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ORIGINAL ARTICLE

Job satisfaction and firm earnings—Evidence from matched survey and register data

Nis Lydiksen[1] | **Andreas Gotfredsen**[1] | **Jacob Ladenburg**[2] | **Helle Stenbro**[3]

[1]Kraka Advisory, Copenhagen, Denmark

[2]Department of Technology, Management and Economics, Technical University of Denmark (DTU), Lyngby, Denmark

[3]Videncenter for God Arbejdslyst, Krifa, Denmark

Correspondence
Jacob Ladenburg, Technical University of Denmark (DTU), Department of Technology, Management and Economics, Produktionstorvet, 424, 024, 2800 Kgs. Lyngby, Denmark.
Email: jlad@dtu.dk

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Abstract

This study examines the relationship between employee job satisfaction and firm performance in a sample of Danish private sector firms. The study relies on a representative survey merged with administrative data and accounting information for a sample of 1,929 Danish firms representing all economic sectors. The results of this study suggest that the average job satisfaction on the firm level positively affects the firms' pre-tax earnings. The effect amounts to a 7.9% increase per point increase in job satisfaction when job satisfaction is measured on a scale from 0 to 10. Furthermore, the study finds that workers' satisfaction with achievements at the job and their satisfaction with management are specifically related to better performance.

JEL CLASSIFICATION

D24, J28

1 | INTRODUCTION

Workers being satisfied with their job are inherently a good thing—at least for the worker. However, more satisfied workers might also be more productive. Consequently, job satisfaction is also a positive worker characteristic for the employer. The happy-productive worker thesis (see Wright & Cropanzano, 2007) stipulates that more satisfied workers are also more productive.

The happy-productive worker thesis also highlights a key policy question of whether increasing job satisfaction (JS) is ultimately worth the potential costs from the employer's perspective.

Despite the potential benefits, from the employer's side, the impact of JS on the organization's performance is still relatively understudied as most studies focus on individual performance. There is especially little knowledge about the connection between JS components and the organization's performance (Eberegbe & Giovanis, 2020).

We examine the connection between the employee's JS and the firms' overall financial performance for a representative sample of Danish workers and firms. Despite a relatively small labour force, the potential relation between employees' JS and financial performance is particularly relevant to test using Danish labour data. The Danish labour market model (The Danish model) is characterized as a flexicurity model, where the employers and employees, represented by trade unions, settle on pay and working conditions in collective agreements. This includes a cap on the weekly working hours, at least 5 weeks of vacation and paid maternity leave. A distinct feature in the model is the flexibility for employers to hire and fire the permanent staff needed relatively easily. The security in the system stems from the Danish daily benefit system and an active labour market policy. This means that unemployment benefits guarantee an income in the event of unemployment, and labour market policy ensures the possibility to continue education and training of skills. In combination, the flexicurity model supports an active labour market, which on one hand supports employees to act hire and fire new employees, but also supports employees to seek for new and better matched job opportunities. As a consequence, Danish employees have one of the highest turnover rates (OECD, 2018), while also being among the most job satisfied globally (Eskildsen et al., 2010; Kristensen & Johansson, 2008; Sousa-Poza & Sousa-Poza, 2000). These key features of the Danish labour market and especially the general high level of job satisfaction make it even more relevant to explore and test the relation between JS and the firms' financial performance.

We combine three data sources measuring the JS of 2,702 workers employed at 1,925 unique firms for this study. First, we identify JS and the components of JS in a representative sample of Danish employees collected using the God Arbejdslyst Indeks-survey [Job Satisfaction Index-survey] developed by Videncenter for God Arbejdslyst [Job Satisfaction Knowledge Center] at the Danish trade union Krifa. Second, we identify firm performance based on a dataset of the accounting information for all Danish limited liability companies. Third, we identify background information for the firms based on employer-employee linked administrative data. From the three data sources, we create a dataset to relate the average JS to the firm's financial performance measured as the earnings before tax per employee. We also control for a range of firm characteristics and proxy for prior financial performance.

We find a positive relationship between the average JS and earnings of the firm. Our JS effect estimate amounts to a 7.9% increase in earnings per employee per point increase in JS measured on a scale from 0 to 10. Our results apply to all sectors in the sample and specifically to *both* the service and manufacturing sectors. Finally, we find evidence that firm performance is specifically related to the average satisfaction with management and workers' sense of achievement. The feeling of professional pride was related to lower overall performance.

Our results contribute to the literature in three ways. First, our study uses an objective performance measure—the firms' earnings. The earlier literature has used proxy variables or subjective measures of performance (ex. quits, absenteeism or managers self-reported evaluation of performance, see Wright and Cropanzano (2007)) measured at the level of the individual worker. We add to a small literature that uses objective measures of firm performance. Most closely related to our study is Böckerman and Ilmakunnas (2012) that used labour productivity as the dependent variable. Using the firms' earnings as the dependent variable, we can identify value at a higher level for the firm and thus be more closely related to the objective function. Our finding that firms with higher average JS also have higher earnings translates directly into the potential for the individual firm.

Second, we show that the association between JS and firm performance can be generalized to the entire private sector. Earlier work has focused either on certain firms or particular sectors. Böckerman and Ilmakunnas (2012), for example, focus on manufacturing plants and cannot link JS to performance in the service sector. As our primary measure of performance, firm earnings, are available for both the service and manufacturing sector, our main estimates of the positive connection between JS applies to both.

Third, we show that certain components of JS are specifically related to performance. Especially employee satisfaction with management and satisfaction with the results from the employee's work had a significant effect on the firms' performance. The average satisfaction with the professional standard at the firm had a negative relationship with earnings. Our finding resembles the result in Eberegbe and Giovanis (2020) finding job security, training, income and sense of achievement to be the major components of JS. We add to this study by establishing the relationship for an objective performance measure. Establishing which components of JS are specifically related to better performance provides actionable insights to firms on which factors of JS potentially affect performance.

1.1 | Job satisfaction and performance

The potential for JS in shaping organizational and individual performance has spurred a large and long-lived literature investigating the connection between the two. JS has been called the Holy grail for human resource management with the promise of fostering more productive workers (Landy, 1989).

The connection between JS and performance has generally been discussed as the happy/productive worker thesis (Judge et al., 2001; Wright & Cropanzano, 2007). With basis in the happy/productive worker hypothesis, JS connects to individual productivity through three factors. The first component is through a 'moral' effect. Workers with better satisfaction might better internalize the organization's goals and may work more diligently for this reason. JS, additionally, links to lower accident rates, which should also lead to higher productivity. The second factor is that employees with better JS could be more productive due to less absenteeism. More satisfied workers could be less prone to illness and less likely to be absent from work for more general reasons. For the organization, filling the gap from the absent worker likely leads to lower productivity. The third factor is that less satisfied workers might be more likely to quit their job. Replacement costs to hire and train a new worker are substantial and could lead to lower productivity and profit for the organization (Bingley & Westergaard-Nielsen, 2004).

Several studies have empirically linked JS to individual productivity. In a review of 312 studies covering 54,417 observations, Judge et al. (2001) found a positive correlation between JS and individual performance of 0.3. In a similar review, Lyubomirsky et al. (2005) find a correlation of 0.2 between overall subjective wellbeing and performance based on 19 cross-sectional studies. Recently the link between individual performance and JS has also been established in an experimental setting by Oswald et al. (2015).

Another strand of literature flips the production satisfaction coin and examines how performance pay (incentives to high productivity) influences JS (Artz, 2008; Bauer, 2004; Brown & Sessions, 2003). The findings are positive, though mixed. Artz (2008) finds that the positive correlation between performance pay and JS is primarily among union workers and males. Brown and Sessions (2003) find that though performance pay is significantly related to higher JS, some performance pay schemes might not be equally related to higher productivity.

Most evidence on the link between JS and performance focuses on the individual worker's performance. Evidence at the individual level could arguably translate to the whole organization. However, it is unclear if this is the case. This has spurred researchers to study the link between JS and performance at the organizational level. Two large meta-analyses of Gallup Workplace Audits find a significant, strong, and positive correlation between JS and the organization's performance (Harter et al., 2002; Krekel et al., 2019). The two studies use measures of wellbeing covering 82,248 and 7,939 business units. Another line of inquiry finds that companies rated as the '100 Best Companies to Work For in America' generated 2.3%–3.8% higher stock returns per year than their peers from 1984 through 2011 (Edmans, 2012).

Most related to our study is a series of studies that investigates the connection between JS and performance at the micro level for plants and firms using regression models. Böckerman and Ilmakunnas (2012) examine the connection between JS and productivity for a sample of Finish manufacturing plants by combining survey data on JS with administrative data on plan productivity. The authors' baseline specification finds that a one-point increase in JS on a 1–6 scale is associated with a 3.6 percentage point increase in the value-added per employee. When accounting for fixed effects in the panel of plants, this estimate increases to 9 percentage points. Eberegbe and Giovanis (2020) extend on the organizational level analysis by considering the components of JS. Eberegbe finds that job security, training, satisfaction with income and the employees' sense of achievement were the most important components.

2 | DATA

2.1 | Job satisfaction

We measure JS based on a Danish employee's work environment and JS survey designed by Videncenter for God Arbejdslyst to develop the God Arbejdslyst Indeks. In the survey, 4,499 persons, representative of all Danish employees in 2019,[1] gave information about their JS and general work environment and could be linked to administrative registers. This paper focuses on the part of the survey regarding JS. JS is measured as the average of three Likert scale questions ranging from 1 to 10. The three questions were: 'To what degree are you satisfied with your work', 'to what degree do you feel happy in your work' and 'to what degree do you feel motivated in your work'. Similarly, the survey measures seven dimensions of the overall JS based on a factor analysis what other survey answers correlated with overall JS. The seven dimensions were 'meaning ', 'balance', 'leadership', 'influence', 'results', 'mastering' and 'colleagues'. We compute the JS scores for each firm as the average of all surveyed employees for firms where at least one employee is surveyed. In this way, we end up with a sample of 1,929 firms. Table 1 shows the number of firms and employees in the sample and the number of employees sampled at each firm. For most firms (81% of firms and 59% of employees in the sample), JS is measured based on one sampled employee. For 328 firms, more than one employee is sampled.[2]

2.2 | Firm performance

Statistics Denmark collected the survey data. Therefore, we can link employees to employers and employers to accounting information using unique firm identifiers. We base our measures

TABLE 1 Number of employees and firms in the sample

	Number of firms	Number of sampled employees	The average number of employees in the firm
One employee sampled	1,601	1,601	99
Two employees sampled	192	384	437
Three or more employees sampled	136	717	1,822

Note: The table shows the number of firms in categories by how many employees were sampled at each firm.

of firm performance on accounting data. More precisely, the firms' earnings. The main specification defines performance as the firms' ordinary earnings before taxes. The measure is available for firms in all sectors and is close to the firms' objective profit maximizing function.[3] We obtain data on firm performance from the Experian database on all Danish companies' accounting information. This database holds information on all Danish limited liability companies. As not all companies are not limited liability companies and as a significant share of the Danish workforce is employed in the public sector, only 2,707 employees out of the 4,499 in the survey are matched to a firm. From the Experian data, we additionally identify the capital stock of the firm, measured as the firm's total assets, the firm's establishment year, and the sector of the firm, expressed by the EU NACE nomenclature.

2.3 | Employee background

We identify additional firm characteristics based on the firms' characteristics. Employees have, similarly to firms, a unique identifier. We can link employees to background characteristics available in administrative registers maintained by Statistics Denmark using the identifier. Here, we are not limited to employees in the survey but include all employees in the population. In this way, we identify each employee's age, education length, and combined tenure. We aggregate these background variables to the firm level as the average of each variable and include these as control variables in the regression. The firm formance and employee descriptives are in Table A5.

3 | METHOD

Similarly to Böckerman and Ilmakunnas (2012), we relate firm performance to JS in the following equation:

$$\ln\left(\frac{earnings_i}{total\ employees_i}\right) = \beta_0 + \beta_1 average\,JS_i + \beta_2 \ln\left(\frac{capital\ stock_i}{total\ employees_i}\right) + \boldsymbol{\beta_3 X_i} + \varepsilon_i \qquad (1)$$

where $earnings_i$ is the firms' earnings before tax in 2019 and $average\,JS_i$ is the average JS of all surveyed workers at the firm level. $Capital\ stock_i$ is the firms' combined assets in 2019. We measure earnings and capital stock per employee by dividing them by the total number of employees at the firm in 2019. The number of employees is identified based on all employees in the population from the administrative registers and not the number of surveyed employees. By standardizing earnings and capital stock, we can compare firms of different sizes. $\boldsymbol{X_i}$ is a vector of control variables that potentially correlate with earnings. $\boldsymbol{X_i}$ includes the firm's establishment year, the firm's geographical location,[4] the number of employees, the average education length, age, and tenure of the firm's employees.

The coefficient on $average\,JS_i$ is the parameter of interest. The JS coefficient can be interpreted as the percentage point increase in earnings related to a one-point (measured on a scale from 0 to 10) increase in JS due to the logarithmic transformation of earnings.

JS can influence firm performance, but the reverse causal relationship could also exist—employees in worse-performing firms could suffer worse JS because of the poor performance. As our data on both JS and earnings are measured in 2019, we cannot, in a simple regression of earnings on JS, point to the direction of the causal relationship. To control for the possible reverse causality between JS and firm performance, we include in $\boldsymbol{X_i}$ in Equation (1) an indicator for the firm's growth in the main specification. By assuming that distressed firms will lay off employees, we can proxy worse-performing firms as firms with negative employment growth from 2017 to 2019. Including the change in employees enables us to compare firms with a similar growth pattern. Therefore, our results will apply to firms with a similar growth profile from 2017 to 2019 and limit the degree to which our result could be caused by poor earlier performance and not current JS.

Similarly to Erickson and Jacoby (2003), we estimate Equation (1) using a Tobit regression as the dependent variable is censored at 0 in our main specification. For 394 firms, the earnings are negative or 0, which means that the logarithmic transformation is undefined. The Tobit specification allows us to use the logarithmic transformation while retaining information for the firms with negative earnings by classifying these observations as being censored. We prefer the logarithmic transformation for two reasons. First, we can interpret the regression similarly to a Cobb-Douglass production function with constant returns to scale. Second, the earnings data exhibits a high degree of skewness, and the logarithmic transformation improves the linearity of the relationship between JS and earnings. Using the logarithmic transformation potentially improves our results' interpretability, as we can interpret the resulting coefficients as percentage effects and have good model properties when estimating positively skewed data (Benoit, 2011).

4 | RESULTS

4.1 | Graphical relationship between job satisfaction and firm earnings

Figure 1 shows the distribution of the reported JS. For the 1,529 firms with positive earnings, Figure 2 shows a positive relationship between JS in 18 equally sized bins and the average log of firm earnings. However, this relationship could be caused by other underlying factors correlated with JS and earnings or a reverse causal relationship. We elaborate on the relationship between JS and earnings in a regression model.

4.2 | Baseline estimates

Table 2 reports the baseline estimates from estimating Equation (1) for the full sample of firms. The first column of Table 2 shows the baseline result from Equation (1), including controls for

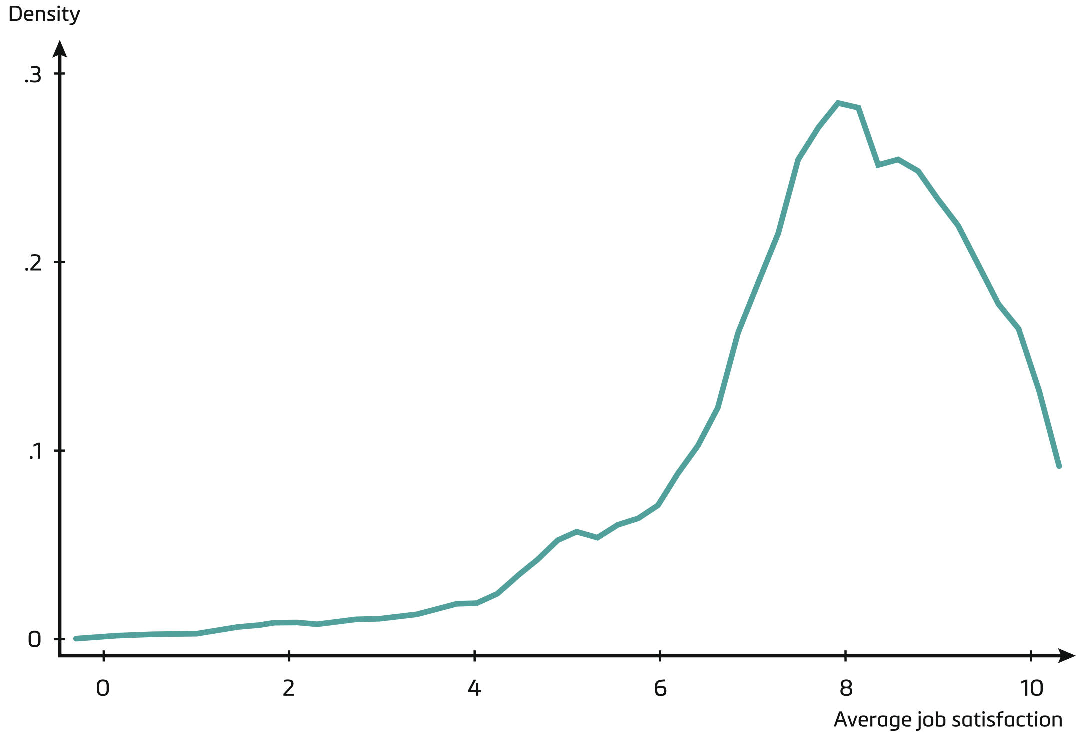

FIGURE 1 Density estimates for average JS. The figure shows kernel density estimates for JS for the 1,929 firms in our sample. JS is measured as the average score for all surveyed employees at the firm level across all firms with at least one surveyed employee.

size, sector, foundation year and employee characteristics of the firm. The estimation is based on 1,925 firms in the full sample with non-missing values for the control variables. We drop four firms with missing values for either of the control variables. For the baseline specification, we get a coefficient on the average JS in the firm of 0.0845. The estimate denotes that a 1-point increase in the average JS in the firm increases earnings by 8.45%. An 8.45% improvement in earnings is arguably a significant potential gain from better JS for the firm. Nevertheless, improving the average JS by 1 point would also be a challenge for the individual firm as most firms in the sample already have high levels of JS, as shown in Figure 1. A one standard error increase in JS (an increase of 1.69 points in JS) corresponds to a more modest effect on earnings of 1.43%.

In column 2, we add information on the prior growth of the firm to the model. We add an indicator variable equalling one for those firms that have had a negative change in the number of employees from 2017 to 2019. We control for the firm's growth to take into account that the effect on JS in column 1, while controlling for a range of firm and employee characteristics, could still be driven by a reverse causal relationship between JS and earnings. At the firm level, we control for the change in the number of employees. Consequently, we can compare firms with a similar growth pattern prior to the JS measurement in 2019. The coefficient on the indicator for firms with negative employee growth is −0,492. This means firms with a negative change in the number of employees had earnings that were 49% compared with firms with no change or a positive change in the number of employees. In our sample, 24% of firms had a

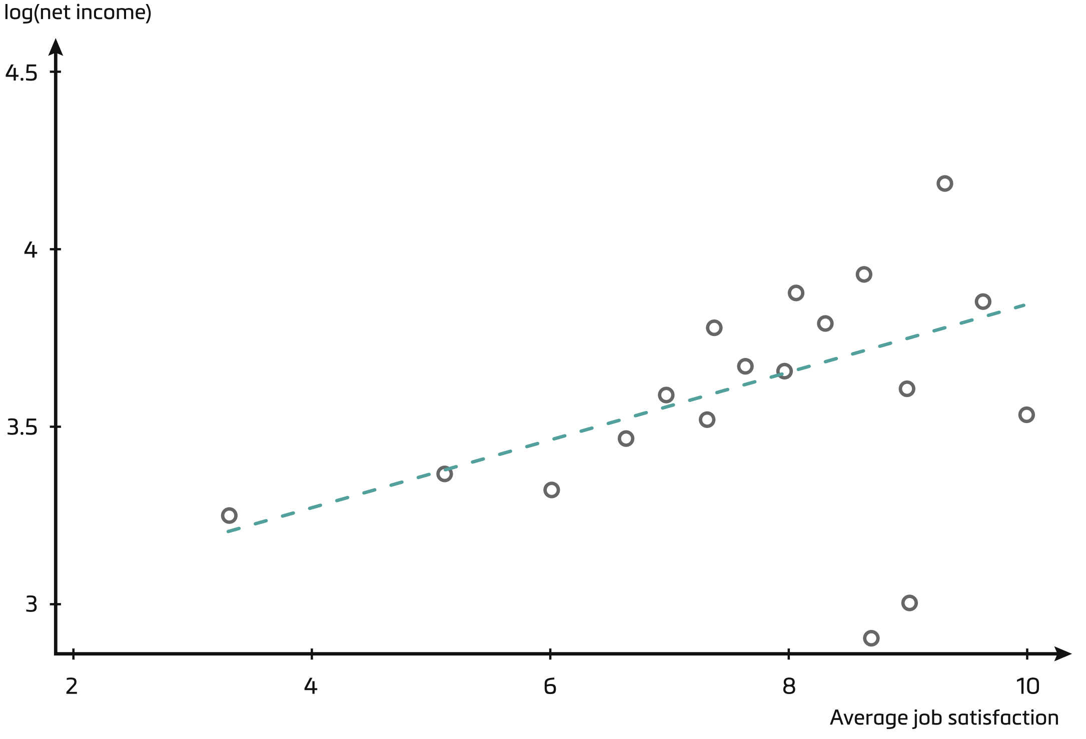

FIGURE 2 JS and earnings. The figure shows the relationship between the logarithm of the firms' earnings and the average JS. JS is measured as the average JS of all firms in 18 equally sized bins. Earnings are measured as the average within the bins. The figure plots the log-transformed earnings. 329 firms with negative earnings are excluded.

negative employee change. The coefficient on JS in column 2 reveals that including the employee change number does not qualitatively change the model's conclusion. We still estimate a significant effect of average JS on the firms' earnings with an estimate on the logarithm of earnings of 0,0788 based on the 1,837 firms without complete records of earnings, JS, control variables and the number of employees in 2017 and 2019.[5]

In column 3, we show the result from estimating Equation (1) using OLS instead of the Tobit model. We change the specification to assess the sensitivity of our result to the specific choice of model. In the OLS model, firm earnings are measured in levels instead of logged earnings used in columns 1 and 2. Of the 1,925 firms, 394 had negative or zero earnings per employee and is therefore censored in the Tobit regressions.[6] The coefficient on the average JS in column 3 is 4.445. As the firms' level earnings are measured in units of 1,000 euros, the coefficient on JS means that a 1-point increase in the average JS at the firm is related to increased earnings per employee of 4,446 Euros.[7] While the coefficient on JS in column 3 is not statistically significant at any conventional level of significance, the magnitude of the effect is comparable to the result in columns 1 and 2 when compared with the mean firm earnings. Compared with the mean earnings per employee of all firms (44,012 Euros) the coefficient on JS in column 3 corresponds to a relative effect of 10%. We, therefore, carefully interpret the results in column 3 as evidence that our preferred results are not driven by choice of using a Tobit regression and censoring observations with negative or zero earnings. The lack of statistical significance for the coefficient on JS in column 3 can be explained by the positively skewed earnings data, including relatively more noise in the estimated relationship between JS and earnings.

TABLE 2 The effect of JS on the firm earnings per employee

Dependent variable Model	(1) Log(net earnings per employee) Tobit	(2) Log(net earnings per employee) Tobit	(3) Net earnings per employee (in 1,000 2019 Euro) OLS
Average job satisfaction (scale 0–10)	0.0845**	0.0788**	4.446
	(0.0358)	(0.0357)	(8.366)
Log(capital stock per employee)	0.773***	0.769***	45.02***
	(0.0643)	(0.0644)	(13.20)
Negative employment growth (2017–2019)		−0.492***	−5.881
		(0.146)	(9.922)
Observations (firms)	1,925	1,837	1,837
Employees in sample	2,754	2,657	2,657
R-squared			0.052
Firm size FE	X	X	X
Sector FE	X	X	X
Region FE	X	X	X
Foundation year FE	X	X	X
Employee characteristics controls	X	X	X
Mean of dependent			44.02

Note: The table shows the regression coefficients from estimating Equation (1) for three different specifications. Column 1 and 2 show the effect on the logarithm of earnings using a Tobit model estimated using maximum likelihood. Column 3 shows the result of estimating the effect of JS on the level of earnings using OLS. Robust standard errors in parentheses.
***$p < 0.01$. **$p < 0.05$.

4.3 | Results across sectors

In Table 3, we explore how the results in Table 2 apply to firms in different sectors. Previous evidence on the positive relationship between JS and firm performance has generally been based on firms in the manufacturing sector. Böckerman and Ilmakunnas (2012), for example, finds that JS improves the labour productivity for plants only in the manufacturing sector but find no effect of JS on sales for all sectors.[8]

In column 1 of Table 3, we estimate Equation (1) using a Tobit regression only for firms outside the manufacturing sector. We divide the firms based on their NACE classification. Firms in the non-manufacturing sector have a NACE classification different from ‘C’. For the 1,499 firms outside the manufacturing sector, a 1-point increase in JS increases the firms' earnings by a statistically significant 7.71%. Accordingly, the results are not driven only by the effect in the manufacturing sector but apply to firms in all sectors.

Column 2 in Table 3 presents the effect of JS for only firms in the manufacturing, agricultural and resource extraction sectors (called ‘non-office’ work in Table 3). These are firms with NACE codes A, B and C. We find a similar effect for these firms on JS as for the full sample and for firms outside the manufacturing sector (an increase in earnings of 8.14% compared with

TABLE 3 The effect of JS on the logarithm of firm earnings per sectors

Subsample Dependent variable Model	(1) Without manufacturing (NACE codes different from C) Log(net earnings per employee) Tobit	(2) 'Non-office' work (NACE codes A, B and C) Log(net earnings per employee) Tobit	(3) 'Office' work (NACE codes different from A, B and C) Log(net earnings per employee) Tobit
Average job satisfaction	0.0771**	0.0814	0.0867*
	(0.0390)	(0.0595)	(0.0448)
Log(capital stock per employee)	0.777***	0.831***	0.759***
	(0.0634)	(0.127)	(0.0686)
Negative employment growth (2017–2019)	−0.600***	−0.779***	−0.393**
	(0.155)	(0.289)	(0.169)
Observations (firms)	1,499	680	1,206
Employees in sample	2,009	927	1,675
Firm size FE	X	X	X
Sector FE	X	X	X
Region FE	X	X	X
Foundation year FE	X	X	X
Employee characteristics controls	X	X	X

Note: The table shows the regression coefficients from estimating Equation (1) for subsamples based on the firms sector. Robust standard errors in parentheses.
***$p < 0.01$. **$p < 0.05$. *$p < 0.1$.

8.45% for the full sample and 8.71% for only firms outside the manufacturing sector). The estimate for 'non-office' work is not statistically significant, but this is likely due to the small sample size in this sample.

Column 3 includes the satisfaction estimates when we restrict the sample to only firms outside the manufacturing, agricultural and resource extraction sectors. The estimated effect of JS is 8.67%, which is slightly higher than for the full sample and for the sample of firms outside manufacturing. Summed up, the estimates in Table 3 show that the effect of JS applies to sectors outside manufacturing.

4.4 | Dimensions of job satisfaction and firm performance

In Table 4, we explore the effect of different dimensions of JS on the firms' earnings. Each dimension is based on a set of more specific questions regarding the overall components of JS. In a factor analysis, we identify groups of specific survey questions that correlate with other questions in the group, have limited correlation with questions in other groups, and correlate with overall JS. We create the dimensions of JS from groups based on the theme of the specific

TABLE 4 The effect of different dimensions of JS on the logarithm of firm earnings per employee from Tobit regression

	(1) With controls
Colleagues	−0.0513
	(0.0532)
Leadership	0.0847**
	(0.0394)
Influence	−0.0420
	(0.0479)
Meaning	0.0226
	(0.0563)
Mastering	−0.0941*
	(0.0539)
Balance	0.0101
	(0.0493)
Results	0.118**
	(0.0579)
Observations	1,828
Employees in sample	2657
Firm size FE	X
Sector FE	X
Foundation year FE	X
Employee characteristic controls	X

Note: See appendix Table A1 for specific definitions and underlying survey questions used to construct the dimensions. Robust standard errors in parentheses.
**$p < 0.05$. *$p < 0.1$.

sub-questions. The value of each dimension is the average of the specific sub-questions. This leaves us with seven dimensions of JS based on 35 specific sub-questions. Table A1 lists the seven dimensions and the 35 specific sub-questions.

Table 4 presents coefficients from a Tobit regression of the logarithm of earnings per employee on the seven separate dimensions, each measured on a scale from 0 to 10. Three dimensions have a significant impact on earnings. The first dimension is ‘Leadership’, that is, the quality of supervision, amounting to an increase in earnings of 8.47%. The second dimension is ‘Results’, that is, the employees' sense of achievement and reward from work amounting to an increase in earnings of 11.8%. Finally, the dimension ‘Mastering’, interestingly, negatively impacts earnings by 9.4%.

4.5 | Robustness checks

We assess the robustness of the baseline estimates by exploring how different specifications of data and the model impact the estimate of the role of JS on shaping firm earnings.

The section reports the result from changing the definition of firm earnings, using more flexible controls for prior employee numbers and using different definitions of JS.

In the main specification, we estimate the impact of JS on the firm earnings before tax and before extraordinary income and expenditures. An alternative earnings definition could include taxes or extraordinary expenditures and income. It is not entirely clear which definition of earnings better reflects the firm's performance. To ensure that the specific definition of earnings is not driving our results, we re-estimate our model using earnings before interest and taxes (EBIT) and earnings before interest, taxes and depreciation (EBITDA). Using EBIT and EBITDA instead of overall earnings before taxes does not qualitatively change our conclusions. The EBIT model yields an estimate of 8.8% with a robust standard error of 3.6%, and the EBITDA model yields an estimate of 7.9% with a robust standard error of 3.1%. The results are presented in Table A2 in the appendix.

In the main specification, we control for the firm's prior performance using an indicator for negative growth in the number of employees. We expand the model with a more flexible set of controls for employee growth as a robustness check. We divide the change in the number of employees from 2017 to 2021 into five groups of roughly equal size and create four indicator variables from these groups. Using the more flexible method to control prior performance gives an estimate of 7.8% with a robust standard error of 3.8%. Our results are robust to instead controlling linearly to the change in number of employees and changing the comparison year to 2018 or 2016 instead of 2017 and including an interaction term between negative employment growth and average JS. The results are presented in Table A3 in the appendix.

JS is measured as the average of three separate questions concerning the employees' JS in the main specification. Using the average satisfaction from the three questions yields comparable estimates compared with the result using the average of the questions in the baseline specification. The results are presented in Table A4 in the appendix.

In the main specification, we include overall firm growth prior to 2019 as a control to rule out a reverse causal relation between worse performing firms and JS. An additional check could be to check for employee sorting. If high-productivity workers sort into high-performing firms, this could bias the result. As an additional robustness check, we extend the baseline model with controls for the change in employee composition. We add controls for the change in average worker education, measured in years of education, and average worker wage from 2017 to 2019 and re-estimate the model for the 1,837 firms that exist in the sample from 2017 to 2019. Extending the model with controls for the change in average worker education and wage leads to an estimated coefficient of JS of 7.8% with a standard error of 3.6%. Doing the same estimation for the change from 2018 to 2019 yields an estimate of 8.0% and a standard error of 3.6%. Both strategies suggest that our results are not driven by employee sorting. The results are presented in Table A7.

5 | CONCLUSION AND DISCUSSION

In this paper, we explore the role of JS in shaping the firm's performance. Our estimate of the role of Job Satisfaction (JS) is based on a survey merged with administrative data and accounting information for a sample of 1,929 Danish firms representing all sectors of the economy. Our data allows us to identify an objective performance measure: firm earnings. Earlier studies have typically used subjective measures of firm performance based on survey data or other proxies for performance that misrepresent actual performance—especially if both JS and performance was measured in the same survey (Böckerman & Ilmakunnas, 2012). Using the firm's earnings also have the added benefit of being closely related to the firm's objective function. As we find a positive relationship, this indicates a direct potential for the individual firm from improving JS. Furthermore, our data allows us to mitigate the possible reverse relationship between JS and performance. While our measured relationship between JS and earnings is cross-sectional, in 2019, we can identify the number of employees in prior years in administrative firm data. By controlling for employee change, we can compare the firm with a similar growth pattern and, therefore, address some of the simultaneity between performance and JS. This is an improvement from earlier studies, which often are based on the cross-sectional relationship between JS and firm performance (Judge et al., 2001). Similarly to Bryson et al. (2017) and Harter et al., 2002, our results indicate that the relation between JS and performance is mainly driven by JS impacting performance and not the reverse relationship.

We find a positive relationship between the average JS of the firm and the firms' earnings. The estimate of a one-point increase in the average JS (on a scale from 0 to 10) amounts to 7.79% increase in earnings. Our findings are consistent with earlier studies that document a positive correlation between JS and performance. Our results resemble those of Böckerman and Ilmakunnas (2012) that finds a 9% increase in productivity of a one point increase in JS when using a fixed effects specification, though this effect is related to an increase in JS on a scale from 1 to 6. When interpreting the estimate of JS it has to be taken into account that JS is concentrated on the higher end of the scale. Accordingly, improving the average JS with one point could be challenging and difficult for the firm obtain. Our results do however highlight to an economic and meaningful potential for improving firm performance through JS. This statement is furthermore supported by the special properties of the Danish labour market, with high levels of satisfaction and high job turnover. Despite that people who have a low job satisfaction have good opportunities to change job and therefore might select jobs with a higher level of satisfaction, our findings support the findings in Böckerman and Ilmakunnas (2012). Or stated differently, if we can estimate a significant relation in a market with high turnover, the relevance of job satisfaction on company profits might even more relevant in job markets, where it is more difficult to fire people and with lower turnover levels.

Our performance measure data is available for all sectors. We find a positive return to JS that apply to both the manufacturing and services industry with similar magnitudes. This is in contrast to Böckerman and Ilmakunnas (2012) that finds only a significant impact of JS for manufacturing plants.

Apart from documenting the impact of overall JS, we are also able to assess how different dimensions of JS separately impacts performance. We define seven dimensions of JS by grouping questions that correlate with each other and with overall JS. Our results denote that especially employees' average satisfaction with their supervisors and employees' sense of achievement and reward for their work had a significant impact on earnings. This result closely resembles the result in Eberegbe and Giovanis (2020). Eberegbe and Giovanis (2020) finds that sense of achievement have the strongest impact on performance. Although the grouping of the individual survey questions into overall dimensions of JS is up to interpretation, the results indicate that certain improvements in JS have more impact than others.

Our results indicate that the individual firms can potentially gain from investing in improved job satisfaction. So far, there has not been much evidence to support this, and we cannot expect firms to know that this is the case. Hence, governments and industrial interest organizations should inform firms about the potential gains from improved job satisfaction and how to improve job satisfaction. The firms should then be able to conduct their own cost–benefit-analysis to identify the optimal investment in job satisfaction. If there are external effects of job satisfaction, incentives through taxes or subsidies may be considered.

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ENDNOTES

[1] 10,028 persons were invited to participate in the survey. The population for the survey were all non-self-employed employees with a minimum of 15 weekly workhours. From this population respondents were picked with random sampling. As such the survey is representative for approximately 2.1 million Danish employees. Non-response amounted to 55% when including failure to link respondents to administrative registers. As we observe a range of characteristics for the population, we can compare the sample to the general population. Table A6 shows the comparison of between sampled workers and the general population. As we aggregate worker responses to the firm level, we cannot correct for non-response using survey weights. The representativeness of the firm sample should be viewed in the light of the difference between the population and the sample workers. This limitation similarly applies to the earlier evidence using aggregated survey data. Similarly, our study, and earlier evidence using survey data on job satisfaction, cannot correct for a potential relation between job satisfaction and non-response.

[2] The difference in the number of sampled employees creates two empirical challenges. One is that it introduces classical measurement error that can lead to a downward bias in our measured relationship between JS and firm performance (Mairesse & Greenan, 1999). The second challenge is that it introduces that larger firms are more likely to be surveyed. We control for this by including firm size fixed effects in the regressions.

[3] We have considered using value-added per hours worked as a measure of performance. This would be a preferable indicator of efficient use of resources. Our problem is that we do not have data on firms' value-added, and we do not have sufficient data to impute it. Few firms report their material input, so we cannot create a value added indicator from data on turnover and materials input. Furthermore, even though we could estimate value added by adding wage payments from register data to firms' ordinary earnings before taxes, we considered this approach to be too uncertain. Add to this that we do not have data on the number of hours worked by the firms' employees, and we could not find a satisfactory way of estimating the number of hours worked on the basis of the data available.

[4] Based on the five Danish administrative regions, which resemble the administrative labour market regions (Hendeliowitz & Hertz, 2008).

[5] Here we drop an additional 88 firms compared with the estimates in column 1 due to missing values for either the number of employees in 2017 or control variables.

[6] The 394 firms with censored earnings still contribute to the estimate of 8.45% as these are used to weight the observed part of the regression line. The coefficient on JS in the Tobit regression should be viewed as the linear effect on the underlying latent earnings for all levels of earnings even if we only directly observe linear effect for firms with positive earnings.

[7] Measured in 2019 Euros.

[8] Böckerman and Ilmakunnas (2012) make a distinction between labour productivity and sales as they have access to data on the former for only for the manufacturing sector but access to data on the latter for all sectors.

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APPENDIX A

Tables A1–A7

TABLE A1 Components of job satisfaction

	Observations	Mean	Question
Job satisfaction	1,929	77.8	To what degree are you satisfied with your work?
			To what degree do you feel motivated going to work?
			To what degree do you fell joy with regards to your job?
Colleagues	1,908	8.2	To what degree do you have a good relationship with your co-workers?
			To what degree do you experience a good professional relationship with your co-workers?
			To what degree do you have faith in your co-workers?
Leadership	1,838	7.5	To what degree do you have faith in your immediate supervisor?
			To what degree do you experience that your immediate supervisor is skilled?
			To what degree do you experience having a good relationship with your immediate supervisor?
Influence	1,929	7.7	To what degree do you experience having suitable influence at your work?
			To what degree do you experience having the possibility to plan and structure your work?
			To what degree do you experience a suitable balance between freedom and control at your work?
Meaning	1,929	7.8	To what degree do you experience that your job is meaningful?
			To what degree do you experience to succeed as a person through your job?
			To what degree do you experience contributing to a common goal through your work?
Mastering	1,929	7.5	To what degree do you experience professional satisfaction though your work?
			To what degree do you experience that you are evolving your abilities?
			To what degree do you experience a match (coherency) between your capabilities and your work?
Balance	1,929	7.1	To what degree do you feel like you have the time to deliver your work with the requested quality?

(Continues)

TABLE A1 (Continued)

	Observations	Mean	Question
			To what degree do you feel like there is a match between your work and the time you have to finish it?
			To what degree do experience a daily balance between your work and your private life?
Results	1,929	7.6	To what degree do you achieve a feeling of accomplishment from your work
			To what degree do you have the possibility to witness tangible results from your work?
			To what degree do you experience having well-defined goals for your work?

Note: The tables show overall components of job satisfaction and the underlying questions.

TABLE A2 Results from estimating the baseline specification using EBIT and EBITDA as the dependent variable

Dependent variable	(1) Log(EBIT per employee)	(2) Log(EBITDA per employee)
Average job satisfaction	0.0888**	0.0788**
	(0.0359)	(0.0306)
Log(capital stock per employee)	0.485***	0.573***
	(0.0677)	(0.0630)
Negative employment growth (2017–2019)	−0.514***	−0.408***
	(0.144)	(0.124)
Observations	1,834	1,835
Firm size FE	X	X
Sector FE	X	X
Region FE	X	X
Foundation year FE	X	X
Employee characteristics controls	X	X

Note: Robust standard errors in parentheses.
***$p < 0.01$. **$p < 0.05$.

TABLE A3 Results using alternative interpretations for the change in employee growth

Dependent variable	(1) Log(net earnings per employee)	(2) Log(net earnings per employee)
Average job satisfaction	0.0786**	0.0828**
	(0.0380)	(0.0402)
Log(capital stock per employee)	0.782***	0.782***
	(0.0734)	(0.0647)
Employee growth groups = 0, −25–	−0.762**	
	(0.353)	
Employee growth groups = 1, −5–	−0.421	
	(0.257)	
Employee growth groups = 3, 0.1–	−0.0919	
	(0.234)	
Employee growth groups = 4, 5–	0.0572	
	(0.258)	
Employee growth groups = 5, 25–	0.0996	
	(0.327)	
Negative employment growth (2017–2019)		−0.567
		(0.705)
Negative employment growth (2017–2019) interacted with job satisfaction		0.0101
		(0.0878)
Observations	1,837	1,837
Firm size FE	X	X
Sector FE	X	X
Region FE	X	X
Foundation year FE	X	X
Employee characteristics controls	X	X

***$p < 0.01$. **$p < 0.05$.

TABLE A4 Results from estimating the baseline specification using different components of the overall JS variable

Dependent	(1) Log(net earnings per employee)	(2) Log(net earnings per employee)	(3) Log(net earnings per employee)
Satisfied in job	0.0950***		
	(0.0349)		
Motivated in job		0.0877***	
		(0.0337)	
Happiness in job			0.0788**
			(0.0357)
Log(capital stock per employee)	0.781***	0.781***	0.0788**
	(0.0647)	(0.0646)	(0.0357)
Negative employment growth (2017–2019)	−0.496***	−0.485***	0.769***
	(0.145)	(0.145)	(0.0644)
Observations	1,837	1,837	1,837
Firm size FE	X	X	X
Sector FE	X	X	X
Region FE			
Foundation year FE	X	X	X
Employee characteristics controls	X	X	X

Note: Robust standard errors in parentheses.
$^{***}p < 0.01$. $^{**}p < 0.05$.

TABLE A5 Descriptive statistics

Variable	Mean (SD)
Log(earnings)	3.631 (2.269)
Average job satisfaction	7.777 (1.695)
Log(capital stock per employee)	6.950 (1.304)
Negative employment growth	0.246 (0.431)
Vintage 1977–1980	0.038 (0.192)
Vintage 1981–1985	0.050 (0.219)
Vintage 1986–1990	0.074 (0.261)
Vintage 1991–1995	0.063 (0.244)
Vintage 1996–2000	0.083 (0.275)
Vintage 2001–2005	0.103 (0.304)
Vintage 2006–2010	0.135 (0.342)
Vintage 2011–2015	0.109 (0.312)
Vintage 2016–2020	0.081 (0.273)
Employees: 20–49	0.193 (0.395)
Employees: 50–99	0.141 (0.348)
Employees: >100	0.353 (0.478)
Average education length (years)	14.164 (1.396)
Average age (years)	43.484 (6.980)

(Continues)

TABLE A5 (Continued)

Variable	Mean (SD)
Average tenure (years)	1.331 (1.167)
Sector: Agriculture, forestry and fishing	0.010 (0.099)
Sector: Arts, entertainment and recreation	0.020 (0.141)
Sector: unknown	0.004 (0.060)
Sector: Mining and quarrying	0.221 (0.415)
Sector: Construction	0.118 (0.323)
Sector: Transportation and storage	0.311 (0.463)
Sector: Information and communication	0.066 (0.249)
Sector: Financial and insurance activities	0.037 (0.189)
Sector: Real estate activities	0.023 (0.149)
Sector: Professional, scientific and technical activities	0.154 (0.361)
Sector: Public administration, education and healthcare	0.035 (0.185)
Region: Nordjylland	0.094 (0.291)
Region: Midtjylland	0.251 (0.434)
Region: Syddanmark	0.217 (0.412)
Region: Hovedstaden	0.341 (0.474)
Region: Sjælland	0.098 (0.297)
Observations	1,925

TABLE A6 Composition of sample workers and population of all workers

	Response	Invited to sample	Population
	Proportion in percent		
Sex			
Men	50	53	53
Women	50	48	47
Age			
18–24	4	7	7
25–34	14	20	21
35–44	22	23	23
45–54	31	27	26
55–64	26	20	20
65+ år	4	3	3
Highest achieved education			
Primary school	12	16	17
Youth education	41	43	43
Short-cycle education cycle higher education	7	6	6
Medium-cycle higher education	22	19	18
Long-cycle higher education	19	16	16
Region of residence			
Nordjylland	10	9	10
Midtjylland	24	24	23
Syddanmark	22	21	20
Hovedstaden	30	33	33
Sjælland	14	14	14
Type of work			
Armed forces occupations	1	1	1
Managers	39	32	32
Technicians and associate professionals	21	19	19
Clerical support workers	12	15	14
Skilled agricultural, forestry and fishery workers	1	1	1
Craft related trades workers	7	9	8
Plant and machine operators, and assemblers	5	5	5
Elementary occupations	6	7	7
No sector	9	13	13
Family income, 1000s Danish kroners			
0–150	11	17	17
150–250	21	25	25
250–300	19	18	18

(Continues)

TABLE A6 (Continued)

	Response	Invited to sample	Population
	Proportion in percent		
300–350	17	14	14
350–500	24	20	19
500+	9	7	7
Personal income, 1,000s Danish kroners			
No income	1	1	1
−100	4	6	7
100–200	12	16	17
200–300	39	39	39
300–400	27	23	23
400+	18	14	14

Note: The table compares the population of all workers to the sample on a range of observable characteristics.

TABLE A7 Results from including change in workers composition in the baseline model

Dependent variable Model	(1) Log(net earnings per employee) Tobit	(2) Log(net earnings per employee) Tobit	(3) Log(net earnings per employee) Tobit
Average job satisfaction	0.0771**	0.0780**	0.0795**
	(0.0360)	(0.0361)	(0.0360)
Log(capital stock per employee)	0.784***	0.769***	0.764***
	(0.0655)	(0.0656)	(0.0661)
Negative employment growth (2017–2019)	−0.491***	−0.509***	−0.519***
	(0.145)	(0.147)	(0.146)
Change in average worker wage 2017–2019 (1,000s euro 2019)		0.00453**	
		(0.00213)	
Change in average worker education 2017–2019 (years of education)		−0.0391	
		(0.131)	
Change in average worker wage 2018–2019 (1000s euro 2019)			0.009***
			(0.003)
Change in average worker education 2018–2019 (years of education)			0.0635
			(0.153)
Observations (firms)	1,837	1,837	1,837
Employees in sample	2,657	2,657	2,657
Firm size FE	X	X	X
Sector FE	X	X	X
Region FE	X	X	X
Foundation year FE	X	X	X
Employee characteristics controls	X	X	X

Note: The table shows coefficients from estimating the baseline model extended with control variables for the change in the average firm education level, measured in years of education, and the average wage of the workers at the firm. Robust standard errors in parentheses.

***$p < 0.01$. **$p < 0.05$.