

DO EMPLOYEE BENEFITS REALLY OFFER NO ADVANTAGE ON FIRM PRODUCTIVITY? AN EXAMINATION OF TAIWAN'S SHIPPING INDUSTRY

Kuen-Hung Tsai
Assistant Professor
Department of Shipping and
Transportation Management
National Taiwan Ocean University
2 Pei-Ning Road, Keelung 202, Taiwan
Fax: 886-2-27390615
E-mail: atmas@mail.cier.edu.tw

Kung-Don Yu
Professor
Department of Shipping and
Transportation Management
National Taiwan Ocean University
2 Pei-Ning Road, Keelung 202, Taiwan
Fax: 886-2-24631903
E-mail: b0228@mail.ntou.edu.tw

Shih-Yi Fu
Ph.D. Candidate
Department of Shipping and
Transportation Management
National Taiwan Ocean University
2 Pei-Ning Road, Keelung 202, Taiwan
Fax: 886-2-24284812
E-mail: peterfu@klhb.gov.tw

Abstract: Employee benefits have grown in importance over the past several decades. A lot of past research has explored the issues related to effects of employee benefits. While most typically viewed benefits as hygiene factors and unrelated to productivity and unable to help firms gain competitive advantage, there was a consensus that benefits are valuable in attracting and retaining competent employees. This claim implies that benefits may have a moderating effect on the relationship between labor input and output. Given the limited statistical evidence, this paper sets out to examine the issue. Analytical models based on production function are developed, and several important control variables are considered. Based on two large samples from Taiwan's shipping industry, empirical examinations reveal that employee benefits have a moderating effect on firm productivity, irrespective of industry or firm size. Furthermore, the effect size is greater in small and medium enterprises (SMEs) than that in large firms.

Key Words: employee benefits, firm productivity, shipping industry

1. INTRODUCTION

Employee benefits have grown in importance over the past several decades. Employee benefits are the membership-based and nonfinancial rewards offered to attract and keep employees (Decenzo and Robbins, 2002). Along with the increasing costs of employee benefits, the effects of such programs have received more attention. Over the last two decades, much research has explored issues related to effects of employee benefits at individual levels. On the whole, most studies explored the impact of employee benefits on turnover intention or satisfaction (e.g. Heneman, 1985; Sutton, 1985; Baber *et al.*, 1992; Buchko, 1992; Hennessey *et al.*, 1992; Gionfriddo and Dhingra, 1999; Miller *et al.*, 2001; Williams *et al.*, 2002). Few articles or case studies examined the impact of employee benefits on firm productivity even though many researchers stressed such effects (e.g. Beam and McFadden, 1988; Evers, 1998; Federico and Goldsmith, 1998; Steere, 2000; Laabs, 2000; Kurlander and Barton, 2003). As a result, little statistical evidence is available regarding the contribution of employee benefits to productivity, in particular, at firm level.

Usually, employee benefits—viewed as a hygiene factor and provided to employees because of membership in the organization—do not motivate employees (Rosenbloom and Hallman, 1981; Hills, 1987; Milkovich and Newman, 1990). Benefits may be valuable in recruiting and retaining employees, but are typically unrelated to productivity (Adigun and Stephenson, 1992; Mondy *et al.*, 2002). Furthermore, citing various studies, Hennessey (1989) argued that benefits cannot help firms achieve competitive advantages. Similarly, Huseman *et al.* (1978), Sutton (1986), and McCaffrey (1987) argued that benefits can be seen as a means to meet organizational objectives, such as increasing morale and retaining and attracting good employees; however, they claimed that benefits can affect employee attitudes and performance through operation of benefit programs. Hennessey *et al.* (1992) contended that mixed views result from benefit awareness. He argued that if employees are completely unaware of benefits, they bring no motivation to organizational productivity. His investigation further demonstrated that benefit-awareness intervention has a significant impact on perceived organizational productivity.

A couple of points, however, are worth noting. First, although previous studies reviewed here present different viewpoints concerning the impact of benefits on competitive advantage, there is a consensus that benefits help firms get good employees. Indeed, this consensus suggests that benefits should not serve as a regressor but as a moderator variable, a “third” variable that alters or has a contingent effect, on labor productivity. In other words, benefits may enhance the effect size of labor input on firm output through the retention and recruitment of competent employees. However, the moderating role of benefits on labor productivity has never been examined. Second, except for the study of Hennessey *et al.* (1992), little is known about possible relationships between benefits and firm productivity. However, even though Hennessey *et al.* (1992) investigated the impact of benefits on organizational productivity, the examination was based on employee perception rather than objective measures. In other words, the demonstration of objective relationship between benefits and objective measures of productivity needs further study. Finally, the level of investigation in past research focused on collection of data (unit of analysis) about individuals. Thus, results cannot straightforwardly link employee benefits of a firm to competitive advantage or may bring bias because of sample dependency.

Hence, this study examines the moderating (contingent) effect of benefits on productivity. In contrast to prior empirical research, this article sets the analytical unit at the firm level to link employee benefits to firm productivity. This analysis concentrates on Taiwan’s ocean shipping. As Taiwan’s economic development heavily relies on international trade, ocean shipping plays a key role on international cargo transportation that is important to the economic growth of the island. Thus, the issues related to the development of shipping industry should be worth concerning, especially in the field of academic research. The contribution of employee benefits to firm productivity is one of the interesting issues. However, little attention has been given to the relationship between employee benefits and shipping productivity. This study therefore focuses on such an issue and the analysis concentrates on Taiwan’s shipping industry, including ocean carrier, shipping agency and ocean freight forwarder. Hence, by focusing on Taiwan shipping industry, this paper hopes to increase industrial competition advantages in the international market.

2. RESEARCH HYPOTHESES

According to social-exchange theory, the more valuable the activity of another is to a person, the more valuable the approval he gives in return (Homans, 1958). This view implies that firms offering more voluntary compensation should have a better chance of attracting or retaining good workers to contribute their skills and knowledge. A lot of studies contend that benefits are a useful means to motivate, retain and attract qualified employees (e.g. Beam and McFadden, 1988; Evers, 1998; Federico and Goldsmith, 1998; Steere, 2000; Laabs, 2000; Kurlander and Barton, 2003). Also, many firms provide benefit programs concerning employee-skills development in the belief that such investments will strengthen their work forces (Cantoni, 1997).

Since employee benefits help firms recruit and retain high-quality employees that are seen as strategic resources in achieving competitive advantage (Lado and Wilson, 1994; Fernandez *et al.*, 1999; Nerdrum and Erikson, 2001; Horwitz *et al.*, 2003), one can expect that overall attractiveness of organizations can be enhanced through benefit offerings and that employees will then be influenced to feel greater satisfaction and loyalty. As a result, this should lead to greater effort and productivity. In short, higher benefits may increase firm productivity by attracting or retaining labor of better quality. Lipold's (2002) case study confirmed this argument. In other words, benefits may be a moderating role and enhance the positive effect of labor input on firm output through the retention and recruitment of competent employees. Therefore, the first research hypothesis in this study is provided as follows:

H₁: Employee benefits have a positive moderating effect on firm productivity.

Since employee benefits are always provided as a group-based reward system, free-rider problems limit incentive effects. In other words, individuals have incentives to shirk work even though all employees gain more if all cooperate in working harder (Weitzman and Kruse, 1990). Some studies suggested that free-rider problems may be overcome by developing team norms of encouraging social-enforcement mechanisms and promoting group cohesion (e.g. Fudenberg and Maskin, 1986; Blasi *et al.*, 1996). Since free-rider problems are lessened in small firms, such cooperative norms should be easier to establish and maintain in small firms than large companies. Moreover, benefit programs at small and medium-sized enterprises (SMEs) vary more, which implies a larger difference of benefit effect in retaining and attracting good employees. Hence, it can be expected that the moderating effect of employee benefits on growth of firm productivity in SMEs is stronger than in large firms. Thus, the second research hypothesis is provided as follows:

H₂: Employee benefits of smaller firms have stronger moderating effect on firm productivity than those of larger firms.

3. METHODOLOGY

3.1 Model

Because analytical frameworks in prior research related to firm productivity are frequently derived from the Cobb-Douglas production function, the basic model in this study is also based upon the log form of such function:

$$q = a + \lambda t + \alpha l + \beta k + \varepsilon, \quad (1)$$

where q , l and k represent logarithms of output, labor and physical capital; a is a constant; t is time in years; λ is the rate of disembodied technical change (i.e., the change of technology does not arise from the accumulation of input factors); α and β are output elasticity of labor and physical capital—ratio of growth rate of value added to growth rate of labor or physical capital—and ε is the unexplained term.

Since the impact of employee benefits on firm productivity is through input of labor quality, here, output elasticity of labor (α) is further considered as a function of benefits. Generally speaking, attractiveness of firms is influenced by benefits offered. Thus, the function can be expressed as the explicit form: $\alpha = \alpha_0 + \alpha_1 bf$, where bf represents employee benefits a firm offers. In other words, α_0 is a constant term of the function of benefits ($\alpha = \alpha_0 + \alpha_1 bf$). Accordingly, Equation (1) can be further rewritten as follows:

$$q = a + \lambda t + \alpha_0 l + \alpha_1 bf^* l + \beta k + \nu, \quad (2)$$

where α_0 is the output elasticity of labor; α_1 is the impact of employee benefits on labor-output elasticity; ν is the error term. Obviously, here, employee benefits are deemed as a moderator variable instead of direct-explanatory variable between labor input and value-added output.

Outsourcing noncore activities are popular with many shipping firms. Benefits arising from outsourcing on production efficiency or firm competency have been addressed in past studies (e.g. Richardson, 1993; Chesbrough and Teece, 1996). Thus, outsourcing is expected to be an explanatory factor of productivity difference among firms, and then is treated as a control variable. In addition, organizations that offer higher direct financial compensation have higher chance of attracting high-quality, productive employees and so achieve lower per-unit labor costs in the same labor market (Jones and Takao, 1995; Mondy *et al.*, 2002). Direct financial compensation is always based on job-related skills and knowledge, competency or performance to improve productivity in shipping organizations (Hill, 1993). Hence, except for employee benefits, direct financial compensation is considered another moderator of labor-output efficiency in this study.

Since the effect of employee benefits examined here is put on labor-output elasticity and since labor productivity is one of the key determinants of enterprise efficiency and cost structure, accordingly, Equation (2) is further re-expressed as a linear term of labor productivity:

$$(q/l) = a + \lambda t + \alpha_1 bf^* l + \alpha_2 w^* l + \beta(k/l) + \theta l + \gamma c + \nu, \quad (3)$$

where (q/l) and (k/l) are the logarithms of labor productivity and physical capital-labor intensity; w represents direct financial compensation a firm offers; c represents outsourcing; ν is the error term. According to research hypotheses, the theoretical sign of α_1 is expected to be positive.

3.2 Measurement

The estimation of Equation (3) needs seven variables: output, physical capital, labor, employee benefits, direct financial compensation, outsourcing and time. Output is measured here by value added since value creation lies at the heart of competitive advantage for a firm (Porter, 1985; Barney, 1991). Value added is deflated by the weighted-output price index. Labor is simply measured by total employees since data on worker hours is unavailable. The

measure of physical capital is total fixed-gross assets deflated by the gross-fixed-capital index. The respective weighted output price index and the gross fixed capital price index are obtained from the *Statistics of Industrial Production* and the *Trends in Multifactor Productivity*, both published by the Directorate-General of Budget, Accounting and Statistics (DGBAS).

Employee benefits here refer to indirect financial compensation, such as security benefits, health benefits and employee services, including all financial rewards that are not included in direct financial compensation. Since firm size affects expenditure on employee benefits (Kostiuk, 1990; Burke and Morton, 1990), benefit intensity and ratio of benefit expenditure to labor costs are used to measure employee benefits instead. In this study, direct financial compensation refers to pay that a person receives in form of wages, salary, bonuses and commissions. The ratio of direct financial compensation per employee and the average direct financial compensation of the same labor market is used to measure relative the level of direct financial compensation a firm offers. Financial compensation is deflated by the consumer-price index, obtained from the *Statistics of Price Indices*. In addition, outsourcing is measured by proportion of outsourcing expenditure to operation costs; time is operationalized by firm age (in years).

3.3 Data and Sample

The examination is based upon two surveys conducted by the Directorate-General of Budget, Accounting and Statistics (DGBAS) in 1997 and 2002. In Taiwan, the DGBAS is responsible for national-industry censuses and surveys. Other than value added, other variables used here are included in these two surveys. Value added is estimated by sales revenue from output less cost of material input (Grant, 2002). A total of 842 shipping firms are collected in the first survey. The sample covers three industries: ocean freight forwarder (374), shipping agency (329), and ocean carrier (139). The second survey collects 813 shipping firms, which also consist of ocean freight forwarder (346), shipping agency (306), and ocean carrier (161). It is worth mentioning that share of sample sizes within each industry accounts for over 85 percent of its population. Since the number of firms within each of the industries is adequate, the sample will be also separately analyzed in this study.

4. ANALYSIS

4.1 Description

Descriptive statistics of major variables for the whole sample and each subsample are reported in Table 1 and Table 2. A couple of interesting points arise from these descriptive statistics. First, significant difference in size exists among firms. Inspection of the two tables, the coefficients of variation (standard deviation to mean ratio) of labor within each industry are around 150 to 350. The figures corresponding to physical capital are even larger. In addition, SMEs dominate the shipping industry; therefore, it is not surprising that the average number of employees in the three industries is fewer than 70 persons. In fact, the positive coefficients of skewness, not listed here, confirm these observations.

Second, Taiwan's shipping firms don't put more emphasis on employee benefits. Statistical examination reveals that the average intensity of employee benefits of all firms significantly decreases (from 9.88 percent to 7.79 percent; $t=5.19$, $p<0.01$), and the trend is found in the

three industries. Among the three industries, benefit intensity of ocean freight forwarder (IND1) are significantly smaller than the others in each time period. Moreover, although the coefficients of variation of benefits intensity are smaller than that of labor or capital, they still suggest that the degree of dispersion of benefits expenditure to labor costs across firms within each industry is high.

Third, there are quite a few firms entering ocean carrier (IND3) during the two periods of time. Compared with the first survey, t-test statistics indicate that the average firm age in ocean carrier (IND3) becomes significantly smaller in the second survey ($t=2.38$, $p<0.1$). Actually, this observation may be confirmed from increase in number of firms in IND3.

Table 1. Means and Standard Deviations of Major Variables (first survey)

Variables	All firms	IND1	IND2	IND3
Added value (NT\$1,000)	59,695 (469,408)	20,982 (102,822)	12,744 (22,132)	274,987 (1,121,194)
Labor (persons)	28 (98)	21 (33)	18 (24)	70 (228)
Capital (NT\$1,000)	131,878(1,159,972)	23,317(169,239)	13,538(48,422)	704,073 (2,778,826)
Benefits intensity (%)	9.88 (12.92)	8.02 (11.26)	10.95 (13.02)	12.37 (15.92)
Firm age (years)	12.09 (10.64)	8.31(6.79)	15.01 (11.81)	15.34(12.81)
Outsourcing (%)	3.74 (3.82)	4.04 (3.27)	4.57 (4.25)	0.94(2.68)
# of firms	842	374	329	139

Notes: Standard deviations are in parentheses; IND1 through IND3 respectively represent ocean freight forwarder, shipping agency and ocean carrier.

Table 2. Means and Standard Deviations of Major Variables (second survey)

Variables	All firms	IND1	IND2	IND3
Added value (NT\$1,000)	58,699(429,348)	19,583 (32,861)	18,702 (52,636)	218,782 (946,445)
Labor (persons)	26 (81)	21 (31)	18 (32)	51 (169)
Capital (NT\$1,000)	97,531(1,023,460)	10,658(69,207)	7,927(40,958)	454,530 (2,267,700)
Benefits intensity (%)	7.79 (5.63)	7.07 (5.15)	8.91 (6.11)	7.22 (5.37)
Firm age (years)	12.94 (10.60)	9.98(6.81)	16.58 (12.73)	12.39(10.82)
Outsourcing (%)	4.17 (13.63)	4.72 (16.83)	4.71 (11.38)	1.93(8.86)
# of firms	813	346	306	161

Notes: Standard deviations are in parentheses; IND1 through IND3 respectively represent ocean freight forwarder, shipping agency and ocean carrier.

4.2 Results

Since the distribution of value added meet assumption of normality, ordinary least-squared method (OLS) is adopted to estimate models. Models for the whole sample and each sub-sample are estimated separately. The regression estimates are reported in Table 3 and Table 4. The high adjusted R^2 values (≥ 0.69) demonstrate that the models fit data reasonably well.

Table 3 and Table 4 also indicate that compared with the estimates of α_2 (coefficient of direct financial compensation), the estimates of α_1 for models are rather greater. Moreover, all are nontrivial, significant at the 1 percent significance level. The t-values corresponding to the estimates of α_1 clearly demonstrate that employee benefits have moderating effects on labor-

output elasticity. In other words, employee benefits contribute to firm productivity through enhancement of labor efficiency. In terms of magnitude, while the rate of benefits intensity increases 1 percent, the output elasticity of labor, on average, increases 0.78 percent (in the first survey) and 1.36 percent (in the second survey). This figure suggests that the contingent effect of benefits on firm productivity is quite big, and it is significant. Thus, the empirical evidence supports the first research hypothesis and implies the advantage of employee benefits on firm productivity.

Table 3. OLS Estimation of Regression Models (first survey)

Variables (coefficients)	All firms (n=842)	IND1 (n=374)	IND2 (n=329)	IND3 (n=139)
$Bf \cdot l (\alpha_1)$	0.781 (13.06) ***	0.910 (7.19) ***	0.681 (8.27) **	0.483 (4.91) ***
$W \cdot l (\alpha_2)$	0.539 (39.71) ***	0.508 (20.02) ***	0.430 (17.53) ***	0.310 (8.86) ***
$k/l (\beta)$	0.086 (7.92) ***	0.050 (3.01) ***	0.061 (4.70) ***	0.433 (11.07) ***
$l (\theta)$	0.0004 (1.44)	0.005 (3.65) ***	0.009 (5.42) ***	0.00000007 (0.00)
$c (\gamma)$	0.004 (0.72)	-0.003 (-0.49)	0.001 (0.25)	0.048 (2.33) **
$t (\lambda)$	-0.0006 (-0.3)	0.0027 (0.62)	-0.002 (-0.94)	0.011 (2.07) **
<i>F-value</i>	773.39	245.28	358.85	326.11
<i>Adj-R²</i>	0.847	0.800	0.870	0.936

Notes: t-values are in parentheses; ***, $P < 0.01$; **, $P < 0.05$; *, $P < 0.10$.

Table 4. OLS Estimation of Regression Models (second survey)

Variables (coefficients)	All firms (n=813)	IND1 (n=346)	IND2 (n=306)	IND3 (n=161)
$Bf \cdot l (\alpha_1)$	1.364 (8.32) ***	1.113 (4.21) ***	0.809 (3.88) ***	2.234 (5.72) ***
$W \cdot l (\alpha_2)$	0.443 (29.49) ***	0.369 (14.42) ***	0.392 (16.59) ***	0.339 (10.34) ***
$k/l (\beta)$	0.078 (6.66) ***	0.089 (5.11) ***	0.102 (5.40) ***	0.198 (6.30) ***
$l (\theta)$	0.0005 (1.23)	0.009 (5.68) ***	0.0069 (4.55) ***	-0.0008 (-1.36)
$c (\gamma)$	0.002 (1.39)	0.0015 (0.68)	-0.003 (-1.07)	0.013 (2.15) **
$t (\lambda)$	-0.004 (-1.66) *	-0.007 (-1.32)	0.0008 (0.29)	0.013 (2.03) **
<i>F-value</i>	469.43	135.69	226.65	212.78
<i>Adj-R²</i>	0.768	0.694	0.810	0.890

Notes: t-values are in parentheses; ***, $P < 0.01$; **, $P < 0.05$; *, $P < 0.10$.

Firm size here is treated as a moderator variable in analyzing the difference of moderating effect of employee benefits. Thus, Equation (3) is analyzed further by firm size. Past empirical studies (OECD, 1998) and the **Small and Medium Enterprise Definition Standards** (approved by Taiwan Executive Yuan in 2000) suggested that the enterprises are regarded as large firms, in the case that the number of employees is up to 50 persons in water and services industry. By such a categorical definition, each of the two whole samples is split into two groups, and then the second hypothesis is examined further. The regression estimates of models for large and small and medium-sized enterprises are reported in Table 5 and Table 6. The adjusted R-square values (≥ 0.71) suggest that all models have a good fit.

Table 5. OLS Estimation of Regression Models by Firm Size (first survey)

Variables (coefficients)	Large Firms (n=88)	SMEs (n=754)
$Bf \cdot l (\alpha_1)$	0.276 (2.95) ***	0.881 (15.42) ***
$W \cdot l (\alpha_2)$	0.193 (6.97) ***	0.441 (24.43) ***
$k/l (\beta)$	0.166 (6.08) ***	0.053 (6.00) ***
$l (\theta)$	0.002 (5.56) ***	0.034 (15.16) ***
$c (\gamma)$	0.022 (1.43)	0.014 (3.06) ***
$t (\lambda)$	0.001 (0.27)	-0.001 (-0.55)
<i>F-value</i>	80.96	711.54
<i>Adj-R²</i>	0.855	0.851

Notes: t-values are in parentheses; ***, P<0.01; **, P<0.05; *, P<0.10.

Table 6. OLS Estimation of Regression Models by Firm Size (second survey)

Variables (coefficients)	Large Firms (n=68)	SMEs (n=745)
$Bf \cdot l (\alpha_1)$	0.811 (2.59) ***	0.890 (4.72) ***
$W \cdot l (\alpha_2)$	0.172 (5.37) ***	0.356 (17.31) ***
$k/l (\beta)$	0.101 (3.15) ***	0.067 (6.04) ***
$l (\theta)$	0.002 (3.21) ***	0.033 (10.59) ***
$c (\gamma)$	0.008 (1.18)	0.001 (0.65)
$t (\lambda)$	0.008 (0.98)	-0.006 (-2.71) ***
<i>F-value</i>	36.63	276.29
<i>Adj-R²</i>	0.802	0.710

Notes: t-values are in parentheses; ***, P<0.01; **, P<0.05; *, P<0.10.

Table 5 shows that the estimates of α_1 in the two models all achieve the statistical significance (one-tail test) ($t=2.95$, $p<0.01$; $t=15.42$, $p<0.01$). The t-values in Table 6 also suggest that the estimates of α_1 are greater than zero ($t=2.59$, $p<0.01$; $t=4.72$, $p<0.01$). These results provide support for the first research hypothesis again, and reveal that employee benefits contribute advantages to firm productivity through the improvement of labor efficiency, irrespective of firm size.

Furthermore, multi-sample analysis, suggested by Jöreskog and Sörbom (1993), is adopted to test the difference of moderating effect of employee benefits on firm productivity between SMEs and large firms. The chi-square values show that the differences of estimates of α_1 between large firms and SMEs in these two surveys are significant at the 10 percent significance level ($\chi_1^2=4.32$, $p<0.05$; $\chi_1^2=2.75$, $p<0.1$). The impact of employee benefits on labor-output elasticity in SMEs is greater than that of large businesses. Clearly, these empirical findings confirm the second hypothesis.

4.3 Discussion

A couple of interesting points are worthy of further discussion. First, the results found in the analysis clearly are not consistent with the viewpoint that benefits cannot be used to achieve a competitive advantage. Hennessey (1989) and Hennessey *et al.* (1992) argued that except for employees who know their own benefits and those of competing firms, benefits cannot help firms gain a competitive differential in hiring or produce a significant impact on firm performance. However, analytical models adopted here do not include the variable representing benefit awareness and the estimates of benefits in models still achieve the significance level. Of course, benefit awareness may have been implied in the analysis since many shipping firms in Taiwan attempt to attract and retain knowledge workers by communicating direct and indirect financial compensation.

Second, labor-output elasticity represents efficiency of labor use and has been widely used in empirical research related to firm productivity (e.g. Griliches, 1986; Wakelin, 2001). Efficient companies have higher productivity than rivals and, therefore, lower costs. Thus, this study implies the link between employee benefits and competitive advantage, and confirms claims of previous research (e.g. Hennessey *et al.*, 1992; Lado and Wilson, 1994; Fernandez *et al.*, 1999; Nerdrum and Erikson, 2001).

Third, the examination supports the fact that a linear relationship exists between employee benefits and labor-output elasticity. However, since employee compensation is a component of labor cost, value added may be undermined through excessive benefit expenditure. Hence, this relationship could be a nonlinear form. To allow for nonlinear examination, a quadratic form of relationship between employee benefits and labor elasticity is assumed ($\alpha = \alpha_0 + \alpha_1 bf + \phi bf^2$). Although the estimates of ϕ for all models are negative, they fail to achieve the 5 percent significance level. In other words, empirical evidence cannot provide support for such an examination.

Finally, this study shows the effect of size of employee benefits on labor-output elasticity. In fact, the marginal contribution of labor to value added ($\partial q / \partial l$) arising from employee benefits can be easily estimated further. By the definition of labor-output elasticity, the estimated value of marginal contribution for each firm is equal to the product of estimates of α_l and ratio of value added to labor ($\alpha_l \exp(q/l)$).

5. CONCLUSION

5.1 Summary and Implications

Based upon two large samples in the Taiwan shipping sector, surveyed in different time periods, this article examines the impact of employee benefits on firm productivity. In contrast to previous research, employee benefits in this study are treated as a moderator instead of independent variable. Several important control variables are also considered in analytical models. The examinations reveal that employee benefits have a significant moderating effect on firm productivity whether samples are analyzed by industry or by firm size and that moderating effect of employee benefits on labor productivity in SMEs is greater than that of large firms.

Two important implications for industry managers arise from the above findings. First, the

investment in employee benefits at shipping firms represents not only costs but also profits. A lot of studies suggest that employee benefits are a useful tool in attracting and retaining employees with critical skills (e.g. Beam and McFadden, 1988; Evers, 1998; Federico and Goldsmith, 1998; Steere, 2000; Laabs, 2000; Kurlander and Barton, 2003). Skilled employees have been viewed as a strategic input for a firm to strengthen core competency (Prahalad and Hamel, 1990; Barney, 1991). Hence, firms can use employee benefits to increase employee productivity, and, in turn, achieve competitive advantage. Second, using employee benefits to achieve competitive advantage for SMEs seems to be more important than large companies. However, attractiveness of a top-quality work force at SMEs is low due to lower stability. Since the longitudinal examination of Hennessey *et al.* (1992) demonstrated that benefit awareness moderates the effect of benefit attractiveness in recruiting and retaining qualified employees, managers at SMEs should pay more attention to communicating information about benefit packages offered.

5.2 Limitations and Future Research

This study suffers some major limitations. First, benefit programs consist of different employee benefit types, such as health-care benefits, security benefits, employee services and premium pay (Mondy *et al.*, 2002, p.352), but these types of employee benefits are treated as a package in this study. In essence, such treatment chiefly comes from lack of data because DGBAS surveys do not distinguish categories of benefits. As a consequence, this study cannot provide individual effect of different benefit types on firm productivity. Next, except for the financial part, employee compensation also includes non-financials, such as workplace flexibility and flextime (Mondy *et al.*, 2002, p.372). Since this article confines the examination to financial compensation, the results cannot be generalized to nonfinancial compensation. Furthermore, although this analysis shows the moderating effects of employee benefits on relationships between labor input and value added, the estimations fail to reveal how such impacts are actually realized. Finally, although outsourcing is treated as a control variable in this study, there are still other management innovations cannot be the control variables due to lack of data, and then be treated as the error term of the model.

This analysis does of course leave some interesting subjects open for future research. One of these issues is that re-examination of findings here may be worth carrying out in other industries or longer time periods. Although a large sample size is included in this analysis, the findings come only from examination of cross-sectional survey of Taiwan shipping industries. In order to further validate these findings, a re-examination should be undertaken. The next issue is that there are different types of employee benefits, but little is known about the relationships between benefit type and firm productivity. Therefore, it would be an interesting topic to explore difference of firm productivity by benefit types. Finally, in this study the possibly confusing issue of causality has not been examined. Future output may depend on past benefit investment, while benefit investment, in turn, depends on both past output and future expectations. Given a longer period of time, and detailed lag assumptions, one may be able to analyze a recursive-equation system with current output depending on past benefit investment, and past benefit investment depending on past output rather than current output.

In summary, despite the growing cost of employee benefits, little is really known about effects of benefit level on firm performance. Obviously, this study demonstrates that employee benefits offer advantage in terms of firm productivity through improvement of labor efficiency. Although external validity of findings is worthy of further examination in other contexts, this study has contributed to the understanding of the relationship between

employee benefits and firm productivity.

REFERENCES

- Adigun, I.O. and Stephenson, G.M. (1992), "Sources of job motivation among British and Nigerian employees", **Journal of Social Psychology**, Vol 63 No 3, pp. 369-76.
- Baber, A.E., Dunham, R.B. and Formisano, R.A. (1992), "The impact of flexible benefits on employee satisfaction: A field study", **Personnel Psychology**, Vol 45 No 1, pp. 55-74.
- Blasi, J., Conte, M. and Kruse, D. (1996), "Employee stock ownership and corporate performance among public companies", **Industrial and Labor Relations Review**, Vol 50 No 1, pp. 60-79.
- Barney, J.B. (1991), "Firms resources and sustained competitive advantage", **Journal of Management**, Vol 17 No 1, pp. 99-120.
- Beam, B.T. and McFadden, J.J. (1988), **Employee Benefits**, Dearborn, Chicago.
- Browne, M.W. (1984), "Asymptotically distribution-free methods for the analysis of covariance structure", **British Journal of Mathematical and Statistical Psychology**, Vol 37 No 1, pp. 62-83.
- Buchko, A. (1992), "Employee ownership, attitudes and turnover: An empirical assessment", **Human Relations**, Vol 45 No 4, pp. 711-34.
- Burke, T.P. and Morton, J.D. (1990), "How firm size and industry affect employee benefits", **Monthly Labor Review**, Vol 113 No 12, pp. 35-43.
- Cantoni, C.J. (1997) "Learn to manage pay and performance like an entrepreneur", **Compensation and Benefits Review**, Vol 29 No 1, pp. 52-8.
- Chesbrough, H.W. and Teece, D.J. (1996), "When is virtual virtuous? **Organizing for innovation**", Harvard Business Review, Vol 43 No 1, pp. 65-74.
- Decenzo, David A. and Robbins, Stephen P. (2002), **Human Resource Management**, 7th ed. New York, The Von Hoffman Press, pp. 328.
- Evers, Y. (1998), "Is your benefits package competitive?", **Executive Journal**, Vol 38 No. 1, pp. 4-10.
- Federico, R.F. and Goldsmith, H.B. (1998), "Linking work/life benefits to performance", **Compensation and Benefits Review**, Vol 30 No 4, pp. 66-70.
- Fernandez, E., Monte, J.M. and Vazquez, C.J. (1999), "Typology and strategic of intangible resources- A resource-based approach", **Technovation**, Vol 20 No 1, pp. 81-9.
- Fudenberg, D. and Maskin, E. (1986), "The folk theorem in repeated games with discounting or with incomplete information", **Econometrica**, Vol 54 No 3, pp. 533-54.
- Gionfriddo, J. and Dhingra, L. (1999), "Retaining high-tech talent: NIIT case study", **Compensation and Benefits Review**, Vol 31 No 5, pp. 31-5.
- Grant, R.M. (2002), **Contemporary strategy analysis**, Blackwell, Massachusetts.
- Griliches, Z. (1986), "Productivity, R&D, and basic research at the firm level in the 1970s",

American Economic Review, Vol 76 No 1, pp. 141-54.

Heneman, H.G. (1985), "Pay satisfaction", **Personnel Human Resource Management**, Vol 3 No 1, pp. 115-39.

Hennessey, H.W., Perrewe, P.L. and Hochwarter, W.A. (1992), "Impact of benefit awareness on employee and organizational outcomes: A longitudinal field examination", **Benefits Quarterly**, Vol 8 No 2, pp. 90-6.

Hennessey, H.W. (1989), "Using employee benefits to gain competitive advantage", **Benefits Quarterly**, Vol 5 No 1, pp. 51-7.

Hill, R.B. (1993), "The advantages of a two-component approach to compensation", **Personnel Journal**, Vol 72 No 1, pp. 154-61.

Hills, F. (1987), **Compensation Decision- Making**, The Dryden Press, Chicago.

Homans, G.C. (1958), "Social behavior as exchange", **American Journal of Sociology**, Vol 63 No 6, pp. 597-606.

Horwitz, F.M., Heng, C.T. and Quazi, H.A. (2003), "Finders, keepers? Attracting, motivating and retaining knowledge workers", **Human Resource Management Journal**, Vol 13 No 4, pp. 23-32.

Huseman, R., Hatfield, J. and Driver, R. (1978), "Getting your benefit programs understood and appreciated", **Personnel Journal**, Vol 57 No 5, pp. 560-66.

Jones, D.C. and Takao, K. (1995), "The productivity effects of employee stock-ownership plans and bonus: Evidence from Japanese panel data", **American Economic Review**, Vol 85 No 2, pp. 391-414.

Jöreskog, K.G. and Sörbom, D. (1993), **LISREL 8 User's Reference Guide**, Scientific Software International Inc., Chicago.

Kostiuk, P.F. (1990), "Firm size and executive compensation", **Journal of Human Resources**, Vol 25 No 1, pp. 90-105.

Kurlander, P. and Barton, S. (2003), "Benefits performance?", **Workspan**, Vol 46 No 11, pp. 31-6.

Laabs, J. (2000), "Demand performance for benefits", **Workforce**, Vol 79, pp. 42-6.

Lado, A.A. and Wilson, M.C. (1994), "Human resource systems and sustained competitive advantage: A competency-based perspective", **Academy of Management Review**, Vol 19 No 4, pp. 699-727.

Lipold, A.G. (2002), "Benefit integration boosts productivity and profits", **Workforce**, Vol 81, pp. 46-50.

McCaffrey, R. (1990), "Organizational performance and the strategic allocation of indirect compensation", **Human Resource Planning**, Vol 12 No 3, pp. 229-38.

Miller, J.S., Hom, P.W. and Gomez-Mejia, L.R. (2001), "The high cost of low wages: Does Maquiladora compensation reduce turnover?", **Journal of International Business Studies**, Vol 32 No 3, pp. 585-95.

Milkovich, G. and Newman, J. (1990), **Compensation**, BPI Irwin, IL.

Mondy, R.W., Noe, R.M. and Premeaux, S.R. (2002), **Human Resource Management**, Prentice Hall, NJ.

Nerdrum, L. and Erikson, T. (2001), "Intellectual capital: A human capital perspective", **Journal of Intellectual Capital**, Vol 2 No 2, pp. 127-35.

OECD (1998), "SMEs and e-commerce", **Ministerial Conference on E-commerce**, Ottawa, Canada.

Prahalad, C.K. and Hamel, G. (1990), "The core competency of the corporation", **Harvard Business Review**, Vol 37 No 3, pp. 24-45.

Porter, M. (1985), **Competitive Advantage**, Free Press, NY.

Richardson, J. (1993), "Parallel outsourcing and supplier performance in the Japanese automobile industry", **Strategic Management Journal**, Vol 14, pp. 339-50.

Rosenbloom, J. and Hallman, V. (1981), **Employee Benefits Planning**, Prentice-Hall, NJ.

Steere, R. (2000), "Vision care: An important employee benefits", **Compensation and Benefits Management**, Vol 16, No 1, pp. 46-50.

Sutton, N. (1985), "Do employee benefits reduce labor turnover?", **Benefits Quarterly**, Vol 1 No 2, pp. 16-22.

Sutton, N. (1986), "Are employees meeting their benefit objectives?", **Benefits Quarterly**, Vol 2 No 3, pp. 14-20.

Weitzman, M. and Kruse, D. (1990), "Profit sharing and productivity", in Blinder, A.S. (Ed.), **Paying for Productivity: A Look at the Evidence**, Brookings Institution, Washington, D.C, pp. 99-141.

Williams, M.L., Malos, S.B. and Palmer, D.K. (2002), "Benefit system and benefit level satisfaction: An expanded model of antecedents and consequences", **Journal of Management**, Vol 28 No 2, pp. 195-215.