

DOES EMPLOYEE STOCK OWNERSHIP WORK? EVIDENCE FROM PUBLICLY-TRADED FIRMS IN JAPAN

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by

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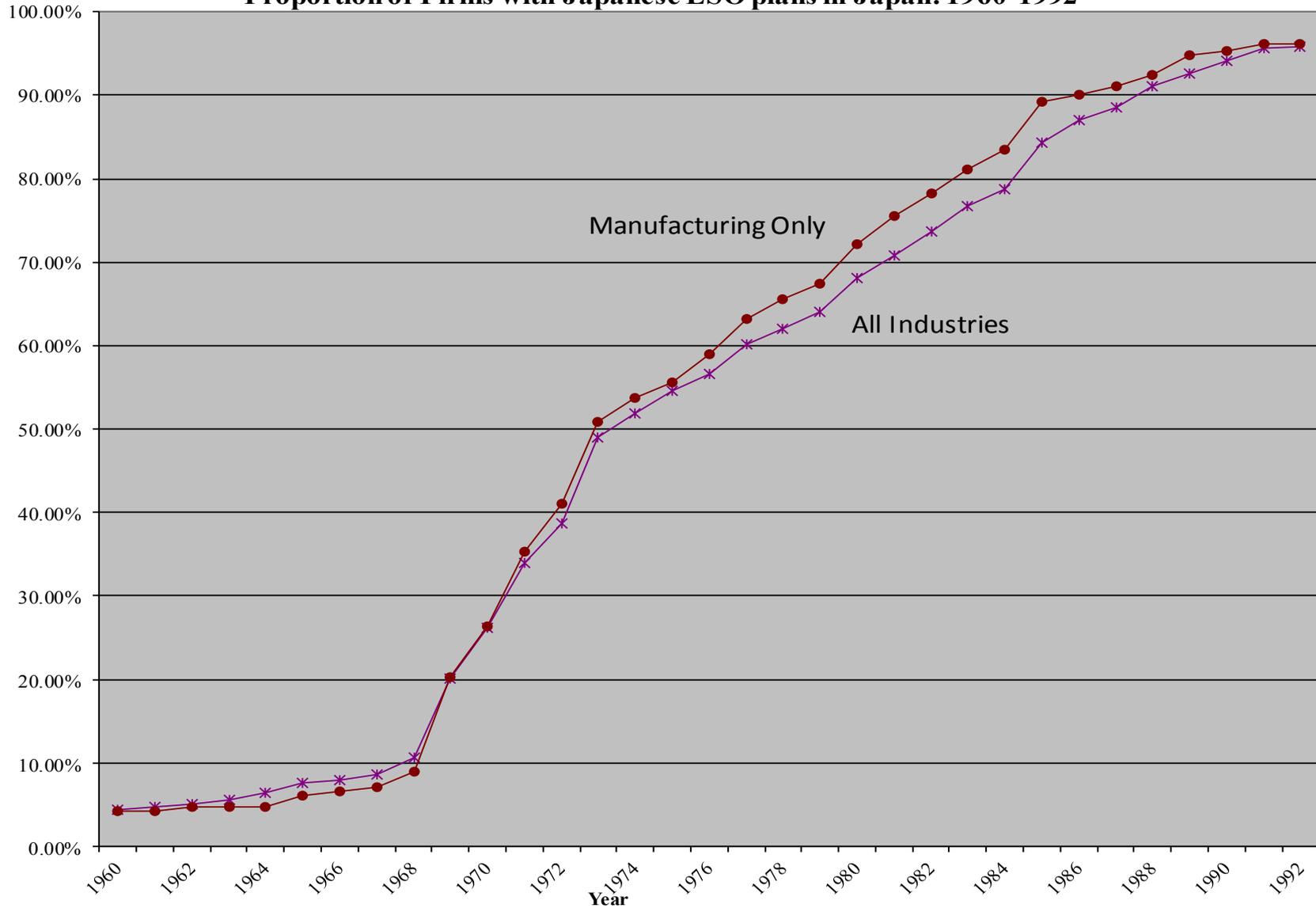
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Introduction

- A rich body of evidence on the productivity effect of employee financial participation but
 - only a few scholars obtain representative panel data and correct for selection bias; and
 - mostly on the extensive margin with limited evidence on the productivity effect of varying attributes of existing group incentive pay (e.g., the intensity of incentive, coverage of a scheme)
- In this paper, we examine the effect of employee stock ownership (ESO) plans on the intensive margin using representative panel data.
 1. Less measurement errors: de facto vs. de jure
 2. Richer implications: help practitioners design effective programs
 3. More relevant as ESO plans diffuse widely.

Proportion of Firms with Japanese ESO plans in Japan: 1960-1992



Survey of Current Status of Employee Stock Ownership (SCSESO) over FY1989-2013 conducted initially by National Conference of Stock Exchanges (FY1989-1998) and later by Tokyo Stock Exchange (FY1999-2013).

Institutional details of Japanese ESO

- Voluntary participation.
- Each participating employee designates a certain amount of money to be withdrawn from her monthly pay to invest in the trust.
- Employer matching contribution: most firms match each employee's contribution by giving 5-10% of the contribution.
 - Very small number of firms offer more than 25%.
- ESO plan's representative (known as a general director) is authorized to vote for the stock held by the plan at the general meeting of share-holders.
- No special tax incentive.

Possible *positive* mechanisms through which ESO plans affect firm productivity

1. Goal alignment and cooperation under team incentives:
 - Employees become more willing to share information and coordinate activities to maximize the firm value leading to more efficient delegation.
 - More active participation and involvement in various productivity-enhancing activities such as *Kaizen*.
 - Collective bargaining becomes smoother and less costly.

Possible *positive* mechanisms through which ESO plans affect firm productivity

2. A broader range of relational contracts made feasible:
 - Greater employee commitment and loyalty
 - Lower turnovers of employees with firm-specific human capital
3. Peer monitoring
4. Insider monitoring of top management
 - The representative of ESO plans can vote at annual meetings of the shareholders.

Possible *negative* mechanisms through which ESO plans affect firm productivity

1. Management putting too much weight on employee interest:
 - Tendency to protect job security, avoid risks, delay restructuring and necessary layoffs.
2. Managerial entrenchment: increased insider ownership weakens pressure from outside investors.
 - Managerial entrenchment effect less relevant to most Japanese ESO plans: the ESO share is typically less than 2% and only 4.5% of ESO plans own more than 5%.

Data

- Survey of Current Status of Employee Stock Ownership (Japanese Stock Exchanges Conference: FY1989-FY1998, Tokyo Stock Exchange: FY1999-FY2013)
 - Given access to more than 80% of companies with ESO Plans listed on TSE (more than 75% of all companies listed on TSE)
- Nikkei Needs
 - Financial data of Nonfinancial companies
 - Equity market data
 - Corporate governance data (ownership structure, adoption of stock options)
- DBJ Data Bank
 - Average employee age and tenure

Measuring Varying Attributes of ESO Plans

- can be decomposed into the following (stake, intensity of ESO) and (breadth of ESO).
- The negative influence of the ESO plan may be most effectively captured by the following .

Empirical Strategy

1. Estimate fixed effect model of trans-log production function augmented by ESO variables

$$(1) \ln Q_{it} = \beta_K \ln K_{it} + \beta_L \ln L_{it} + \beta_{KK} (\ln K_{it})^2 + \beta_{LL} (\ln L_{it})^2 \\ + \beta_{KL} (\ln K_{it} * \ln L_{it}) + \beta_E \ln(\text{ESO per employee}_{it-1}) + X_{it} \lambda \\ + \alpha_i + \tau_t + u_{it}$$

- X_{it} is a vector of time-variant control variables including $\ln(\text{average employee tenure}_{it})$, $\ln(\text{firm age}_{it})$, industry-specific quadratic time trends.
2. **Replace key independent variables as follows:**
 - $\Rightarrow \ln(\text{ESO per participant}_{it-1}) + \ln(\text{Participant rate}_{it-1})$
 - $\Rightarrow \ln(\text{ESO per employee}_{it-1}) + \ln(\text{ESO share}_{it-1})$
 - ESO share_{it} may capture managerial entrenchment effect.

Empirical Strategy

3. Accounting for possible endogeneity of ESO variables by using IVs:
 - 1) highest matching rate among the firm's peers
 - 2) the average proportion of stable shareholders in ownership for the peer group; and
 - 3) interaction term involving the above two variables.
- the peer group is defined as those in the same industry, which use the same securities firm to manage ESO fund and accounts.
 - In order to keep at least three firms in the same peer group all the time, we put together neighboring industries to form coherent peer groups.

Empirical Strategy

5. Repeat similar analyses for three other outcome variables:
 - a) Profitability (ROA)
 - b) Wages
 - c) Tobin's Q
6. Study possible Heterogeneous Effects
 - a) Do the effects of ESO vary, depending on ownership structure (powerful institutional investors and foreign investors)?
 - b) Do the effects of ESO vary, depending on firm size, firm age, and the use of stock option?

Main FE Estimation Results

1. An increase in the overall intensity of the existing ESO plan results in statistically significant and economically meaningful productivity gains.
2. Increasing stake of the existing core participants is more effective in boosting gains from ESO Plans than bringing in more employees into the trust.
3. Such productivity gains are found to be shared between shareholders and employees in the form of higher wage and Tobin's q .
4. Long-term gain captured by Tobin's q is greater than short-term gain captured by ROA.

Main IV Estimation Results

4. Our IV estimates tend to be insignificant due to weak IVs but all coefficients turn out to be greater than FE estimates.
 - Overestimation due to endogeneity bias may not be serious.
 - Restructuring and the adoption of pay-for-performance observed in many firms in 2000s may cause FE estimates underestimated.
5. Results for wage gains and Tobin's Q increases are robust to the use of IVs indicating that a half of the productivity gain goes to employees.

Table 3 The Fixed Effect Estimates of the Effect on Productivity of ESO Plans

	Eq. (1)	Eq. (2)	Eq. (3)	Eq. (1)'	Eq. (2)'	Eq. (3)'
JESOP variables	FE			FE with IVs		
$\ln(\text{ESO per employee})_{t-1}$	0.0945***		0.111***	0.311		0.486
	(0.00762)		(0.00831)	(0.220)		(0.376)
$\ln(\text{ESO per participant})_{t-1}$		0.119***			0.315	
		(0.00895)			(0.227)	
$\ln(\text{participation rate})_{t-1}$		0.0436***			0.391	
		(0.0114)			(0.559)	
$\ln(\text{ESO share})_{t-1}$			-0.0361***			-0.519
			(0.00519)			(0.742)
Observations	23,094	23,094	23,094	14,407	14,407	14,407

Table 5 The Fixed Effect Estimates of the Effect on ROA of ESO Plans

	Eq. (4)	Eq. (5)	Eq. (6)	Eq. (4)'	Eq. (5)'	Eq. (6)'
VARIABLES	FE			FE with IVs		
$\ln(\text{ESO per employee})_{t-1}$	0.00963*** (0.000797)		0.0117*** (0.000894)	0.00701 (0.0158)		0.00914 (0.0381)
$\ln(\text{ESO per participant})_{t-1}$		0.0135*** (0.00102)			0.00837 (0.0166)	
$\ln(\text{participation rate})_{t-1}$		0.00240** (0.000974)			-0.0320 (0.0454)	
$\ln(\text{ESO share})_{t-1}$			-0.00505*** (0.000705)			-0.00734 (0.119)
Observations	21,260	21,260	21,260	13,455	13,455	13,455

Table 6 The Fixed Effect Estimates of the Effect on Wages of ESO Plans

	Eq. (7)	Eq. (8)	Eq. (9)	Eq. (7)'	Eq. (8)'	Eq. (9)'
VARIABLES	FE			FE with IVs		
$\ln(\text{ESO per employee})_{t-1}$	0.0209*** (0.00270)		0.0258*** (0.00281)	0.201** (0.0795)		0.0613 (0.333)
$\ln(\text{ESO per participant})_{t-1}$		0.0229*** (0.00280)			0.205*** (0.0762)	
$\ln(\text{participation rate})_{t-1}$		0.0171*** (0.00428)			0.0871 (0.208)	
$\ln(\text{ESO share})_{t-1}$			-0.0118*** (0.00219)			0.460 (0.993)
Observations	21,242	21,242	21,242	13,440	13,440	13,440

Table 7 The Fixed Effect Estimates of the Effect on Tobin's Q of ESO Plans

	Eq. (10)	Eq. (11)	Eq. (12)	Eq. (10)'	Eq. (11)'	Eq. (12)'
VARIABLES	FE			FE with IVs		
$\ln(\text{ESO per employee})_{t-1}$	0.167***		0.208***	0.415**		0.0260
	(0.0172)		(0.0193)	(0.186)		(0.958)
$\ln(\text{ESO per participant})_{t-1}$		0.228***			0.440**	
		(0.0213)			(0.191)	
$\ln(\text{participation rate})_{t-1}$		0.0528***			-0.309	
		(0.0154)			(0.521)	
$\ln(\text{ESO share})_{t-1}$			-0.0964***			1.336
			(0.0104)			(3.001)
Observations	21,261	21,261	21,261	13,455	13,455	13,455

Main Heterogeneity Results

6. The positive effects of ESO plans are found to become larger as the proportion of institutional investors and foreign investors rises.
 - Such powerful outside shareholders may be reducing the adverse managerial entrenchment effect of ESO Plans.
7. Productivity gains from ESO plans are found to be more limited for smaller and younger firms.
 - Consistent with the institutional complementarity view that ESO is an integral part of the Japanese High Performance Work System (HPWS)--which are more pervasive among larger and older firms in Japan.

Table 8 Interplays between ESO per employee and Ownership Structure in the productivity effects

	Fixed Effect Estimates (1989-2013)			
Dependent Variables	Value Added		Wages	
Lagged Explanatory Variables	(1)	(2)	(3)	(4)
$\ln(\text{ESO per employee})_{t-1}$	0.0879***	0.0884***	0.0204***	0.0204***
	(0.0077)	(0.0076)	(0.0027)	(0.0027)
$\ln(\text{ESO per employee})_{t-1}$ * high ownership share of institutional investors (5th quintile)	0.0350**		0.0026*	
	(0.0157)		(0.0015)	
$\ln(\text{ESO per employee})_{t-1}$ * high ownership share of foreign investors (5th quintile)		0.0352**		0.0027*
		(0.0165)		(0.0016)
Observations	23,094	23,094	21,242	21,242
Number of firms	1,729	1,729	1,617	1,617

Table 8 Interplays between ESO per employee and Ownership Structure in the productivity effects

	Fixed Effect Estimates (1989-2013)			
Dependent Variables	ROA		Tobin's Q	
Lagged Explanatory Variables	(5)	(6)	(7)	(8)
$\ln(\text{ESO per employee})_{t-1}$	0.00919***	0.00917***	0.159***	0.160***
	(0.00080)	(0.00080)	(0.018)	(0.018)
$\ln(\text{ESO per employee})_{t-1}$ *high ownership share of institutional investors (5th quintile)	0.00248***		0.0467**	
	(0.00094)		(0.0147)	
$\ln(\text{ESO per employee})_{t-1}$ *high ownership share of foreign investors (5th quintile)		0.00277***		0.0455**
		(0.00095)		(0.0152)
Observations	21,260	21,260	21,261	21,261
Number of firms	1,617	1,617	1,617	1,617

Table 12 The heterogeneous productivity effect of ESO Plans

	(1)	(2)	(3)
VARIABLES	Stock Option	Small Firms	Young Firms
$\ln(\text{ESO per employee})_{t-1}$	0.0916***	0.102***	0.0978***
	(0.0084)	(0.009)	(0.00784)
$\ln(\text{ESO per employee})_{t-1}$	0.00020		
* Stock option dummy	(0.00099)		
$\ln(\text{ESO per employee})_{t-1}$		-0.0191***	
* med-to-small firm dummy		(0.00926)	
$\ln(\text{ESO per employee})_{t-1}$			-0.00914**
* young firm dummy			(0.00532)

Policy Implications

- Increasing stake is more effective than bringing in more employees into the trust.
⇒ Should offer a higher matching rate and monthly contribution limit for employees in higher job ranks.
- But, offering stock options to senior management is not enough.
- ESO plans are more effective in firms with stronger external monitoring and complementary high-performance work system practices.

Extension

- Plan to test whether ESO is complementary with other practices typical of the Japanese High Performance Work System (HPWS).
- We use three variables from the Labor-Management Communication Survey conducted by MHLW.
 - Union
 - Joint labor-management committee
 - Shop-floor committee
- Examine how the existence of these communication channels interact with our ESO variables in the production function.

Figure 1 : Key Attributes of ESO Plans over 1989-2013: Balanced Panel of 572 firms

