse & Blasi, 1997).
(2) Productivity improves by an extra 4-5% on average in the year an ESOP is adopted, and the higher productivity level is maintained in subsequent years. This one-time jump is more than twice the average annual productivity growth of the U.S. economy over the past 20 years.

The pre/post-adoption comparisons used by many studies help control for selection effects associated with pre-existing productivity levels. A number of studies have

attempted to control for other forms of self-selection bias resulting from the types of companies that adopt employee ownership plans, but these corrections have made little substantive difference in the results.

In examining possible mechanisms explaining the effect of employee ownership on performance, Gamble (1998) finds that companies adopting ESOPs to give employees incentives and having ESOPs as the dominant stockholder had greater success than companies adopting ESOPs to get tax advantages or where ESOPs are only a minor stockholder. Several studies have also examined the role of employees' participation in decision-making, finding that such participation is generally associated with better performance (Hochner et al., 1988; Kardas et al., 1994; Logue & Yates, 1999, 2001; Winther & Marens, 1997). In addition, the meta-analysis by Doucouliagos (1995) found that participatory employee-owned firms have higher performance than participatory capitalist firms.

3.2. Employee Attitudes

A review of 31 studies of employee attitudes and employee behavior under employee ownership found that while employee ownership does not automatically improve employee attitudes and behavior, there are a number of findings that employee ownership improves them and almost never appears to hurt them (Kruse, 2002; Kruse & Blasi, 1997; also see Sesil et al., 2003). The most positive findings have been with respect to organizational commitment and identification, while studies are mixed between favorable and neutral effects of employee ownership on job satisfaction, motivation, and behavioral measures such as turnover and absenteeism. Such findings indicate that there is clearly no automatic improvement of attitudes and behavior associated with being simply an employee-owner - the relationship is likely to depend on employee/employer relations and how employee ownership is implemented. While a number of studies found that greater perceived participation in decisions was linked to better attitudes, the studies were mixed on whether employee-owners are more likely to perceive and desire greater participation in decisions.

3.3. Firm Survival and Employment Behavior

Very few studies deal with survival and employment behavior in employee-owned companies. Blair et al. (2000) tracked U.S. public companies from 1983 and found that those with substantial employee ownership stakes were 20% more likely than their industry counterparts to survive through 1995. Similarly, Kruse and Blasi

(1999) found that privately held companies with ESOPs in 1988 were more likely than closely matched firms without ESOPs to survive until 1999, and Welbourne and Cyr (1999) found that among companies with initial public offerings in 1988, those with broad-based ownership had higher rates of survival and stock price growth. Studies of French worker cooperatives have also found that they have high rates of survival, with little evidence of degeneration (Estrin & Jones, 1992). A shorter supply of capital funds is associated with future closure of cooperatives (Perotin, 1987), while the business cycle appears to have similar effects on the failure rate of cooperatives and conventional firms (Perotin, 1997). The pattern of risk for new firms, however, is found to be different: new cooperatives often experience a "honeymoon" period in which commitment is high and risk of closure is lower than for conventional firms, while risks increase after the honeymoon (Perotin, 1997).

With respect to employment behavior, the employee ownership companies in the study by Blair et al. (2000) had more stable employment than other comparable firms. In addition, Craig and Pencavel (1992) show that because worker cooperatives are more inclined to adjust pay than employment during an economic downturn, employment in cooperative plywood companies is more stable than in conventional plywood companies. These results appear to be achieved without a cost to efficiency, since the stock price returns were higher among employee ownership companies in Blair et al. (2000), and productivity levels were 6-14% higher among the plywood cooperatives compared to conventional companies (Craig & Pencavel, 1995).

4. THEORETICAL MODEL AND HYPOTHESES

This section uses the results of past studies to build a model of employee ownership that focuses on its relationship to firm survival. Before doing so, some discussion of the meaning of "survival" is necessary. Firms can disappear as publicly traded companies for a number of reasons, particularly: (1) merger or acquisition; (2) bankruptcy or liquidation; or (3) privatization. The relationship between employee ownership and mergers has several components. Employee ownership is sometimes used to fend off hostile takeovers. Even in the heavy takeover period of the 1980s, though, there were only 96 cases in which employee ownership was involved in a hostile takeover environment, and only 5% of ESOP companies reported that hostile takeover was a reason for ESOP formation (Blasi & Kruse, 1991; U.S. GAO, 1987). There are now greater restrictions on the use of employee ownership to fight hostile takeovers: under current U.S. law, employee ownership can operate as an effective defense only when employees own more than 15% of the

company (which is not the case for over three-quarters of the EO companies studied here). Employees are free to vote for or against a takeover, and whether they will be favorably or unfavorably disposed to mergers is not obvious. Employees will naturally resist takeovers when jobs would be threatened; also, employee ownership may be associated with greater company identification or a cooperative culture that would lead them to resist mergers. In some cases, however, employees may favor mergers in cases where workers have problems with current management. Similar factors may operate with respect to privatization of public companies - workers may use employee ownership to take a company private and protect it against potential takeovers and interference from outside shareholders, but privatization may also be a way to gain greater control of management, or simply to cash out employee shares.

Therefore how employee ownership affects firm survival is not a straightforward matter, since it can have different effects on the different reasons for non-survival. While this paper is focused on the basic question of whether employee ownership firms are more or less likely to survive, our model discusses how employee ownership is related to the different reasons for survival, and the analysis provide some initial exploration of how employee ownership may relate to the different reasons for firm disappearance.

Turning to the theoretical model, the mechanisms explaining the effects of employee ownership on firm performance and employee attitudes have not been well explored. Pierce et al. (1991) build a model in which employee ownership influences group and individual outcomes through operational ownership, psychological ownership, and integration (e.g. organizational commitment), while Logue and Yates (2001) model the effects that organizational structure, training, communication, and participation in ESOP companies have on firm performance.

According to Kruse and Blasi (1997), most of the studies on the effect of employee ownership on organizational commitment and identification found a positive effect. Such commitment and identification may increase firm survival by leading employees to resist mergers and acquisitions. In addition, it can motivate employees to work harder and smarter, decreasing the likelihood that the firm will disappear due to bankruptcy or liquidation. Working harder means that employees voluntarily work for a greater amount of time or more intensely, while working smarter means that they attempt to develop work processes and to exchange information about day-to-day work, and cooperate with co-workers and the management. This is important in that front line workers know best the characteristics of their work, especially in knowledge-based industries. Similarly, in the case of a service industry, decision-making rights of front line staff play an important role because their work needs a swift response to the demand of customers.

These motivated employees contribute to higher productivity, more sales, and higher profits.

Hypothesis 1. Employee ownership increases productivity through improved identification with the company and motivation to work efficiently.

This higher productivity, in turn, should contribute to a higher likelihood that the firm would weather economic shocks and be able to survive:

Hypothesis 2. Productivity improvement helps a company survive longer, especially in a downturn.

If employee-owned companies are successful in creating a cooperative culture, they are likely to maintain this culture by laying off fewer employees than other companies, especially during financial sufferings. This suggests Hypothesis 3:

Hypothesis 3. Employment in employee-owned companies is more stable.

Any improvement in j ob security should help employees identify with the company, which may contribute to longer survival of employee-owned companies by causing employees to vote against mergers and acquisitions. In addition, employee-owners may be more willing to accept corporate restructuring and changes in strategy than employee non-owners. This cooperation from employee-owners contributes to a decline in labor strife and conflict costs. Also, stable employment may influence firm survival through labor productivity. Low quit rates and low lay-off rates encourage companies to invest in employee training, increasing human capital within the companies which in turn increases productivity and the likelihood of survival. Levine and D' Andrea-Tyson (1990) and Levine (1995) argue that employment security is an important condition for the success of employee involvement and group compensation systems such as employee ownership, since employees will increase effort and share productive information only when any productivity improvements will not lead to job loss. Therefore a fourth hypothesis is:

Hypothesis 4. Stable employment in employee-owned companies increases the likelihood of firm survival.

A final component of employee ownership considered' here is that it represents a form of flexible compensation, in which stock values and dividends rise and fall with firm performance. Such flexibility can allow companies to adjust compensation of employees rather than employment in economic downturns.[1]

Hypothesis 5. Compensation in employee-owned companies is more flexible.

The flexible compensation strategies can make it easier for companies to weather financial difficulties, which in turn can increase the likelihood that a firm survives:

Hypothesis 6. More flexible compensation in employee-owned companies helps a company survive longer.

These relationships are portrayed in Fig. 1, representing how employee ownership may affect firm survival.

In this figure, all arrows indicate a positive influence. Employee participation and company policies play a moderator role that amplify impacts of employee ownership on identification of employees with the company and employment stability. Identification and motivation function as mediators that link employee ownership to productivity improvement. It should be noted that this model is not complete; in particular, management philosophy may be an important variable, while government legislation such as tax incentives can also influence productivity
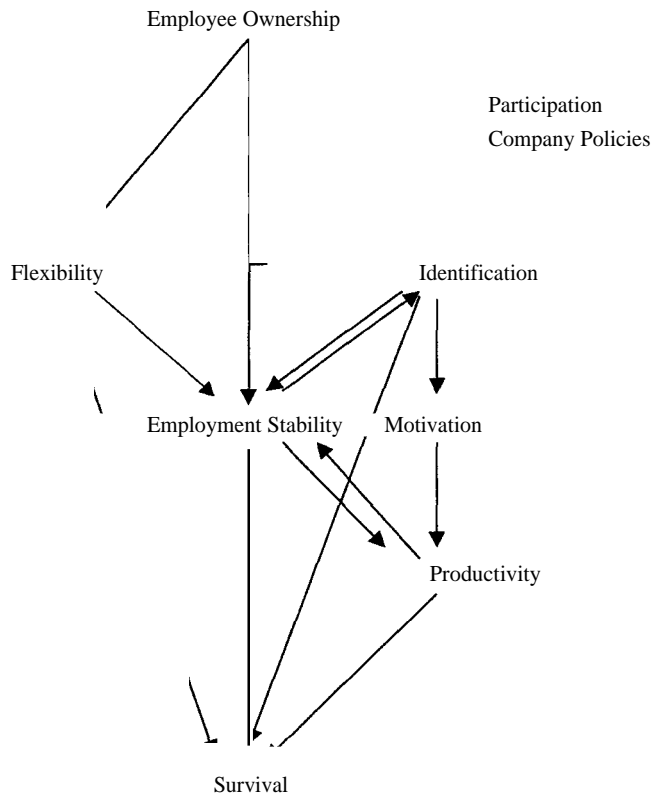

Fig. 1. Impacts of Employee Ownership on Employment Stability. *Note: All* arrows indicate positive effects.

and survival (although government legislation is unlikely to be a factor in this study, since employee-owned stock in U.S. public companies enjoys no special tax advantages).

The remaining sections test the impact of employee ownership on firm survival, and the role of employment stability, productivity, and compensation flexibility as mediators in these mechanisms. This study lacks data on participation in decisions, identification, and motivation, which would be required for a full analysis of this model. The results here should provide an impetus for more inclusive future research.

5. DATA AND METHOD

5.1. Data

This study examines the above hypotheses and the debates regarding employee-owned companies using data on employee-owned stock among all U.S. public companies in 1988, following the companies through 2001. The data on public companies are obtained from Standard and Poor's Compustat database, while data on employee ownership come from the federal Form 5500, containing information reported to the federal government on all pension plans existing in 1988 (including ESOPs). The Compustat and Form 5500 data are merged using common identifiers (CUSIP and IRS Employer Identification Numbers). Because the Form 5500 data are not available except for the 1988-1990 period, it is not possible to test the arguments that employee-owned firms will degenerate into conventional ownership (although as noted, those arguments are based on worker cooperatives, and have limited applicability to the ownership structure studied here).

In this paper, a company is considered as an employee-owned (EO) company when employees own 5% or more stock of the company (meeting the Security and Exchange commission's definition of a major stakeholder) (Blasi & Kruse, 1991). Comparisons are made both to all other public companies and to a sample of matched companies. The matched sample is constructed by selecting, for each EO company, the company in the same industry that has the closest employment level.

Table 1 shows descriptive statistics for 3 kinds of companies in 1988: EO companies, matched companies, and all other companies. EO companies are subdivided into 3 groups according to the proportion of the company's stock that employees own.

In 1988, 5,680 companies were listed, of which 245 were EO companies with 5% or more employee ownership. Only 232 companies are matched, because 13 companies were the closest matches for more than one EO company. As

	Employee-Owned Company				Match	All non-EO	% That are EO Cos.
	0.05<EO<.2	0.2<EO<0.5	0.5<EO	Total			
Employees (1,000)	20.961	11.592	3.034	19.187	11.580	5.505	
Capital ($1,000,000)	1535.253	466.589	58.930	1348.367	892.107	373.204	
Capital intensity ($1,000)	109.482	60.736	51.188	101.217	113.719	117.273	
Industry							
Agriculture	0	0	0	0	0	24	0.00
Mining	8	1	1	10	10	312	3.21
Construction	1	1	0	2	2	83	2.41
Manufacturing	87	19	3	109	101	2334	4.67
Transportation	4	1	0	5	4	123	4.07
Communication	36	0	0	36	36	364	9.90
Wholesale	9	4	0	13	12	251	5.18
Retail	12	3	1	16	14	363	4.41
Finance	34	2	1	37	36	730	5.07
Service	14	2	1	17	17	848	2.00
Total	205	33	7	245	232	5432	4.51

Table 1. Descriptive Statistics in 1988.

can be seen, EO companies have more employees and capital than matched companies and all other companies. General Motors and Sears, which are EO companies, have more than 500,000 employees, but only Kelly Services has more than 500,000 employees among all other companies, and K-Mart with 350,000 employees is largest among the matched companies. These values show that EO companies are relatively concentrated among large companies. However, EO companies have lower capital intensity per employee than others. EO companies accounted for 4.5% of all publicly traded companies in 1988, and are relatively concentrated in the communication industry.

To compare survival among the three groups, this study measures how many companies of each category lasted from 1988 through 2001. Following Blair et al. (2000), survival in this study means that a company continues to exist as an independent publicly traded company. In other words, a survivor is defined as a company that did not experience merger, acquisition, bankruptcy, liquidation, or privatization.[2] Figure 2 shows how long EO companies, matched companies, and other companies have survived through 2001. This figure reveals that the survival rate of EO companies is systemically higher than that of matched companies and all other companies. While 50.6% of EO companies survived through 2001, only 41.8% of matched companies and 42.4% of all other companies survived through the same period. Moreover, in no year do the matched companies or all other companies show higher survival rates than EO companies.
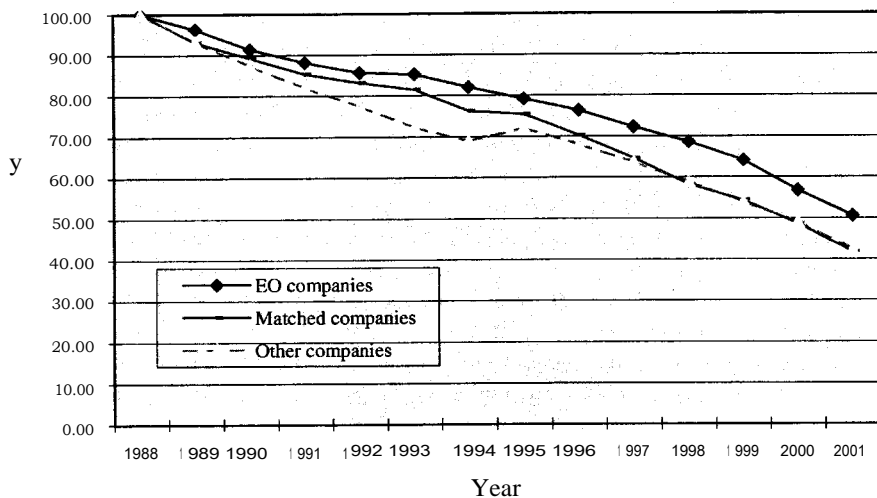

Fig. 2.   Survival Rates in 3 Categories of Companies.

Table 2. Survival Rates and Reasons for Exit from Public-traded Market.

	EO		Matched		All Others	
	Number	%	Number	%	Number	%
Survived	124	50.6	97	41.8	2301	42.4
Did not survive						
Merger or acquisition	92	37.6	96	41.4	1762	32.4
Bankruptcy	8	3.3	9	3.9	296	5.4
Liquidation	2	0.8	3	1.3	124	2.3
Reverse acquisition	0	0.0	0	0.0	14	0.3
Leveraged buyout	0	0.0	0	0.0	24	0.4
Privatization	1	0.4	2	0.9	91	1.7
Other reason	7	2.9	11	4.7	758	14.0
Missing reason	11	4.5	14	6.0	62	1.1
Subtotal	121	49.4	135	58.2	3131	57.6
Total	245	100.0	232	100.0	5432	100.0

Table 2 indicates why the companies in each sample exited from publicly traded stock market. The most common reason for non-survival among all three groups was merger or acquisition. As discussed earlier, EO might help companies fight hostile takeovers, and might engender company identification that leads employees to resist mergers. The actual pattern, however, is mixed: EO companies were slightly less likely than the matched companies (37.6% compared to 41.4%), but more likely than all non-EO companies (32.4%), to disappear due to merger or acquisition.

Clearly the most catastrophic reason for disappearance is bankruptcy or liquidation, which may result in unemployment of most employees of the companies. Fewer EO companies were delisted due to bankruptcy or liquidation (4.1 % total) than among matched companies (5.2%) and other companies (7.7%). EO companies were also less likely than non-EO companies to disappear for the other reasons listed (reverse acquisition, leveraged buyout, privatization, and unspecified other reasons). While the main focus of this study is on survival per se, exploratory logit regressions were run to predict non-survival for different reasons (not reported here). These regressions found that EO measures are not related to disappearance in a merger or acquisition, but several of the EO measures predict a lower likelihood of disappearance due to bankruptcies or liquidations, or for any other reason. Further exploration of reasons for non-survival is a valuable topic for future research (ideally with additional information on the unspecified "other" reasons for disappearance, since that was an important source of difference between the EO and non-EO firms).

5.2. Method

In this study the presence of employee ownership plans, percent of employees in employee ownership plans, and % of stock owned by the plans are used as predictors of potential mediators (productivity, employment stability, financial strength, and compensation flexibility) as well as firm survival. The percent of employees covered by the plans as well as the percent of stock owned by employees may have an important influence in inducing identification and motivation of employees within the company. Control variables are firm size (the number of employees), capital stock, industry, and other benefits. Because the distributions of the number of employees, capital stock, and labor productivity are skewed, logarithms are used to normalize those measures. All of the variables are defined, and descriptive statistics are provided, in Table 3.

The analysis is done in two stages. First, the effects of EO on potential mediators is examined using formula (1):

$$\text{Dep} = a + b_1 \text{ x EO} + b_2 \text{ x Lnemp} + b_3 \text{ x Lncap} + b_4 \text{ x Benefit} + b_5$$
$$\text{x Industry dummies} + e \qquad (1)$$

where Dep is labor productivity, financial strength, employment variability, or compensation flexibility. These are estimated as OLS regressions in the base year of 1988.[3]

In formula (1), EO is alternatively measured as dummy variables for employee ownership (D1 or D2), percent of stocks owned by employees (EO%), or percent of employees covered by employee ownership plans (Covered EE%). The dummy variable Dl represents EO of 5% or more, while the variable D2 represents EO of greater than 0% but less than 5%.

Labor productivity, financial strength, employment variability, and compensation flexibility are the dependent variables in this specification, and will be tested as possible mediators in the survival analysis. Labor productivity is measured as the logarithm of the annual production per employee in 1988. Financial strength is measured by financial ratio and cash flow. Mossman et al. (1998) find that the financial ratio model (Altman's Z model) and the cash flow model (Aziz et al.) predict bankruptcy better than other models. This paper tests the appropriateness of financial ratio and cash flow as mediators of firm survival. It uses rates of working capital to total assets for the estimation of financial ratio and rates of cash and short-term investment to total assets for cash flow.

Employment variability is estimated as the standard deviation of the annual change in the logarithm of employment in each company from 1982 to 2001. By measuring the standard deviation of the change in employment, this variable

Table 3. Variable Definitions and Descriptive Statistics.

Variable	Definition	Means (Std. Dev.)		
		EO Cos.	Matched	All Others
D1	Dummy variable for the companies where employees have stock more than 5%.	1.00 (0.00)	0.00 (0.00)	0.00 (0.00)
D2	Dummy variable for the companies where employees have stock less than 5%, but more than 0%	0.00 (0.00)	0.00 (0.00)	0.13 (0.33)
EO%	% of company stock owned by employees.	13.70 (0.12)	0.00 (0.00)	0.001 (0.007)
Covered EE%	% of employees covered by EO.	58.20 (25.26)	0.00 (0.00)	5.81 (18.19)
Lnemp	Natural logarithm of employment.	7.87(1.96)	7.71(1.86)	6.16 (2.39)
Lncap	Natural logarithm of net value of property, plant, and equipment.	18.42 (2.41)	18.22 (2.39)	16.40 (2.71)
Benefit	Dummy variable with a defined benefit plan, 401k, or other defined contribution plan invested in other companies.	0.60 (0.49)	0.51 (0.50)	0.37 (0.48)
Lnprod	Natural logarithm of productivity: ln((sales + inventory change)/employees)	11.85 (0.63)	11.82 (0.67)	11.64 (0.98)
Finratio	Working capital to total assets = (current assets - current liabilities)/total assets.	0.22 (0.20)	0.21 (0.21)	0.22(1.03)
Cashflow	(cash + short-term investment)/total assets.	0.09 (0.11)	0.10 (0.13)	0.14 (0.18)
Empvar	Standard deviation of the annual change in the logarithm of employment in each company from 1982 to 2001.	0.15 (0.09)	0.17 (0.10)	0.22 (0.13)
Penflex	Standard deviation of the annual change in the logarithm of pension and retirement expenses in each company from 1982 to 2001.	0.45 (0.22)	0.45 (0.21)	0.45 (0.22)
Wageflex	Standard deviation of the annual change in the logarithm of labor and related costs in each company from 1982 to 2001.	0.10 (0.07)	0.10 (0.07)	0.12 (0.09)

represents the variability of employment around a trend. Compensation flexibility is alternatively measured as pension or wage flexibility. Pension flexibility is measured as the standard deviation of the annual change in pension and retirement expenses per employee in each company from 1982 through 2001, and wage flexibility is defined as the standard deviation of the annual change in all labor and related expenses per employee. Both of these measures, which are available only for a limited number of the companies, are evaluated as proxies of compensation flexibility described in Fig. 1.

In the second stage of analysis, a Weibull model is used to analyze the yearly hazard of disappearance of EO companies, matched companies, and other companies. An advantage of the Weibull specification is that it takes account of incomplete spells - that is, it accounts for the fact that many companies are still surviving at the end of the observed period. These spells are treated as censored, and are designated by a dummy variable. In the Weibull model, the hazard rate is estimated by formula (2).

$$HQ, X) = ho \ x \ exp(bX)p[exp(bX)t]^{(p-1)} \qquad (2)$$

The dependent variable $HQ, X)$ is the hazard rate of disappearance, which is a function of survival time t and the independent variables X's. The variable $ho \ is$ the baseline hazard, the value p is a parameter that estimates whether the hazard rate is constant, increasing, or decreasing over time, and t is survival time. The survival regression results in this paper are presented as relative hazard rates, which represent the proportional change in the hazard of failing as an independent variable changes by one unit. An estimated value of 0.80, for example, indicates that the hazard rate declines to 80% of its former value when the independent variable increases by one unit, while an estimated value of 1.00 indicates that the hazard rate is not predicted to change, and an estimated value of 1.20 indicates that the risk of failure is increased by 20%. The Z-statistics represent statistical tests of the null hypothesis that the relative hazard rate is 1.00.

In formula (2), bX, is measured by formula (3), which includes the standard controls along with the potential mediators.

$$bX = a + b_1 \ x \ EO + b2 \ x \ Lnemp + b3 \ x \ Lncap + b4 \ x \ Industry + b5$$

$$x \ Benefit + b6 \ x \ Lnprod + b7 \ x \ Finan + b8 \ x \ Empvar + b9$$

$$x \ Compflex + e \qquad (3)$$

where Lnprod is the log of labor productivity, Finan is financial ratio or cash flow, and Compflex is pension flexibility or wage flexibility.

A variable must meet four conditions to be considered as a mediator (Baron & Kenny, 1986). First, an independent variable must affect the potential mediator;

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second, the independent variable must affect a dependent variable; third, the potential mediator must affect the dependent variable in the regression equation in which the independent variable and mediator are used together; finally, the coefficient of the independent variable in the second condition must be larger than that in the third one. The analysis will take account of these conditions in determining which variables mediate the relationship between EO and firm survival.

6. RESULTS AND DISCUSSION

6.1. *Prediction of Potential Mediators*

In the first stage of analysis examining whether employee ownership is related to the potential mediators, productivity is found to be weakly related to employee ownership. While productivity is not significantly related to the EO dummy variables or percent of company owned (columns 1-2), it is positively related to the percent of employees covered at the 90% level of confidence (columns 3-4). [4] This latter finding is consistent with Hypothesis 1. The lack of strong significant findings is consistent with many other individual studies of employee ownership in the U.S. - only when results are combined in a meta-analysis are significant positive effects found (Kruse, 2002; Kruse & Blasi, 1997). In addition, the lack of a strong overall effect is consistent with the idea that the effects of employee ownership depend on the context in which it is implemented, including the quality of employee-management relations and the presence of employee involvement and supportive workplace policies.

Table 4 also shows that the financial ratio is not significantly correlated with EO of greater than 5%, or with the percent of the company owned by employees. It is, however, positively linked to the percent of employees covered. None of the EO variables is significantly related to cash flow.

Table 5 examines the relationship between employee ownership, employment variability, and compensation flexibility. All of the EO variables are significantly linked to lower levels of employment variability, supporting Hypothesis 3. Only two-thirds of the companies report pension data, and less than one-fifth report labor expense data, so it is difficult to get consistent information about compensation flexibility from these data. The limited data show that pension flexibility is unrelated to employee ownership (columns 5-7), while wages in fact appear to be less flexible in EO companies (columns 8 and 10). We cannot find the evidence supporting Hypothesis 5 and the idea that compensation flexibility can be a mediator between employee ownership and firm survival, although these results are based on limited data.

Table 4. Productivity and Financial Strength Regressions.

Dep. Var.	Productivity				Financial Ratio			Cash Flow		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
EO vars.										
Dl (EO > 0.05)	0.019			0.010	0.019			-0.013		
	(0.373)			(0.140)	(0.808)			(1.219)		
D2 (0 < EO < 0.05)	0.033				0.029*			0.001		
	(1.001)				(1.941)			(0.091)		
EO%		-0.072		-0.369		0.107			-0.049	
		(0.266)		(0.938)		(0.872)			(0.862)	
Covered EE%			0.082*	0.109*			0.060**			-0.009
			(1.727)	(1.855)			(2.531)			(0.858)
Controls										
Lnemp	-0.247***	-0.247***	-0.246***	-0.246***	0.049***	0.050***	0.050***	-0.005**	-0.005**	-0.005**
	(22.223)	(22.185)	(22.158)	(22.114)	(9.863)	(9.989)	(10.016)	(2.056)	(2.067)	(2.090)
Lncap	0.250***	0.251***	0.249***	0.249***	-0.054***	-0.054***	-0.055***	-0.018***	-0.018***	-0.018***
	(25.538)	(25.648)	(25.395)	(25.345)	(12.329)	(12.240)	(12.406)	(8.884)	(8.908)	(8.783)
70 Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit	0.102***	0.103**	0.103***	0.104$^{*};$*	0.056***	0.056***	0.056***	0.000	0.000	0.000
	(4.514)	(4.527)	(4.547)	(4.578)	(5.538)	(5.518)	(5.519)	(0.054)	(0.031)	(0.062)
N	5300	5300	5288	5288	4800	4800	4791	5400	5400	5388
R2	0.31	0.31	0.31	0.31	0.16	0.16	0.16	0.19	0.19	0.19

Notes: t-value based on OLS regressions is in parenthesis.

*p < 0.10.

**p < 0.05.

***p < 0.01.

Table 5. Employment Variability and Compensation Flexibility Regressions.

Dep. Var.	Employment Variability				Pension Flexibility			Wage Flexibility		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Dl (EO > 0.05)	-0.029***			0.001	0.008			-0.010		
	(3.851)			(0.098)	(0.481)			(1.120)		
D2 (0 < EO < 0.05)	-0.014***				-0.012			-0.012*		
	(2.792)				(1.045)			(1.799)		
EO (%)		-0.157***		-0.059		0.052			-0.019	
		(3.898)		(1.015)		(0.622)			(0.389)	
Covered EE (%)			-0.045***	-0.040***			-0.019			-0.012
			(5.927)	(4.545)			(1.106)			(1.415)
Lnemp	-0.014***	-0.014***	-0.014***	-0.014***	-0.005	-0.005	-0.005	-0.016***	-0.016***	-0.016***
	(8.231)	(8.403)	(8.405)	(8.368)	(1.031)	(1.064)	(1.065)	(4.831)	(4.860)	(4.874)
Lncap	-0.005***	-0.006***	-0.005***	-0.005***	0.000	0.000	0.000	0.002	0.001	0.001
	(3.632)	(3.804)	(3.437)	(3.471)	(0.015)	(0.031)	(0.051)	(0.518)	(0.446)	(0.478)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit	-0.018***	-0.018***	-0.018***	-0.018***	-0.007	-0.007	-0.007	-0.020***	-0.021***	-0.020***
	(5.240)	(5.226)	(5.356)	(5.303)	(0.882)	(0.873)	(0.852)	(3.806)	(4.171)	(3.984)
N	4924	4924	4912	4912	3036	3036	3031	843	843	840
R^2	0.24	0.24	0.25	0.25	0.05	0.05	0.05	0.42	0.41	0.42

Notes: t-value based on OLS regressions is in parenthesis.
*$p < 0.10$.
***$p < 0.01$.

The results in Tables 4 and 5 are based on the full sample of publicly traded firms. When similar specifications are run with the matched sample (not shown to conserve space), the results similarly show significantly lower employment variability associated with employee ownership. The results for labor productivity, however, are weaker, with positive but insignificant effects of D 1 and Covered EE % on labor productivity (influenced by the smaller sample which increases standard errors).

6.2. Prediction of Firm Survival

Tables 6-8 present the results of the survival analysis, predicting firm survival both before and after controlling for potential mediators. Employee ownership is measured using dummy variables in Table 6, percent of company owned in Table 7, and percent of employees covered in Table 8.

As shown in the first column of Table 6, employee ownership is strongly related to a higher rate of firm survival after controlling for employment size, capital stock, the presence of other benefit plans, and detailed industry dummies. The results reveal that EO is associated with a relative hazard rate that is significantly smaller than one, which means that EO companies are more likely to survive. Furthermore, EO companies with more than 5 % of stock owned by employees have lower hazard rates than EO companies with less than 5% of stock owned by employees.

Table 6 shows that when employees own a considerable amount (5% or more) of their employer's stock, the hazard rate for disappearance of the company declines to 0.758 of the hazard rate for non-EO companies (column 1). In other words, the risk that an EO company will disappear in any year is only 75.8% of the risk for a comparable non-EO company. In the case where EO plans of moderate level (less than 5 %) are used, the plans also contribute to decreasing the hazard rate, but the contribution is less than for companies with EO greater than 5%. This result is almost identical when the regression is confined to the matched sample (column 2 of Table 6), where the relative hazard rate for companies with EO greater than 5% is 0.745, representing a risk that is 74.5% of the risk for the closely-matched non-EO companies.

The remaining regressions in Table 6 include the potential mediators, to examine the extent to which they can help explain the positive relationship between EO and firm survival. Only the potential mediators that were found to be related to EO in Tables 4 and 5 are used here, since the lack of a positive relationship between EO and the variables of cash flow, pension flexibility, and wage flexibility means that they fail the first condition of mediation and are not candidates for explaining the EO-survival relationship.

Somewhat surprisingly, labor productivity does not contribute to firm survival (Table 6, column 3), which is not consistent with Hypothesis 2. This result might

Table 6. Weibull Regressions Predicting Survival, Using EO Dummy Variables.

Sample	Full (1)	EO & Match (2)	Full (3)	Full (4)	Full (5)	Full (6)	Full (7)
EO variables							
DI (EO > 0.05)	0.758***	0.745**	0.766***	0.743***	0.818**	0.827**	0.801**
	(2.898)	(2.273)	(2.782)	(2.780)	(2.080)	(1.961)	(2.046)
D2 (0 < EO < 0.05)	0.852***	a	0.860**	0.831***	0.907	0.925	0.905
	(2.703)		(2.520)	(2.824)	(1.594)	(1.278)	(1.489)
Controls							
Lnemp	0.941***	0.809**	0.942***	0.980	0.971	0.976	1.023
	(3.375)	(2.261)	(3.113)	(1.002)	(1.454)	(1.113)	(0.968)
Lncap	0.953***	1.046	0.946**	0.913***	0.969[†]	0.959**	0.908***
	(3.090)	(0.581)	(3.234)	(5.193)	(1.825)	(2.176)	(4.500)
70 Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit	1.011	1.069	1.005	1.025	1.116***	1.110**	1.125***
	(0.279)	(0.494)	(0.123)	(0.597)	(2.659)	(2.506)	(2.653)
Mediators							
Lnprod			0.985			1.013	1.048*
			(0.671)			(0.516)	(1.721)
Finratio				0.593***			0.587***
				(12.426)			(8.873)
Empvar					2.344***	2.508***	2.258***
					(4.914)	(5.217)	(4.326)
N	5423	476	5300	4800	4924	4834	4294
Log likelihood	-6821***	-475***	-6622***	-5995***	-5633***	-5503***	4877[†]***

Notes: z-value is in parenthesis.

Figures represent relative hazard rates estimated from Weibull survival models. See text for example.

'No companies in the matched sample have 0 < EO < 5%.

*p < 0.10.

**p < 0.05.

***p < 0.01.

Table 7. Weibull Regressions Predicting Survival, Using Percent of Stock Owned by Employees.

Sample	Full (1)	Matched (2)	Full (3)	Full (4)	Full (5)	Full (6)	Full (7)
EO variables							
EO (%)	0.335**	0.466	0.346**	0.280**	0.507	0.540	0.430
	(2.025)	(1.177)	(1.976)	(2.126)	(1.273)	(1.161)	(1.431)
Controls							
Lnemp	0.938***	0.809**	0.939***	0.977	0.969	0.974	1.021
	(3.563)	(2.263)	(3.276)	(1.186)	(1.555)	(1.193)	(0.883)
Lncap	0.950***	1.046	0.943***	0.911***	0.967*	0.957**	0.906***
	(3.270)	(0.571)	(3.405)	(5.384)	(1.930)	(2.263)	(4.601)
70 Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit	1.011	1.053	1.005	1.027	1.116***	1.109**	1.125***
	(0.290)	(0.379)	(0.138)	(0.631)	(2.649)	(2.492)	(2.653)
Mediators							
Lnprod			0.985			1.013	1.048*
			(0.705)			(0.503)	(1.704)
Finratio				0.591***			0.585***
				(12.531)			(-8.943)
Empvar					2.379***	2.541***	2.288***
					(5.003)	(5.296)	(4.400)
N	5423	476	5300	4800	4924	4834	4294
Log likelihood	-6826***	-477***	-6626***	-6000***	-5635***	-5504***	-4879***

Notes: z-value is in parenthesis.

Figures represent relative hazard rates estimated from Weibull survival models. See text for example.

*p < 0.10.

**p < 0.05.

***p < 0.01.

Table 8. Weibull Regressions Predicting Survival, Using Covered Employee Percentage.

Sample	Full (1)	Matched (2)	Full (3)	Full (4)	Full (5)	Full (6)	Full (7)
EO variables							
Covered employee (%)	0.806**	0.803	0.820**	0.769**	0.901	0.924	0.880
	(2.385)	(1.144)	(2.189)	(2.535)	(1.124)	(0.850)	(1.210)
Controls							
Lnemp	0.938***	0.806**	0.939***	0.976	0.968	0.974	1.020
	(3.594)	(2.292)	(3.289)	(1.230)	(1.604)	(1.216)	(0.831)
Lncap	0.953***	1.052	0.945***	0.914***	0.968*	0.958**	0.908***
	(3.105)	(0.647)	(3.279)	(5.176)	(1.839)	(2.216)	(4.496)
70 Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Benefit	1.010	1.052	1.004	1.024	1.116***	1.109**	1.124***
	(0.250)	(0.374)	(0.089)	(0.575)	(2.642)	(2.483)	(2.637)
Mediators							
Avglnprod			0.987			1.015	1.049*
			(0.607)			(0.580)	(1.742)
Finratio				0.593***			0.587***
				(12.384)			(8.805)
Empvar					2.366***	2.537***	2.281***
					(4.956)	(5.271)	(4.372)
N	5411	475	5288	4791	4912	4822	4285
Log likelihood	-6811***	-477***	-6611***	-5988***	-5621***	-5490***	-4868***

Notes: z-value is in parenthesis.

Figures represent relative hazard rates estimated from Weibull survival models. See text for example.

*p < 0.10.

**p < 0.05.

***p < 0.01.

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come from the fact that the reasons for exit from the publicly traded market come heavily from mergers and acquisitions, which may be unrelated to the productivity of a company. The estimated hazard rates for the EO variables are also virtually unchanged when productivity is included. The financial strength variable - financial ratio - has coefficients smaller than one in Tables 6-8, supporting past research that this is a predictor of firm survival.[5] The estimated hazard rate for the EO variables, however, is again virtually unchanged when this variable is included (column 4), so it does not help explain the relationship between EO and survival.

The relative hazard rate associated with employment variability is larger than one (column 5 of Table 6), which means that employment stability is associated with a lower hazard of failure, consistent with Hypothesis 4.[6] Furthermore, the relative hazard rates for the EO variables become closer to one (Tables 6 and 8), or insignificant (Tables 7 and 8), when employment variability is controlled. Therefore the greater survival of EO companies appears to be at least partly linked to lower employment variability, which may reflect a policy of low layoffs and turnover in EO companies. Employment stability may be an important part of the explanation for the positive relationship between EO and firm survival.

The results of Table 6 are essentially replicated in Tables 7 and 8, which use different EO measures. The results in Table 7 show that a greater percentage of the stock owned by employees is associated with a lower hazard of firm disappearance. For example, if all the stock of a company is owned by EO plans, the relative hazard rate declines to 33.5% (column 1). Similarly, Table 8 shows that broad-based EO plans are correlated with a lower hazard rate. If all of the employees within a company own their employer's stock, the company's relative hazard rate is 80.6% of the hazard compared to companies with no employee ownership. Consistent with the results in Table 6, the relative <u>hazard</u> rates for the EO variables are not substantially affected by the inclusion of the productivity and financial strength variables, but increase and are no longer significantly different from one when controlling for employment variability (column 5 in Tables 7 and 8).

These results show that the variables productivity, financial ratio, cash flow, pension flexibility, and wage flexibility fail at least one of the four conditions to be considered a mediator between EO and firm survival (Baron & Kenny, 1986). Only employment stability meets all of the conditions and can be considered a positive mediator, regardless of which EO variables are used.

6.3. Discussion

As in many prior studies, these results do not indicate a strong direct relationship between employee ownership and productivity. It is likely that complementary

workplace policies, such as employee involvement, are needed for a positive effect. Nonetheless, there is a weak positive relationship between productivity and the percentage of employees who own company stock, which is consistent with Hypothesis 1. Against our expectations, however, this paper found that productivity does not contribute to firm survival, which does not confirm Hypothesis 2. One possible explanation may be made from the results of Table 2: more than half of the delisted companies exit from the publicly-traded market due to merger and acquisition, which might be irrelevant to productivity.

The financial strength variables contribute to firm survival, which confirms the findings of Mossman et al. (1998). Only the financial ratio, however, is related to any of the EO variables (percent of covered employees, in Table 4), and the relationship of EO to firm survival is not substantially changed when controlling for financial ratio, so financial strength is not a mediator.

Employment is more stable in EO companies than in others, which in turn is associated with EO companies surviving longer. This result may be explained by lower turnover and company policies that represent increased commitment to employees in EO companies. These policies can induce a cooperative culture, which may be accomplished by combining employee ownership, employment security, employee participation in decision-making, and other policies, and which allow the company to accomplish more flexible strategies. These results confirm Hypotheses 3 and 4.

Finally, employee ownership is not associated with greater pension or wage flexibility, so these do not operate as mediators explaining greater survival. Furthermore, when pension and wage flexibility are used as predictors of firm survival (results not shown), neither operate to predict greater survival. These results do not confirm Hypotheses 5 and 6.

Overall, these findings suggest that firm survival can be improved not through numerical flexibility like employment adjustment and compensation flexibility, but through functional flexibility in which employees have a broad range of skills, input into decision-making, and a greater willingness to make adjustments during economic difficulties. If a cooperative culture can be induced through employee ownership and other policies that increase employee commitment, a company may enjoy higher performance and survival. This paper, however, does not have data that can be used to explore functional flexibility, company policies, employee attitudes, and the related factors that may help to explain greater firm survival.

These results refute a number of arguments about employee ownership. First, employee ownership does not seem to induce inefficiency including free rider, prisoner dilemma, and agency problems, because, on the contrary, it seems to improve labor productivity. Second, it cannot be argued that employee ownership makes employees accept more risk, because EO companies survive longer, and

employees in the EO companies earn more on average and do not appear to have more variable compensation overall.[8] The greater survival and employment stability provide incentives for both companies and employees to invest in training and firm-specific human capital. Other arguments against employee ownership, however, cannot be tested in this study, because we are not able to measure decision-making processes or the extent of ownership throughout the period (though the degeneration arguments apply mainly to worker cooperatives, and not to the type of ownership studied here).

7. **CONCLUSION**

This study finds that employee ownership companies survive longer, consistent with the limited prior research on this topic (Blair et al., 2000; Kruse & Blasi, 1999; Welbourne & Cyr, 1999). Employment in employee ownership companies is also found to be more stable, consistent with Craig and Pencavel (1992) and Blair et al. (2000). In addition, productivity is found to be positively related to some measures of employee ownership, consistent with some but not all prior studies (reviewed in Kruse, 2002; Kruse & Blasi, 1997).

We also examine the ways in which employee ownership may enhance firm survival through mediating mechanisms. Labor productivity and compensation flexibility are not found to operate as mediators, but employment stability appears to be a mediator. The apparent effect of employment stability is complex, and may involve more mechanisms. Company policies designed to increase commitment of employees will help make employment more stable. These policies may affect identification of employees with the company, which may increase productivity and the willingness of workers to be flexible and make adjustments during economic difficulties. It is very possible that the employment stability is related to a culture that emphasizes employee participation in decisions. If participatory employee-owned companies can be identified, as Logue and Yates (1999, 2001), Kardas et al. (1994), and Winther and Marens (1997) found, and if company policies and employee attitudes are included in the analysis, more mechanisms and more significant results could be found. Also, if data about the companies that are experiencing financial crises can be collected, compensation flexibility may be found to be a good mediator. The cooperative culture in EO companies may make those companies adopt more flexible compensation strategies, which helps those companies weather the crises.

Future research should more closely examine whether productivity is an important determinant of firm survival, which this paper does not find. In addition, research should look more closely at reasons for non-survival, espe-cially bankruptcy and liquidation, which are the most disastrous forms of firm

disappearance for employees and shareholders. Finally, to complement the study of employment variability, it would be valuable to study the relationship between employee ownership and employment growth.

The greater firm survival and employment stability among employee ownership firms indicate that employee ownership may have an important role to play in increasing job and income security, and decreasing levels of unemployment. Further research in this area could have great payoffs in understanding employee ownership and promoting economic stability.

NOTES

1. This is related to, but distinct from, the argument by Weitzman (1984) that profit sharing should increase employment stability of both firms and the economy as a whole. Weitzman's result is based on the lower short-run marginal cost of labor in profit-sharing firms, rather than the extra compensation flexibility provided by profit sharing (for a summary of evidence, see Kruse, 1993).

2. The term survival does not mean necessarily greater economic success than non-survival, since successful firms are sometimes bought out. The analysis includes a brief discussion of reasons for non-survival.

3. Several of the potential mediators are limited variables, since employment variability, pension flexibility, and wage flexibility have a lower bound of zero but no theoretical upper bound. This is not a problem for this sample, however, as none of the companies had zero values on these variables, so that limited dependent variable models produce the same results as OLS regressions.

4. If output and employment are simultaneously determined as firms react to demand shocks, the employment coefficient will be biased. Estimates accounting for the simultaneity, using lagged employment as an instrument, led to smaller employment coefficients but little change in the EO coefficients.

5. Cash flow is also found to be a strongly significant predictor of firm survival, but these results are not shown since Table 5 finds that cash flow is unrelated to the EO variables.

6. To avoid the endogeneity problem, this paper also measured employment variability just over the 1982-1988 period, which is exogenous to the post-1988 likelihood of survival. The results were similar but weaker, in part due to a smaller sample size.

7. In fact, greater wage flexibility is associated with lower rates of survival, although the coefficients are not significant.

8. They earn more income both when looking just at wages and salaries, and when including pension and retirement benefits. Consistent with Blasi et al. (1996), average compensation per employee from 1988 through 2001 is estimated as:

	Wage or Salary ($)	Wage or Salary + Pension or Retirement Benefits ($)
EO companies	44,765	46,847
Non-EO companies	39,855	43,050

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