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**Employee stock ownership and employee performance:
Why does ownership affect individual performance?**

Felix Hofmann

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Vorsitzender:

Prof. Dr. Hanna Hottenrott

Prüfende der Dissertation:

1. Prof. Dr. Isabell M. Welpé
2. Prof. Dr. Andranik Tumasjan
3. Prof. Dr. Nicola Breugst

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¹ Pietsch, B. M. (2015). *Dispensational Modernism*. Oxford University Press.

ABSTRACT

Existing research demonstrates that employee stock ownership (ESO) can increase firm performance. This is argued to occur due to enhanced individual employee performance that aggregates to the firm. However, ESO research on actual work behavior remains scarce and lacks theory on how and why employees respond to ESO, especially when there is no clear line of sight between their individual behavior and firm stock performance. Since ESO can confound incentive and benefit effects, I draw on and compare agency theory and social exchange theory to investigate the relationship between ESO and individual employee performance. Using five-year panel data of 156,051 employees, I find ESO to be related to both, employee performance quantity and quality. The results indicate that higher individual employee performance results from receiving the benefit of discounted stocks rather than a financial incentive effect. Hence, I contribute to ESO and compensation research by challenging the dominant financial incentive perspective highlighted in agency theory and providing evidence for a social exchange based understanding of ESO. I also extend pay, ESO and social exchange research through showing that small financial benefits, such as discounted ESO plans can drive individual employee performance, and show how this result changes over time.

KURZFASSUNG (GERMAN ABSTRACT)

Bisherige Studien zeigen, dass Mitarbeiterkapitalbeteiligung (ESO) die Profitabilität von Unternehmen fördern kann. Die zu Grunde liegende Argumentation basiert häufig darauf, dass dieser Zusammenhang auf eine verbesserte Arbeitnehmerleistung zurückzuführen ist. ESO-Forschung die sich mit tatsächlichem Mitarbeiterverhalten auseinandersetzt und dabei versucht theoretisch zu beantworten wie und warum Mitarbeiter positiv auf ESO reagieren, ist jedoch nach wie vor rar. Insbesondere für Mitarbeitergruppen die keinen unmittelbaren Zusammenhang zwischen ihrer individuellen Leistung und dem Unternehmenserfolg sehen, liefern bestehende Theorien nur lückenhafte Erklärungen für potentielle Effekte von ESO auf Mitarbeiterverhalten. Da ESO gleichzeitig finanzielles Anreizsystem als auch Nebenleistung (Benefit) darstellt, nutze ich Agency Theory und Social Exchange Theory um den konkreten Zusammenhang zwischen ESO und der Arbeitsleistung einzelner Mitarbeiter zu erklären und empirisch zu untersuchen. Die Auswertung eines Längsschnitt-Datensatzes (5 Jahre) von 156.051 Mitarbeitern zeigt, dass ESO sowohl mit der Quantität als auch mit der Qualität der Mitarbeiterleistung zusammenhängt. Darüber hinaus zeigt sich, dass gesteigerte Arbeitsleistung eher reziprokes Verhalten in einer Arbeitnehmer-Arbeitgeber Beziehung als die Konsequenz einer finanziellen Incentivierung darstellt. Die Arbeit leistet außerdem einen Beitrag zur Vergütungs- und Nebenleistungsforschung, gibt Hinweise, dass selbst kleine finanzielle Entgegenkommen durch Nebenleistungen die Leistung einzelner Mitarbeiter steigern können und gewährt Einblicke in den Zeitverlauf dieses Zusammenhangs.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	2
ABSTRACT	3
KURZFASSUNG (GERMAN ABSTRACT).....	4
TABLE OF CONTENTS	5
LIST OF FIGURES.....	7
LIST OF TABLES	9
LIST OF ABBREVIATIONS	10
1 INTRODUCTION.....	11
2 LITERATURE REVIEW.....	15
2.1 Employee stock ownership and firm performance	17
2.2 Employee stock ownership and employee attitudes	22
2.3 Employee stock ownership and employee behaviors	35
2.4 Synthesis of theoretical considerations behind ESO	40
3 SCOPE AND RESEARCH QUESTIONS.....	45
3.1 Scope.....	45
3.2 Research questions.....	46
4 THEORY AND HYPOTHESES DEVELOPMENT.....	50
4.1 Economic perspectives: Financial incentives for individual performance	50
4.2 Psychological perspectives: Social exchange incentives for individual performance....	51
4.3 Financial or social incentive? Integrating and comparing two perspectives	53
4.4 Time as a boundary condition.....	57
4.5 Hypotheses.....	59
5 METHODOLOGY.....	60
5.1 Sample	61
5.2 Variables	62
5.3 Data Analyses	67

6	RESULTS	74
6.1	Employee share ownership and individual performance quantity	75
6.2	Employee share ownership and individual performance quality	79
6.3	Relevance and effect size of the ESO–individual performance relationship.....	83
6.4	Employee perceptions of the stock ownership plan.....	84
6.5	Discounted versus non-discounted stocks and individual performance	87
6.6	ESO – individual performance relationship over time	90
7	POST-HOC AND ROBUSTNESS ANALYSES	93
7.1	ESO as a continuous variable	93
7.2	Shape of the annual ESO-individual employee performance effect.....	95
7.3	Systematic differences between stock-holder groups.....	101
7.4	Idea quality as a proxy for individual employee creativity	103
7.5	ESO – individual performance relationship over time (> 3 ESO participations).....	105
8	DISCUSSION	107
8.1	Contributions to ESO theory and beyond	109
8.2	Practical implications.....	112
8.3	Limitations and future research directions.....	113
9	CONCLUSION	116
	REFERENCES.....	117
	APPENDIX	127

LIST OF FIGURES

Figure 1: Theoretical framework of effects of employee share ownership on organization performance.....	19
Figure 2: A Model of Employee Ownership	28
Figure 3: A theoretical model illustrating the effects of economic structures organizational integration via control and incentive mechanism.....	31
Figure 4: Average frequency of absence over three-month periods, before and after employee ownership	36
Figure 5: Financial (agency) incentive mechanism (non-discounted stocks proxy) versus social exchange incentive mechanism (discounted stocks proxy)	56
Figure 6: Employee ESO perceptions	86
Figure 7: ESO-idea quantity relationship over time.....	91
Figure 8: ESO-idea quality relationship over time.....	92
Figure 9: ESO-performance score relationship over time.....	92
Figure 10: Marginsplot ESO effects on idea quantity at ESO packages of 5, 11, 16, 22, 32 and 42 stocks.....	96
Figure 11: Marginsplot ESO effects on absenteeism at ESO packages of 5, 11, 16, 22, 32 and 42 stocks.....	97
Figure 12: Marginsplot ESO effects on idea quality at ESO packages of 5, 11, 16, 22, 32 and 42 stocks.....	97
Figure 13: Marginsplot ESO effects on performance score at ESO packages of 5, 11, 16, 22, 32 and 42 stocks	98
Figure 14: Marginsplot ESO effects on idea quantity at ESO packages of 5, 11, 16 and 22 stocks, after dropping observations for NUMBERESO>22	99
Figure 15: Marginsplot ESO effects on absenteeism at ESO packages of 5, 11, 16 and 22 stocks, after dropping observations for NUMBERESO>22	99
Figure 16: Marginsplot ESO effects on idea quality at ESO packages of 5, 11, 16 and 22 stocks, after dropping observations for NUMBERESO>22	100
Figure 17: Marginsplot ESO effects on performance score at ESO packages of 5, 11, 16 and 22 stocks, after dropping observations for NUMBERESO>22	100

Figure 18: Average expert CAT ratings for idea novelty.....	105
Figure 19: Average expert CAT ratings for idea usefulness	105
Figure 20: ESO-absenteeism relationship over time.....	106

LIST OF TABLES

Table 1: ESO benefit value, ESO stock value and ESO 5-year gain per annual base salary for ESO package of 10+1 and 20+2 (in brackets) stocks	55
Table 2: ESO scheme characteristics 2011 – 2015	65
Table 3: Descriptive statistics and pairwise correlation coefficients	75
Table 4: Fixed effects models of individuals performance quantity	77
Table 5: Difference-in-difference models of individuals' performance quantity	79
Table 6: Fixed effects models of individuals performance quality	81
Table 7: Difference-in-difference models of individuals' performance quality	83
Table 8: Means, standard deviations and T-tests for employee perceptions on ESO	86
Table 9: Fixed effects models of individuals performance quantity and quality - ESO versus ESO&OTHER.....	89
Table 10: Fixed effects models for NUMBERESO and NUMBERESO ² on individual employee performance quantity	94
Table 11: Fixed effects models for NUMBERESO and NUMBERESO ² on individual employee performance quality	95
Table 12: Similarities between stockholder groups	102
Table 13: CAT results & interrater reliability (IRR).....	104

LIST OF ABBREVIATIONS

DID	Difference-in-difference
ESO	Employee stock ownership
ESOP	Employee Stock Ownership Plan(s)
CEO	Chief Executive Officer
TMT	Top Management Team
401(k)	A 401(k) plan is a tax-qualified, defined-contribution pension plan where employees can invest before-tax money that is deducted from their paychecks and often matched by their employers in company stocks

1 INTRODUCTION

Employee stock ownership (ESO) is an increasingly ubiquitous company benefit (Anderson, Gohm, Rapp, & Filbert, 2013; BLS, 2017; Freeman, 2007; NCEO, 2017; O'Boyle, Patel, & Gonzalez-Mulé, 2016) that is expected to promote more favorable employee attitudes, which in turn provoke behavioral changes, such as lower voluntary turnover, that are then reflected in enhanced financial performance (Blasi, Freeman, & Kruse, 2016; Kuvaas, 2003). Agency theory (Fama & Jensen, 1983; Jensen & Meckling, 1976), which proposes the idea that ESO serves as a financial incentive for more favorable employee attitudes and behaviors, has emerged as the dominant theoretical foundation to explain why ESO evokes favorable at the individual and company level (e.g., Bakan, Suseno, Pinnington, & Money, 2004; Buchko, 1992b; Klein, 1987). The principle underlying assumption is that ESO incentivizes employees to perform in ways that will help the company profit and in turn benefit shareholders (Andrews, Bellmann, Schank, & Upward, 2010; Caramelli & Carberry 2014; Hammer, & Stern, 1980; Harden, Kruse, & Blasi, 2010; Jensen & Meckling, 1976; O'Boyle et al., 2016; Pendleton, 2005; Sesil, Kruse, & Blasi, 2003). However, while ESO has shown to relate to employee attitudes, work behaviors, and employee attraction and retention, the financial incentive effects paradoxically may be minimal (Fakhfakh, 2004; Oyer & Schaefer, 2005; Sengupta, Whitfield & McNabb, 2007). Thus, while the overall company effects of using ESO appear to be positive (O'Boyle et al., 2016), the theoretical justifications are insufficient. More importantly, we do not understand why or how ESO affects employee behaviors; hence, we have little empirical or theoretical understanding about the microfoundations underlying how, why, or when ESO can be effective.

Agency theory is the dominant theoretical perspective for understanding alignment between the interests of agents and shareholders, particularly when employees have a clear line of sight regarding how their actions affect company outcomes that will in turn benefit the

employee. Agency theory provides strong predictions for how and why employees who are able to affect company outcomes (e.g., CEOs) will respond to such interest alignment (Nyberg, Fulmer, Gerhart, & Carpenter, 2010). However, ESO plans are generally directed to employees across the company, most of whom lack a clear line of sight with regard to stock performance. This broad-based character of employee ownership is especially pronounced for mainstream ESO, which is the most common form of ESO and is usually offered by large quoted companies (Kaarsemaker, Pendleton, & Poutsma, 2010; Sesil et al., 2003).

Consequently, it is questionable whether agency theory and the idea that ESO provides a financial incentive are able to explain a positive relationship between ESO and individual employee outcomes. Hence, a better theoretical understanding is needed regarding how the broad majority of employees will respond to ESO. The challenge of understanding theoretically how and why employees respond to ESO is further complicated when ESO involves matching stocks or discounted stock offers, because such offers confound incentive and benefit effects. Such benefits are similar to life insurance or work–life benefits that provide desirable subsidies without immediate, clear financial incentives for employee performance (Arthur, 1994; Lambert, 2000). Indeed, many benefits are not associated with incentives but instead are designed to attract and retain employees (Gerhart & Rynes, 2003).

Overall, the theoretical challenge to understanding how and why ESO plans work is exacerbated by minimal empirical research about whether ESO affects individual employee behaviors and the absence of research regarding how it affects actual individual employee performance. While there is some research investigating effects on employee loyalty (Keef, 1994), such as turnover and absenteeism (Blasi, Freeman, Mackin, & Kruse, 2010; Buchko, 1988; Buchko, 1992b; Hammer, Landau, & Stern, 1981) and scholarly perceptions of a gift exchange leading to employee reciprocity (Bryson, Clark, Freeman, & Green, 2016; Bryson & Freeman, 2014; 2019); generally, economic expectations are at the root of the theoretical focus explaining the workings of ESO plans (Nyberg, Maltarich, Abdulsalam, Essman, &

Cragun, 2018).

In addressing these theoretical and empirical challenges, the present dissertation responds to calls for more theoretical foundation behind the mechanisms through which ESO operates (Caramelli & Briole, 2007; Chiu, 2003; Pierce, Rubinfeld, & Morgan, 1991) and addresses the lack of ESO research at the individual level of employee performance (Blasi et al., 2010). In particular, this work aims at understanding, both theoretically and empirically, whether ESO serves as (1) a financial incentive for individual employee performance as previous research building on agency theory suggests or (2) rather operates as an employee benefit that provokes employee satisfaction, a strengthening of the employee-employer social exchange relationship and thus materializes in higher individual employee performance. Moreover, the dissertation also addresses calls for a better understanding of the temporal dimension of ESO effects (Chiu, Hui, & Lai, 2007; Hammer & Stern, 1980) by researching how the ESO–individual employee performance relationship develops over time and repeated employee participations in ESO.

The dissertation is structured as follows. First, it provides a chronological literature review on (1) ESO as a practical phenomenon, (2) previous research on the relationship between ESO and firm-level financial performance, and (3) previous research on the relationship between ESO and individual-level employee attitudes and behavior. The literature review ends with a synthesis of the theoretical foundation used to explain ESO effects at the individual level. Then, guided by the previous literature addressed in the literature review and by the most common ESO scheme characteristics, the scope and research questions of this dissertation are determined and presented. To answer my research questions, theory and an appropriate methodology are developed, the resulting empirical findings (including some post-hoc estimations) are illustrated, their theoretical and practical implications are discussed, and a conclusion is drawn.

Overall, this dissertation makes four contributions to pay research. First, many firm-

level results are consistent with economic models, but most employees have only a minimal ability to see how their behaviors affect the stock price, and the economic payout is so minimal that economic explanations are implausible. For instance, Harden and colleagues (2010) provide a first indication that ESO may affect innovative work behaviors, but the economic payout to these employees is too small to explain how ESO could create such incentive effects. Thus, I contribute to pay research by observing how non-managerial employees respond to ESO and challenging agency theory assumptions about ESO influences on employee behaviors. Specifically, I challenge the dominant theoretical perspective by showing that ESO often provides minimal financial gains apart from the up-front discounts inherent in ESO offerings.

Second, I use a psychological (social-exchange-based) perspective to advance theory about the mechanisms underlying ESO (Chiu, 2003; Pierce et al., 1991). By uniting economic perspectives about financial incentives with psychological perspectives (Shaw, Gupta, & Delery, 2000), I contribute to each by identifying contingencies and boundaries related to ESO effects on employee behaviors.

Third, I extend individual pay research by providing a theoretical and empirical understanding of benefits. Benefits represent a common practice that affects attitudinal and behavioral outcomes but that is rarely empirically investigated (Gupta & Shaw, 2014).

Fourth, I extend knowledge about economic and psychological mechanisms that affect responses to ESO over time. The results also provide an indication of why higher levels of ESO participation may have counterintuitive effects (Guedri & Hollandts, 2008; Richter & Schrader 2017a).

2 LITERATURE REVIEW

ESO is a practical phenomenon and, as such, appears in many different forms. This fact complicates the framing of a concrete general definition of ESO. However, one working definition of ESO formulated by Long (1980) has served well and helps to distinguish ESO from elite stock ownership programs covering only top management. Long (1980, p. 728) states that “employee ownership occurs when (a) the majority of voting stock is owned by current company employees, (b) ownership is broadly distributed throughout the firm's employees (at least 30 percent of the employees own stock) and (c) no employee group is systematically excluded from ownership.”

In an attempt to circumvent the difficulty of designing concrete ESO definitions, scholars have defined dimensions along which ESO can be characterized (Kruse, 2002; Long, 1980). The two most basic of these dimensions are (1) the degree to which ownership is held within the organization (i.e., the size of the equity stake being controlled by the firm's employees) and (2) the extent to which an organization's employees participate in this ownership (Long, 1980). Kruse (2002) extended this set of characteristics by adding two additional dimensions, namely (3) the dimension of inequality of the ownership stakes held by employee shareholders and (4) the rights that come with ownership such as the right to control, the right to share in surpluses and the right to share in the company's wealth (Kruse, 2002; Mygind, 2012). (5) A fifth aspect that is crucial for understanding the structure of a specific ESO scheme is whether ownership appears as direct or indirect. While the former (direct ownership) makes employees similar to a conventional stockholder of a public company, employees in the latter case (indirect ownership) do not hold stocks in their private accounts; instead, ownership is held on behalf of the employees, such as through a trust (Conte & Tannenbaum, 1978).²

² An alternative set of criteria to classify ESO schemes can be found in O'Boyle et al., 2016.

Building on these dimensions and characteristics, Mygind (2012) distinguishes four major forms of ESO. The first form is majority employee ownership, sometimes also referred to as controlling employee ownership or employee-owned business. In these ESO schemes, employees accumulate the full right to control profits and wealth. Collectively, employees in these schemes often hold the full or at least a controlling majority of the firm's total equity (Kaarsemaker et al., 2010; Mygind, 2012). The second form is Employee Stock Ownership Plans (ESOP), which are funds that own shares on behalf of a company's employees, often leveraged by loans. While surplus and wealth rights are in place, employees in many ESOPs lack control, as voting rights are not executed by the employees themselves but rather by the fund's trustees (Mygind, 2012). The third form is minority employee ownership, which is characterized by a very small amount of total equity, usually less than 5%, distributed among the workforce. While ownership can be direct or indirect and exposes employees to changes in profits and wealth, the small individual and collective stakes generally limit employees' control rights (Kaarsemaker et al., 2010; Mygind, 2012; Sesil et al., 2003). Finally, the fourth form of ESO is that of worker cooperatives, which are often based on the principle of one vote per member (control right), with only employees being eligible to become members. Besides the voting rights, members also share in profits and are allowed to sell their membership stakes once they retire. However, value at sale is often limited, which in turn limits potential capital gains (Mygind, 2012). Other forms of employee participation, such as financial participation (e.g., profit sharing) or pure control rights that come without monetary rights (e.g., the German codetermination), are not considered forms of ESO in the present work (Mygind, 2012).³

The following literature review provides a mostly chronological overview of previous research addressing the relationship between various forms of ESO (as illustrated above) and

³ Different firm motives to implement ESO as well as country and institutional differences have resulted in a myriad of different ESO scheme structures and ESO participant rights (O'Boyle et al., 2016). The present work does not map the global diversity of ESO offerings and legal requirements. However, comprehensive reviews can be found in Carberry (2011), Kaarsemaker (2006), and Kruse, Blasi, and Park (2010).

two levels of outcomes: (1) financial performance at the firm level and (2) attitudes and behaviors at the individual level. The review covers research on different ESO scheme types and structures and is intended to provide a qualitative understanding of what has been theorized and empirically addressed regarding the effects of ESO at both the firm level and the individual level. However, the review is not intended to exhaustively cover every piece of theoretical or empirical work on ESO. The literature review ends with a synthesis of the theoretical considerations underlying previous research on the relationship among ESO, individual-level outcomes, and firm-level performance.

2.1 Employee stock ownership and firm performance

Since the very beginning of ESO research, scholars claimed that ESO has a positive impact on organizational performance through employee job attitudes and behavior (Holyoake, 1906; Lloyd, 1898; Webb, 1912). Following a paucity of research on the subject, scholars during the late 1970s became interested in theoretically predicting and empirically showcasing the effects of ESO on the financial performance of firms offering ESO to their employees compared to conventional non-ESO peer companies. Although the ESO–financial firm performance relation is not at the core of the present work, which instead focuses on ESO effects at the individual employee performance level, I nonetheless believe it is important to incorporate the ESO–financial firm performance perspective here, as it to some extent makes the case for individual-level ESO research. The reason is that firm-level ESO effects have been theorized to be grounded in attitudinal and behavior effects at the level of the individual (Long, 1978a). However, if ESO did not relate empirically to higher levels of financial firm performance, then inquiring into the question of a potential ESO–individual level performance relationship would be arbitrary when assuming that individual employee performance aggregates at the firm level (McCarthy, Reeves & Turner, 2010a). Thus, before addressing the individual-level effects, prior firm-level ESO research is provided hereinafter.

Among the first studies to empirically addressing ESO effects at the firm level, Conte

and Tannenbaum (1978) found that firms providing employee ownership either through an ESOP (trust) or direct ownership showed above-industry-average profitability. Ownership (i.e., the amount of equity owned by employees) and control mechanisms (i.e., employee voting rights resulting from ESO) were tested, but only the amount of equity owned proved to be statistically significant in explaining variance in the studied firms' profitability. During the same period, Long (1978a) provided a complex theoretical framework (see Figure 1) that guided subsequent ESO research (Bakan et al., 2004; Garrett, 2010; Long, 1979). His model predicted the relationship between ESO and organizational performance by introducing a variety of potential mediating and moderating variables at the individual level. The model introduced three potential mechanisms through which ESO operates: 1) employee integration as a result of sharing in the profits from increased organizational performance; 2) involvement, which is defined as a feeling of solidarity, membership, and belongingness as a result of being a legal owner of the organization and receiving additional information; and 3) organizational commitment, which is a sense of loyalty that results indirectly from integration and involvement and directly from the size of the stake that employees have invested with the firm and the years of ownership (1978a).

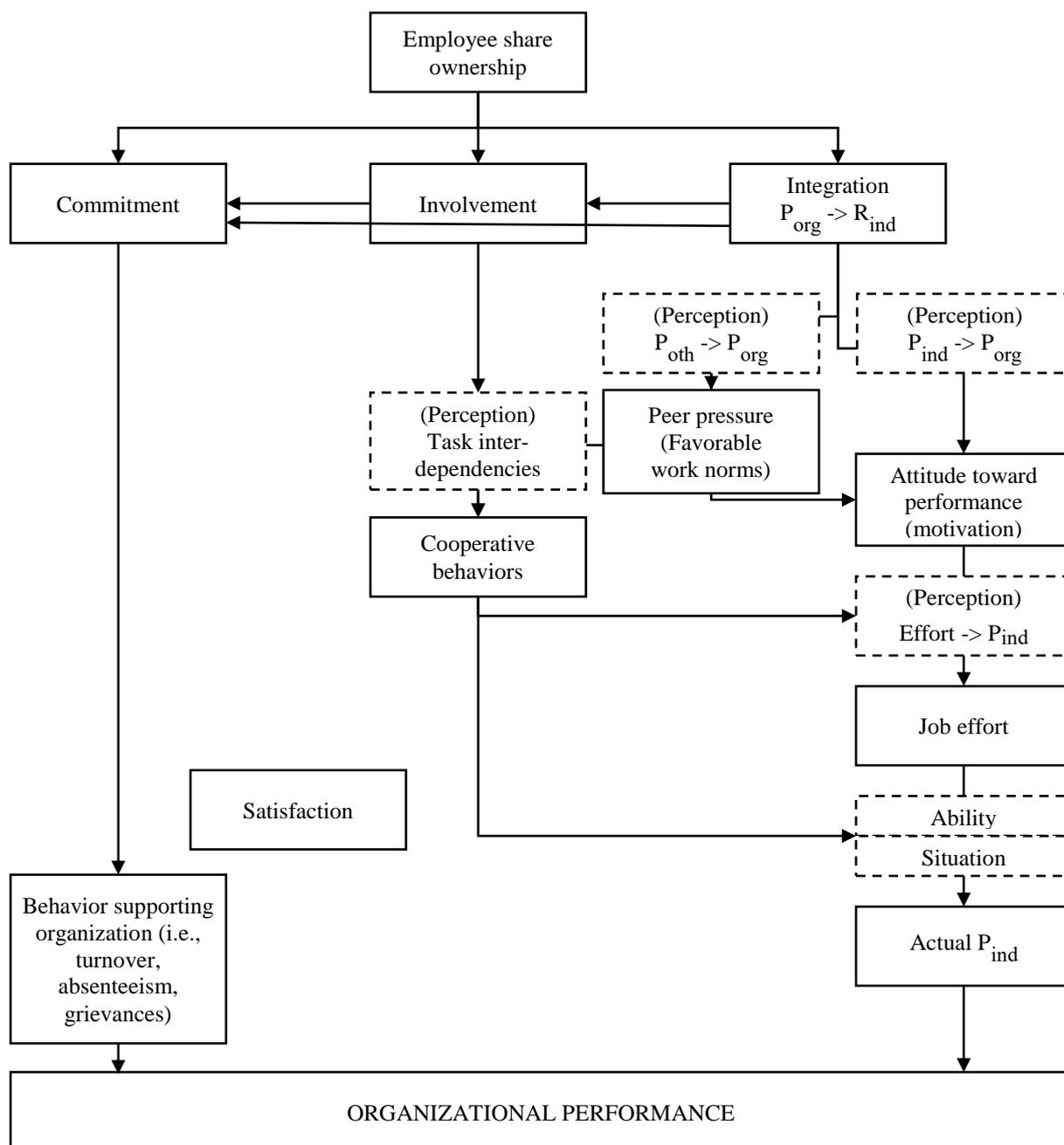


Figure 1: Theoretical framework of effects of employee share ownership on organization performance.

Boxes in broken lines represent moderating variables. Reprinted (with layout modified) from Long (1978a).

Long (1980) later tested parts of the model on three firms that were going through ESO conversion and found substantial support for the idea that the introduction of ESO resulted in more favorable job attitudes (motivation), lower levels of turnover and grievances, and higher levels of corporate performance (profits and share price). Another theoretical model of how ESO relates to firm performance was developed in the field of behavioral economics but never empirically tested (Paul & Ebadi, 1987). The model assumes that

through higher organizational commitment, ESO increases the whole range of employee work behaviors, such as employee diligence, reduced absenteeism and turnover, and increased efficiency and performance, which then translate into increased firm performance by decreasing organizational slack.

As a consequence of the inability of subsequent research to confirm Long's (1980) promising previous results, with some even supporting an opposing negative ESO–firm performance relationship (Livingston & Henry, 1980), scholars tried to understand why ESO in some case supports and in other cases limits firm performance. In this vein, Ben-Ner and Jones (1995) focused on the interaction between employees' control and return rights resulting from ESO and provided possible combinations of both dimensions in a 4×4 matrix. Conceptually, they argued that performance effects are stronger – though not necessarily positive – when return and control rights are combined and that the effects of their interaction exceed the sum of the separate effects.

Similar to Long (1978a) but in a less complex fashion, Wagner, Parker, and Christiansen (2003) provided and tested an alternative model directly linking formal ownership from participation in ESO with an integration of employee and employer goals, employee feelings of exercising control over organizational decisions, and employee beliefs that they have a vested interest in the firm's financial success. Their data, collected from a sample of 215 firms offering 401(k) plans, show that plan participation resulted in ownership beliefs, which then related to ownership behaviors. While the former related to improved attitudes towards the organization, the latter materialized in higher levels of firm performance. Ownership behaviors in their study are operationalized using a four-item construct including behaviors of seeking financial information, improving one's own work performance, finding ways to cut costs, and making innovative suggestions for improvement (Wagner et al., 2003).

Using an even larger sample (226 firms offering ESO and 1880 non-ESO firms) and market-based performance measures, Faleye and colleagues (2006) found unflattering

evidence regarding the ESO–firm performance relationship. Their data showed that the firms in their sample provided employees greater voice through ESO, deviated more from shareholder value maximization, showed lower Tobin’s q , took fewer risks and grew more slowly than the non-ESO peer companies (Faleye, Mehrotra, & Morck, 2006).

Another study was built on qualitative management responses and aimed at understanding both the financial effects of ESO and their root cause (Sengupta et al., 2007). The authors found support for the notion that ESO is related to financial performance and labor productivity; however, using commitment and turnover measures, their findings did cast doubt on the notion that ESO operates through improved employee attitudes, which they call the “golden path” hypothesis. Instead, in showing that ESO affects turnover but not commitment, they argue for the “golden handcuff” hypothesis – that is, that the ESO–financial performance relationship results from lower turnover due to employees having an unvested financial stake in their firm.

While most of the ESO studies focusing on the ESO-firm performance relation until the late 2000s were predominantly concerned with the question of whether or not ESO relates to performance, later research investigated at what levels of distributed equity firm-level ESO effects are most pronounced assuming a non-linear relationship. Using market- and accounting-based performance measures, ESO was found to relate more to accounting- than to market-based measures, and this relation was found to be inversely u-shaped, with a peak at around 1.67% equity being controlled through ESO (Guedri & Hollandts, 2008). The authors’ argument was that two opposing processes operate simultaneously: 1) a positive ESO effect on firm performance from increased employee motivation, involvement, satisfaction and lower turnover and 2) a negative effect resulting from employees using their voice to maximize their short-term payoffs and minimize managerial risk-taking (Guedri & Hollandts, 2008). Richter and Schrader (2017a) support this perspective on ESO in their finding that marginal ESO–performance effects (measured as Tobin’s Q , Return on Assets, and sales per

employee) decline at higher levels of ESO and peter out at values between 1.5% and 2% of distributed equity. Further, they also find ESO effects to be country-specific. Building on this notion, Kim and Patel (2017) illustrate that ESO effects are negative in some countries and industries but positive in others. Hence, they find no overall direct effects of ESO on firm performance, but they show that its joint interaction effects with country, industry, year, and firm explain more than 7% of variance in Return on Assets and workplace productivity, respectively (Kim & Patel, 2017).

Since the findings regarding the effect of ESO on firm performance tend to be mixed, meta-analyses on ESO effects have been conducted to aggregate individual findings (Doucouliagos, 1995; Kruse & Blasi, 1995; O'Boyle et al., 2016). The most recent meta-analysis, which includes the majority of studies covered in previous ones and a total of 102 samples and 56,984 firms, finds a small but positive and statistically significant relationship between ESO and firm performance that is robust to different types of performance operationalization and persistent among private and public firms (O'Boyle et al., 2016).

Another way to look at performance is to understand how different firms respond to economic volatility. Lampel, Bhalla, and Jha (2014) focalize on firm resilience of employee-owned businesses during crises and conclude that downward shifts in profitability during global economic downturns are distinctly sharper for non-ESO than ESO firms.

Beyond financial firm performance, research has also investigated alternative performance outcomes. Garrett (2010) provided support for the hypothesis that ESO moderates the relationship between R&D intensity (R&D expenses as a percentage of total sales) and the firm's total patent count. However, no evidence was found for any direct effects of the amount of stocks held per employee on innovative output (Garrett, 2010).

2.2 Employee stock ownership and employee attitudes

The literature review above illustrates that (1) ESO on average is related to various performance measures at the firm level and (2) this relationship appears to be theoretically

grounded in ESO effects at the individual level of employee attitudes and behaviors. This and the following section provide a review of both the theoretical reasoning and empirical findings on the relationships between ESO and individual employee attitudes and ESO and individual employee behavior. As some studies conduct research on both attitudinal and behavioral effects, they may appear in both sections.

One of the first studies to research the effects of ESO at the individual level compared employee attitudes of shareholders and non-shareholders of the same wholly-employee-owned firm and how they perceived their work life compared to working in a non-ESO company (Goldstein, 1978). The study found that stockholders appreciate their current work life more than non-stockholders on several dimensions, including personal development, sense of responsibility, sense of commitment, income capacity, wealth capacity, drive in working and involvement in decision-making. (Goldstein, 1978). Theoretically, Goldstein (1987) assumed that ESO affects both (1) employees' rational-economic part that understands ESO as a source of additional income but also a source of additional risk depending on the firm's financial performance and (2) employees' self-consistent part that sees the possibility of having a voice regarding their immediate work-environment and organization decision-making.

Using questionnaire data from another wholly-owned trucking firm, Long (1978a; 1978b) compared whether a dummy for share ownership or a three-item participation in decision-making scale better explained a set of five employee attitudes (integration, involvement, commitment, satisfaction, motivation) (Long, 1978b). Further, he tested his conceptual framework (see Figure 1) using the same data (Long, 1978a). He found that combined ownership and participation explained a significant amount of variance in the attitudinal variables, with participation in decision-making appearing to have stronger effects than ESO. Only for commitment did ownership explain more variance than participation (Long, 1978b). Further, he found evidence that the transition to employee ownership

increased owners' overall satisfaction, feelings of job security, perceptions of effort and mutual communication, and he concluded that the data support the plausibility of many hypotheses presented in his model without permitting any causal inference (Long, 1978a).

Extending his wholly-owned trucking firm data set by adding two additional firms with different ownership structures (70% employee-owned knitting mill and 34% employee-owned furniture firm), Long (1980) introduced the idea that different ownership setups may affect ESO effectiveness. Comparing individual employee survey responses from the three firms, he hypothesized and found that ESO results in favorable job attitudes (the same five attitudinal variables listed above) and that these effects increase with increasing intensity of ownership being distributed among the employees.

Introducing a variable that Long (1980) omitted in his model, Hammer and Stern (1980) measured psychological or felt ownership to research the implications of ESO on perceived distribution of power. Surprisingly, their data yielded only a weak relation between legal and felt ownership, as employees still perceived the management team to be the real owners. Hence, individual and collective ownership did not translate into perceptions of felt ownership in their data.

While these previous studies mainly researched single or small samples of firms in which employees held large ownership stakes, subsequent works broadened their scope to other forms of ESO. Rhodes and Steers (1981) compared employees in a worker cooperative (where employees do not hold legal ownership) and a conventional firm. Mainly focusing on how employee behaviors (which are discussed in the next paragraph) are affected by organizational commitment, they found that employees in the cooperative reported higher commitment levels, which resulted from higher levels of perceived participation in decision-making, pay equity and performance-reward contingencies.

In a landmark study that still guides ESO research today, Klein (1987) attempted to empirically distinguish among three different theoretical explanations for the mechanism

behind the ESO–individual employee attitude and behavior relationship. Her study used employee-level survey data (multiple-item scales for satisfaction with the plan, organizational commitment and turnover intention) and firm-level ESOP data of 37 companies offering ESOPs that varied in terms of the percentage of equity owned by the plan, the firms' annual contribution to the plan, stock returns and voting rights. Although the study was grounded in agency theory (Jensen & Meckling, 1976), Klein's (1987) fundamental assumption was that ESO may result in three forms of satisfaction at the individual level and that these types of satisfaction in turn lead to favorable employee attitudes and behavior. First, the intrinsic satisfaction model predicted that the simple fact of ownership increases satisfaction and commitment. Intrinsic satisfaction was measured as the percentage of company stock owned by the ESOP but no evidence was found for this model. Second, the instrumental satisfaction model predicted that ownership increases employees' influence in decision-making and thus satisfaction and commitment. Using several measures including voting rights, management's philosophical commitment to the plan, and the extent to which management informs and educates employees about the plan, substantial evidence was found for a positive relation between instrumental ESO satisfaction and employee commitment. Third, the extrinsic satisfaction model predicted that employees develop satisfaction when ESO is financially rewarding. Measured as the size (value of cash or stock) that the companies' contribution to their respective ESOPs and the two-year stock returns, evidence was found that extrinsic satisfaction from financial rewards relate to employee commitment. Overall, Klein (1987) concluded that ownership per se is not effective, but when ESO is financially rewarding and management commits to the plan and to extensive ESOP communication, employee ownership results in satisfaction and commitment.

Guided by these and other previous studies providing indications of an ESO–work attitude relationship, Dewe and colleagues (1988) reversed the direction of effects and tested how employee work attitudes and attitudes towards the ESO plan predict individual ESO

participation (Dewe, Dunn, & Richardson, 1988). Using measures of commitment, belongingness and satisfaction, they found no evidence that highly committed employees or those with a strong sense of belongingness and satisfaction were more likely to participate in ESO. Also, using organizational commitment as both an outcome of ESO and a predictor of favorable employee behaviors (grievances and absenteeism), Buchko (1988) finds support for the notion that owners in a firm's ESOP report higher commitment than non-owners in the same firm.

To further deepen the understanding the relation between ESO participation and employee satisfaction with such ESO plans, which has been theorized and tested to be a crucial prerequisite for ESO effectiveness (Klein, 1987) but which has also been shown not to automatically result from mere ownership (Hammer & Stern, 1980), Klein and Hall (1988) researched the requirements for satisfaction with an ESOP. Their results showed that satisfaction is a function of (1) ESOP characteristics (i.e., management ESOP philosophy, ESOP communication, value of the company contribution to ESOP, and ESOP age); (2) employee status (i.e., salary, tenure, vesting, and age); (3) employee values (i.e., desire for participation in decision making); (4) statistical interactions between those three dimensions of employee and company characteristics; and (5) employees' general attitudes toward the organization. The latter to some extent cuts across the findings of Dewe and colleagues (1988), who argue that employee attitudes towards their work and the organization do not predict ESO participation. Combining the findings of Dewe and colleagues (1988) and Klein and Hall (1988), it appears that employees with less favorable organizational attitudes do in fact participate in ESO despite not being satisfied with the plan.

ESO research on employee attitudes and behaviors (see below) has hitherto used cross-sectional data sets to compare owners and non-owners within the same firm or across firms. Using survey responses of three employee groups (ESO joiners, employees willing to join ESO, ESO non-joiners), Dunn, Richardson, and Dewe (1991) followed up on their

previous study (Dewe et al., 1988), thus setting up one of the first longitudinal research designs in the ESO literature. Collecting employee responses on seven attitudinal items such as “I feel loyalty to the firm”, “It wouldn’t take much for me to leave this firm”, “The firm looks after its workers well”, or “The firm is a fair employer” (Dunn et al., 1991, p. 8), the authors found that attitudes deteriorated after the introduction of the ESO plan, and responses of the members and non-members of the scheme did not vary significantly. While the findings were surprising and opposed their hypotheses, the authors argued that, to some extent, the results were affected by poor firm performance and the failed attempt to unionize the company at the same time as the ESO introduction occurred (Dunn et al., 1991).

Despite Long’s theoretical model (1978) and Klein’s (1987) study empirically addressing different mechanisms behind ESO, no well-developed theoretical explanations of the mechanisms underlying the relationship between ESO and employee attitudes and behaviors existed. In an attempt to fill this gap, Pierce, Rubinfeld, and Morgan (1991) developed a theoretical model and a set of propositions to explain the process through which ESO impacts attitudes and behaviors (see Figure 2). While borrowing some factors affecting the relation between ESO, attitudes, and behaviors from previous studies, such as studies on the managerial philosophy behind ESO (Klein & Hall, 1988), employee ownership expectations and orientations (Klein & Hall, 1988), and the type of ownership plan (Long, 1980), the model’s main innovation was in putting forth the idea that ESO is expected to operate from both a formal and a psychologically perceived form of ownership (Pierce et al., 1991). The model suggests that formal ownership causally relates to the psychological experience of ownership (psychological ownership) stemming from control and mutual maximizing financial interests between employees and employers. Psychological ownership in turn results in organizational commitment, higher levels of motivation (attendance motivation, performance motivation, citizenship behavior motivation) and subsequently improved behavior (work performance and attendance) (Pierce et al., 1991). Although the

model provided a vast network of relationships and conditions through which ownership may produce effects and took into account that ESO effectiveness is sensitive to different plan designs and employee expectations, it lacked the provision of a clear understanding of what is considered psychological ownership. However, its introduction further paved the way for theory and research looking into the black box between formal ownership and attitudinal and behavioral outcomes.

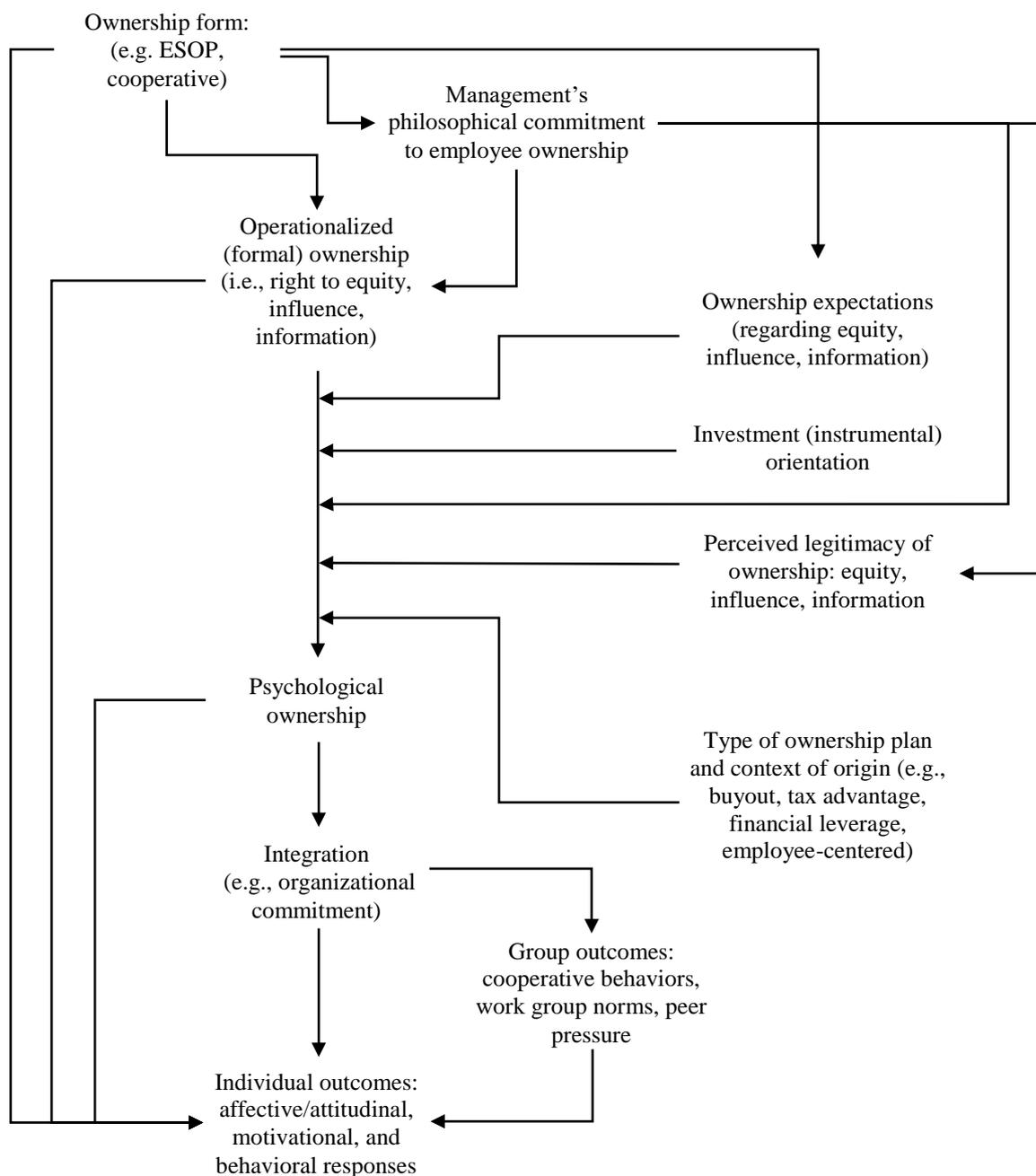


Figure 2: A Model of Employee Ownership.

Reprinted (with layout modified) from Pierce, Rubinfeld, & Morgan (1991)

Klein's (1987) satisfaction model, which has been developed and tested among several ESOP companies, was later validated on a wholly-employee-owned firm (Buchko, 1992a; 1992b). Due to the single-firm study design, intrinsic, instrumental, and extrinsic satisfaction were measured differently than by Klein (1987), but the author found very similar results. While the intrinsic satisfaction resulting from mere ownership did not predict employee organizational commitment, turnover intention, job involvement, and job satisfaction, extrinsic satisfaction (i.e., individual employees' monetary value invested in ESO) and instrumental satisfaction (i.e., individual employees' perceived influence in decision making) were statistically significant and positive predictors (Buchko, 1992a; 1992b).

An aspect of ESO that has rarely been incorporated in previous studies is the size of the firm providing ESO. Building on the notion that employees in larger firms have naturally less impact on corporate performance, Filbeck, Gorman, and Fink (1999) researched whether ESO is a less effective tool to foster employee motivation in larger than in smaller firms. The study asked employees and employers to rate their agreement with statements, such as: "Do you think that the ESOP has resulted in reduced employee absenteeism?" "Because of the ESOP, how do you perceive higher employee morale?" and "because of employee ownership, my day-to-day work is more enjoyable". While employer responses differed at a statistically significant level on almost every question between small and large firms, employees held very similar perceptions (Filbeck et al., 1999). Only with respect to lower absenteeism, more job security and likelihood to volunteer for company-sponsored activities did employees in small firms hold more favorable perceptions. As an explanation for their findings, the authors argued that individuals in general tend to overweight the importance of their actions, and hence employees in large companies hold equal opinions although they are less likely to have an influence on the stock price.

During the early 2000s, ESO research increasingly went outside the Anglo-American sphere. After employee stockholding was introduced to state enterprises in the People's

Republic of China, these companies became an interesting research subject. Chiu (2003), for instance, developed a conceptual framework (see Figure 3) that borrowed from previous models, in particular the three perspectives of satisfaction (Klein, 1987) and Pierce and colleagues' (1991) model of psychological ownership, but aimed at reflecting the special context of socialist China. End-to-end, the model predicts that ESO provides formal (1) financial incentives and (2) control rights that are aligned with the local economic structures. Both incentive and control mechanisms then translate into the three forms of satisfaction, with perceived fairness of the ESO plan moderating this relationship. Lastly, organizational integration, also referred to as sense of ownership, forms the endpoint of the model. The model is innovative in that it raises awareness that different forms of economic structures will result in different mechanisms of control and incentives, and in that it introduces the concept of procedural and distributive justice. The author proposes that when ownership is introduced in such a way that employees felt excluded from the decision-making process, perceptions of procedural justice may suffer, while when companies make small profits or even losses and when ownership stakes are distributed unevenly, perceptions of distributive justice may suffer.

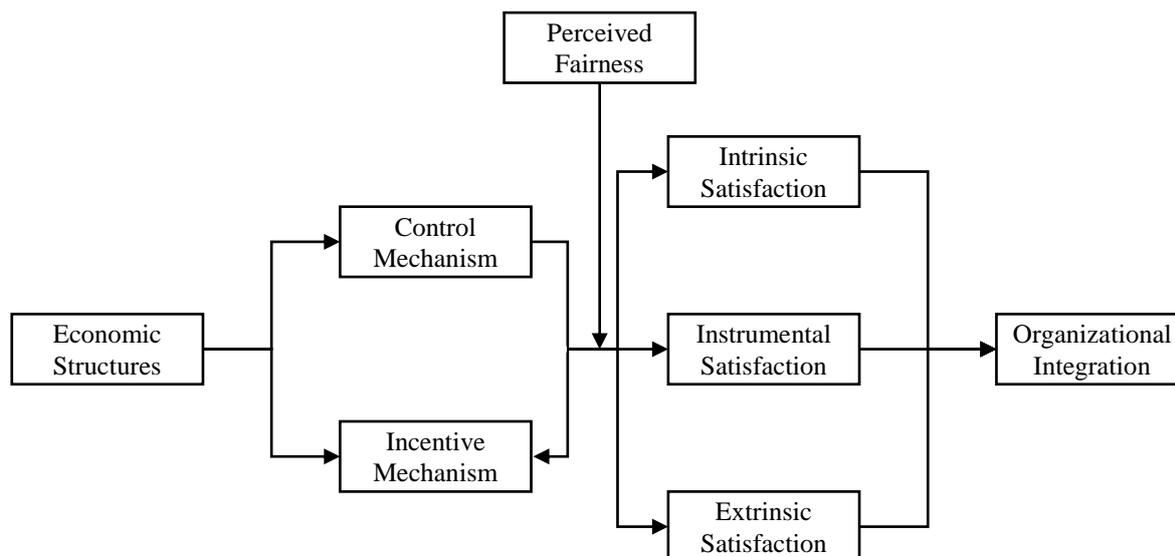


Figure 3: A theoretical model illustrating the effects of economic structures on organizational integration via control and incentive mechanism.

Reprinted (with layout modified) from Chiu (2003)

Combining the issue of employee preferences (see Klein & Hall, 1988; Pierce et al., 1991) and perceived fairness (see Chiu, 2003), Kuvaas (2003) hypothesized that ownership preferences and fairness of the ownership plan will both lead to affective employee commitment. After controlling for personal and work characteristics and the size of the individual employees' financial contribution to ESO, Kuvaas (2003) found that preference for ownership and the perceived fairness of the employee ownership plan were significant predictors of affective commitment. He argued that employee ownership may have intrinsic motivating effects on employees through a mediating mechanism, whereby the effects depend on how employees evaluate and perceive formal ownership plans.

Financial participation (incentive) and participation in decision-making (control) have been the subjects of various models. In an attempt to empirically distinguish them, Bakan and colleagues (2004) showed that participation in decision-making had the same effects on commitment regardless of whether or not it was accompanied by financial participation and concluded that more favorable ESO effects are not more likely when control and financial participation are combined (Bakan et al., 2004). This finding provides additional support for the instrumental satisfaction model but argues against the extrinsic satisfaction model, both

proposed by Klein (1987).

Employee satisfaction with ESO has been researched previously and incorporated in several models explaining the effects of ESO on attitudes and behavior (Buchko, 1992a, 1922b; Klein, 1987; Klein & Hall, 1988). Further, employees' perceptions about the extent to which they can affect decisions (Bakan et al., 2004), firm performance (Filbeck et al., 1999), and fairness (Chiu, 2003; Kuvaas, 2003) have also been deemed important. A study by Hallock and colleagues (2004) integrated these attributes to research how demographics, perceived influence on stock performance, perceived influence on decision-making, perceived pay equity and the combination of these factors explain variance in employees' satisfaction with an ESOP (Hallock, Salazar & Venneman, 2004). Individually, demographics, perceived influence on decision-making, perceived pay equity, and perceived influence on stock performance were found to be significant correlates of ESOP satisfaction. However, in combination and using step-wise regression, only age, perceived influence on stock performance, and perceived influence on decision-making explained variance in ESOP satisfaction at a statistically significant level (Hallock et al., 2004).

As ESO spread beyond the Anglo-American sphere, Caramelli (2004) and Caramelli and Briole (2007) opened another dimension in ESO research, that of culture. They derived general propositions on the relationship between employee perceptions, job satisfaction, ESOP satisfaction, and employee work attitudes and behaviors from previous research. By linking these aspects of the ESO–individual attitude and behavior relationship to Hofstede's (1983; 1994) model of national cultures, they developed sets of propositions linking the general ESO relationships to cultural dimensions. For instance, they propose that “The individual level of stock ownership is more strongly (positively) associated to affective organizational commitment for high individualistic employees” and “The strength of the positive relation between the financial value of the shareholding and affective organizational commitment and job satisfaction is higher for masculine employees compared to feminine

employees” (Caramelli & Briole, 2007, p. 298, 299).

Commitment has been subject to almost every theoretical model in ESO research and part of most empirical studies (Bakan et al., 2004; Buchko, 1988; Goldstein, 1978; Klein, 1987; Kuvaas, 2003; Pierce et al., 1991; Rhodes & Steers, 1981). In most cases, authors assumed that ESO results in affective commitment, namely a strengthening of the bond between the employee and the organization. Claiming that commitment is multifaceted and that ESO likely to be related to more aspects than just affective commitment, Culpepper and colleagues (2004) predicted and investigated how ESO relates to three-component commitment (Meyer & Allen, 1997) among 321 pilots working for three airlines covered by ESOPs (Culpepper, Gamble, & Blubaugh, 2004). First, the authors researched the relationship between ESO and employees’ continuance commitment – that is, employees’ feeling that they must stay with the organization due to constraining financial circumstances. By differentiating two reverse effects on continuance commitment, they found that the size of the employer ESO contribution (percentage of pay) as an ongoing benefit increased continuance commitment, while employees perception regarding the financial value of their ESOP lowered continuance commitment, as employees have accumulated a certain amount of portable wealth (Culpepper et al., 2004). Second, they researched how ESO relates to normative commitment – that is, a form of employee personal loyalty norm creating a felt obligation to reciprocate particularly good treatment – and found that normative commitment resulted from employees’ perceived empowerment (opportunity for influence and control) resulting from ESO. Third, like previous studies, they predicted and found that perceived empowerment, employer commitment to ESO, and perceived financial value accumulated in ESO predict affective commitment (Culpepper et al., 2004). The authors concluded that it is insufficient to limit ESO research to affective commitment only and to predicting unexceptionally positive ESO–commitment effects.

While most of these previous studies addressing commitment among employees

covered by ESO painted a rather favorable picture and provided evidence that the ESO–firm performance relationship may in part result from a closer alignment of employees and their organizations, later studies provide mixed findings. One such study questioned the link and provided an alternative explanation (Sengupta et al., 2007). While showing that ESO relates to firm performance and labor productivity (as illustrated above), they argued that these effects stem from ESO effects on employee retention rather than commitment (Sengupta et al., 2007). Their findings received support from Kaarsemaker (2008), who was unable to show any link between ESO and commitment. On the other hand, McCarthy and colleagues (2010b) researched the impact of ESO in a firm that went through privatization and found that ESO participation relates to higher levels of commitment and organizational citizenship behavior (McCarthy, Reeves, & Turner, 2010b)

Researching attitudinal effects of ESO from an agency theory perspective among 510 Chinese employees in 10 ESO firms ranging from state-owned and international joint ventures to private firms, Chiu and colleagues (2007) found ESO participation to be positively related to psychological ownership, measured as employees knowledge about the firm's business operations and their concern about the business in general. Further, they found that employees were more positive about the firm's future as measured in terms of organizational optimism. The former relationship was then also found to be mediated by employees' extrinsic job satisfaction, using an eight-item scale that, similarly to Klein's (1987) extrinsic satisfaction, measured to what extent employees are financially satisfied by their employment, covering aspects such as salary, benefits, promotion, and job security (Chiu et al., 2007).

Previous research has indicated that satisfaction with ESO is a crucial prerequisite for its effectiveness. Bryson and colleagues (2016) used a broad scope by researching several forms of shared capitalism and its impact on job satisfaction, and they found that job satisfaction was related to both the amount of compensation and how workers receive it. Their findings showed that job satisfaction increases when forms of shared capitalism, such as stock

or profit-related pay, are in place, keeping total compensation levels equal. Further, they concluded from their findings that, with respect to shared ownership, a significant part of the ESO membership effects result from increased levels of organizational loyalty and perceptions of pay fairness, which materialize in employee reciprocity to the organization (measures of loyalty and pay fairness accounted for 40% of explained variance in job satisfaction). The authors also found evidence that employees in shared capitalism are more tolerant towards unpleasant working conditions such as tight deadlines, working shifts, and unpaid overtime (Bryson et al., 2016).

Overall, ESO research on attitudes mainly centers around different facets of employee commitment and employees' satisfaction with their work in general and the ESO plan in particular. Although findings are not universally positive, most published studies suggest a link between ESO and favorable employee attitudes.

2.3 Employee stock ownership and employee behaviors

A change in employee attitudes that does not manifest in altered employee behaviors cannot explain performance effects of ESO at the firm level (Blasi, et al., 2010; McCarthy et al., 2010a). Thus, most models predicting ESO–firm performance effects expect both attitudinal and subsequent behavioral changes once employees participate in ownership schemes (Long, 1978a; Sengupta et al., 2007). The following paragraphs provide a review of literature addressing ESO effects on individual employee behavior.

Long's (1980) study comparing three firms that recently implemented ESO provides one of the first indications of whether employees actually change their behavior after ESO is introduced. By comparing observational and survey data before and after the transition to ESO at the aggregated level of the firm and in the absence of sophisticated data analysis techniques, he found that turnover and worker productivity increased and grievances decreased after ESO was implemented. Similarly, but at the individual-level, Hammer,

Landau, and Stern (1981) researched behavioral changes after ESO transition by collecting data on individuals' voluntary and involuntary absenteeism. While they found a steep decline in voluntary absenteeism (i.e., absence due to personal reasons or without formal excuse), after the company's employees purchased 34% of the stocks, this decline was offset by increased involuntary absenteeism (i.e., illness, illness in the family, medical leave, etc.), as Figure 4 illustrates. Their findings indicate that employees began to legitimize their absence after the transition to ESO (Hammer et al., 1981).

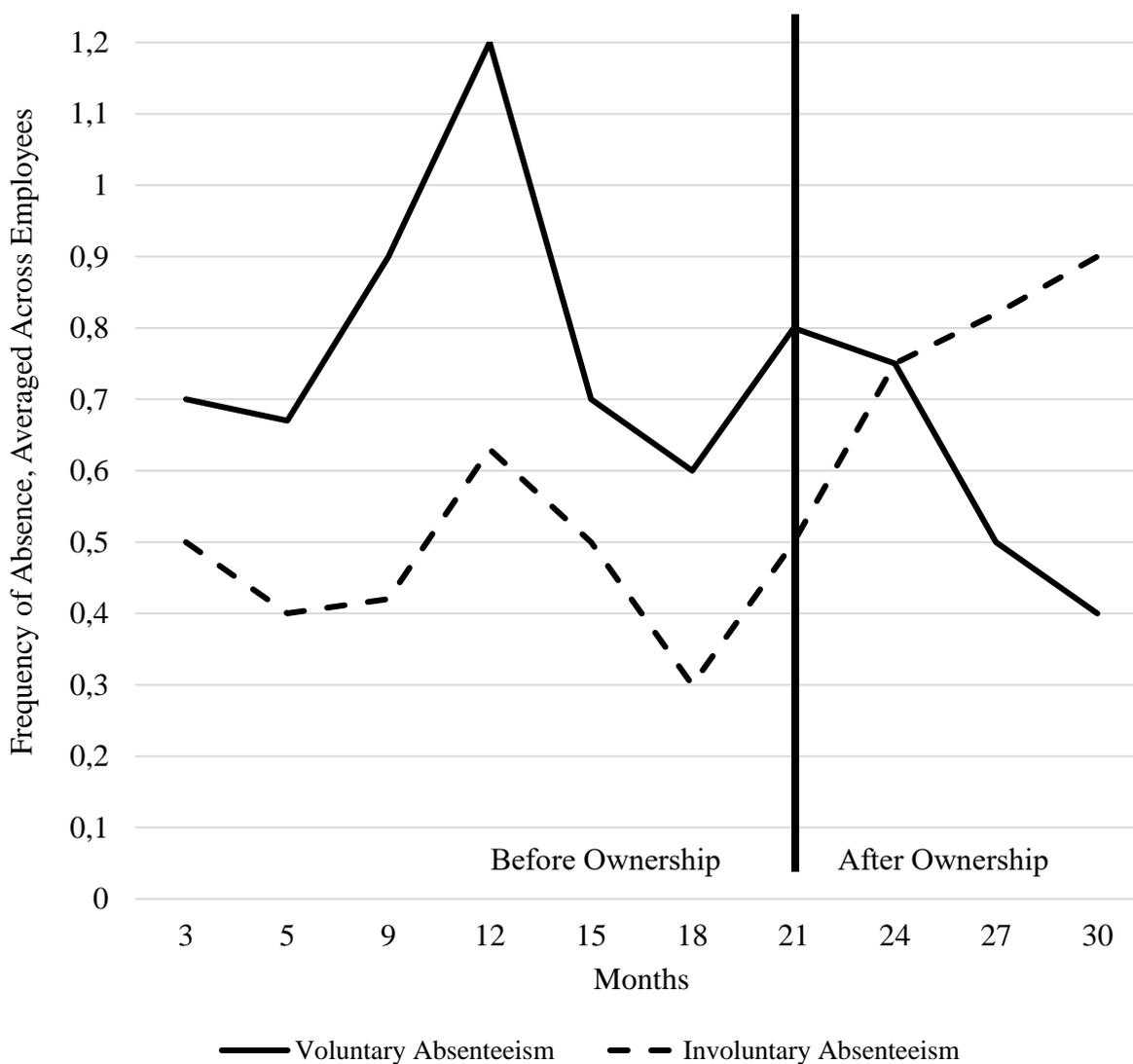


Figure 4: Average frequency of absence over three-month periods, before and after employee ownership.

Reprinted (with layout modified) from Hammer, Landau, and Stern (1981)

Also covering absenteeism together with tardiness, accidents, turnover, and grievances, Rhodes and Steers (1981) researched how higher levels of organizational commitment in a worker cooperative (compared to a conventional non-ESO company) translated into these behavioral outcomes. Contrary to their hypotheses, absenteeism and tardiness were higher among cooperative employees, despite the fact that they reported significantly higher levels of commitment. For turnover and grievances, however, numbers were lower in the cooperative firm, while the data for accidents in the two firms did not show any significant difference (Rhodes & Steers, 1981). Similarly, Buchko (1988) also found no indication that ESO related to employees' absenteeism but also not to grievances counts, although employees reported higher levels of commitment. Turnover data was also part of Klein's (1987) competitive testing of three models of satisfaction stemming from ESO participation. Generally, she found the same relationship as for commitment (see above), indicating that ESO relates to lower levels of turnover intention triggered through instrumental and extrinsic satisfaction. Although these previous empirical findings regarding the ESO-absenteeism relationship were not promising, Pierce and colleagues (1991) adhere to the expectation of a positive relationship and propose that both formal and psychological ownership "operates on employee behavior [...] i.e. performance and work attendance" (Pierce et al., 1991, p. 137; see Figure 2 above).

In contrast to absenteeism, empirical findings for turnover were stable and received additional support during subsequent research. Buchko (1992b) found that employees with greater financial value in ESO report lower turnover intentions and show lower actual turnover numbers. Based on firm-level data stemming from one of the few longitudinal ESO research projects, Fakhfakh (2004) unveiled that ESO, in contrast to profit sharing, resulted in distinctly lower levels of quits among 129 French firms. Another attempt to understand the rationale behind the ESO-turnover relation was built on individual employee data from 45 Taiwanese high-tech firms offering ESO schemes that varied in terms of the vesting

regulations, among other factors (Hsieh & Liu, 2006). The authors predicted that vesting may affect how ESO reduces employees' turnover intention and empirically found that vested ESO (i.e., stock ownership that involves certain holding periods) reduces employee change intention. However, when ESO has portable characteristics, stock ownership even reinforced voluntary change intention within the Taiwanese sample (Hsieh & Liu, 2006). These authors' empirical finding align well with Sengupta and colleagues' (2007) research claiming that ESO operates through "golden handcuffs" rather than a "golden path". Put more simply, they argued that ESO effects on lower turnover and thereby on firm performance do not result from higher levels of aligned interests, commitment and motivation but instead from a financial lock-in effect, as employees lose their unvested ESO stockholding when terminating their employment contract. Their data fit their hypotheses in showing that workplaces with ESO schemes in place did not show higher levels of commitment but did show lower levels of turnover and higher levels of financial performance (Sengupta et al., 2007).

One common criticism of ESO is that it shifts risks to shareholding employees and thus may result in reduced levels of risk-taking, which in turn limit employees' and firms' innovativeness (Faleye et al., 2006; Jensen & Meckling, 1979). Directly researching risk-taking behavior among 14 Taiwanese firms offering different types of ESO, Wu, Su, and Lee (2008) found no indication that employees' motivation to participate in ESO, which they distinguish into intrinsic motivation (i.e., employees' state of identification with the firm) and extrinsic motivation (i.e., employees' financial motives to participate in ESO), is related to lower levels of risk-taking behavior. In contrast, they found intrinsic motivation for ESO to be related to higher risk-taking (Wu, Su & Lee, 2008). Additional support that ESO relates to higher rather than lower employee innovativeness was provided by subsequent research. Researching ESO in the context of incomplete employment contracts, McCarty and colleagues (2010b) assumed that ESO can help to provide guidance and incentives to employees when formal employment contracts are incomplete and found that a significant

share of employees who participate in ESO report willingness to perform duties beyond their contractually agreed-upon duties. They concluded that ESO leads to higher levels of organizational citizenship behavior (McCarty et al., 2010b). Individuals' innovative work behavior is one such behavior that often goes beyond formal employment contracts; it was researched in the context of ESO by Harden and colleagues (2010). Their survey data indicated that ESO affects employees' innovative work behavior, as they found that employees who participated in ESO reported greater willingness to contribute innovative ideas to their organizations (Harden et al., 2010).

Using a broad scope that went beyond ESO alone, Blasi and his colleagues (2010) tried to understand how shared capitalism in general affects employee workplace performance. They found that shared capitalism relates positively to employees' perceptions about their own effort, co-workers' effort, loyalty, willingness to make suggestions for improvement, and intention to stay with the firm. Among the different forms of shared capitalism included in their study, employee ownership appeared to have the strongest effects on workplace performance (Blasi et al., 2010). Using a similar set of outcome variables, Bryson and Freeman (2014; 2019) researched how an employee stock purchase plan affects employees' self-reported work effort (relative to co-workers and relative to contractual hours), absence, job search behavior, and quit intention, as well as whether employees intervened when co-workers departed from how they should work. They found that belongingness to the researched ESO scheme resulted in employee expressions of higher work effort, less desire to quit or to seek employment elsewhere, and less absence compared to employees not participating in the scheme. Further, ESO members monitored co-worker effort, especially when they perceived high ESO membership rates among them. By re-researching outcomes from previous research, the authors offered a new theoretical angle on the mechanism behind ESO effects. They assumed that employees who participate in ESO become more productive when the ownership-associated financial group incentives and gift-

exchange reciprocity (i.e., employees' positive response to the benefits (gifts) associated with ESO), overcome employees' temptation to free-ride. Empirically, they found that a small part of the ESO–behavior relationship was explained by organizational loyalty, which they deemed a measure for gift exchange, and thus they argued that ESO is both a financial incentive and a gift (Bryson & Freeman, 2014; 2019).

The review of the individual-level ESO literature presented above illustrates that scholarly attention has shifted over time, from a focus on attitudinal outcomes between the late 1970s and the early 2000s to a focus on more behavioral-centered research in more recent work. While technical reasons may partly account for this shift – such as a lack of behavioral employee data sources in early ESO research or barriers to collecting such data from corporate databases – it also indicates an increased desire to understand what happens at the behavioral level once employees participate in ESO. However, among the studies using actual behavioral data or, more commonly employee statements regarding their own behavioral intentions, employee loyalty behaviors and effort have been the main issues researched, leaving space for studies on core employee work performance and extra-role behaviors (Pendleton, 2005).

2.4 Synthesis of theoretical considerations behind ESO

The literature review above illustrates that, although ESO research has addressed a variety of potential firm- and individual-level outcomes that may be favorably related to ESO, most studies have been primarily empirical with little theoretical consideration. For instance, while many scholars assume that the main impact of ESO occurs through enhanced commitment and were able to empirically showcase such a relationship, most of these studies are not grounded in a strong theoretical understanding (Sengupta et al., 2007).

The few studies that have developed theoretical ESO models or at least used explicit theoretical underpinnings to conduct empirical research applied two general theoretical viewpoints, which are summarized in the following paragraphs. The first view is held by most

advocates of ESO and assumes that ESO in fact positively affects employee attitudes and subsequent behaviors, which then materialize in improved firm performance (e.g., Bryson & Freeman, 2019; Culpepper et al., 2004; Long, 1978a; Pierce et al., 1991). The second view also assumes that ESO relates to firm performance, but mainly through employee self-selection (attraction) and continuance commitment (retention) rather than through actual effects on employee work attitudes and behaviors. Specifically, this latter view predicts that the ESO–firm performance effects stem from attracting more high-performing employees and from generating “golden handcuffs” that decreases those employees’ likelihood of searching for new employments (e.g., Hsieh & Liu, 2006; Oyer & Schaefer, 2005; Richter & Schrader, 2017b; Sengupta et al., 2007). Both perspectives are explained in more detail below.

ESO, attitudes, and behavior. Studies and their theoretical ESO models that assume ESO to affect employee work attitudes and behaviors have applied either a variant of agency theory (e.g., Blasi, Conte, & Kruse, 1996; Chiu et al., 2007; Harden et al., 2010) or some type of socio-psychological approach (e.g., Long, 1978; Pierce et al., 1991). Regardless of the approach chosen, all of these models implicitly or explicitly accept the assumptions that (1) a conflict between the interests of the owners of the firm and its employees exist and (2) ESO enhances the alignment of employer and employee interests by encouraging long-term profit maximizing behavior when employees receive a stake in their firms (Pendleton, 2006; Sengupta et al., 2007). Hence, most theories on how ESO operates include the assumption that ownership provides a financial incentive for employees that links their individual payoffs to their firm’s financial performance. A substantial amount of empirical evidence supports this mechanism, which has often been termed the extrinsic effect of ESO (Buchko, 1992a, 1992b; Chiu et al., 2007; French, 1987; Klein, 1987; Klein & Hall, 1988). While generally accepting the financial incentive mechanisms underlying ESO effects at the individual level, studies have often proposed and tested additional complementary mechanisms. The most common of these are (1) formal ownership as such, (2) control and participation in decision-

making, and (3) perceptions of satisfaction and fairness.

The notion that the very fact of employee ownership creates commitment and favorably relates to further employee attitudes is very straightforward (Klein, 1987; Kuvaas, 2003; Rhodes & Steers, 1981). It suggests that the benefits of ESO derive directly from the simple fact of ownership, which for instance may have ego-enhancing consequences (Klein, 1987; Long, 1978a; 1978b). Empirical research on ESO from the UK in particular has implicitly accepted this perspective by using the existence of an ESO plan or plan participation as the main independent variable (Bakan et al., 2004). However, this mechanism, which has often been described as the direct or intrinsic effect of employee ownership, has received little empirical support (e.g., Buchko, 1992; Long, 1978a; French & Rosenstein, 1984; Hammer & Stern, 1980; Klein, 1987; Kuvaas, 2003).

The second prevalent complementing mechanism is the expectation that ESO leads to an increase in employees' formal control over and influence on company decision-making. By holding stocks from their employers, employees receive the right to information, invitations to shareholder meetings, and other rights traditionally reserved for stockholders. Such opportunities for worker participation in decision-making are expected to increase employee commitment and other employee attitudes and behaviors (Goldstein, 1987; Klein, 1987; Wagner et al., 2003). This mechanism, which has often been described as the indirect or instrumental effect of employee ownership, has received stable empirical support (e.g., Buchko, 1992a; French & Rosenstein, 1984; Hammer & Stern, 1980; Klein, 1987; Long, 1978b, Pendleton et al., 1998). Evidence also suggests that positive ESO effects suffer or even reverse when ESO is not accompanied by increased employee participation in decision-making (Kruse, 1984; Sengupta et al., 2007)

The third common complementing mechanism that appears in most ESO models in some form is employee satisfaction. ESO scholars predict that employee satisfaction results from ESO scheme characteristics. In particular, the above-outlined aspects of (1) a

performance-reward contingency stemming from the size of the ESO payout, (2) ownership as such, and (3) increased participation in decision-making are proposed sources of employee satisfaction. The higher the financial value covered in ESO, the larger the ownership stake, and the greater the increase in perceived control through ownership, the more employees feel satisfied with the ESO scheme and their organization as a whole. Subsequently, this increased level of satisfaction translates into commitment and thus better work attitudes and behaviors (Bryson et al., 2016; Klein, 1987). Related to satisfaction, scholars have also raised the issue of fairness. Only if employees perceive the ownership stake allocation procedure (procedural fairness) and the size of these stakes (distributive fairness) as fair can ESO be an effective tool to foster employee commitment (Kuvaas, 2003). Most recently, scholars have also introduced and empirically addressed the idea that ESO, in addition to providing a financial incentive, formal ownership feelings, and formal control rights, also constitutes an employer-provided gift, which in turn may result in gift-exchange reciprocity (Bryson & Freeman, 2014; 2019). Hence, higher levels of loyalty that employees develop as a reciprocal response to fair treatment may provide an additional side effect to the financial incentive inherent in ESO when it comes to changing employee attitudes and behaviors.

Underlying virtually all approaches explaining how ESO affects employee work attitudes and behavior is the assumption that it operates both formally and in the form of psychological ownership, which then complements formal ownership in guiding employees to feel and behave more benevolently toward the organization (Pierce et al., 1991).

ESO, attraction, and retention. The literature review also points out that ESO has the potential to attract and retain employees (Oyer & Schaefer, 2003). By offering ESO, firms indicate to candidates their willingness to reward high levels of firm performance and their ability to pay above-market compensation (Richter & Schrader, 2017b). In return, employees that have a preference for a contingency between wage and firm performance self-select themselves into ESO firms. However, besides its attraction effects, ESO (especially when

vested) also confronts employees with constraining financial circumstances (Culpepper et al., 2004). The higher are the future ESO payouts employees would lose by quitting, the less likely it is that they will look for new employment opportunities (e.g., Blasi & Kruse, 1999; Hsieh & Liu, 2006; Sengupta et al., 2007). While this idea that ESO fosters employee attraction and retention may complement ESO effects on employee work attitudes, work behavior, and eventually firm performance (Culpepper et al., 2004; Klein, 1987), some scholars have argued that individual-level ESO effects that later materialize in firm performance exclusively result from ESO firms' advantage in attracting and retaining high-performing employees (Oyer & Schaefer, 2005; Sengupta et al., 2007).

All of these theoretical perspectives presented above exist in combination and are not mutually exclusive but instead overlap in different ways and in different models (Sengupta et al., 2007). Strikingly, almost all theoretical models that predict ESO effects on individuals' attitudes and behavior, including those that apply socio-psychological assumptions, have in common an understanding of ESO as a tool to provide contingency between individual payoffs and firm performance. Hence, ESO research nearly universally accepts the idea that employee ownership provides a financial incentive that aligns employee and employer interests under the mutual umbrella of long-term profit maximization while being complemented by minor additional mechanisms such as control, satisfaction, and gift exchange.

3 SCOPE AND RESEARCH QUESTIONS

Differences in firm motives, institutions, and local regulatory requirements have led to a wide variety of ESO scheme structures (O’Boyle et al., 2016). Such differences, especially in terms of discounts (including cash discounts and free matching stocks) employees receive and rights employees obtain once they participate in ESO, may affect how ESO relates to certain firm- and individual-level outcomes. Hence, research on ESO must be clear about what particular form of ESO is under research to ensure that the developed theory is appropriate and the empirical findings can be compared, reproduced and generalized (Klein, 1987; Klein & Hall, 1988; O’Boyle et al., 2016). In concrete terms, this means that while a certain theoretical grounding and empirical strategy may be appropriate when researching how senior management responds to ESO in a small wholly-employee-owned firm, the same approach is likely to be misguided when researching the effects on non-managerial employees’ work behavior in a multinational enterprise where employees collectively hold only a minority stake.

In building on the broad variety of ESO scheme characteristics and the existing knowledge on how different forms of ESO theoretically and empirically relate to individual employee outcomes (see Chapter 2: Literature Review), the following paragraphs outline the broader scope and concrete research questions of this dissertation.

3.1 Scope

This work focuses on what Kaarsemaker and colleagues (2010) call “mainstream” ESO, which most closely approximates both ESOPs and minority ownership as defined by Mygind (2012). Mainstream ESO offers ownership opportunities (direct or indirect) to all employee groups within an organization; participation is voluntary and is accompanied by significant discounts and/or matching stocks (Andrews et al., 2010; Caramelli & Carberry 2014; Pendleton, 2005; Sesil et al., 2003). Individually and collectively, employees hold small

equity stakes, usually less than 5%, and thus have limited control rights (either because the stakes are too small to actually affect firm decision-making or because a trustee exercises the collective voting rights) but share in the company's surpluses and wealth (Kaarsemaker et al., 2010; Sesil et al., 2003). Mainstream ESO is predominantly found in larger firms that are listed on the stock market (Kaarsemaker et al., 2010; Pendleton, Poutsma, Van Ommeren, & Brewster, 2001; Sesil et al., 2003).

The choice to focus my research on mainstream ESO is based on both practical and theoretical reasons. From a practical perspective, mainstream ESO is the prevailing form of employee ownership in developed economies (Kaarsemaker et al., 2010). In Europe, 85% of publicly traded firms offer some form of mainstream ESO, resulting in more than 10 million employee stockholders (O'Boyle et al., 2016). From a theoretical standpoint, existing theories to explain the mechanisms by which ESO affects individual-level outcomes, especially individual employee behavior, are incomplete (Buchko, 1992b; Caramelli & Briole, 2007; Pierce et al., 1991). Although mainstream ESO is among the ESO types that have attracted the most scholarly interest since the 1970s (Kaarsemaker et al., 2010), the theoretical incompleteness is especially pronounced in the case of mainstream ESO, as I will explicitly illustrate below and throughout the theory and hypothesis development chapter.

3.2 Research questions

This work aims at answering three main research questions to address the relationship between mainstream ESO and individual employee performance. While the research questions are briefly introduced below to demonstrate their relevance, a theoretical analysis and hypothesis development for each of the three research issues is presented in the subsequent theory section.

Research question 1. The literature review presented above shows that ESO on average relates to higher levels of firm performance (e.g. O'Boyle et al., 2016). Further, there is a common, albeit not universal, belief among ESO scholars that these effects in part result

from ESO effects at the individual attitudinal and behavioral levels (Long, 1978a; Wagner et al., 2003). Research addressing ESO effects at the individual level is mainly confined to investigating attitudes and loyalty behaviors (as presented in the literature review above), which have been shown to explain at least parts of the ESO–firm performance relationship through attraction and retention (e.g., Oyer & Schaefer, 2005; Sengupta et al., 2007). However, other core work behaviors that could have an even clearer impact on firm performance, such as individual employee performance (Paul & Ebadi, 1987), have received little empirical research attention (Blasi et al., 2010). Thus, this work aims at answering the following first research question:

(1) Does mainstream ESO relate to individual employee performance?

Research question 2. Existing predictions on how ESO relates to individual employee outcomes (Chiu, 2003; Klein, 1987) are mainly rooted in economic thinking. As the literature review outlined, theoretical and empirical ESO studies almost universally use a principle-agent approach or at least accept the idea that ESO results in financial incentivization of stock-holding employees and an alignment of interests between these employees and their employers (Kaarsemaker et al., 2010). However, these models widely ignore some mainstream ESO characteristics and thus give rise to the question of whether existing economically grounded ESO theory is complete. First, mainstream ESO confounds two separate pay constructs, namely (1) a financial incentive by providing employees with stock performance exposure (Hammer & Stern, 1980; O’Boyle et al., 2016) and (2) an unconditional benefit by granting cash discounts or free matching stocks (Andrews et al., 2010; Caramelli & Carberry 2014; Pendleton, 2005; Sesil et al., 2003). Hence, theory on how benefits relate to improved individual employee attitudes and work behavior (Dulebohn, Molloy, Pichler, & Murray, 2009; Harris & Fink, 1994; Lambert, 2000) needs to be

incorporated into ESO theory building and research. Second, the large public corporations that are most likely to offer mainstream ESO (Kaarsemaker et al., 2010; Pendleton et al., 2001; Sesil et al., 2003) are usually characterized by a low line of sight between individual non-managerial employees' work performance, financial firm performance, and stock market performance (Blasi et al., 1996; Kruse, Blasi, & Park, 2010). Further, individual ESO stakes in these schemes are often small (Kaarsemaker et al., 2010; Sesil et al., 2003). These features conflict with existing knowledge about requirements for effective financial incentives, namely a clear line of sight (Vroom, 1964) and minimum value thresholds (Mitra, Jenkins, Gupta, & Shaw, 2015; Mitra, Tenhiälä, & Shaw, 2016). Thus, it is reasonable to question the effectiveness of mainstream ESO as an economic financial incentive and hence the fundamental theoretical grounding of most ESO theories.

As a consequence, the mismatch between mainstream ESO characteristics and existing theoretical grounding of ESO research calls for (1) a challenging of the prevalent economic explanations for the ESO–individual performance mechanism and (2) an incorporation of additional psychological perspectives to account for the unconditional benefits inherent in ESO plans. Uniting economic perspectives about financial incentives with psychological perspectives (Shaw, Gupta & Delery, 2000) contributes to each in general and to ESO theory in particular. Thus, this work aims at answering the following second research question:

(2) How can the relationship between mainstream ESO and individual employee performance be explained theoretically?

Research question 3. As a consequence of the incompleteness of theoretical models explaining the mechanisms behind ESO (Chiu, 2003; Pierce et al., 1991) and the scarcity of longitudinal ESO research (Chiu et al., 2007; Hammer & Stern, 1980; Pierce et al., 1991), the literature provides little understanding on how the effects of ESO in general, and its effects on

individual-level employee performance in particular, develop over time. Since ESO is a temporal phenomenon, which is offered to employees on a recurring annual basis (Kaarsemaker et al., 2010), researching ESO in a longitudinal fashion is a crucial component in the attempt to theoretically and empirically understand its effectiveness. Thus, this work aims at answering the following third research question:

(3) How does the relationship between mainstream ESO and individual employee performance develop over time?

This work clearly focuses on the relationship between mainstream ESO and individual employee performance. However, for simplicity I will only use the abbreviation ESO when referring to mainstream ESO hereinafter.

4 THEORY AND HYPOTHESES DEVELOPMENT

Economically grounded theories, particularly agency theory and the idea that ESO provides a financial incentive for more favorable employee behavior, are ubiquitous in past research seeking to explain why ESO should improve employee behavior in general and performance in particular. However, I argue that psychological constructs based on benefit satisfaction and social exchange theory better explain the outcomes of ESO on individual employee performance. Although both perspectives can justify an ESO–individual performance relationship, social-exchange-based explanations are more complete. The following paragraphs outline both perspectives individually and provide a comparison of their persuasiveness when explaining a potential ESO–individual performance relation. Further, I will provide a prediction regarding the temporal development of this relationship and finally present four concrete hypotheses.

4.1 Economic perspectives: Financial incentives for individual performance

ESO allows employees to act as financial investors who share in company gains and losses (Hammer & Stern, 1980). While employee/employer interests are often misaligned (Eisenhardt, 1989; Jensen & Meckling, 1976), owning shares is believed to correct these challenges by aligning interest in firm performance (French, 1987; Klein, 1987; McCarthy & Palcic, 2012). Agency theory argues that stock-holding employees will maximize their performance to maximize shareholder returns, consistent with general economic assumptions that employees, as agents, will behave in ways that maximize their self-interest (Eisenhardt, 1989; Milgrom & Roberts, 1992). Thus, ESO may financially incentivize employees to maximize their stock payoffs by performing at their best. Researchers have not conducted empirical tests to observe how ESO affects individual employee performance, but they have empirically shown that the more monetary value employees hold in ESO, the greater will be their positive employee attitudes and behavioral intentions (Buchko, 1992b; Klein, 1987).

Since this perspective on ESO as a financial incentive dominates existing literature and has been outlined throughout the literature review above, no further elaboration on the relationship between ESO as a financial incentive and individual employee performance is provided hereinafter.

4.2 Psychological perspectives: Social exchange incentives for individual performance

Beyond agency theory, social exchange perspectives (Blau, 1964; Cropanzano, Anthony, Daniels, & Hall, 2016; Cropanzano & Mitchell, 2005) provide an alternative or complementary explanation of how ESO affects individual performance. Social exchange theory refers to a family of conceptual models rather than a single theory (Cropanzano et al., 2016; Cropanzano & Mitchell, 2005). Essentially, these models share the common assumption that in well-established social exchange relationships, employers show goodwill toward employees by providing resources and benefits; in return, employees feel socially obligated to repay this positive treatment (Lavelle, Rupp, & Brockner, 2007; Rhoades, Eisenberger, & Armeli, 2001; Van Dyne, Graham, & Dienesch, 1994) and will reciprocate through positive work behavior, attitudes, and identification with the organization (Cropanzano & Mitchell, 2005; Rupp & Cropanzano, 2002). A common way for employees to fulfil their social obligation is by reciprocating with behavior that the employees know will benefit the organization (Lavelle et al., 2007; Rhoades et al., 2001; Van Dyne et al., 1994), such as higher levels of job performance or organizational citizenship behavior (Masterson, Lewis, Goldman, & Taylor, 2000; Wayne, Shore, Bommer, & Tetrick, 2002).

Benefits research shows that meaningful benefits can serve as an avenue of potential employer goodwill that strengthens employee–employer social exchange relationships (Dulebohn, Molloy, Pichler, & Murray, 2009; Harris & Fink, 1994). Benefits that evoke feelings of benefit satisfaction (Harris & Fink, 1994; Lambert, 2000) can increase organizational commitment (Eisenberger, Fasolo & Davis-LaMastro, 1990; Eisenberger,

Huntington, Hutchison, & Sowa, 1986; Settoon, Bennett & Liden, 1996), cause employees to feel obligated to perform in ways that will benefit the organization (Settoon et al., 1996), and eventually motivate in-role and extra-role performance (Dulebohn et al., 2009; Harris & Fink, 1994). Thus, benefits provided by the firm are thought to propel employees to reciprocate, such as by providing more suggestions for improvement, attending meetings regularly, and helping coworkers (Lambert, 2000).

ESO plans can give employees free stocks or opportunities to purchase discounted stocks (DeGeorge, Jenter, Moel, & Tufano, 2004; Kaarsemaker, Pendleton, & Poutsma, 2010). Such discounts are generally considerable, such that even if the firm's stock price declines, employees will not lose money (Bryson & Freeman, 2014). Hence, ESO offerings are provided in addition to salary (Filbeck et al., 1999; Freeman, 2007; Kruse, Freeman, & Blasi, 2008) and are thus likely to be perceived as a meaningful employment benefit (Bryson & Freeman, 2014; Long, 1978a).

Combining this existing knowledge on social exchange, benefits, and ESO, I expect that employees perceive the discounts and free matching stocks accompanying ESO offers as an unconditional benefit that goes beyond contractually agreed-upon salary (Filbeck et al., 1999; Freeman, 2007; Kruse, Freeman, & Blasi, 2008), thus triggering employee feelings of benefit satisfaction (Bryson & Freeman, 2014; Harris & Fink, 1994; Long, 1978a) and increased employee satisfaction in general (Wagner, Parker, & Christiansen, 2003). This in turn leads employees to develop commitment, a feeling of reciprocal obligation, and a desire to behave in ways that benefit their organization (Eisenberger et al., 1986; 1990; Settoon et al., 1996), overall constituting a strengthened social exchange relationship (Blau, 1964; Kuvaas, Shore, Buch, & Dysvik, 2017). One behavior that generally benefits organizations, and hence one potential way for employees to fulfil their reciprocal obligation, is through increased work performance (Cropanzano & Mitchell, 2005; Masterson et al., 2000; Wayne et al., 2002). Thus, I expect that ESO may, instead of or in addition to being an economic

financial incentive, also relate to higher levels of individual employee performance, based on the principle of social exchange.

Previous empirical ESO research provides support for this perspective, indicating that employees are more likely to generate favorable ESO outcomes when they are satisfied with the ESO scheme (Chiu, 2003; Kuvaas, 2003), especially when satisfaction comes from an employer's financial contribution to such schemes (Klein, 1987; Kuvaas, 2003; Pierce et al., 1991).

4.3 Financial or social incentive? Integrating and comparing two perspectives

Agency theory perspectives imply that employees will maximize the utility of ESO plans by performing better to increase shareholder returns, while social exchange theory perspectives argue that feelings of reciprocity will lead to increased employee performance.

Both theoretical viewpoints are sound, but I argue that social exchange theory is more persuasive. If ESO is to be incentivizing, employees must believe that their individual performance will actually increase firm performance and shareholder return (Vroom, 1964). Employees will engage in behaviors that they believe will lead to desired outcomes only as long as they believe that they are capable of producing such behaviors (Kuvaas et al., 2017; Vroom, 1964). However, employees in most ESO plans, especially mainstream ESO, hold very small amounts of stock (Kaarsemaker et al., 2010; Sesil et al., 2003) and can rarely affect a firm's total shareholder return (Blasi et al., 1996; Kruse et al., 2010). Thus, it is questionable whether employees believe that their own performance directly increases their monetary utility from ESO due to a lack of line of sight (Lawler, 1971; Lawler, 2000). Although employees may believe that their individual performance benefits the organization, they are unlikely to see a direct relationship between their performance and the firm's overall financial performance and subsequent stock payouts.

By offering purchasing discounts (Degeorge et al., 2004; Kaarsemaker et al., 2010), ESO may appear to be an up-front gift rather than a long-term financial incentive.

Consequently, I believe it is more appropriate to expect that ESO is positively related to employee performance because employees will feel reciprocally obligated than to assume that employees increase their individual performance due to a perceived financial incentive.

In comparison with their overall salaries, employees earn trivial amounts from ESO. For instance, during the years of my sample (observations were collected between 2011 and 2015; see Methodology chapter for details), employees made the highest gains when they purchased the 2011 ESO offering at EUR 47 and held their stocks until mid-2015, when the stocks reached an all-time high of about EUR 92. Based on the average annual stock purchase of $M=16.3$ stocks and including five dividend payments for 2011 until 2015, employees gained EUR 935, but only if they sold at the highest point. During that time, an average employee earned an annual base salary of $M=EUR\ 50,500$, meaning that the most an average employee could earn during the four years of ESO gains was 1.85% of their annual base salary. Table 1 illustrates the average values of the ESO discount and matching stocks, the total ESO package, and the five-year ESO gains from stock price increase and dividend payments compared to annual base salaries for ESO packages offered by the firm. Values are calculated for low (25th percentile), medium (mean), and high (75th percentile) base salaries.

Table 1: ESO benefit value, ESO stock value and ESO 5-year gain per annual base salary for ESO package of 10+1 and 20+2 (in brackets) stocks

Level	Annual Base Salary ^a			ESO Benefit Value per Salary ^{b, c}		
	[EUR]			[%]		
	<i>25th percentile</i>	<i>mean</i>	<i>75th percentile</i>	<i>25th percentile</i>	<i>mean</i>	<i>75th percentile</i>
Lower Management	65,475	70,928	78,039	0.39 (0.52)	0.36 (0.48)	0.33 (0.44)
Admin	42,647	53,000	64,618	0.61 (0.80)	0.49 (0.64)	0.4 (0.53)
Production-related	36,443	42,047	54,436	0.71 (0.94)	0.61 (0.81)	0.47 (0.63)
Direct Production	33,602	36,234	38,678	0.77 (1.02)	0.71 (0.94)	0.67 (0.88)
Average		50,552			0.54 (0.72)	

Level	ESO Stock Value per Salary ^{b, c}			ESO 5-year Gain per Salary ^{b, c, d}		
	[%]			[%]		
	<i>25th percentile</i>	<i>mean</i>	<i>75th percentile</i>	<i>25th percentile</i>	<i>mean</i>	<i>75th percentile</i>
Lower Management	0.94 (1.88)	0.87 (1.74)	0.79 (1.58)	0.58 (1.15)	0.53 (1.06)	0.48 (0.97)
Admin	1.44 (2.89)	1.16 (2.32)	0.95 (1.90)	0.88 (1.77)	0.71 (1.42)	0.58 (1.17)
Production-related	1.69 (3.38)	1.46 (2.93)	1.13 (2.26)	1.03 (2.07)	0.9 (1.79)	0.69 (1.38)
Direct Production	1.83 (3.66)	1.7 (3.40)	1.59 (3.18)	1.12 (2.24)	1.04 (2.08)	0.97 (1.95)
Average		1.3 (2.60)			0.79 (1.59)	

Notes:

^a The numbers express the total annual amount of base pay not including any variable pay.

^b I use the two most common ESO packages of 10 and 20 stocks. Both packages offer a EUR 175 discount, one (10 stock package) or two (20 stock package) free matching stock(s), and the previous year's dividend on all 11 (22) stocks. The value in brackets applies to the larger 20 stock package.

^c The average stock price during my period of observation was EUR 55.94.

^d The average annual stock price increase during my period of observation was 10.26%; the total increase between the 2011 and the 2016 ESO offering was 39.15%; and the average annual dividend payment was EUR 2.47.

Considering the minimal line of sight combined with low potential ESO gains, relative to even a single year's salary, expectancy theory (Vroom, 1964) suggests that ESO has little motivational force. Expectancy theory provides a rationale for why pay is related to employee performance (Porter & Steers, 1973). It explains motivation by considering the attractiveness of the outcome (valence), the probability that effort exerted will lead to a desired performance (expectancy), and the likelihood that performance will be rewarded with the desired outcome (instrumentality) (Vroom, 1964). Motivation intensity is based on the idea that employees will work harder when their efforts affect performance and subsequent rewards. It predicts performance if pay constructs are accurately measured and conceived (Gupta, Conroy, & Delery, 2012). However, most employees are not part of critical firm decision-making groups, such as CEOs or TMTs, and are unlikely to see how their performance affects stock prices. Further, since all employees can participate in ESO plans, individual performance has no direct connection with participation. Hence, the level of instrumentality is extremely low.

Similarly, since ESO has a relatively small monetary value, the level of valence is also extremely low.

Empirical evidence supports the idea that pay for performance must reach a threshold of about 7% of annual salary to be sufficiently motivating (Jenkins, Mitra, Gupta, & Shaw, 1998; Mitra et al., 2015; Mitra, Tenhiälä, & Shaw, 2016). Thus, because of the very low line of sight, low expectancy, low instrumentality, and low valence resulting from the minimal relative dollar value that ESO can return to employees, I expect psychological incentives to be more salient than financial incentives. Hence, I argue that benefits (proxied by discounted ESO in my data, see chapter 5 METHODOLOGY) – and in particular employee benefit satisfaction, which results in a strengthened employee-employer social exchange relationship – explain more variance in employees' individual performance than do inherent financial incentives (proxied by non-discounted stocks in my data, see chapter 5 METHODOLOGY), as illustrated in Figure 5.

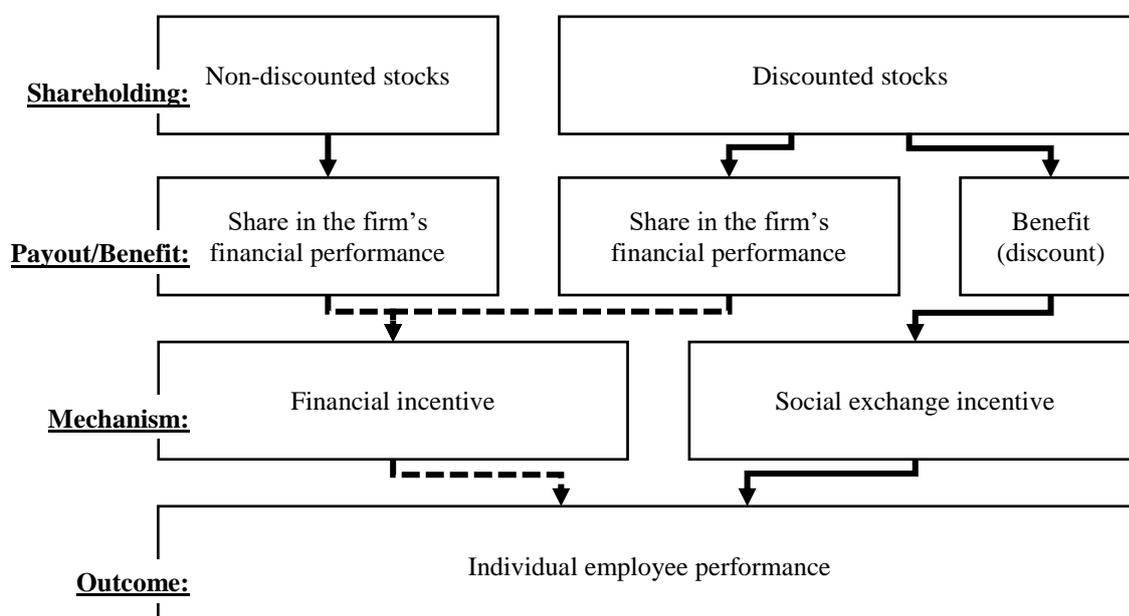


Figure 5: Financial (agency) incentive mechanism (non-discounted stocks proxy) versus social exchange incentive mechanism (discounted stocks proxy)

4.4 Time as a boundary condition

Due to both different legislations and firm-specific decisions regarding the structure and subsidization of ESO, characteristics of ESO schemes can vary considerably between firms. Nevertheless, most have in common that employees are permitted to participate a limited number of times (usually once) per year and to invest a limited amount of money into ESO (Kaarsemaker et al., 2010). As a result, over the course of time employees can incrementally increase their shareholdings through repeated annual participation in ESO and at the same time are able to enjoy the employer-offered discounts and free matching stocks with every participation.

In building on my expectations presented above that ESO operates as an unconditional employee benefit evoking social exchange rather than a financial incentive, I expect this characteristic to also reflect in the shape of ESO effects over time. Previous research has shown that positive effects of new unconditional pay tend to wane (Maltarich, Nyberg, Reilly, Abdulsalam, & Martin, 2017; Reilly, Nyberg, Maltarich, & Weller, 2014; Shaw, Duffy, Mitra, Lockhart, & Bowler, 2003) as employees adapt to new situations (Ariely, Jones, & Ariely, 2010; Ployhart & Bliese, 2006). These diminishing effects may largely result from both the effects of habituation and diminishing marginal utility. The latter presumes that the more of a good individuals obtain or consume, the lower will be the preference they will assign to having more of this good (Bernoulli, 1954; Layard, Mayraz, & Nickell, 2008). While applicable to most consumable goods, this concept is commonly employed to investigate “how fast the marginal utility of income declines as income increases” (Layard et al., 2008: 1846).

As I understand ESO as a form of unconditional income that constitutes an employee benefit, I expect ESO participation to have diminishing performance effects (similarly to other forms of income, Maltarich et al., 2017; Reilly et al., 2014) rather than increasing performance effects as the quantity of share ownership increases over time. While this

expectation is in sharp contrast to economic predictions that hold that share ownership should be a constant motivational source and that as the quantity of share ownership increases, so too should motivation (Milgrom & Roberts, 1992), it aligns well with previous empirical ESO and reciprocity research. First, firm-level research on ESO has identified diminishing positive effects at higher levels of distributed equity (Guedri & Hollandts, 2008; Richter & Schrader 2017). Second, field-experimental research on unconditional wage increases indicates that the effectiveness of gift-exchange reciprocity decays over time and with frequent exposure to such unconditional gifts (Chung & Narayandas, 2017; Gneezy & List, 2006). Hence, I expect that although employees continuously increase their ESO stockholdings, the relationship between ESO and individual employee performance will decrease over time and as employees participate more often in ESO.

4.5 Hypotheses

In building on the theoretical considerations presented above, I expect (1) ESO in general to be positively related to individual employee performance; (2) the benefits (discounts and free matching stocks) accompanying ESO to result in employee (benefit) satisfaction; (3) employees' reciprocal responses (social exchange obligation) to these benefits to be stronger than their economic responses to the financial incentive inherent in ESO, and thus the relationship between ESO and individual employee performance to be stronger for discounted than for non-discounted stocks; and (4) the ESO-individual performance relationship to diminish over time. Thus, I hypothesize as follows:

Hypothesis 1: There is a positive relationship between ESO and individual employee performance.

Hypothesis 2: Employees develop satisfaction for the benefit of discounted stocks purchased through an employee stock ownership plan.

Hypothesis 3: The positive relationship between stock ownership and individual employee performance will be stronger for discounted stocks (ESO) than for non-discounted stocks.

Hypothesis 4: The positive relationship between ESO and individual employee performance will diminish over time.

5 METHODOLOGY

I analyzed five years (2011-2015) of individual-level employee data from the databases of a German manufacturing firm belonging to the DAX30, the leading German stock index (Höpner & Jackson 2006; Sanders & Tuschke, 2007). The firm offers access to (1) employee stock purchase data from the firm's share registry and (2) actual individual performance data and control variables from various sources such as the corporate idea suggestion scheme and several HR databases. Data are available for employees in seven major locations across Germany, and at seven levels: CEO; top, middle, and lower management; admin staff, production-related staff, and direct production staff. Employees work in eight major functions, which I aggregated into three categories: production (assembling, quality control and procurement, logistics), administration (finance, HR, IT, legal) and Research & Development (R&D). Data was gathered by myself as a participant observer to better understand the context. Beyond the factual data from the firm's information system, I collected data from informal interviews, observations, internal chat boards, and an employee survey.

By covering employees working for the same firm in Germany, I eliminated country- and industry-specific effects that may affect ESO outcomes (Caramelli & Briole, 2007; Kim & Patel, 2017; O'Boyle et al., 2016). Further, the results are not biased by different (1) approaches that firms use to communicate and promote ESO schemes, (2) ESO schemes, and (3) reasons for implementing ESOs, all of which can influence employee reactions (Klein, 1987; Klein & Hall, 1988; O'Boyle et al., 2016).

Discounted (ESO) and non-discounted stocks. I gathered employee stockholding data from the firm's share registry database to distinguish between stocks purchased at discounted rates through the ESO plan and stocks that employees purchased without discounts in the open market. In both cases, the underlying stocks have identical voting and dividend rights, differing only in the discount and free stocks that come along the ESO stocks.

This sample was appropriate to observe the effects of discounted and non-discounted stocks on employee performance; 7008 observations of non-discounted stock purchases show that a significant number of employees purchased non-discounted stocks in the open market. Although it might seem odd to purchase non-discounted rather than discounted stocks, employees expressed three reasons for doing so. First from 2011 through 2015, four of the five ESO offerings occurred during stock price upswings (Appendix B). Thus, employees might have purchased stocks at lower prices before or after the ESO offering. Observations of internal chat board comments indicated that employees were dissatisfied about the fact that ESO offerings tended to occur when stock prices were high. Second, in discussions with employees administrating the ESO scheme and in chat comments, I learned that many employees disliked Deutsche Bank, which hosts the ESO program. Third, ESO was complex and required them to open a separate bank account. Several comments indicated that some employees disliked opening an additional account. Consequently, employees had reasons for purchasing stocks at full price rather than using their ESO discounts.

5.1 Sample

My sample included all Germany-based employees employed by the firm from 2011 to 2015. I excluded nonpermanent employees (e.g., interns, students, trainees, or expatriates) and management levels above lower management because they are covered by additional stock-based long-term incentive plans and work under different working times, performance appraisals, and individual pay for performance. Additionally, in contrast to research that generally focuses on share ownership in top management, my theoretical focus is on how ESO plans affect broad-based employees. I also excluded retail employees because retail units were undergoing fundamentally restructuring during my period of observation.

My five-year observation included 156,051 employees equaling 680,646 employee

years.⁴ Employees averaged $M=43.3$ years-old; had worked for the firm for $M=20.3$ years; 94% were fulltime; 13.9% were women; 45.5% worked in direct production; 15% worked in production-related jobs; 27.9% worked in non-production and administrative jobs; 11.6% were in lower management.

The size and longitudinal nature of the sample combines the advantages of both statistical power and insights on temporal issues (Ployhart & Ward, 2011). To my best knowledge, this sample is the largest that has been used to study the effects of ESO on work behaviors. The size and time span allows to observe how stocks acquired through ESO discounts and stocks acquired without discounts have long-term behavioral effects.

5.2 Variables

To capture ESO effects on total work performance, I observed absenteeism; the number of ideas employees suggested; supervisor performance ratings and the number of idea suggestions that were implemented. Although theoretically I have no reason to believe that ESO should affect these four individual employee work outcomes differently, I subsumed them into individual performance quantity (*absenteeism* and *number of idea suggestions*) and individual performance quality (*supervisor performance ratings* and *number of idea suggestions implemented*) to serve claims in individual employee performance research to differentiate between quantity and quality of employee outcomes (Jenkins et al., 1998).

Performance Quantity

Idea quantity. Quantity of performance can be measured according to how much an individual employee produces. I could not develop a pure measure of work production, because my sample participants were involved in various workplaces and functions. Instead, I measured the total number of suggestions each employee made annually through the firm's idea suggestion plan in which employees can make non-mandatory, extra-role suggestions for

⁴ Due to turnover and missing data the final N equals 680,646 instead of 780,255 (5*156,051).

enhancing work practices. I counted only first-time ideas, not reiterations of previously rejected ideas, and counted ideas coming from single individuals rather than groups. The measure is a proxy for willingness to engage in extra work, but does not measure the success or quality of the ideas.

Absenteeism. Another measure of work quantity is the amount of time spent on the job. Germany has employee-friendly absenteeism laws, so employees can easily be absent without endangering their positions. I measured the annual count of days each employee was absent, not counting unpaid absenteeism, to capture amount of days not worked.

Performance Quality

Idea quality. Another employment consideration is quality of work, which I believe is indicated by the quality of ideas. Thus I counted the number of suggestions that were chosen for implementation by the immediate supervisor and experts in the field of idea application (Fuchs, Sting, Schlickel & Alexy, 2019). (Appendix C shows a schematic illustration of how ideas are suggested and assessed in the studied firm.) Employees are rewarded based on expert assessments of their idea's expected net economic benefits.

Performance score. I used supervisor performance appraisals to measure individual performance. Appraisal scores in this company range from 0 to 24 points with higher scores indicating higher quality performance. Appraisals are conducted by an employee's direct supervisor and can be translate to annual pay increases of up to 30% ($\text{score} * 1.25$) of base salary. Employees in direct production such as assembly-line employees have little discretion over how they perform their work, so they receive no supervisor performance appraisal or variable pay. This reduces the initial sample of $n=156,051$ employees to a subsample of $n=84,799$ employees receiving a performance appraisal. Because of local collective bargaining agreements for the particular firm and industry, changes in performance scores tend to be negative (left) skewed making a *performance score* raise about 60 times more likely than a deduction, assuming that jobs/responsibilities are constant.

Predictors

For each year of observation, I used three explanatory variables to differentiate employees who (1) purchased stocks at a discount through the firm's ESO scheme, (2) purchased stocks at no discount through private brokerage accounts, and (3) purchased both discounted and non-discounted stocks.

ESO. The binary indicator for *ESO* has the value of 1 when employees purchased discounted stocks only from the firm's ESO scheme and 0 otherwise. Hence, this captures all employees who only purchased company shares through the discounted company plan in a respective year of observation. A total of 94,573 observations are in this condition.

The firm's ESO scheme allows all permanent employees to purchase a limited number of stocks, usually in packages of 5, 10, 15, and 20, except for 2011 and 2012 when employees could purchase up to 40 stocks⁵ at a predetermined time – usually in March. In addition to purchasing stocks from the ESO scheme, participants received free stocks and cash discounts from 20% to 30% per stock, depending on the year and the ESO package. Details on the ESO offerings during my period of observation are provided in Table 2.

⁵In 2011 (2012), employees could purchase up to 40 stocks, but only 10% (7.4%) purchased packages with more than 20 stocks.

Table 2: ESO scheme characteristics 2011 – 2015

ESO Packages	2011			2012			2013		
	Stocks	Free stocks	Discount [€]	Stocks	Free stocks	Discount [€]	Stocks	Free stocks	Discount [€]
Package 1	5	0	100 €	5	0	100 €	5	0	100 €
Package 2	10	1	175 €	10	1	175 €	10	1	175 €
Package 3	15	1	175 €	15	1	175 €	15	1	175 €
Package 4	20	2	175 €	20	2	175 €	20	2	175 €
Package 5	30	2	175 €	30	2	175 €		n.a.	
Package 6	40	2	175 €	40	2	175 €		n.a.	

ESO Packages	2014			2015		
	Stocks	Free stocks	Discount [€]	Stocks	Free stocks	Discount [€]
Package 1	5	0	100 €	5	0	100 €
Package 2	10	1	175 €	10	1	175 €
Package 3	15	1	175 €	15	1	175 €
Package 4	20	2	175 €	20	2	175 €
Package 5		n.a.			n.a.	
Package 6		n.a.			n.a.	

OTHER. The binary indicator for *OTHER* has the value of 1 when employees only purchased non-discounted stocks from the open market and 0 otherwise. Hence, this captures employees who purchased company shares in the open market, but not any discounted company shares in a respective year. A total of 3,019 observations are in this condition.

ESO&OTHER. The binary indicator for *ESO&OTHER* has the value of 1 when employees purchased both discounted stocks from the ESO and non-discounted stocks from the open market, and 0 otherwise. Hence, this represents the employees that purchased shares both through a discount and in the open market in a respective year. A total of 3,989 observations are in this condition.

To allocate stock purchases to the appropriate employees and to distinguish between stocks from the ESO scheme and stocks from the open market, I used the full name, date of birth, and address to match employees in the sample with the shareholding data in the stock registry. I then used day of registration and amount of stocks registered to distinguish whether the registered transactions were purchased from the ESO scheme or from the open market. I considered day of registration because all ESO stocks are registered within a few days after

the participation period ends. To identify the dates, I analyzed the stock registration data of a subsample of employees for whom I had precise knowledge about ESO participations between 2011 and 2015. After ensuring the exact dates of registration, I counted stock amounts as ESO only if they were registered during these dates and matched the offered packages. For instance, if the stock registry displays a registration of 17 stocks within the ESO period for 2015, I regarded the stocks as non-discounted, as the entry failed to match any ESO package offered. However, a registration of 22 stocks was considered as discounted ESO stocks as the amount matched an ESO package (20 plus 2 matching stocks).

Moderator. I included the year of observation (time variable in my panel data set) as a moderator variable to investigate my expectation that time moderates the ESO-performance relation. I used the natural logarithm of year (Ln_Year), in the expectation that the moderation effects are following a logarithmic rather than a linear shape (ESO effectiveness is diluted but never fully vanishes).

Covariates. For each observation year, I used HR databases to collect additional data potentially related to ESO and employee performance. I included age, tenure, and gender because they relate to the likelihood of investing in company shares.⁶ Furthermore, I included *fulltime* (1 = yes, 0 = no) and dummy variables for individuals job *level* (direct production, production-related, non-production and administration, lower management) to protect against bias resulting from economic conditions. I also included the *teamsize* of work groups, and dummy variables for the broad *functional area* (R&D functions, other functions, production-related functions) to account for group norms. R&D functions encompass all departments in charge of research and development activities. Other functions include areas such as HR, sales and marketing, and finance and accounting. Production functions cover mainly manufacturing, logistics, procurement, and quality management. For my models using

⁶Age, tenure, and gender are included in my analyses using count data models but omitted in my analyses using linear fixed effects panel data models (see below for estimation method), as the latter drop variables that are time-invariant or perfectly collinear with other variables.

performance score as a dependent variable, I added two additional covariates to account for recent promotions: *salary category change*, a binary indicator with the value of 1 when *salary category* changed in the previous period and 0 otherwise; and *performance restored*, a binary indicator that has the value of 1 when *performance score* was zero in the previous period and 0 otherwise.

5.3 Data Analyses

Panel data estimation method for observational data. Considering the longitudinal nature of my data and building on Wooldridge (2002), I first chose panel data methods over pooled OLS using the Breusch-Pagan Lagrange multiplier test (command *xttest0* in STATA) (Breusch & Pagan, 1980). Test results indicated the presence of unobserved individual effects. Second, using panel data methods, I estimated both the fixed and random effects model and compared them using the Hausman test. The results rejected the null hypothesis that the unique errors are not correlated with the regressors, so I chose the fixed effects model. Third, I tested whether the dummies for all years are equal to zero (command *testparm* in STATA). I rejected the null hypothesis that coefficients for all years are jointly zero and therefore included time fixed effects in the model. Finally, I tested for heteroscedasticity using the modified Wald test (command *xttest3* in STATA) and serial correlation using the Wooldridge test for autocorrelation (command *xtserial* in STATA) (Greene, 2000; Wooldridge, 2002). I rejected the null hypothesis for both tests and therefore included robust and clustered standard errors at the individual level.⁷

Three of my dependent variables (*idea quantity*, *idea quality* and *absenteeism*) are counts, so I examined whether a count model such as a Poisson or negative binomial best fit the data distribution (Kim, Arthurs, Sahaym, & Cullen, 2013). By comparing the distribution of the predicted values from the specified linear model with the actual distribution of the three

⁷ Robust and clustered standard errors are included in the linear models for performance score only.

count dependent variables, I found that predicted and actual distributions did not match. Distributions were heavily left-skewed, thus a count model is most appropriate. I identified that variances of the three variables exceed their respective means, which suggests over-dispersion and thus the use of a negative binomial rather than Poisson model (Hausman, Hall, & Griliches, 1984). Overall, I used a negative binomial panel data model with fixed effects and time fixed effects for *idea quantity*, *idea quality* and *absenteeism* and a linear panel data model with fixed effects, time fixed effects, and robust and clustered standard errors for *performance score*. My estimations include no lag, meaning that all variables refer to the same year. However, for robustness and to test whether effects of *ESO*, *OTHER* or *ESO&OTHER* take longer than one period (year) to materialize, I ran my models using values of my DVs measured one year after the respective stock purchase, as reported in the footnotes under the respective tables. To test Hypothesis 4, I included interaction terms and plotted the slopes of the interaction effects (Dawson, 2014; Dawson & Richter, 2006). Visualization of interaction effects is especially important for the negative binomial models as interaction coefficients cannot be interpreted as straightforwardly as in linear models (Hoetker, 2007; Zelner, 2009). Results of the performed and above-described tests are provided in Appendix D.

Difference-in-difference. ESO research should avoid selection bias or other sources of endogeneity (Chiu et al., 2007; Guery, 2015; Sengupta, Whitfield, & McNabb, 2007), so I applied a difference-in-difference (DID) method for partially circumventing endogeneity bias in regression estimations (Forman, Ghose & Goldfarb, 2009; Ma & Khanna, 2016) to examine cases in which employees purchased discounted or non-discounted company stocks for the first time before and after the treatment. I used a control group of employees who had never purchased company stocks, which allowed the DID approach to control for other factors that may have changed around the time of the treatment and thus to isolate the treatment effect (Forman et al., 2009). To run the DID approach, I identified all employees as treated (1

in the binary *treatment* variable) who entered the firm shortly before or during my period of observation, who had not owned stocks in the company before, and who engaged in either discounted or non-discounted stock purchase for the first time during my observation. The control group included all employees who had never purchased stocks, discounted or non-discounted (0 in the binary *Treatment* variable). For both groups, I used their pre- (year before stock purchase) and post-treatment (year of stock purchase) individual performance variables to identify the treatment effects of discounted (*ESO*) and non-discounted (*OTHER*) stock purchase. DID allowed me to control for the *year* of treatment and to include all other controls used in the panel data regression models. To account for the distribution of my dependent variables, I applied a negative binomial model for *idea quality*, *absenteeism* and *idea quantity* and a linear model for *performance score* in the DID approach.

Matching. For robustness, I ran my analyses (panel data regression for observational data and DID) on matched samples. Matching techniques avoid confounding treatment effects with the impact of unobserved characteristics (Love, Lim & Bednar, 2017), by restricting estimations to individuals sharing similar characteristics. I based matching on six employee characteristics: *tenure* (<10; 11-20; 21-30; >30 years), *gender*, *fulltime*, *functional area*, *level* and *salary*. The matching procedure identified a substantial number of exact matches for each employee who purchased stocks, either discounted or non-discounted. To achieve balance, I chose a 1:1 matching to acquire a “twin-like” control for every stock purchaser. Exact matching was based on the first year of observation (2011) in my panel data regression for observational data and carried throughout the five years of observation. Matching for the DID approach took place in the year of treatment. For instance, if employees first participated in ESO in 2013, I found a 1:1 match for 2013 among employees who had never participated in ESO. Table footnotes report model results using matched samples.

Survey. The firm under study designed an employee survey to examine reasons for employee participation in the ESO in 2019 using five-point semantic differential scales.

Semantic differential scales are common in satisfaction studies (Oliver & Swan, 1989) and frequently used to observe bi-polar perceptions (Nag & Gioia, 2012; Schaumberg & Flynn, 2017). The second and third question of the survey were designed to measure employee satisfaction regarding the benefit accompanying ESO (discounts and free matching stocks): “I consider the bonus shares and the discount granted for purchasing employee stocks of [Company name] to be [“a voluntary gift from my employer” or “not a voluntary gift from my employer”] and “The opportunity to purchase [Company name] stocks at a discount via the employee stock program makes me [“thankful” or “not thankful”].

Besides, also questions regarding employees’ perceptions on the profitability of ESO (question 1), the complicatedness to participate (question 4), the financial risk involved in ESO-participation (question 5), the costs of participation (question 6) and the difficulty to understand the firm’s ESO program (question 7) were included. While mainly question 2 and 3 of the survey provide data to test for hypothesis 2, also the remaining 5 questions were analyzed as they provide an indication regarding employee satisfaction with the firm’s ESO scheme. Results are provided in the results section.

The survey was sent to 13,442 randomly selected employees, requiring only that the sample was evenly split into ESO participants and non-participants and that they had access to a corporate email address, which eliminated most employees in direct production. I received 4,423 (32.9%) complete questionnaires and 530 (3.9%) incomplete questionnaires; 1,329 (9.9%) opened the questionnaire link but did not submit a questionnaire; 6,065 (45.1%) opened the email but not the link; 1,095 (8.1%) ignored the survey. The final sample included $N = 4,423$ employees after excluding 138 who indicated being unaware of the ESO offering. The sample was balanced ($N = 2,211$ ESO participants and $N = 2,074$ non-participants).

Employees in the final sample averaged $M=43.2$ years-old and $M=17.6$ years tenure; 25.9% were women; 66.7% had university degrees; 25.9% were in lower management levels; 74.1% were in non-production/admin levels. Employees in direct production or production-

related jobs were excluded because they lacked email access.

The semantic differentials were analyzed using descriptive statistics (means and standard deviations) and independent t-tests to determine whether ESO participants and non-participants have statistically significantly different ESO perceptions on the seven ESO characteristics.

Outliers. Organizational science research faces a major methodological challenge when data points are noticeably different from others and may disproportionately influence conclusions regarding relationships between variables (Aguinis, Gottfredson, & Joo, 2013). Consequently, I applied a single construct procedure to identify outliers in my dependent variables *idea quantity*, *absenteeism* and *idea quality*. Supervisor performance appraisals are provided on a predefined scale, so no outliers occurred for *performance score*. I used scatterplots to visualize outliers and realized that in each year of observation, a small group of employees issued and/or implemented an exceptionally high number of ideas, as much as a hundred times the respective average. The average for *absenteeism* was about 8 days, but some employees were absent for more than 2 months (50 days). The recommended cutoff for potential error outliers is within the top and bottom 2.5% of observations (Aguinis et al., 2013), so I used percentage analysis to determine the appropriate cutoff level for the error outliers. Considering that employees are unlikely to develop more than one genuine idea per week without neglecting their primary operational duties, I dropped observations for *idea quantity* and *idea quality* above 52 – equivalent to issuing or implementing an average of one idea per week. Consequently, I dropped 134 and 52 observations respectively, which in both cases account for less than 0.02% of all observations. For *absenteeism*, I used 50 days as a cutoff (3.7% of observations) indicating that employees were missing 1/6 of their contractual working days. The results of my regression models were qualitatively identical before and after dropping outliers. Thus, results including outliers are reported.

Endogeneity. When researchers estimate non-experimental causal models, they must consider endogeneity in which the regressor is correlated with the error term (Antonakis, Bendahan, Jacquart, & Lalive, 2010). In my research, alternative explanations may be available for the ESO–performance relation: ESO may be an endogenous predictor and an omitted variable may cause the relationship (Dunn, Richardson & Dewe, 1991).

To test for endogeneity, I regressed with instrumental variables (Angrist, Imbens, & Rubin, 1996; Shaver, 1998; Winship & Morgan, 1999). For an instrumental variable z to be valid, it must be (1) a proxy of the potentially endogenous variable x and (2) not correlated with the error term, meaning that z affects the dependent variable y only through x but not directly (Murray, 2006). In my case, one instrument sufficiently estimated an exactly identified model (given one potentially endogenous regressor). However, using only one instrument fails to test whether the instrument itself is exogenous (Wooldridge, 2002). Unfortunately, only one of the variables within my data met the theoretical requirements for being a good instrument. Hence, I used *salary category*, which defined monthly base salaries from 1 to 17 as an instrumental variable. *Salary category* meets the exclusion restriction as it depends on the task description of each job, is exogenously defined through collective agreements between firm and labor union, and does not incorporate performance pay that may relate to motivational states, work performance, or other measure of the employee–firm relationship. Furthermore, it indicates disposable income, which predicts ESO participation (Kurtulus, Kruse, & Blasi, 2011). Thus, my instrumental variable should predict ESO participation.

I estimated my panel regression models (except for the DID models) by instrumenting *ESO* with *salary category* using the command *xtivreg2* in STATA (Schaffer, 2005). The instrument performed well on the under-identification test (rejected the null hypothesis at $p < 0.05$) and the Stock and Yogo (2005) weak instrument test. The tests indicated that my instrument was valid and a strong predictor of my regressor *ESO*. The endogeneity test, also

incorporated in *xtivreg2*, indicated that my suspicious regressor can be considered non-endogenous (failed to reject the null hypothesis at $p > 0.05$) (Baum, Schaffer, & Stillman, 2002) for *idea quantity* ($\chi^2=0.31, p > 0.10$) and *idea quality* ($\chi^2=0.42, p > 0.10$). However, for *absenteeism* ($\chi^2=4.43, p < 0.05$) and *performance score* ($\chi^2=300.83, p < 0.05$), the test indicated endogeneity, indicating the need to interpret my regression results with caution. Appendix D provides test results.

6 RESULTS

Table 3 shows descriptive statistics and correlations of the variables derived from the data (survey variables not included). Employees in the sample issued $M=0.31$ ideas (total ~42,000); $M=0.13$ ideas were accepted for implementation (total ~18,000) per year from 2011 to 2015. Each year $M=14\%$ of the workforce in the sample participated in ESO; $M=0.45\%$ purchased non-discounted stocks from the open market; $M=0.59\%$ acquired stocks from both the ESO scheme and the open market. Employees participating in ESO purchased $M=16.03$ stocks; employees purchasing ESO and non-discounted stocks purchased $M=20.37$ ESO and $M=180.77$ non-discounted stocks; employees purchasing only non-discounted stocks averaged $M=256.00$ stocks per year.

As predicted, correlations show that the purchase of discounted stocks (*ESO*), non-discounted stocks (*OTHER*), or both (*ESO&OTHER*) had an overall relation ($p < 0.05$) with *idea quantity*, *idea quality*, *performance score* (all positive) and *absenteeism* (negative). However, *ESO* was negatively related to *idea quality* and unrelated to *idea quantity*. Level dummies show that employees in direct production or production-related jobs issue more ideas (*idea quantity*), which are more likely to be accepted for implementation (*idea quality*). However, they are more absent (*absenteeism*), have lower performance appraisals (*performance score*), and are less likely to purchase stocks, especially from more than one source (*ESO&OTHER*), in comparison with administration or lower management levels.

Table 3: Descriptive statistics and pairwise correlation coefficients^{a, b}

Variables	Mean	SD	Annual Total [tsd]	1	2	3	4	5	6	7	8	9	10	11	12
1 Idea Quantity	.31	2.20	42.38												
2 Idea Quality	.13	1.26	17.61	.87											
3 Absenteeism	8.17	13.43	1390.61	.01	.01										
4 Performance Score	11.24	4.25	n.a.	-.02	-.02	-.003									
5 Age	43.29	10.44	n.a.	-.05	-.03	.15	.37								
6 Tenure	20.25	10.65	n.a.	-.02	-.01	.12	.35	.79							
7 °Gender	.14	.35	n.a.	-.04	-.03	-.03	.08	-.11	-.11						
8 °Fulltime	.94	.24	n.a.	.02	.02	-.01	-.07	-.01	-.02	-.42					
9 °Function - R&D	.10	.30	n.a.	-.04	-.03	-.06	.05	.01	-.03	-.02	.03				
10 °Function - Other	.24	.43	n.a.	-.05	-.05	-.15	.01	-.01	-.03	.30	-.17	-.19			
11 °Function - Production	.65	.48	n.a.	.07	.06	.18	-.04	-.001	.05	-.26	.14	-.46	-.78		
12 °Level - Direct Production	.46	.50	n.a.	.06	.05	.19	-.44	-.05	-.06	-.24	.11	-.31	-.37	.53	
13 °Level – Production-related	.15	.36	n.a.	.01	.02	.01	.07	.04	.11	-.09	.01	.04	.01	-.03	-.38
14 °Level - Admin	.28	.45	n.a.	-.05	-.05	-.14	.14	-.09	-.10	.36	-.15	.17	.31	-.39	-.57
15 °Level - LowerManagement	.12	.32	n.a.	-.03	-.03	-.09	.19	.16	.11	-.03	.03	.20	.13	-.24	-.33
16 Teamsize	21.06	15.84	n.a.	.04	.03	.16	-.06	-.02	-.02	-.17	.06	-.21	-.35	.45	.56
17 Salary Category	9.25	3.91	n.a.	-.04	-.04	-.18	.19	.05	.02	.01	.08	.38	.11	-.35	-.66
18 °Salary Category Change	.25	.43	n.a.	-.01	-.01	-.19	-.25	-.34	-.33	.12	-.03	-.08	.34	-.26	-.05
19 °Performance Restored	.01	.09	n.a.	-.004	-.003	-.002	-.22	-.003	-.01	.01	-.01	.004	.06	-.06	-.02
20 °ESO	.14	.35	306.46	-.001	-.003	-.07	.11	.08	.08	-.01	.01	.11	.04	-.11	-.22
21 °OTHER	.005	.07	158.65	.003	.001	-.02	.01	.00	-.002	-.01	.003	.01	.002	-.01	-.02
22 °ESO&OTHER	.006	.08	162.68	.01	.01	-.02	.02	.01	.01	-.02	.01	.02	.00	-.01	-.04
23 Ln_Year	.96	.57	n.a.	-.01	-.01	.27	.03	.04	.03	.01	-.01	.004	.003	-.005	-.003

Variable	Mean	SD	Annual Total [tsd]	13	14	15	16	17	18	19	20	21	22	23
13 °Level – Production-related	.15	.36	n.a.											
14 °Level - Admin	.28	.45	n.a.	-.26										
15 °Level - LowerManagement	.12	.32	n.a.	-.15	-.23									
16 Teamsize	21.06	15.84	n.a.	-.01	-.41	-.29								
17 Salary Category	9.25	3.91	n.a.	-.09	.39	.57	-.54							
18 °Salary Category Change	.25	.43	n.a.	-.01	.13	-.08	-.08	-.08						
19 °Performance Restored	.01	.09	n.a.	.003	.02	-.004	-.03	.00	.09					
20 °ESO	.14	.35	306.46	.004	.12	.17	-.16	.28	-.08	-.01				
21 °OTHER	.005	.07	158.65	.001	.01	.02	-.02	.03	-.01	-.003	-.03			
22 °ESO&OTHER	.006	.08	162.68	.003	.02	.03	-.03	.05	-.02	-.004	-.03	-.01		
23 Ln_Year	.96	.57	n.a.	-.01	.02	-.01	.01	.03	-.01	.03	-.04	-.02	-.04	

Note:

^a N=680,648; n=156,051.

^b Pairwise correlation coefficients > 0.005 are reported with two decimal places; Pairwise correlation coefficients < 0.005 are reported with three decimal places; Pairwise correlation coefficients > |.003| are statistically significant at $p < 0.05$.

^c Coded 0, “no” (“man”) and 1, “yes” (“woman”).

^d Annual Total for ESO, OTHER and ESO&OTHER is measured as the total annual number of stocks purchased.

6.1 Employee share ownership and individual performance quantity

Table 4 shows the results from my panel data regression models for the predictor *ESO* and covariates on performance quantity (*idea quantity* and *absenteeism*). Model 1 for *idea quantity* and *absenteeism* indicates overall statistical significance ($Wald\ chi^2 = 2,043.85$; $p < 0.01$ and $Wald\ chi^2 = 6,576.21$; $p < 0.01$) and shows that all covariates are statistically

significantly related to *idea quantity* and *absenteeism*. *Age* is negatively related to *idea quantity* and positively related to *absenteeism*, but *tenure* shows the opposite direction.⁸

Women (*gender*) and *fulltime* employees who work in larger teams (*teamsize*) are more likely to make suggestions and to be absent. Employees in production are more likely to make suggestions and less likely to be absent than are employees in other administrative functions or R&D. Employees who work in production-related jobs are more likely to make suggestions than are employees in non-production/administrative jobs, direct production jobs and lower management. The coefficient for the *level* dummies indicated that lower management employees have the lowest *absenteeism*; employees in direct production have the most.

Beside covariates, the models include an *ESO* dummy, indicating whether employees purchased discounted stocks. *ESO* participation from 2011 to 2015 was related to higher *idea quantity* ($b = 0.16; p < .01$) and lower *absenteeism* ($b = - 0.07; p < .01$) in the same year. The relationship is robust to using an exact matching sample and to dropping outliers.

⁸ Age and tenure are correlated. Thus, I ran the models using either measure and received similar results.

Table 4: Fixed effects models of individuals performance quantity^{a, b, c, d, e}

Variables	Idea Quantity (negative binomial model)				Absenteeism (negative binomial model)			
	1		2 ^f		1		2 ^f	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	-.25**	.07	-.26**	.07	-.46**	.02	-.46**	.02
Controls								
Age	-.01**	.00	-.01**	.00	.01**	.00	.01**	.00
Tenure	.01**	.00	.01**	.00	-.01**	.00	-.01**	.00
‡Gender	.21**	.06	.20**	.06	.22**	.01	.22**	.01
‡Fulltime	.26**	.04	.26**	.04	.09**	.01	.09**	.01
‡Function - R&D	-.52**	.06	-.52**	.06	.24**	.01	.24**	.01
‡Function - Other	-.31**	.03	-.31**	.03	.11**	.01	.11**	.01
‡Level – Production-related	.35**	.03	.36**	.03	-.21**	.01	-.21**	.01
‡Level - Admin/NonProduction	.30**	.03	.30**	.03	-.24**	.01	-.24**	.01
‡Level - LowerManagement	-.02**	.04	-.02	.04	-.35**	.01	-.35**	.01
Teamsize	.002**	.00	.002**	.00	.001**	.00	.001**	.00
‡Salary Category Change	n.a.		n.a.		n.a.		n.a.	
‡Performance Restored	n.a.		n.a.		n.a.		n.a.	
Predictors								
ESO	.16**	.02	.21**	.02	-.07**	.01	-.06**	.01
OTHER	.03	.05	excluded		.01	.03	excluded	
ESO&OTHER	.21**	.05	excluded		-.06*	.03	excluded	
Moderator and Interaction								
Ln_Year			-.25**	.01			.19**	.00
ESO x Ln_Year			-.08**	.02			-.01	.01
Year dummies	included		included		included		included	
Wald chi ²	2043.85**		2052.00**		6576.21**		6575.46**	
F value	n.a.		n.a.		n.a.		n.a.	
R ² (overall)	n.a.		n.a.		n.a.		n.a.	

Note:

^a Fixed effects negative binomial panel regression models use information from changes within an individual. Hence, observations with all zero outcomes are dropped. Using a linear fixed effects panel regression model that does not drop all zero outcomes, I receive qualitatively equal results for the predictor, moderator and interaction variables for Idea Quantity. For Absenteeism, ESO drops to marginally significant ($p = 0.069$) and ESO&OTHER to not significant.

^b Final sample after dropping zero outcomes is $N = 179,289$; $n = 37,538$ for Idea Quantity and $N = 433,490$; $n = 114,069$ for Absenteeism.

^c I also ran my models using an exact matching sample (see Matching section) and receive qualitatively equal results for the predictor, moderator and interaction variables.

^d I also ran my models on lagged (+1 year) values of Idea Quantity and Absenteeism. Neither OTHER nor ESO&OTHER are related to Idea Quantity and Absenteeism at $t+1$. However, I find ESO to be positively related to Idea Quantity at $p < 0.10$ and negatively related to Absenteeism at $p < 0.01$ one year after ESO participation.

^e After dropping potentially outlying observations (>52 for Idea Quantity; >50 for Absenteeism) I receive qualitatively equal results for the predictor, moderator and interaction variables.

^f Time fixed effects are included in all models. I also ran model 2 for Idea Quantity and Absenteeism without time fixed effects and receive qualitatively equal results for the predictor, moderator and interaction variables for Idea Quantity. For Absenteeism, the interaction term turns negative and significant ($p = 0.018$).

‡ Coded 0, “no” (“man”) and 1, “yes” (“woman”).

* $p < 0.05$; ** $p < 0.01$

Table 5 illustrates results of the DID approach used to isolate whether stock purchases related to behavioral changes. I used an employee subsample who participated in ESO (treatment group) for the first time and employees who had never owned stocks of the studied

firm (control group) during the period of observation. For *idea quantity*, the DID results for *treatment x period* interaction ($b = 0.38; p < .01$) are consistent with panel data regression indicating that *idea quantity* increases after *ESO* participation. The *treatment* dummy (not statistically significant) indicated that *ESO* participants are not statistically significantly different from non-participating peers in terms of *idea quantity*. For *absenteeism* the DID results are contrary to the panel data regression results: first-time *ESO* participants had higher *absenteeism* ($b = 0.18; p < .01$) after becoming shareholders. The *treatment* dummy ($b = -0.50; p < .01$) indicated that first-time *ESO* participants averaged fewer absences than non-shareholding peers. However, the DID results for *absenteeism* were sensitive to matching. Using the matched sample, the interaction term (*treatment x period*) was not statistically significant.

Overall, the results support H1a by showing that *ESO* is related to performance quantity. However, the significant *treatment* dummy in the DID results for absenteeism indicate that for the subsample of first-time *ESO* participants, selection bias may somewhat affect the relationship between *ESO* and absenteeism.

Table 5: Difference-in-difference models of individuals' performance quantity

Variables	Idea Quantity (negative binomial model)				Absenteeism (negative binomial model)			
	a, cESO- Treatment		b, dOTHER- Treatment		a, cESO- Treatment		b, dOTHER- Treatment	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	.55**	0.13	.56**	.13	.19**	.03	.057**	.02
Controls								
Age	-.04**	.00	-.05**	.00	.02**	.00	.02**	.00
Tenure	.02**	.00	.02**	.00	.01**	.00	.01**	.00
^e Gender	-.69**	.05	-.69**	.05	.36**	.01	.23**	.01
^e Fulltime	.22*	.09	.23*	.09	-.18**	.02	-.11**	.02
^e Function - R&D	-1.76**	.06	-1.72**	.07	-.16**	.02	-.02	.02
^e Function - Other	-1.17**	.05	-1.16**	.06	-.67**	.02	.07**	.01
^e Level – Production-related	.25**	.05	.25**	.06	-.07**	.01	-.23**	.01
^e Level - Admin/NonProduction	-.35**	.05	-.34**	.05	-.52**	.02	-.72**	.01
^e Level - LowerManagement	-.47**	.11	-.47**	.11	-.65**	.02	-.87**	.02
Teamsize	.002**	.00	.002**	.00	.003**	.00	.001**	.00
^e Salary Category Change	n.a.		n.a.		n.a.		n.a.	
^e Performance Restored	n.a.		n.a.		n.a.		n.a.	
DiD Variables								
^f Period	-.04**	.01	-.05**	.01	.69**	.00	.67**	.00
^e Treatment	-.14	.09	.23	.34	-.50**	.05	-.45**	.17
Treatment x Period	.38**	.09	-.33	.30	.18**	.06	.20	.20
Year dummies	included		included		included		included	
Wald chi ²	2833.47**		2635.03**		378255.47**		853179.37**	
F value	n.a.		n.a.		n.a.		n.a.	
R ² (overall)	n.a.		n.a.		n.a.		n.a.	

Note:

^a Final sample is N = 860,076 (5592 treated observations) for Idea Quantity and N = 686,525 (4,446 treated observations) for Absenteeism.

^b Final sample is N = 838,060 (553 treated observations) for Idea Quantity and N = 562,272 (243 treated observations) for Absenteeism.

^c I also ran the ESO-Treatment models using an exact matching sample (see Matching section). For Idea Quantity, I receive similar results but the Period dummy turns statistically non-significant ($p > 0.10$). For Absenteeism, the treatment interaction term (Treatment x Period) turns non-significant.

^d I also ran the OTHER-Treatment models using an exact matching sample (see Matching section). For Idea Quantity, I receive similar results but the Treatment dummy turns statistically significant ($p < 0.05$). For Absenteeism, I receive similar results but the Treatment dummy turns non-significant ($p > 0.1$).

^e Coded 0, “no” (“man”) and 1, “yes” (“woman”).

^f Coded 0, “period 0” and 1, “period 1”.

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

6.2 Employee share ownership and individual performance quality

Table 6 shows the results from my panel data regression models for the predictor *ESO* and covariates on performance quality (*idea quality* and *performance score*). Model 1 for *idea quality* and *performance score* respectively are overall statistically significant ($Wald\ chi^2 =$

939.89; $p < 0.01$ and F value = 2,150.00; $p < 0.01$).⁹ All covariates except for *gender* and the *level-admin/nonproduction* dummy are statistically significantly related to *idea quality*. For *absenteeism*, all covariates except for the *fulltime* and the *function-R&D* dummy are statistically significant. *Age* was negatively and *tenure* was positively related with *idea quality*.¹⁰ Employees who worked *fulltime* and in larger teams (*teamsize*) showed higher *idea quality*. *Teamsize* was also related to higher *performance scores*. Production employees were more likely to make suggestions that were accepted for implementation (*idea quality*) and tended to have higher *performance scores* than employees in other administrative functions and employees in R&D. They were also more likely to suggest successful ideas (*idea quality*) than were employees in direct production and lower management. The coefficient for the level dummies indicated that employees in lower management, admin/non-production, and production-related jobs had higher *performance scores* than employees in direct production.

The models also included an *ESO* dummy for employees who purchased discounted stocks from the *ESO* plan. *ESO* participation between 2011 and 2015 was related to higher *idea quality* ($b = 0.13$; $p < .01$) and *performance scores* ($b = 0.11$; $p < .01$) in the same year. The relationship was robust to using an exact matching sample and to dropping outliers.

⁹ Wald χ^2 is reported for the negative binomial panel data regression models; F value is reported for the linear panel data regression models.

¹⁰ Age and tenure are correlated. Thus, I ran the models using either measure and received similar results. The linear fixed effects model for performance score drops age, tenure and gender (see the estimation approach).

Table 6: Fixed effects models of individuals performance quality^{a, b, c, d, e}

Variables	Idea Quality (negative binomial model)				Performance Score (linear model)			
	1		2 ^f		1		2 ^f	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	-.17	.10	-.18**	.10	9.11**	.10	9.12**	.10
Controls								
Age	-.01**	.00	-.01**	.00	n.a.		n.a.	
Tenure	.02**	.00	.02**	.00	n.a.		n.a.	
‡Gender	.15	.11	.15	.11	n.a.		n.a.	
‡Fulltime	.29**	.06	.29**	.06	.03	.03	.03	.03
‡Function - R&D	-1.02**	.16	-1.02**	.16	-.13	.07	-.13	.07
‡Function - Other	-.25**	.06	-.25**	.06	-.11**	.04	-.11*	.04
‡Level – Production-related	.35**	.04	.35**	.04	2.44**	.11	2.44**	.11
‡Level - Admin/NonProduction	.03	.06	.04	.06	2.60**	.13	2.60**	.13
‡Level - LowerManagement	-.39**	.08	-.39**	.08	2.36**	.14	2.36**	.14
Teamsize	.002**	.00	.002**	.00	.01**	.00	.01**	.00
‡Salary Category Change	n.a.		n.a.		-.84**	.01	-.84**	.01
‡Performance Restored	n.a.		n.a.		-1.66**	.03	-1.66**	.03
Predictors								
ESO	.12**	.02	.20**	.03	.11**	.01	.09**	.02
OTHER	-.02	.08	excluded		.04	.03	excluded	
ESO&OTHER	.20**	.07	excluded		.08**	.03	excluded	
Moderator and Interaction								
Ln_Year			-.24**	.01			.45**	.01
ESO x Ln_Year			-.10**	.03			.01	.01
Year dummies	included		included		included		included	
Wald chi ²	939.89**		951.20**		n.a.		n.a.	
F value	n.a.		n.a.		2150.00**		2298.82**	
R ² (overall)	n.a.		n.a.		.265		.266	

Note:

^a Fixed effects negative binomial panel regression models use information from changes within an individual. Hence, observations with all zero outcomes are dropped. Using a linear fixed effects panel regression model that does not drop all zero outcomes, I receive qualitatively equal results for my predictor, moderator and interaction variables. Only the interaction term (model 2) turns not significant for Idea Quality. For Performance Score, linear fixed effects panel regression model is reported in the table.

^b Final sample (after dropping zero outcomes) is N = 104,685; n = 21,806 for Idea Quality and N = 360,511; n = 84,799 for Performance Score.

^c I also ran the models using an exact matching sample (see Matching section) and receive qualitatively equal results for my predictor, moderator and interaction variables for Idea Quality. For Performance Score, the ESO&OTHER variable loses statistical significance ($p > 0.05$) but the interaction term turns negative and significant ($p = 0.008$).

^d I also ran the models on lagged (+1 year) values of Idea Quality and Performance Score. Neither OTHER nor ESO&OTHER are related to Idea Quality and Performance Score at $t+1$. However, I find ESO to be positively related to Performance Score at $p < 0.01$ but not related to Idea Quality one year after ESO participation.

^e After dropping potentially outlying observations (>52 for Idea Quality; outliers not relevant for Performance Score) I find qualitatively equal results for my predictor, moderator and interaction variables.

^f Time fixed effects are included in all models. I also ran model 2 for Idea Quality and Performance Score without time fixed effects and receive qualitatively equal results for my predictor, moderator and interaction variables.

‡ Coded 0, “no” (“man”) and 1, “yes” (“woman”).

* $p < 0.05$; ** $p < 0.01$

Table 7 illustrates DID results. For *idea quality*, the DID results for the *treatment x period* interaction ($b = 0.29$; $p < .05$) were consistent with regression results indicating that *idea quality* increased after ESO participation. The *treatment* dummy ($b = - 0.29$; $p < .05$)

indicated that *ESO* participants averaged lower *idea quality* compared with non-participating peers before the treatment. For *performance score*, the DID results are contrary to the panel data regression results in that *ESO* treatment (*treatment x period*; $b = - 0.32$; $p < .01$) was negatively related to *performance score*. The *treatment* dummy ($b = - 1.29$; $p < .01$) indicated that first-time *ESO* participants averaged lower *performance scores* than their non-shareholding peers before participating in *ESO*. DID results for *idea quality* were not robust to matching: *period*, *treatment* and the *treatment x period* dummy turned statistically non-significant after matching. The treatment interaction term for *performance score* also turned positive and nonsignificant after matching, indicating that neither *idea quality* nor *performance score* changed at a statistically significant level after employees' first *ESO* participation.

Overall, the results partially support H1b by showing that *ESO* is related to performance quality, but not in the matched DID results.

Table 7: Difference-in-difference models of individuals' performance quality

Variables	Idea Quality (negative binomial model)				Performance Score (linear model)			
	a, cESO- Treatment		b, dOTHER- Treatment		a, cESO- Treatment		b, dOTHER- Treatment	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	-.29†	.16	-.30†	.16	2.40**	.05	2.40**	.05
Controls								
Age	-.05**	.00	-.05**	.00	.08**	.00	.08**	.00
Tenure	.02**	.00	.02**	.00	.07**	.00	.06**	.00
^e Gender	-.60**	.07	-.60**	.07	.49**	.02	.50**	.02
^e Fulltime	.33**	.12	.34**	.12	.03	.03	.06*	.03
^e Function - R&D	-2.69**	.10	-2.65**	.10	-.42**	.01	-.45**	.01
^e Function - Other	-1.43**	.08	-1.40**	.08	.05**	.01	.05**	.02
^e Level – Production-related	.25*	.06	.26**	.06	4.45**	.02	4.46**	.02
^e Level - Admin/NonProduction	-.95**	.08	-.95**	.07	5.13**	.02	5.16**	.02
^e Level - LowerManagement	-1.38**	.13	-1.37**	.13	5.82**	.03	5.83**	.03
Teamsize	-.01**	.00	-.01**	.00	.01**	.00	.02**	.00
^e Salary Category Change	n.a.		n.a.		-.59**	.01	-.58**	.01
^e Performance Restored	n.a.		n.a.		-4.41**	.03	-4.56**	.03
DiD Variables								
^f Period	-.03**	.01	-.03	.01	.11**	.01	.12**	.01
^e Treatment	-.29*	.13	-.59†	.33	-1.29**	.06	-1.16**	.20
Treatment x Period	.29*	.14	.41	.42	-.31**	.08	.36	.26
Year dummies	included		included		included		included	
Wald chi ²	2165.52**		2053.44**		n.a.		n.a.	
F value	n.a.		n.a.		18518.13**		17022.69**	
R ² (overall)	n.a.		n.a.		.414		.410	

Note:

^a Final sample is N = 860,076 (5,592 treated observations) for Idea Quality and N = 407,128 (4,605 treated observations) for Performance Score.

^b Final sample is N = 838,060 (553 treated observations) for Idea Quality and N = 390,545 (419 treated observations) for Performance Score.

^c I also ran the ESO-Treatment models using an exact matching sample (see Matching section). For Idea Quality, Period, Treatment and Treatment x Period dummies turn non-significant ($p > 0.01$). For Performance Score, Treatment ($p < 0.10$) and Period ($p < 0.10$) remain significant but turn positive, the interaction term (Treatment x Period) turns non-significant.

^d I also ran the OTHER-Treatment models using an exact matching sample (see Matching section). For Idea Quality, I receive similar results but the Treatment dummy turns non-significant ($p > 0.10$). For Performance Score, Period dummy remains positive and significant ($p < 0.05$), Treatment dummy turns positive and significant ($p < 0.10$) and the interaction term (Treatment x Period) remains non-significant ($p > 0.10$).

^e Coded 0, “no” (“man”) and 1, “yes” (“woman”).

^f Coded 0, “period 0” and 1, “period 1”.

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

6.3 Relevance and effect size of the ESO–individual performance relationship

My panel regression estimates for the relationship between ESO and four individual performance outcomes appear small but are statistically significant. Based on the analyses reported in Tables 4 and 6, I calculated marginal effect sizes for ESO participation and found it related to higher average annual idea quantity of 0.17 idea suggestions, lower average

annual absenteeism of -0.06 days, higher average annual idea quality of 0.14 accepted ideas, and a higher average annual performance score of 0.11 points (marginal effect equals the linear regression coefficient for performance score). Marginal effects can be translated to monetary effect sizes for absenteeism (based on the average daily cost of labor of EUR 262.2)¹¹ and idea quality (based on the average net economic benefit per accepted idea of EUR 1,653)¹² using utility analysis (Breugh, 2003). Suggestions (idea quantity) have no value unless they are implemented, and a supervisor performance appraisal (performance score) is an abstract non-monetary measure, so I cannot attach a monetary value to these outcomes.

ESO participation had an annual monetary effect of about EUR 237,000 (EUR 262.20 x 0.058 x 15,629 ESO participants being absent) through lower absenteeism and of about EUR 644,000 (EUR 1,653 x 0.14 x 2,783 ESO participants making a successful suggestion) through higher idea quality. Offering ESO annually costs the firm an average of EUR 6,122,161. Hence, lower absenteeism and higher idea quality amortizes about 14.4%.

6.4 Employee perceptions of the stock ownership plan

I studied the firm's internal chat boards to observe employee correspondences and postings related to official announcements about ESO. In February 2016, when firm officials announced their ESO offer for that year (since 2006, the firm has offered discounted ESO every year except for 2009 and 2010), the post received 4.41 of 5 stars, a rating similar to common customer product or service reviews. Employees also left comments. For example, "Thanks to all those who take this action so professionally and of course to the company, because we do not take it for granted"; "To be honest, I am surprised that only one in five

¹¹ Average daily cost of labor is calculated as average employer gross salary (EUR 65,650) divided by an average of 250 annual working days, which equals EUR 262.6.

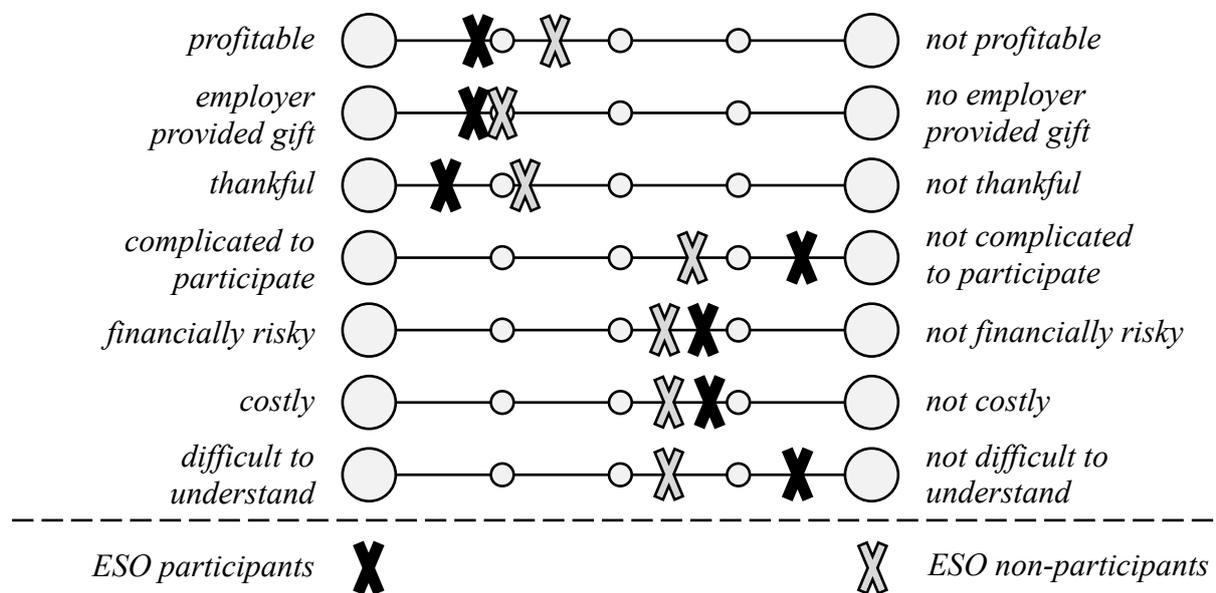
¹² Average net economic benefit of idea quality is calculated as the total net economic benefit divided by the total number of implemented suggestions. Successful suggestions of ESO participants averaged a net economic benefit of M =EUR 1,653, which is higher than the average net economic benefit of M =EUR 1,285 resulting from successful suggestions of employees not holding stocks.

people accept this offer, which confirms that many people are stock-averse and prefer to put their money in real estate or savings”; “Thanks to all who actively participate in the program. I have been with the company for 32 years and have already bought/sold many employee shares and have no regrets. As before, I feel it is a social benefit from the company.”

Similarly, in 2017 and 2018 official ESO announcements received ratings greater than 4.9/5. In 2018, an employee commented: “Thanks for this offer, great thing :) like every year!” The quotes and ratings indicated that employees are grateful for and satisfied with the offer to purchase discounted stocks through ESO. Ratings can be anonymous, but the internal social media network prohibits anonymous postings. Thus comments may be somewhat positive-biased, however, several employees also left negative comments regarding the timing, the size limitations of ESO packages, and the financial institution involved. For example, “Participation is possible only through Deutsche Bank, and I do not want to be their customer for several reasons. Sorry!” or “I agree that Deutsche Bank is one of the most dubious banks imaginable.”

Table 8 shows the results for the survey questions. (To visualize the results, see Figure 6.) The results indicate that ESO participants ($N = 2,211$) and non-participants ($N = 2,074$) on average ranked the ESO program highly on the dimensions of being a gift versus no gift (survey question no. 2: $M=4.15/5$ ESO-participants; $M=4.00/5$ non-participants) and being thankful versus not being thankful for the ESO offer (survey question no. 3: $M=4.41/5$ ESO-participants; $M=3.91/5$ non-participants). The remaining survey questions also provide an indication that employees perceive ESO as being highly profitable (survey question no. 1: $M=4.09/5$ ESO-participants; $M=3.66/5$ non-participants). Further, while non-participants on average rank ESO moderate complicated to participate in, risky, costly and difficult to understand (survey questions 4 to 7), ESO participants perceive ESO less complicated to participate in, risky, costly and difficult to understand. The differences are particularly pronounced for complicatedness (survey question no. 4: $M=1.55/5$ ESO-participants;

$M=2.34/5$ non-participants) and difficulty (survey question no. 7: $M=1.61/5$ ESO-participants; $M=2.66/5$ non-participants). All differences between ESO participants and non-participants are statistically significant at $p < 0.01$.



Note:

^a Differences in means are statistically significant at $p < 0.01$.

^b $N = 4,285$ ($N = 2,211$ ESO participants and $N = 2,074$ ESO non-participants).

Figure 6: Employee ESO perceptions ^{a, b}

Table 8: Means, standard deviations and T-tests for employee perceptions on ESO

	ESO-Participants N=2211		Non-Participants N=2074		Diff = mean(ESO) - mean(Non-ESO)	
	Mean	SD	Mean	SD	Diff	SE
"profitable"	4.09	.91	3.66	1.06	.44*	.03
"gift"	4.15	.97	4.00	1.02	.15*	.03
"thankful"	4.41	.76	3.91	1.05	.50*	.03
"complicated"	1.55	.94	2.34	1.22	-.79*	.03
"risky"	2.28	1.03	2.72	1.06	-.44*	.03
"costly"	2.10	1.05	2.66	1.08	-.56*	.03
"difficult"	1.61	.94	2.66	1.25	-1.05*	.03

Note:

* $p < 0.01$

Overall, internal employee correspondences on the social intranet and the survey results supported H2 indicating employee feelings of satisfaction with the firm's ESO offering. The survey indicated that ESO participants held statistically significantly higher

perceptions of ESO profitability, ESO as an employer gift and thankfulness for the ESO offering and lower perceptions regarding complicatedness to participate, financial risk of ESO, costliness to participate and difficulty to understand the plan than their non-participating peers.

6.5 Discounted versus non-discounted stocks and individual performance

The models in Tables 4 and 6 include dummies for *OTHER*, a binary variable indicating employees who purchased non-discounted stocks from the open market rather than the ESO scheme, and *ESO&OTHER*, a binary measure indicating employees who purchased stocks from both the ESO scheme (discounted stocks) and the open market (non-discounted stocks) in the same year. The coefficients indicate that the *OTHER* indicator was not related to any individual performance outcome at a statistically significant level. The coefficients tended to be small compared to the coefficients of the *ESO* measure and even displayed a positive sign for *absenteeism* and a negative sign for *idea quality*. Results were robust to using an exact matching sample and to dropping outliers. Non-discounted stock purchases from the open market averaged more than 15 times larger than the average ESO package, but were not related to performance quantity or quality.¹³

Although the dummy for *OTHER* was not related to performance, I found similar results for employees who purchased discounted and non-discounted stocks (*ESO&OTHER*) in the same year compared to employees who purchased only discounted stocks (*ESO*). *ESO&OTHER* was related to the four individual performance outcomes, with coefficients of similar magnitude as the *ESO* coefficients. The results were also robust to using an exact matching sample and to dropping outliers. For *performance score* only, the *ESO&OTHER* measure dropped to nonsignificant ($p > 0.05$) in the matched sample.

¹³ I also tested the models on lagged values (t+1) for *idea quantity*, *absenteeism*, *idea quality*, and *performance score* in case the incentive effects from non-discounted stocks purchased in the open market (*OTHER*) would appear later or because individuals have purchased stocks in the open market at the end of each year. However, results were unchanged for *OTHER* in all models.

Employee commentary from 2019 indicated that employees were aware that the discount is more rewarding than the stock price increase itself. For example: “The stock has lost 30% in value, because we make 30% less profit and the market is doubtful about our future. That's how it works. I find the program to be great. The € 175 and bonus shares are just a gift”; Another commented “Our stock price has hardly changed during the last 20 years. However, our employer donates the bonus shares and the € 175 to sponsor this equity investment, and I think that is great. You should definitely take it and be happy.”

To compare *ESO* with *ESO&OTHER* on the four performance outcomes, I dropped observations for *OTHER*>0 and for individuals not purchasing stocks in the respective years, leaving a sample of employees purchasing *ESO* or *ESO&OTHER*. Using a binary indicator of 1 for employees purchasing *ESO&OTHER* and 0 for employees purchasing *ESO* only, I ran the same models and found no statistically significant difference between the relationship of *ESO&OTHER* with performance quality and quantity and the relationship of *ESO* with performance quality and quantity. The coefficient for *ESO&OTHER* was even close to zero (*absenteeism*) or had a non-favorable direction (negative for *idea quantity* and *performance score*). Table 9 shows that employees who on average purchased 10 times larger stock amounts by combining *ESO* and non-discounted stock purchases did not show greater performance quantity and quality than employees who purchased an average of only 16 discounted stocks per year through *ESO*. However, the result could partially be a function of power. To this end, I conducted statistical power analysis for all four outcome variables. I identified the required sample size to find an effect for *ESO&OTHER* over *ESO* at different effect sizes and at the recommended level of statistical power of 0.8 (Cohen, 1992, 2013). I defined the effect of *ESO&OTHER* over *ESO* to be small, medium and large if it explains 10%, 25% and 50% respectively of the variance explained by discounted stock purchase variables (*ESO* and *ESO&OTHER*) in performance quantity and quality (*idea quantity*, *absenteeism*, *idea quality* and *performance score*) derived from the full models (Models 1 in

Tables 4 and 6). Power analysis (Appendix E) indicates that if a large (and for Absenteeism and Performance Score even a medium) difference between individuals purchasing discounted stocks and individuals purchasing discounted and non-discounted stocks ever existed, the sample sizes would have revealed it.¹⁴

Table 9: Fixed effects models of individuals performance quantity and quality - ESO versus ESO&OTHER^{a, b}

Variables	Idea Quantity (negative binomial model)		Absenteeism (negative binomial model)		Idea Quality (negative binomial model)		Performance Score (linear model)	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	.00	.22	-.94**	.08	.38	.35	10.29**	.37
Controls								
Age	.00	.01	.01**	.00	.00	.01	n.a.	
Tenure	.01	.01	-.01**	.00	.00	.01	n.a.	
^c Gender	.35	.22	.18**	.04	.20	.49	n.a.	
^c Fulltime	.21†	.12	.08†	.04	-.09	.19	-0.05	.08
^c Function - R&D	-.56**	.13	.24**	.03	-1.13**	.35	-0.06	.12
^c Function – Other	-.37**	.08	.13**	.03	-.43**	.15	-0.13	.08
^c Level – Production-related	.35**	.08	-.09**	.03	.47**	.11	2.22**	.38
^c Level - Admin/NonProduction	.42**	.09	-.03	.03	.35*	.16	1.91**	.40
^c Level - LowerManagement	.12	.11	-.18**	.04	-.16	.22	1.78**	.41
Teamsize	.002	.00	.001	.00	.001	.00	.01**	.00
^c Salary Category Change	n.a.		n.a.		n.a.		-.82**	.02
^c Performance Restored	n.a.		n.a.		n.a.		-2.02**	.18
Predictors								
^d ESO&OTHER	-.01	.05	.00	.03	.03	.07	-.04	.03
Year dummies	included		included		included		included	
Wald chi ²	381.35**		649.18**		168.17**		n.a.	
F value	n.a.		n.a.		n.a.		349.89**	
R ² (overall)	n.a.		n.a.		n.a.		.11	

Note:

^a Fixed effects negative binomial panel regression models use information from changes within an individual. Hence, observations with all zero outcomes are dropped. Using a linear fixed effects panel regression model that does not drop all zero outcomes, I receive qualitatively equal results for my predictor ESO&OTHER for all four outcome variables.

^b Final sample after dropping zero outcomes is
 N = 24,778; n = 6,571 for Idea Quantity;
 N = 56,829; n = 18,695 for Absenteeism;
 N = 12,432; n = 3,314 for Idea Quality;
 N = 69,458; n = 23,100 for Performance Score

^c Coded 0, “no” (“man”) and 1, “yes” (“woman”).

^d This dummy variables has a value of 1 if individuals purchased both, discounted (ESO) and non-discounted (OTHER) in the same year and 0 if individuals only purchased discounted stocks (ESO). Individuals purchasing no stocks or only non-discounted stocks are excluded.

† $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

¹⁴ I conducted statistical power analysis using Stata’s *powerreg* command assuming a linear regression model because no common statistical power analysis approach is available for negative binomial regression models. The choice should be a reasonable indication of statistical power because I received qualitatively almost identical results for negative binomial and linear models for all models in Tables 3, 5 and 8 (see footnotes).

As I did for ESO participation, I used DID to investigate the treatment effects for first-time stock purchases from the open market. Tables 5 and 7 show that the *OTHER* treatment interaction coefficient (*treatment x period*) is not related to any of the four individual performance outcomes at a statistically significant level ($p > 0.10$). The coefficients tend to display a positive sign for *absenteeism* and a negative sign for *idea quantity*. The *treatment* dummies (statistically significant at $p < 0.05$ for *absenteeism*, *idea quality*, and *performance score*) indicate that first-time open-market purchasers average less absence, lower levels of *idea quality*, and lower *performance scores* than their non-shareholding peers before the treatment. DID results for the treatment effects are robust to exact matching.

Overall, the results support H3 indicating that the purchase of discounted stocks through ESO has a statistically significantly stronger relationship with performance quantity and quality than the average purchase of distinctly larger amounts of non-discounted stocks. Further, I find no indication that purchasing non-discounted stocks on top of ESO leverages the ESO – individual performance relationship.

6.6 ESO – individual performance relationship over time

Hypothesis 4 predicted that ESO has a diminishing positive relationship with performance quantity and quality over time. Model(s) 2 for each of the four individual performance outcomes (*idea quantity* and *absenteeism* in Table 4 and *idea quality* and *performance score* in Table 6) present the statistical interactions between the natural logarithm of the time variable (*Ln_Year*) and *ESO*. Overall, the models for *idea quantity* (Wald $\chi^2 = 2,052.00$; $p < 0.01$), *absenteeism* (Wald $\chi^2 = 6,575.46$; $p < 0.01$), *idea quality* (Wald $\chi^2 = 951.20$; $p < 0.01$) and *performance score* (F value = 2,298.82; $p < 0.01$) respectively are statistically significant and largely unchanged compared to the models without interaction terms for all covariates and the *ESO* explanatory variable.¹⁵ The

¹⁵ Wald χ^2 is reported for the negative binomial panel data regression models; F value is reported for the linear panel data regression models.

interaction between *ESO* and *Ln_Year* was negative and statistically significant for *idea quantity* ($b = -0.08$; $p < .01$) and *idea quality* ($b = -0.10$; $p < .01$). However, the *ESO-absenteeism* and the *ESO-performance score* relationship did not diminish over time. The results are also robust to using an exact matching sample and to dropping outliers. For *performance score*, however, the interaction term ($ESO \times Ln_Year$) turned negative and statistically significant ($p > 0.01$) in the matched sample.

The slopes of the statistically significant interactions between *ESO* and *Ln_Year* are plotted in Figures 7 to 9 at all moderator values (Years 1 through 5) and at a low value of 0 and 1 for *ESO*. Slopes for *idea quantity* and *idea quality* are plotted based on the analyses using the un-matched sample. The slope for *performance score* is based on the results after matching. No slope is plotted for *absenteeism*, which shows no signs of positive or negative interaction effect with time.

Overall, the results support H4 indicating a diminishing relationship between *ESO* and performance quantity (*idea quantity*) and quality (*idea quality* but not *performance score*) over time.

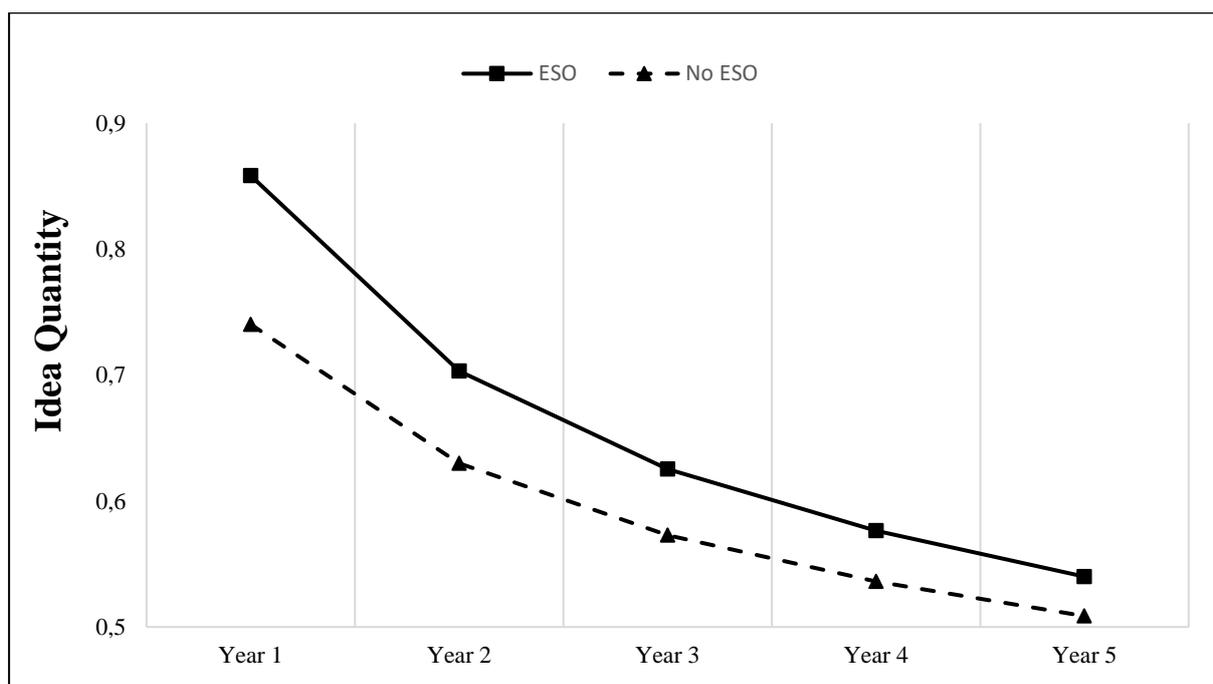


Figure 7: ESO-idea quantity relationship over time

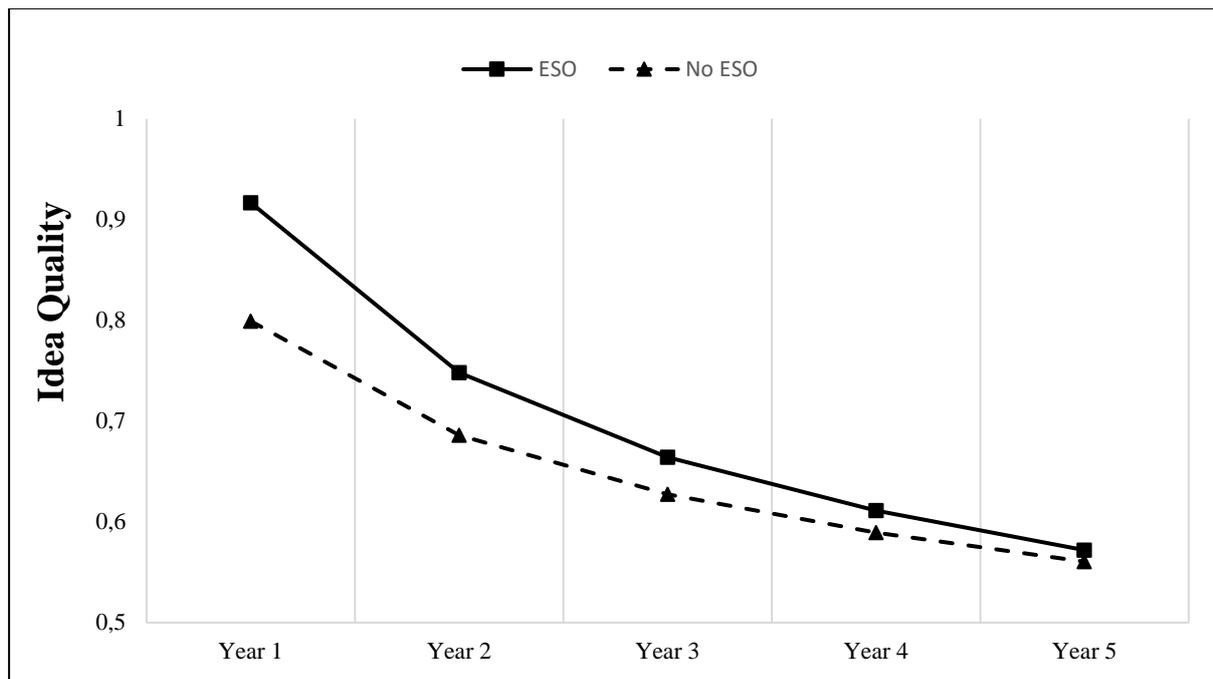
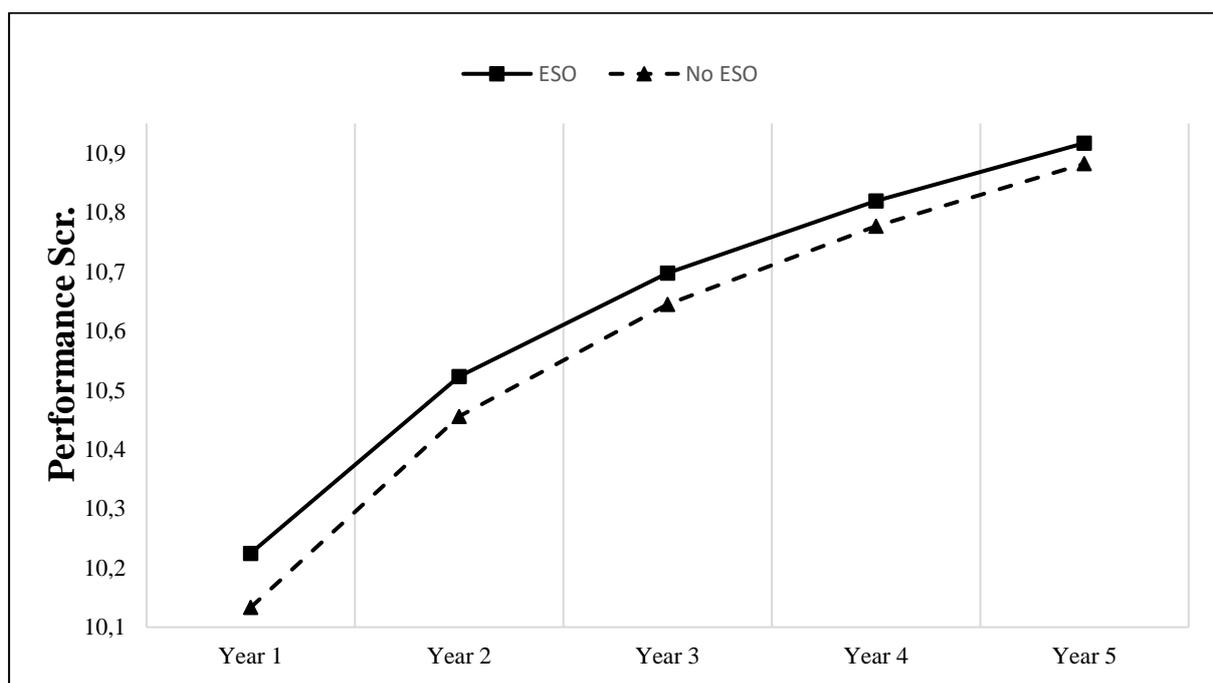


Figure 8: ESO-idea quality relationship over time



Note:

^a Unmatched observations dropped.

Figure 9: ESO-performance score relationship over time ^a

7 POST-HOC AND ROBUSTNESS ANALYSES

The analyses and results presented above were driven by my research questions and the theoretical grounding used to derive testable hypothesis. However, a selection of further analyses that were performed post-hoc for robustness reasons or to generate additional empirical insights into the nature of the data and the studied effects are provided below.

7.1 ESO as a continuous variable

In the analyses above, ESO is operationalized as a binary measure. However, the data also allows for a continuous operationalization of ESO, measured as the annual number of stocks purchased from the firm's ESO scheme. Based on my theory, measuring ESO in a binary or continuous fashion should yield qualitatively similar results when testing the main effect of ESO on the four individual employee performance outcomes. Hence, in the expectation to receive qualitatively similar results, I tested the relationship between ESO and individual employee performance using a continuous ESO measure (variable = *NUMBERESO*) to provide greater robustness.

Supporting my expectation, Table 10 and Table 11 (Models 1) illustrate a statistically significant relation between ESO as a continuous variable and all individual employee performance outcomes. Comparing coefficient sizes to the original coefficients presented in Table 4 and Table 6 (Models 1), it becomes apparent that the coefficients for the binary ESO measure are about 20 times higher (0.1617 vs. 0.0070 for Idea Quantity; -0.0695 vs. -0.0041 for Absenteeism; 0.1246 vs. 0.0059 for Idea Quantity and 0.1062 vs. 0.0039 for Performance Score) than the respective coefficients for the continuous ESO operationalization. The difference in magnitude makes sense as the presented coefficients indicate the amount of behavioral change explained by one additional unit of stock purchased from the firm's ESO scheme per year, while the original coefficients represent the amount of behavioral change explained by employees general participating in ESO in a respective year. Consequently,

coefficients that measure stock purchase in a binary way are likely to be distinctly higher.

Table 10: Fixed effects models for NUMBERESO and NUMBERESO² on individual employee performance quantity^{a, b, c}

Variables	Idea Quantity (negative binomial model)				Absenteeism (negative binomial model)			
	1		2		1		2	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	-.25**	.07	-.25**	.07	-.46**	.02	-.46**	.02
Controls								
Age	-.01**	.00	-.01**	.00	.01**	.00	.01**	.00
Tenure	.01**	.00	.01**	.00	.01**	.00	-.01**	.00
^d Gender	.20**	.06	.20**	.06	.22**	.01	.22**	.01
^d Fulltime	.26**	.04	.26**	.04	.09**	.01	.09**	.09
^d Function - R&D	-.52**	.06	-.52**	.06	.24**	.01	.24**	.01
^d Function - Other	-.31**	.03	-.31**	.03	.11**	.01	.11**	.01
^d Level – Production-related	.36**	.03	.36**	.03	-.21**	.01	-.21**	.01
^d Level - Admin/NonProduction	.31**	.03	.30**	.03	-.24**	.01	-.24**	.01
^d Level - LowerManagement	-.01	.04	-.02	.04	-.35**	.01	-.35**	.01
Teamsize	.002**	.00	.001**	.00	.001**	.00	.001**	.00
^d Salary Category Change	n.a.		n.a.		n.a.		n.a.	
^d Performance Restored	n.a.		n.a.		n.a.		n.a.	
Predictors								
NUMBERESO	.01**	.00	.01**	.00	.00**	.00	-.01**	.00
Interaction								
NUMBERESO ²	n.a.		.0003**	.00	n.a.		.0001†	.00
Year dummies	included		included		included		included	
Wald chi ²	2012.67**		2027.05**		6573.79**		6578.11**	
F value	n.a.		n.a.		n.a.		n.a.	
R ² (overall)	n.a.		n.a.		n.a.		n.a.	

Note:

^aFixed effects negative binomial panel regression models use information from changes within an individual. Hence, observations with all zero outcomes are dropped.

^bFinal sample (after dropping zero outcomes in negative binomial models) is:

n=37,538; N=179,289 for Idea Quantity

n=114,069; N=433,490 for Absenteeism

^cContinuous variables for OTHER and ESO&OTHER included as covariates in all models.

^dCoded 0, “no” (“man”) and 1, “yes” (“woman”).

† p < 0.10

* p < 0.05

** p < 0.01

Table 11: Fixed effects models for NUMBERESO and NUMBERESO² on individual employee performance quality^{a, b, c}

Variables	Idea Quality (negative binomial model)				Performance Score (linear model)			
	1		2		1		2	
	Coefficient	SE	Coefficient	SE	Coefficient	SE	Coefficient	SE
Intercept	-.23**	.07	-.17†	.10	9.12**	.10	9.12**	.10
Controls								
Age	-.01**	.00	-.01**	.00	n.a.		n.a.	
Tenure	.02**	.00	.02**	.00	n.a.		n.a.	
^d Gender	.15	.11	.15**	.11	n.a.		n.a.	
^d Fulltime	.29**	.06	.29	.06	.03	.03	.03	.03
^d Function - R&D	-1.02**	.16	-1.02**	.16	-.13†	.07	-.13†	.07
^d Function - Other	-.25**	.06	-.25**	.06	-.11**	.04	-.11*	.04
^d Level – Production-related	.36**	.04	.35**	.04	2.44**	.11	2.44**	.11
^d Level - Admin/NonProduction	.04	.06	.03	.06	2.60**	.13	2.60**	.13
^d Level - LowerManagement	-.39**	.08	-.39**	.08	2.36**	.14	2.36**	.14
Teamsize	.002**	.00	.002**	.00	.01**	.00	.01**	.00
^d Salary Category Change	n.a.		n.a.		-.84**	.01	-.84**	.01
^d Performance Restored	n.a.		n.a.		-1.66**	.03	-1.66**	.03
Predictors								
NUMBERESO	.01**	.00	.01**	.00	.00**	.00	.01**	.00
Interaction								
NUMBERESO ²	n.a.		.0002†	.00	n.a.		.0003**	.00
Year dummies	included		included		included		included	
Wald chi ²	935.93**		938.63**		n.a.		n.a.	
F value	n.a.		n.a.		2148.99**		2023.82**	
R ² (overall)	n.a.		n.a.		.2651		.2654	

Note:

^aFixed effects negative binomial panel regression models use information from changes within an individual. Hence, observations with all zero outcomes are dropped.

^bFinal sample (after dropping zero outcomes in negative binomial models) is:

n=21,806; N=104,685 for Idea Quality

n=84,799; N=360,511 for Performance Score

^cContinuous variables for OTHER and ESO&OTHER included as covariates in all models.

^dCoded 0, “no” (“man”) and 1, “yes” (“woman”).

† p < 0.10

* p < 0.05

** p < 0.01

7.2 Shape of the annual ESO-individual employee performance effect

While using a continuous ESO measure to provide greater robustness, it also allows for additional insights into the shape of the ESO-individual employee performance relationship. As mentioned in the variables section above, the studied firm provided ESO in packages of 5, 11, 15 and 22 stocks (also packages of 32 and 42 stocks were available in previous years; See Table 2). Previous literature expects the effects of ESO to be contingent on the number of stocks employees hold (Long 1980; Buchko, 1992; Hsieh & Liu, 2006;

Klein, 1987). To test if the data on the ESO-individual employee performance relationship depict changing marginal effects or even signs of an inverted u-shape (Guedri and Hollandts, 2008) at higher numbers of stock, I (1) included a squared term for the number of stocks purchased through ESO (variable = *NUMBERESO*²). Then, (2) I calculated the amount of stocks that mark the axis of symmetry for the quadratic function in STATA.¹⁶ Lastly, (3) I plotted margins for all available ESO packages to visualize the shape of the effect.

I find the axis of symmetry at 25.59 stocks for Idea Quantity, at 42.70 stocks for Absenteeism, at 28.59 stocks for Idea Quality and at 19.20 stocks for Performance Score. This illustrates that the effectiveness of ESO on fostering individual employee performance quantity and quality shows signs of diminishing marginal effectiveness as employees purchase more stocks, and a tipping point between 19.2 and 28.6 stocks. Marginsplots in Figures 10 to 13 illustrate this.

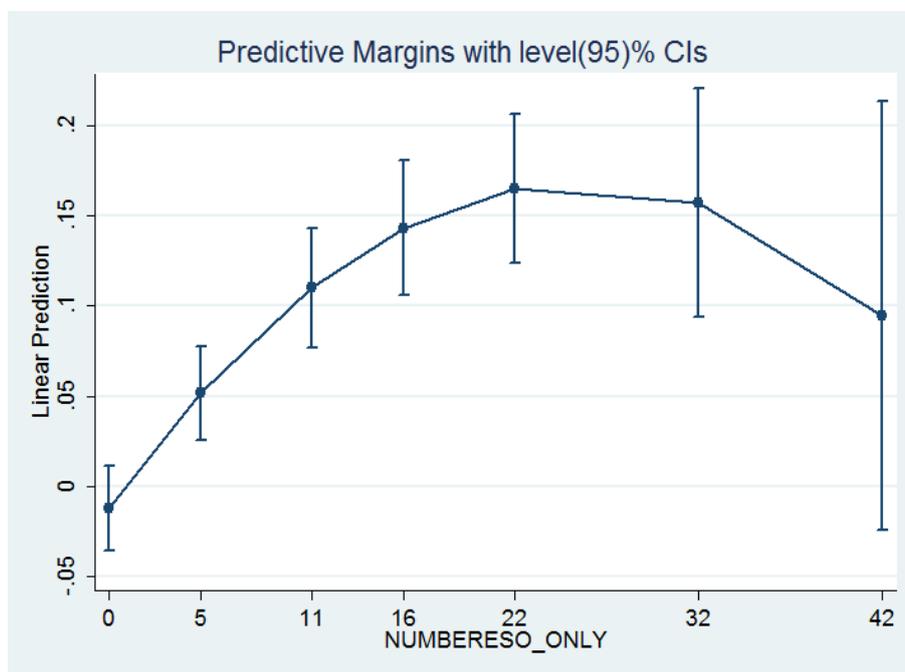


Figure 10: Marginsplot ESO effects on idea quantity at ESO packages of 5, 11, 16, 22, 32 and 42 stocks

¹⁶ The axis of symmetry for the quadratic function was calculated using the following STATA command: `"nlcom -_b[NUMBERESO]/(2*_b[c.NUMBERESO #c.NUMBERESO])"`.

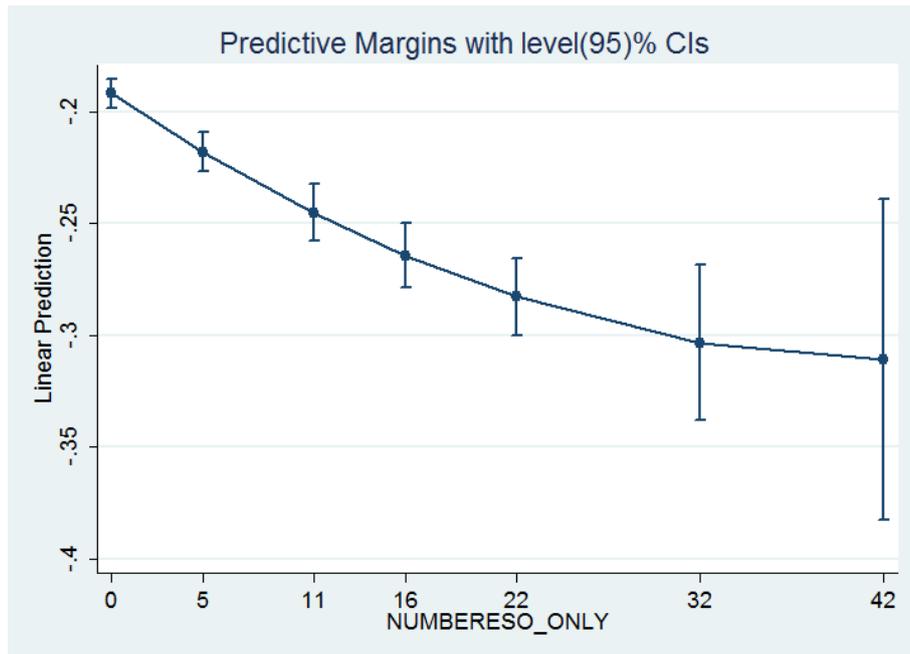


Figure 11: Marginsplot ESO effects on absenteeism at ESO packages of 5, 11, 16, 22, 32 and 42 stocks

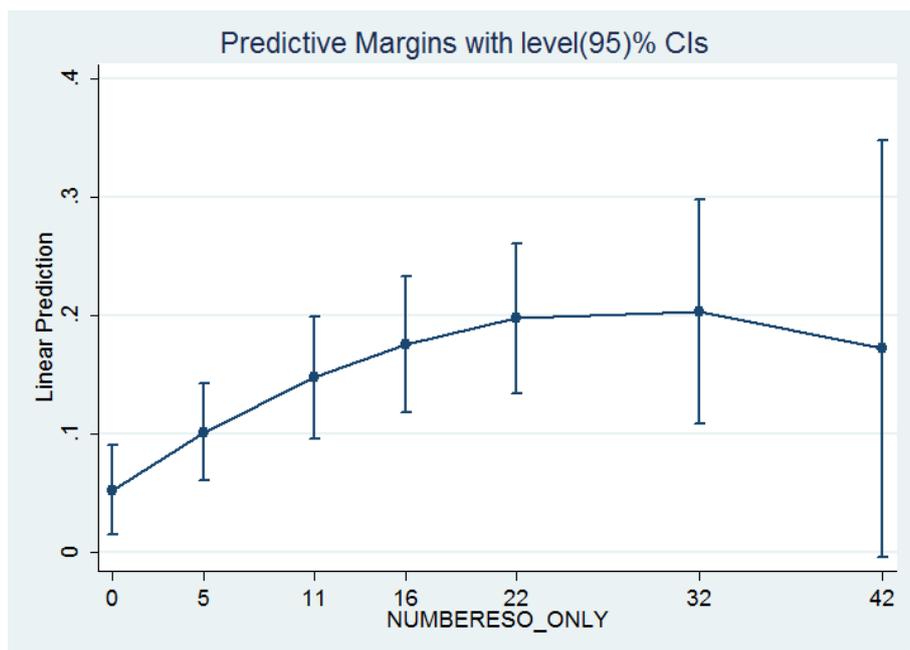


Figure 12: Marginsplot ESO effects on idea quality at ESO packages of 5, 11, 16, 22, 32 and 42 stocks

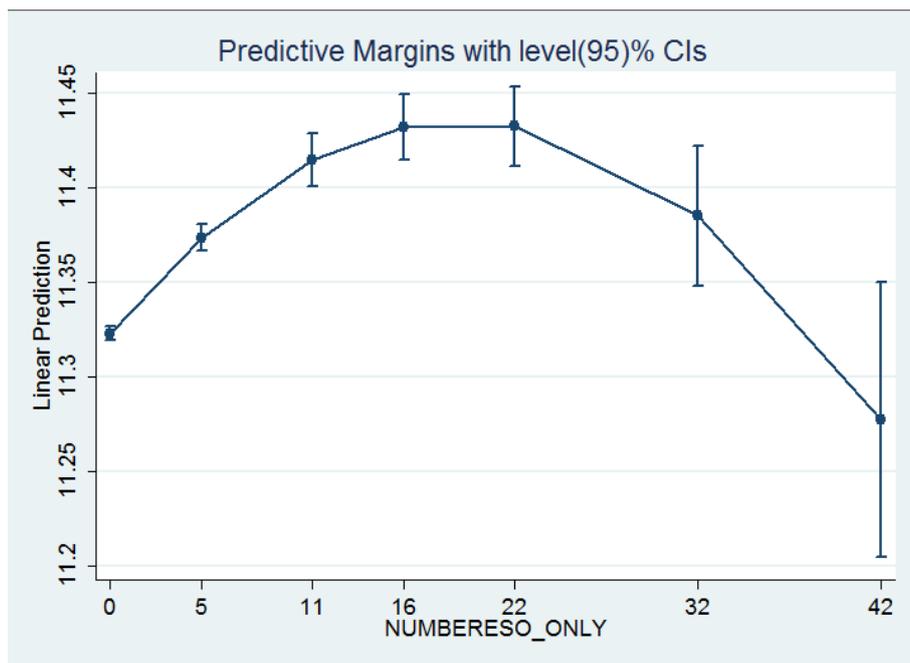


Figure 13: Marginsplot ESO effects on performance score at ESO packages of 5, 11, 16, 22, 32 and 42 stocks

When dropping observations of ESO purchases above the 22 stock package (3399 observations), which do not provide any additional discount or free stocks to employees above the discount they receive from purchasing the 22 stock package, the axis of symmetry moves to a stock amount of 21.04 for Idea Quantity, 26.97 for Absenteeism, 637.39 for Idea Quality and 16.08 for Performance Score. This illustrates, that only for Performance Score a real inverse-U-shape appears. Marginplots after dropping ESO packages > 22 illustrate this in Figures 14 to 17.

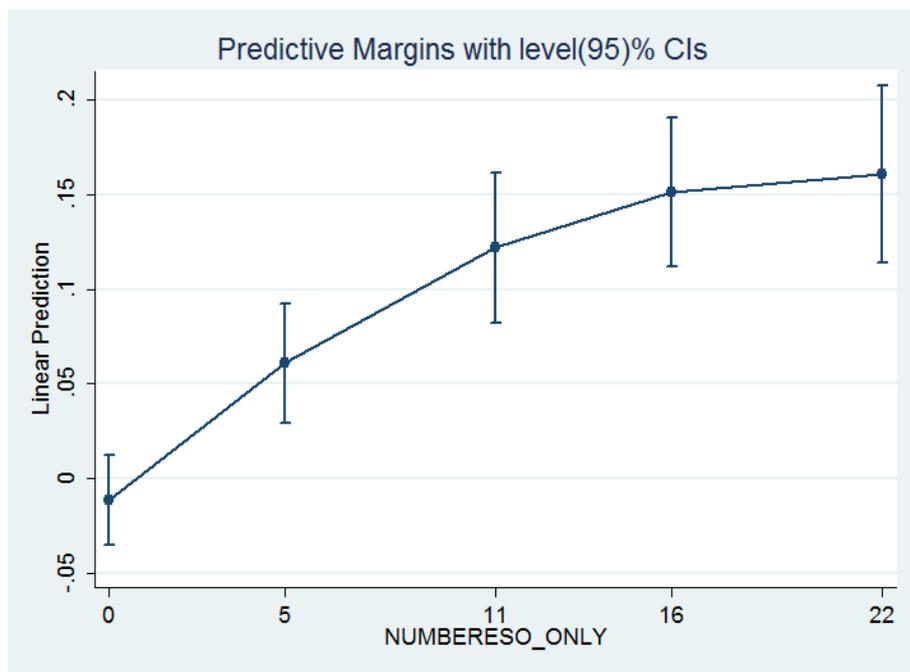


Figure 14: Marginsplot ESO effects on idea quantity at ESO packages of 5, 11, 16 and 22 stocks, after dropping observations for NUMBERESO>22

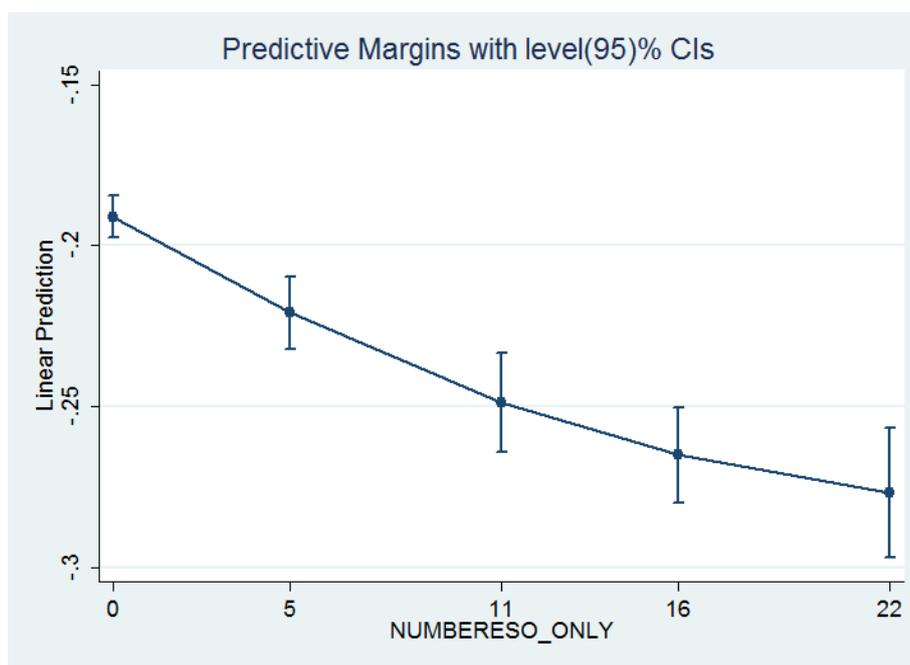


Figure 15: Marginsplot ESO effects on absenteeism at ESO packages of 5, 11, 16 and 22 stocks, after dropping observations for NUMBERESO>22

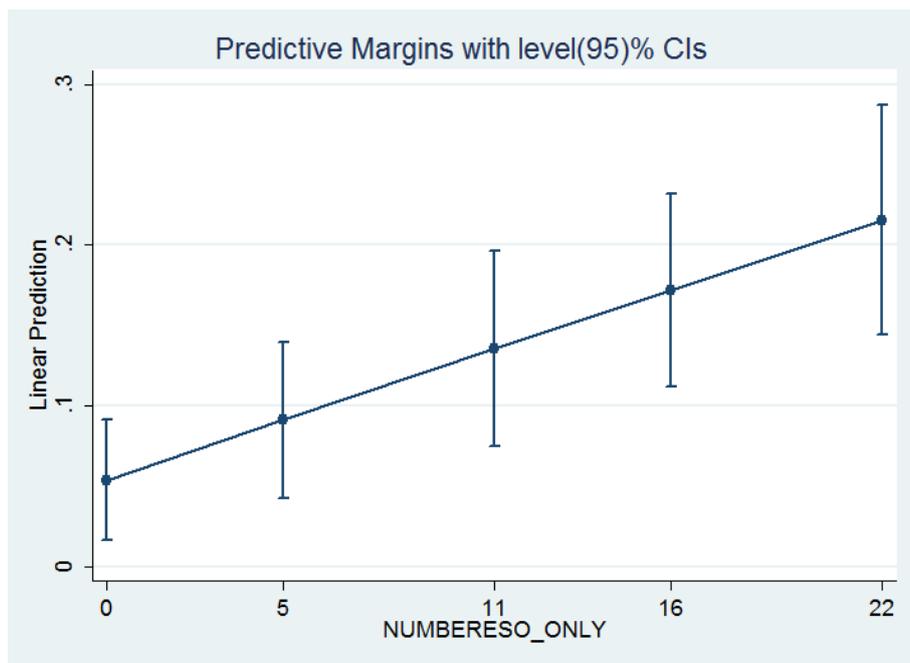


Figure 16: Marginsplot ESO effects on idea quality at ESO packages of 5, 11, 16 and 22 stocks, after dropping observations for NUMBERESO>22

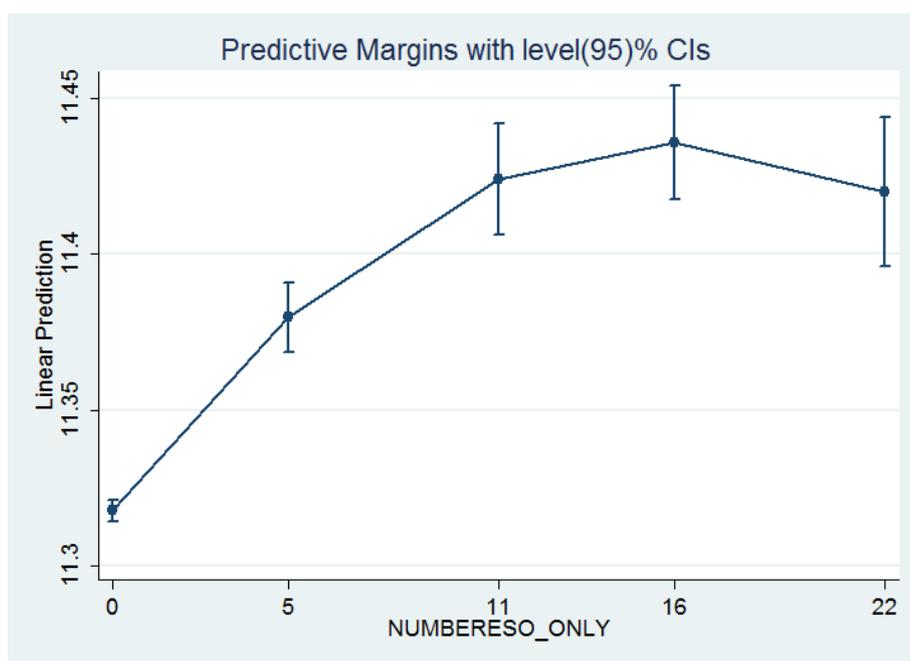


Figure 17: Marginsplot ESO effects on performance score at ESO packages of 5, 11, 16 and 22 stocks, after dropping observations for NUMBERESO>22

Overall, the results indicate that the effectiveness of ESO diminishes at higher stock volumes and aligns with the theoretical arguments that it is not the quantity of stockholding that provides an incentive but the benefit appreciation that accompanies the fact of receiving discounted shares.

7.3 Systematic differences between stock-holder groups

Among the variables used in the statistical models I included binary indicators for whether or not employees participated in the ESO scheme and for whether or not employees purchased stocks from the open market. Combined, this resulted in four groups of individuals who (1) purchased stocks at a discount through the ESO scheme (*ESO*), (2) purchased stocks at no discount through their private brokerage accounts (*OTHER*), (3) purchased both discounted and non-discounted stocks (*ESO&OTHER*), and (4) purchased no stocks at all. My results show that those groups of employees who participated in ESO (*ESO* and *ESO&OTHER*) depict higher levels of individual employee performance whereas the purchase of non-discounted stocks (*OTHER*) does not related to performance increase. Although these findings align well with my theoretical predictions, the DID results and the endogeneity-tests provide some indication that at least partially, systematic differences between stockholding and non-stockholding employee groups may be the true cause of the effects.

The first concern is that systematic differences between stockholding and non-stockholding employees would cast doubt on the causality of the general effects of ESO on individual employee performance as reported above. The second concern is that systematic differences also between employees purchasing stocks from the ESO-scheme (*ESO* and *ESO&OTHER*) and employees purchasing stocks from the open market (*OTHER*) would cast doubt on the robustness of my analyses when it comes down to comparing the financial incentive effect of non-discounted stocks with the psychological (social exchange based) effect of discounted stocks. Hence, and to shed more light on characteristical differences between the four groups, I examined and compared those four groups (see Table 12) using all employee characteristics that I had access to (most of them are also used as covariates in the analyses).

Table 12: Similarities between stockholder groups ^a

Variables	ESO		OTHER		ESO&OTHER		NO STOCK	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	45.41	9.17	43.53	9.60	44.60	9.54	43.63	10.17
Tenure	22.36	10.13	20.24	10.38	22.14	10.23	20.68	10.28
^b Gender	.13	.34	.07	.26	.06	.24	.14	.35
^b Fulltime	.94	.23	.95	.21	.97	.17	.94	.24
^b Function - R&D	.19	.39	.16	.37	.18	.39	.09	.29
^b Function - Other	.28	.45	.25	.43	.24	.43	.24	.43
^b Function - Production	.53	.50	.59	.49	.57	.49	.67	.47
^b Level - Direct Production	.18	.39	.29	.46	.20	.40	.49	.50
^b Level - Production-related	.15	.36	.16	.36	.16	.37	.15	.36
^b Level - Admin/NonProduction	.41	.49	.35	.48	.39	.49	.26	.44
^b Level - LowerManagement	.25	.43	.20	.40	.24	.43	.10	.29
Teamsize	14.60	12.09	17.06	14.41	15.33	12.61	21.77	15.76
Salary Category	11.86	3.72	10.90	4.04	11.82	3.69	8.77	3.75

Note:

This figure shows similarities and differences between the four stockholder groups. Boxes indicate domains of employee characteristics where the four groups display noticeable differences. Groups being in the same box and linked with a “≈” share similar characteristics, while groups being in distinct boxes and linked with a “≠” are noticeably different.

^aSample Size: N=94,573 for ESO; N=3,019; for OTHER; N=3,989; for ESO&OTHER; N=550,642 for NO STOCKS.

^bCoded 0, “no” (“man”) and 1, “yes” (“woman”).

Generally and as supported by the DID and endogeneity test results, I find employees who do purchase stocks (*ESO*, *ESO&OTHER*, *OTHER*) to be distinct from employees not purchasing stocks mainly in terms of function, level and salary. After discussions with employees in the firm who administrate the ESO program, I assume that the two major reasons for the differences (especially for participation in ESO), is the amount of available income and access to information. The firm mainly uses its corporate intranet and e-mail communication to inform employees about the ESO program. Although there is a paper based process, it is likely that employees with minimal access to e-mail and intranet (employees in production jobs generally work on assembly lines without access to laptops) are less likely to take notice about the scheme offering and hence may miss their chance to purchase ESO.

Between the three groups of employees purchasing stocks, I see little difference. I do find that fewer women purchase non-discounted stocks in the open market (*ESO&OTHER* and *OTHER*). Further I see employees in direct production to have a higher share in group *OTHER* than in *ESO* or *ESO&OTHER*. Lastly, I see employees only purchasing non-discounted stocks (*OTHER*) to have slightly lower salaries than employees purchasing only

ESO or both, discounted and non-discounted stocks (*ESO&OTHER*).

As outlined earlier in the methodology section, I found three qualitative reasons for employees to purchase non-discounted stocks from the open market rather or in addition to discounted *ESO* stocks, namely timing and complexity (see also Table 8) of the *ESO* offering and the providing bank. All these reasons are unrelated to systematic employee differences and thus I argue that the data provides (1) little indication that the three stockholding employee groups are systematically different from each other, but (2) some evidence that stockholding and non-stockholding employees differ mainly with regards to function, level and salary.

7.4 Idea quality as a proxy for individual employee creativity

This work focuses on individual employee performance and uses individuals' idea suggestions as a proxy for employees' contribution to the overall functioning and efficiency of their organization. However, previous non-*ESO* literature has used individuals' idea suggestions also as a proxy for employee creativity (Baer, 2012; Frese, Teng & Wijnen, 1999). To test if the data supports this assumption and thus whether my results can be extended beyond individual employee performance by drawing inferences on the relationship between *ESO* and individual employee creativity, I content-analyzed a subsample of implemented ideas (*Idea Quality*) using Amabile's (1982) consensual assessment technique (CAT). CAT relies on the assumption that creativity only appears when something, such as a product or an idea, is novel and useful at the same time. Further, the approach assumes that experts in a certain domain can recognize creativity when they see it (Amabile's, 1982). The procedure is very common to generate expert creativity assessments and mostly results in single-item creativity scores that are then averaged across the individual raters (Aggarwal & Woolley, 2018; Calic & Mosakowski, 2017; Perry-Smith, Shalley, 2014). However, recently creativity scholars have suggested that it is crucial to assess novelty and usefulness separately as both are distinct features of creativity, that exist independently of each other (Montag,

März & Baer, 2012; Sullivan & Ford, 2010).

While one could argue that the firm's assessment of whether an idea should be implemented is already a natural version of Amabile's (1982) CAT, similar to collector values of comic books (Taylor, Alva & Greve, 2006) or the granting of a patent (Audia & Goncalo, 2007), I ran an additional creativity rating for a subset of implemented ideas using CAT and two experts from the studied firm, who rated each idea's novelty and usefulness as two distinct items. The experts, who work in the firm's R&D department for combustion engines, were provided 222 ideas issued and implemented in 2015 and independently rated novelty and usefulness for each idea on a scale of 1 to 5 – (1) not novel/useful at all to (5) highly novel/useful. The raters demonstrated acceptable levels of interrater agreement; the interrater reliability was 0.63, ($F = 4.92$, $p < 0.001$) for novelty and 0.66 ($F = 5.11$, $p < 0.001$) for usefulness. On average, ideas are more useful ($M=3.37$) than novel ($M=2.79$). Only seven ideas received an average novelty rating of 1 and nine ideas an average usefulness rating of 1 (1 overlap). This indicates that a total of 16 out of the 222 ideas (7%) do not meet the definition of creativity, namely being both, novel and useful (Amabile, 1982). Hence, I argue that the firm's binary measure of whether an idea gets implemented can also be interpreted as a proxy of creativity in 93% of the rated cases. CAT results can be found in Table 13 and the distributions of average novelty and usefulness ratings are plotted in Figure 18 and Figure 19.

Table 13: CAT results & interrater reliability (IRR) ^a

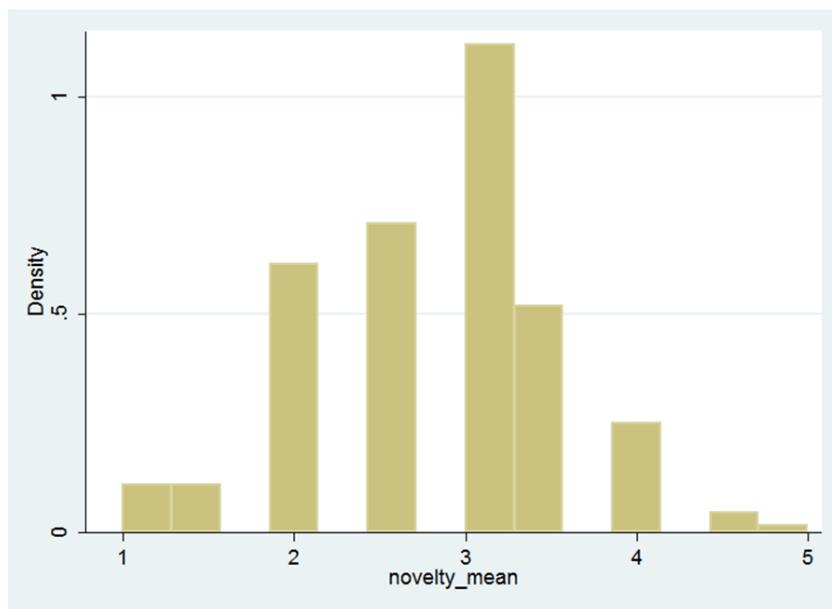
	Novelty		Usefulness	
	<i>Coefficient</i>	<i>SD</i>	<i>Coefficient</i>	<i>SD</i>
Mean	2.79	.73	3.37	1.00
Min	1		1	
Max	5		5	
# Novelty or Usefulness = 1	7		9	
# Novelty & Usefulness =1	1		1	
Interrater Correlation	.67**		.69**	
Interrater Reliability	.63**		.66**	
F Value (IRR)	4.92		5.11	

Note:

^aInterrater Reliability (IRR) is calculated using a two-way random effects model (kappaetc, icc (random) in STATA).

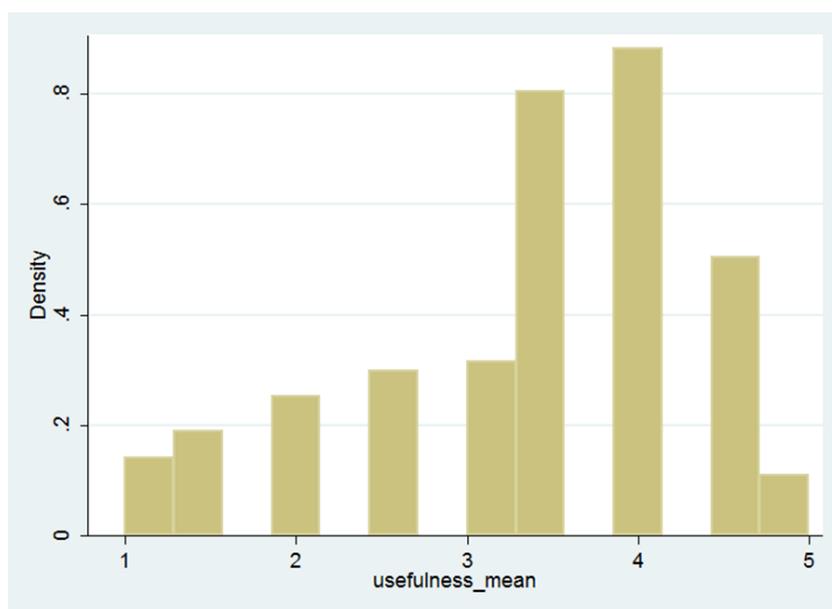
* $p < 0.05$

** $p < 0.01$



Note: This figure shows the distribution of the average expert novelty rating for the 222 rated ideas.

Figure 18: Average expert CAT ratings for idea novelty



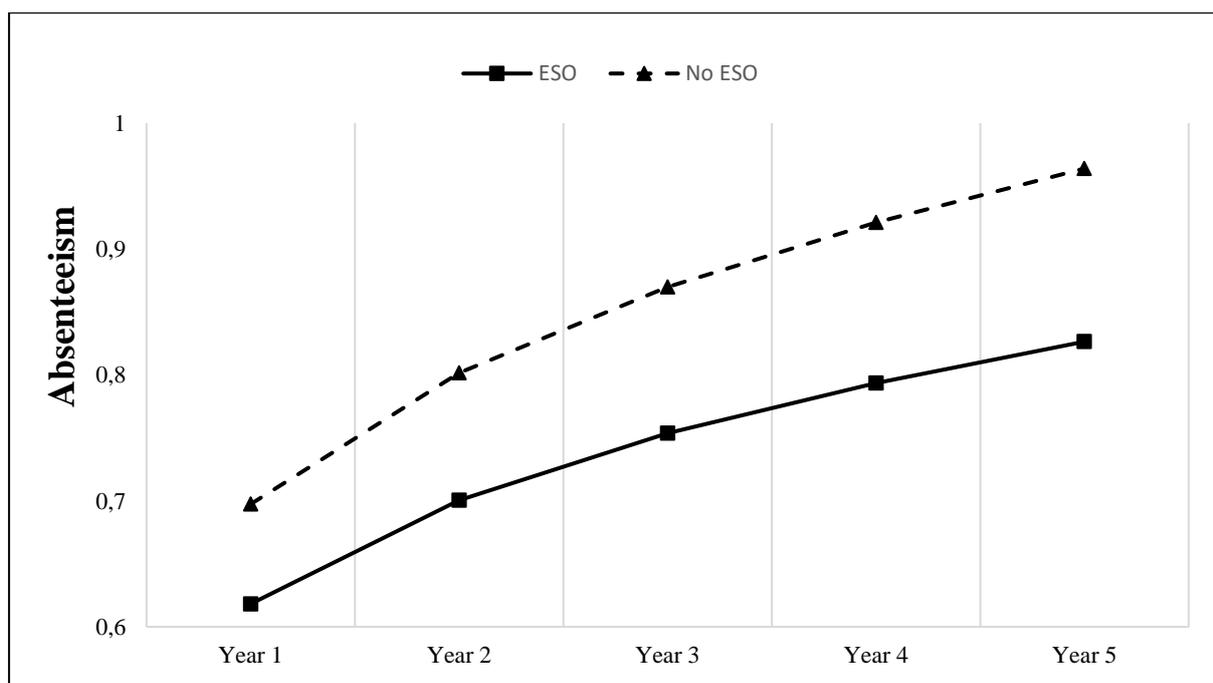
Note: This figure shows the distribution of the average expert usefulness rating for the 222 rated ideas.

Figure 19: Average expert CAT ratings for idea usefulness

7.5 ESO – individual performance relationship over time (> 3 ESO participations)

In the results section above I presented the statistical interactions between the natural logarithm of the time variable (\ln_Year) and ESO for each of the four individual performance outcomes (Model(s) 2 in Table 4 and Table 6). For greater robustness, I ran the same models

after dropping employees who participated in ESO at some point but fewer than four times during the five years of observation to test if the results remain qualitatively and quantitatively similar even if employees significantly increased their shareholdings through persistent annual ESO participations. For *idea quantity*, *idea quality*, and *performance score*, the results remained qualitatively and quantitatively similar compared to results in Tables 4 and 6. For *absenteeism*, however, the interaction term turned negative ($b = -0.0298$) and statistically significant ($p < 0.01$), other results being qualitatively and quantitatively similar, indicating that employees who quadrupled their shareholdings during the period of observation were increasingly less absent than their non-shareholding peers. This interaction is plotted in Figure 20.



Note:

^a ESO participants with fewer than four ESO participations dropped.

Figure 20: ESO-absenteeism relationship over time ^a

8 DISCUSSION

The objective for this study is to determine if and when ESO is related to individual employee performance and to provide theoretical grounding through agency theory and social exchange theory to explain why and how ESO affects employees who are below top-management levels. Furthermore, how the relationship between ESO and individual employee performance develops the more often employees participate in ESO over was also investigated.

I used internal databases, a small survey and internal communication records from a German manufacturing firm to form a longitudinal data set that shows how participation in the firm's ESO plan relates to individual performance. I distinguished between individual performance quantity, measured as number of suggestions made through the firm's suggestion scheme (*idea quantity*) and the number of days individuals were absent from work (*absenteeism*); and performance quality, measured according to the number of suggestions that the firm accepted for implementation (*idea quality*) and supervisor performance appraisals (*performance score*).

I find stable support that ESO participation relates to all four performance measures in the panel data models. Where possible, I translated ESO–performance relationship effect sizes into monetary utility. Lower absenteeism and more accepted ideas among ESO participants had an average annual monetary value of $M = \text{EUR } 881,000$, covering about 14.4% of the company's annual expenses to offer the ESO plan. Focusing on the before and after (DID approach) performance of first-time ESO participants, and using a matched sample comparing employees of similar characteristics, I found robust support only for altered idea quantity but no effects for the remaining three outcomes. Thus, I find support for the contention that ESO relates to willingness to expend extra effort (Blasi et al., 2010; Bryson & Freeman, 2019), but the results raise doubt on whether the higher effort (performance quantity) yields better performance, such as higher innovation (Harden et al., 2010). The differences between the

panel regression and DID results together with the endogeneity tests indicate selection bias, a common but rarely addressed issue in ESO research (Chiu et al., 2007; Guery, 2015; Sengupta et al., 2007). Employees who have positive attitudes toward their organizations and consequently perform better may be more likely to join ESO (Dunn et al., 1991), leading to biased findings regarding ESO effects on attitudes and behavior.

To better understand how the ESO–individual performance relationship occurs, I investigated employee perceptions about the ESO program and found that they were satisfied with ESO as they perceived that the benefits were a gift, and felt thankful. ESO participants, in comparison with nonparticipants, indicated the most positive perceptions. Consequently, employees perceive ESO to be a benefit that enhances their satisfaction, beyond contractual compensation (Harris & Fink, 1994). From the remaining survey questions it became also apparent that ESO participants perceived ESO to be more profitable and less complicated (both, regarding complexity to understand the ESO scheme and difficulty to participate in), less costly and less risky than their non-participating peers.

To further disentangle whether ESO is related to performance because of the financial incentive inherent in discounted or non-discounted stock ownership, or from the discounts and free matching stocks associated with ESO, I contrasted effects of discounted and non-discounted stocks on performance quantity and quality. I compared four groups of individuals who (1) purchased stocks at a discount through the ESO scheme (*ESO*), (2) purchased stocks at no discount through their private brokerage accounts (*OTHER*), (3) purchased both discounted and non-discounted stocks (*ESO&OTHER*), and (4) purchased no stocks at all. Neither the panel data regression nor the DID results focusing on first-time purchasers of non-discounted stocks indicated that non-discounted stock purchase was related to performance, although stock amounts averaged 15 times larger than the average ESO package. When comparing groups 1 and 3, I found no indication that the purchase of non-discounted stocks in addition to ESO would strengthen the relationship with performance. The results support the

idea that discounts and free stocks rather than financial incentive resulting from stock ownership dominate the relationship with performance.

I also find that the ESO–individual performance relationship diminishes over time, both in the full sample and after I reduced the ESO participant population to those who participated at least four times during my observation (see Post-hoc and robustness analyses). The findings indicate that even if employees quadrupled their shareholdings, the higher performance effects decreased over time, which contradicts assertions that that higher values of ESO shareholding increase financial incentives (Klein, 1987; Milgrom & Roberts, 1992). Only for absenteeism, employees who participated in ESO every single year depicted somehow increasing ESO effects. In the light of my findings regarding non-discounted stocks and the absence of a financial incentive inherent in ESO, an increasing effect of ESO on absenteeism may indicate that the repeated exchange of benefits through ESO results in an improved social exchange relationship between employee and firm strengthens as predicted by social exchange scholars (Colquitt, LePine, Piccolo, Zapata, & Rich, 2012; Cropanzano & Mitchell, 2005). Employees may express this strengthened bond with their organization through increased loyalty behavior such as presentism the more often they participated in ESO.

8.1 Contributions to ESO theory and beyond

I compare the economic perspective of agency theory with the psychological perspective of social exchange theory to understand how and why ESO causes employees to show higher individual performance. First, both theoretically and empirically, I show that ESO provides minimal financial incentives for non-managerial employees because (1) ESO and potential gains have very small economic value compared to employees' salaries; (2) employees lack a clear line of sight showing how they will benefit by increasing their performance, how that their increased performance will increase overall firm performance, and how those forces will increase stock prices; and (3) each force of expectancy theory is

weak in the system. My study contributes to research and theory on the effects of ESO, which predominantly relies on economic agency-based predictions and on identifying boundaries of agency theory (Shaw et al., 2000).

Second, I provide theory and empirical results supporting a social exchange theory perspective for understanding the ESO–individual performance relationship. Social exchange theory can fill shortcomings of agency theory, especially when researching employees below top management (Shaw et al., 2000). To compare agency and social exchange theories, I contrasted discounted (ESO) and non-discounted stocks. Both were equal in terms of voting rights and dividend payouts, but differed in the discount and free matching stocks accompanying ESO. Agency theory would predict that both discounted and non-discounted stocks provide a financial incentive for higher employee performance, assuming that dollar value, line of sight, and expectancy are in place, while social exchange then would predict that only discounted stocks should contribute to the employee/organization social exchange relationship. However, non-discounted stocks, either solo or in combination with ESO, failed to affect individual employee performance in my data. This finding enhances theory about the mechanisms behind ESO and thus addresses a lack of theoretical foundation in ESO research (Buchko, 1992b; Caramelli & Briole, 2007; Pierce et al., 1991). In particular, I do not only challenge the dominating economically driven theoretical grounding behind most ESO research that assumes ESO to operate as a financial group incentive, but also provide an altered angle to reappraise previous ESO findings and landmark studies. I argue that ESO research to the present day has confounded the economic and the psychological ESO mechanism when researching how the monetary value employees have generated from ESO or an employer's financial contribution to an ESO scheme affect individual level employee outcomes (Culpepper et al., 2004; Dunn et al., 1991; Klein, 1987). Several previous studies have theoretically predicted (e.g. Klein, 1987; Pierce et al., 1991) and empirically shown (Chiu et al., 2007; Culpepper et al., 2004; Klein, 1978; Buchko, 1992; French, 1987) that a

favorable relation between the monetary rewards that employees derive from ESO and individual employee outcomes exist. While these theoretical predictions and empirical results have guided many researchers to believe that ESO serves as a financial group incentive that aligns employee and employer interests (Harden et al., 2010; McCarty et al., 2010b), I argue based on my findings that it is more appropriate to assume that the monetary rewards were a trigger of benefit satisfaction and a psychological strengthening of the employee-employer relationship. Hence, my research further emphasizes the importance of employee satisfaction (Kuvaas, 2003) but puts benefit satisfaction at the core of the ESO mechanism rather than at the outskirts complementing the financial ESO incentive as previous studies stressed (Bryson & Freeman, 2019). This is supported by empirical results showing that employees were more satisfied with their ESO scheme and depicted higher levels of commitment the more ESO was financially rewarding (Dunn et al., 1991; Klein & Hall, 1988).

Third, my research goes beyond current ESO literature that has focused on attitudes such as commitment (Bakan et al., 2004; Klein, 1987; Long, 1978b), motivation (Long, 1980), or satisfaction (Wagner et al., 2003) and on behaviors of absenteeism and turnover (Blasi et al., 2010; Buchko, 1988; 1992b; Hammer et al., 1981). Instead, I investigate how ESO relates to actual employee performance. My investigation reveals differences between ESO effects on performance quantity and quality and adds to understanding the relationships among ESO, individual work behavior, enhanced innovativeness, and improved performance (Chiu, 2003; Garrett, 2010; Freeman, 2007). After showing that ESO is more of an employee benefit than a financial incentive, I show that ESO can motivate employee performance in general and extra role idea suggestions in particular, which adds to the general dearth of normative management research about benefits (Dulebohn et al., 2009). However, differences between the panel regression and DID results also suggest concerns about selection bias in ESO research (Chiu et al., 2007; Guery, 2015; Sengupta et al., 2007), and thus suggest caution when interpreting the relationship between ESO, attitudes, and behavior.

Fourth, I provide theory and evidence for a generally diminishing ESO–individual performance relationship over time (except for absenteeism), which contributes to both ESO and social exchange research. The literature has repeatedly called for knowledge about how ESO effects develop over time (Goldstein, 1978; Richter & Schrader 2017a). My study suggests a potential cause for previous findings of declining ESO effects at higher levels (Guedri, & Hollandts, 2008; Richter, & Schrader 2017). Including a temporal dimension indicates that financial incentive perspectives are insufficient because economic predictions assume that ESO effects should increase at higher levels of shareholdings (Klein, 1987; Milgrom & Roberts, 1992), but I do not find this result. I also find that reciprocity in social exchange relationships based on employer benefits evolves over time (Gilchrist, Luca, & Malhotra, 2016). I show that tangible resources can actually lead to a lasting social exchange relationship, in contrast to studies focused on diffuse and socio-emotional inducements as antecedents to social exchange (Kuvaas et al., 2017; Shore, Tetrick, Lynch, & Barksdale, 2006).

8.2 Practical implications

Firms offer ESO as an employee benefit to enhance innovation and performance and to foster profitability (*The Economist*, 2015; Frick, 2015). In my sample ESO participation covered about 14.4% of total annual ESO expenses through lower absenteeism and greater tendencies to make useful suggestions.

The results also suggest that discounts and free matching stocks are the dominating mechanism behind the ESO–individual performance relationship. Hence, managers should rethink the framing of ESO plans in terms of the value of ESO-related communication strategies: ESO schemes will be more effective if firms that shift the focus from considering ESO to be a mechanism for financially aligning interests and instead recognize ESO as a contribution to a well-functioning social exchange relationship. These results cast doubt on the effectiveness of offering common non-discounted stock or stock options as part of an

employee's total salary to incentivize higher performance or innovativeness. My results suggest that ESO is not an effective financial incentive to increase individual performance when offered to non-management employees, when they offer small equity, and when they are not discounted, although such ESO schemes are common (Lerner, & Wulf, 2007).

8.3 Limitations and future research directions

My study has several limitations, some of which provide rich possibilities for future research. First, although the data is large, it stems from only a single firm, creating potential generalizability challenges, particularly if firms or industries handle ESO in unique ways. Further, all employees are located in Germany, which limits cultural generalizability.

Second, some employees seemed to act economically irrationally in purchasing non-discounted stocks in the open market rather than purchasing the same stocks at a discount. Rather than assume that their irrationality would apply to their daily work, I analyzed employee comments through interviews and on internal chat boards, and found three primary reasons for buying stocks outside of the ESO discounts, unrelated to employee characteristics: (1) a timing issue, (2) a dislike for the bank that hosts the ESO program, and (3) the complex process required for opening an account. Further, the survey results also provide an indication that participation in ESO also depends on whether employees perceive ESO participation to be complicated and whether they have difficulties in understanding the ESO scheme (see Table 8).

Third, although I address the mechanism through which ESO operates, I do not run a mediation approach modeling the effect of ESO on social exchange and the effect of social exchange on employee performance. However, social exchange, measured through trust, has been shown to mediate ESO effects (Bryson & Freeman, 2019), but the finding was based on economic thinking, assumed that ESO operates mainly as an economic incentive, and used an incomplete measure of social exchange. Nevertheless, the study sufficiently indicates that ESO evokes feelings of social exchange.

Fourth, empirically I use non-discounted stocks to measure the economic effect of stock purchase on individual performance and discounted (ESO) stock offerings to measure the aggregated economic plus social exchange effect of ESO. In showcasing that non-discounted stocks are unrelated to individual performance I try to make the case for social exchange as the dominant mechanisms behind the ESO-individual performance effects. However, it could also be argued that discounted (ESO) stocks provide an even greater economic incentive than non-discounted stocks and that the effects for discounted stocks would still stem from financial incentivization rather than any form of psychological social exchange effect. While it is true that the economic gains from ESO through dividends and increased market capitalization may be larger for discount than non-discounted stocks as a relative number compared to an employee's initial investment, in absolute numbers the gains are equally large and hence I do not think that the effects that I found for discounted stocks are confounded by the size of the relative economic gains. Nevertheless, it may still be interesting to further investigate if employees assess financial gains more as an absolute amount of money than a relative return.

Fifth, power analysis shows that my sample for testing the purchase of non-discounted stocks in addition to ESO participation (ESO&OTHER) is suitable to detect medium and large effects, but not small effects. Because non-discounted stock purchases average 10 times larger than ESO stock purchases, I am confident that if non-discounted stocks had an effect, I would have detected it. However, I cannot fully rule out the possibility that the purchase of non-discounted stock adds a small additional incentive. Hence, further research could investigate the relationship by focusing on small effects.

Sixth, I found that ESO has diminishing effects on performance quantity and quality over time. During the period of my research, the firm showed substantial increases in financial performance and stock price. ESO participation might have decreased because ESO participation became more expensive. I did not theorize that stock prices would play a role in

the ESO–performance relation, because the related discount of free matching stocks is proportional to rising stock prices. However, future research may consider how stock price fluctuations affect the ESO–employee outcome relation. In particular, it would be interesting to observe whether employees adjust their reciprocity in response to the firm’s current financial performance.

9 CONCLUSION

To the best of my knowledge, this is the first empirical research to address how ESO relates to individual employee performance and the first to compare the financial incentive inherent in ESO with the psychological effects resulting from reciprocal social exchange relationships evoked by the benefits inherent in ESO. I show that employees – especially those participating in ESO – are satisfied with the offering, that ESO and individual employee performance are positively related but this relationship diminishes over time. Furthermore, I show that the relationship between employee stock ownership and individual performance only holds for stock offerings that come at a discount but not for non-discounted stock purchases.

I provide evidence that a social exchange perspective is more appropriate than an agency theory perspective for explaining mainstream ESO effects at the individual level, which challenges the predominant theoretical grounding of virtually all previous ESO models and studies. My study contributes to the literature by showing that ESO can generate higher levels of individual performance quantity and quality, mainly because of the discount and free matching stocks associated with ESO rather than financial incentives inherent in holding company stocks. However, my results also indicate that the effects are partially subject to selection bias. Overall, understanding ESO from a social exchange rather than an agency perspective therefore provides a new and fruitful way to think about existing and future ESO research.

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APPENDIX

APPENDIX A

Eidesstattliche Erklärung

Ich erkläre an Eides statt, dass ich die bei der promotionsführenden Einrichtung
TUM School of Management

der TUM zur Promotionsprüfung vorgelegte Arbeit mit dem Titel:

Employee stock ownership and employee performance: Why does ownership affect individual performance

in Fakultät für Wirtschaftswissenschaften, Lehrstuhl für Strategie und Organisation

Fakultät, Institut, Lehrstuhl, Klinik, Krankenhaus, Abteilung

unter der Anleitung und Betreuung durch: Frau Prof. Dr. Isabell M. Welp ohne sonstige Hilfe erstellt und bei der Abfassung nur die gemäß § 6 Ab. 6 und 7 Satz 2 angebotenen Hilfsmittel benutzt habe.

Ich habe keine Organisation eingeschaltet, die gegen Entgelt Betreuerinnen und Betreuer für die Anfertigung von Dissertationen sucht, oder die mir obliegenden Pflichten hinsichtlich der Prüfungsleistungen für mich ganz oder teilweise erledigt.

Ich habe die Dissertation in dieser oder ähnlicher Form in keinem anderen Prüfungsverfahren als Prüfungsleistung vorgelegt.

Die vollständige Dissertation wurde in der TUM Hochschulbibliothek veröffentlicht. Die promotionsführende Einrichtung Technische Universität München

hat der Veröffentlichung zugestimmt.

Ich habe den angestrebten Doktorgrad noch nicht erworben und bin nicht in einem früheren Promotionsverfahren für den angestrebten Doktorgrad endgültig gescheitert.

Ich habe bereits am _____ bei der Fakultät für _____ der Hochschule _____ unter Vorlage einer Dissertation mit dem Thema _____ die Zulassung zur Promotion beantragt mit dem Ergebnis: _____

Die öffentlich zugängliche Promotionsordnung der TUM ist mir bekannt, insbesondere habe ich die Bedeutung von § 28 (Nichtigkeit der Promotion) und § 29 (Entzug des Doktorgrades) zur Kenntnis genommen. Ich bin mir der Konsequenzen einer falschen Eidesstattlichen Erklärung bewusst.

Mit der Aufnahme meiner personenbezogenen Daten in die Alumni-Datei bei der TUM bin ich

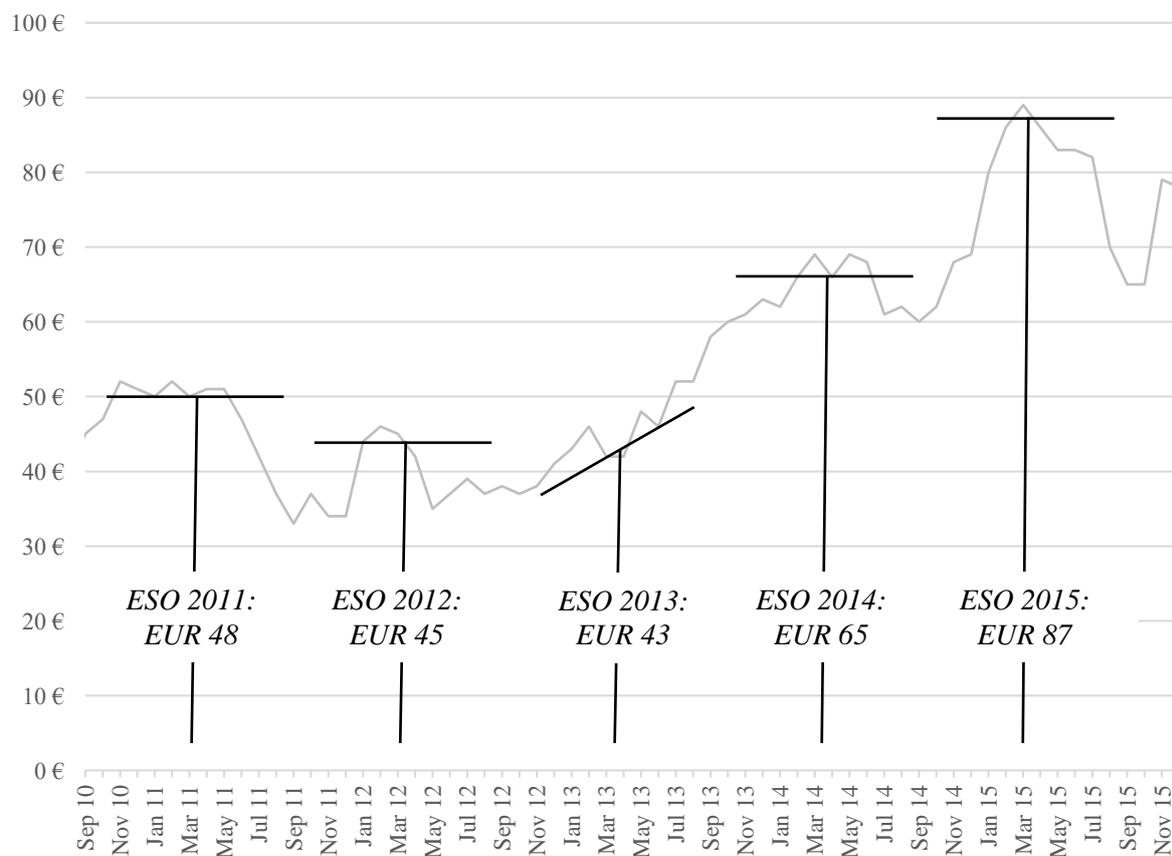
einverstanden, nicht einverstanden.



Stuttgart, 02.02.2020, Unterschrift

APPENDIX B

Stock Price and ESO Offerings 2011-2015 ^{a, b, c}



Note:

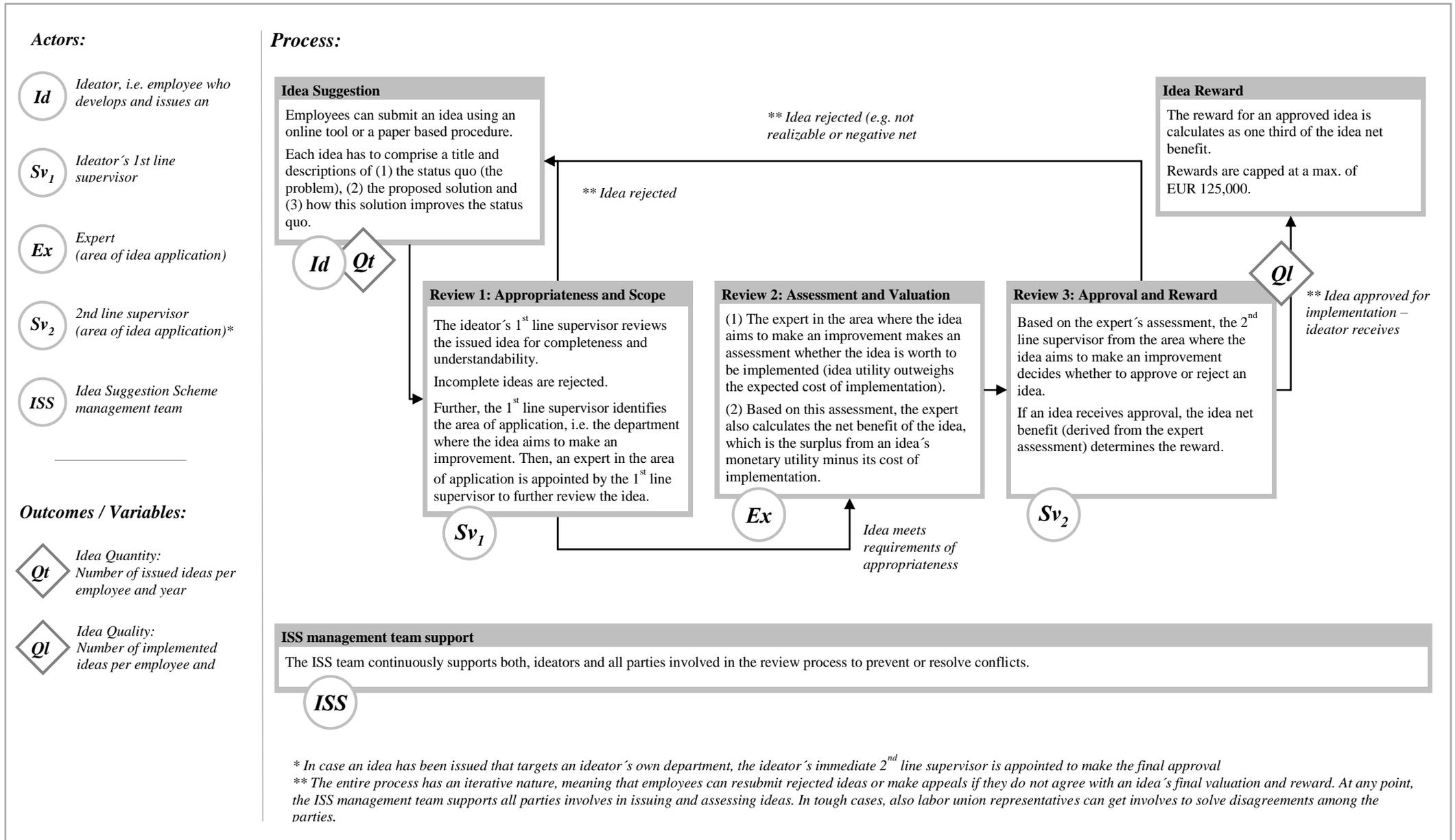
^a The figure illustrates the studied firm's overall stock price development and the time and price of the five ESO offerings between 2011 and 2015.

^b Monthly stock price quotes were extracted from Google Finance.

^c The y-axis displays the stock price in EUR.

APPENDIX C

Idea Suggestion Scheme Procedure and Actors



APPENDIX D

Estimation Method Specification and Endogeneity Tests

Test		Idea Quantity	Absenteeism	Idea Quality	Performance Score
Model Specification Tests					
^a Breusch-Pagan Lagrange multiplier test for random effects	<i>chibar2:</i>	3.10E+05	1.00E+05	2.60E+05	4.30E+05
	<i>Prob > chibar2:</i>	.00	.00	.00	.00
^a Hausman specification test	<i>chi2:</i>	117.26	666.58	87.98	3.47E+04
	<i>Prob > chi2:</i>	.00	.00	.00	.00
^a Testing for time fixed effects	<i>F:</i>	95.25	892.50	41.19	3527.82
	<i>Prob > F:</i>	.00	.00	.00	.00
^b Modified Wald statistic for groupwise heteroskedasticity in fixed effect model	<i>F:</i>	3.00E+42	1.60E+40	3.90E+42	2.30E+38
	<i>Prob > F:</i>	.00	.00	.00	.00
^b Wooldridge test for serial correlation in panel-data models	<i>chi2:</i>	11.12	10.41	13.75	5844.53
	<i>Prob > chi2:</i>	.00	.00	.00	.00
^bTesting for Endogeneity					
Underidentification test (Kleibergen-Paap rk LM statistic)	<i>chi2:</i>	208.33	107.84	208.33	230.69
	<i>P-val</i>	.00	.00	.00	.00
Weak identification test	<i>Cragg-Donald Wald F statistic:</i>	247.40	129.83	247.40	249.30
	<i>Kleibergen-Paap rk Wald F statistic:</i>	208.68	107.60	208.68	230.26
	<i>Stock-Yogo weak ID test critical values:</i>	10%: 16.38	10%: 16.38	10%: 16.38	10%: 16.38
	<i>[% maximal IV size:</i>	15%: 8.96	15%: 8.96	15%: 8.96	15%: 8.96
	<i>Value]</i>	20%: 6.66	20%: 6.66	20%: 6.66	20%: 6.66
Endogeneity test of endogenous regressors	<i>chi2:</i>	.31	4.43	.42	300.83
	<i>P-val</i>	.58	.04	.52	.00

Note:

^a These tests were performed using linear and negative binomial models and I got similar results. The presented values result from the linear models.

^b These tests were performed using linear models only (tests not appropriate/available for negative binomial models).

APPENDIX E

Required Sample Sizes for ESO&OTHER versus ESO Subsample at a statistical power of 0.8 ^{a, b}

Effect Size	Idea Quantity n=98,562	Absenteeism n=64,498	Idea Quality n=98,562	Performance Score n=69,741
	<i>required sample size</i>	<i>required sample size</i>	<i>required sample size</i>	<i>required sample size</i>
Small Effect Size (10%)	193,536	88,192	279,552	143,360
Medium Effect Size (25%)	77,056	34,944	111,104	57,344
Large Effect Size (50%)	38,528	17,472	55,552	28,672

Note:

^a Statistical power analysis is conducted using Stata's powerreg command assuming a linear regression model as there is no common statistical power analysis approach for negative binomial regression models available.

^b I define the effect size of ESO&OTHER over ESO to be small, medium and large if it explains 10%, 25% and 50% respectively of the variance explained by discounted stock purchase variables (ESO and ESO&OTHER) in individuals performance quantity and quality (Idea Quantity, Absenteeism, Idea Quality and Performance Score) derived from the full models (Models 1 in Table 3 and Table 5).