Three Essays on Corporate Finance

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Declaration

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The Prophet said: "Whoever teaches some knowledge will have the reward of the one who acts upon it, without that detracting from his reward in the slightest."

— Sunan Ibn Majah, Vol. 1, Book 1, Hadith 240

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"Whoever does not thank people has not thanked Allah."

— *Source: Sunan Abī Dāwūd 4811*

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Table of Contents

Abstract

This thesis comprises three essays in corporate finance, broadly encompassing the impact of CEO characteristics and their ability to efficiently use firm resources on financial policy and decision-making. The first essay examines the role played by CEO characteristics in managing a firm's predation risk. Predation occurs when competing firms aim to force an opponent to exit the market by engaging in predatory actions by price reductions or increased non-price competition expenditure such as advertising. Our results show that firms led by overconfident, empire-building CEOs significantly reduce their predation risk by diversifying their operations to become more dissimilar than their industry competitors. We use the random, exogenous passage of large US import tariff reductions and CEO deaths as quasi-natural experimental settings to address endogeneity concerns. We demonstrate that reduction of predation risk through CEO characteristics leads to significant growth in a firm's market share over industry competitors and higher total compensation and option grants for the CEOs. These empirical results offer a crucial insight into how CEO behavioural characteristics play a role in a firm's survival in competitive product markets against predatory threats.

The second chapter investigates how major customer firms (identified as representing more than 10% of a supplier's revenue) managed by higher ability managers gain significant bargaining power over their network of suppliers. Using a composite index capturing a customer's supply chain power and the Demerjian (2012) measure of managerial ability that considers the efficient use of firm resources, we provide evidence that higher ability managers in major customer firms hold significant supply chain power over their suppliers. We use two-stage least squares (2SLS) regressions using instrumental variables and difference-in-differences estimates surrounding forced CEO turnovers to address endogeneity concerns. This positive association is stronger for higher ability managers who engage more in socially responsible activities and have better corporate innovation performance. Suppliers are found

to extend greater trade credit when customers managed by higher ability managers have more supply chain power.

The third chapter explores how firms managed by executives with superior ability can extract greater trade credit from their suppliers. Trade credit is one of the most used sources of liquidity for inter-firm commerce. Using the Demerjian (2012) measure for managerial ability and two proxies for trade credit, we document a positive association between managerial ability and the trade credit received by a firm. Two-stage least squares (2SLS) regressions using instrumental variables are used to mitigate endogeneity concerns. We identify that engagement in socially responsible activities by higher ability managers acts as a channel that drives the relationship between trade credit and managerial ability. Cross-sectional variation analysis demonstrates that this positive association is stronger for superior managers in firms identified as major customers (representing 10% or more business revenue of a suppliers) and during periods of economic recession. Further robustness tests demonstrate that higher ability managers use this trade credit to outgrow their industry competitors and improve their product market performance, while preserving cash in hand by reducing trade receivables. These findings emphasize the role of managers in efficiently managing resources to access more trade credit for the firm's business operations.

Chapter 1: Introduction

1. Overview of the Thesis

This thesis comprises three essays in corporate finance, broadly surrounding the role of CEO characteristics and CEOs' ability to efficiently use firm resources on financial policy and decision-making. The first essay studies the role played by overconfident and empire-building CEOs in managing a firm's predation risk. In a competitive product market environment, firms often engage in predatory actions through reduced prices or increasing expenditure on non-price competition (i.e., advertising) to force an opponent to exit (Haushalter et al., 2007, Bernard, 2016, Bolton and Scharfstein, 1990). If a firm is overly similar and attached to the technological core of its industry, it is highly likely to face predation risk if an industry competitor engages in predatory behaviour. Our results highlight the positive impact of overconfident, empire-building and female CEOs in reducing predation risk through investments focused on differentiating their business operations from their industry competitors. The predation risk reduction by these CEO characteristics also brings forth positive outcomes in the product market and executive compensation in the form of higher market sales growth compared with industry competitors and better CEO option grants and total compensation.

The second essay examines the effect of superior ability managers in gaining significant bargaining power over their network of suppliers. Firms usually have little choice over their customer base, but seek opportunities to control and optimize their supply chain with the aim of ensuring low product prices, high quality and lowest total sourcing and production costs by having multiple, competing, financially dependent suppliers (Lee and Oakes, 1996, Flynn and Flynn, 2005, Lian, 2017). According to the resource-based view of the firm, businesses look to exert control over their bundle of resources to achieve sustainable competitive advantage,

something higher ability managers can achieve by developing control over customer firms' supply chain to facilitate an efficient sourcing flow that benefits their operational performance (Barney, 1991, Rungtusanatham et al., 2003). We provide empirical evidence supporting this argument and find a positive association between managerial ability and supply chain power. This positive effect is stronger for superior managers engaged in more socially responsible activities and better corporate innovation performance. Our findings also demonstrate that better ability managers use this bargaining power to extract higher trade credit from their suppliers.

The third essay investigates the role of a manager's ability to efficiently use firm resources in extracting trade credit from the firm's suppliers. According to the resource-based theory of the firm, it is the managers who drive efforts to maximize value through initiatives that lead to beneficial firm-related outcomes, i.e., greater utility or lower unit costs (Holcomb et al., 2009, Lepak et al., 2007). In the last few decades, trade credit has increasingly become one of the most used liquidity sources for inter-firm commerce, despite its high implicit costs (Ng et al., 1999, Rajan and Zingales, 1995, Jory et al., 2020). By using the Data Envelopment Analysis (DEA)-based Managerial Ability measure centred on a manager's revenue-generating efficiency (Demerjian et al., 2012), we find evidence that superior managers are positively associated with gaining higher trade credit from their suppliers. This positive association is stronger for higher ability managers with greater engagement in socially responsible activities. Cross sectional variation analysis shows that higher ability managers secure more trade credit when they manage firms identified as a major customer (representing 10% or more business revenue of a supplier) and during periods of economic recession. Our results add to the resource-based view of the firm, since extended trade credit from its suppliers leads to efficient bundling and deployment of a firm's resources compared with its competitors, leading to superior value creation (Hansen et al., 2004, Lippman and Rumelt, 2003, Miller, 2003).

2. CEO Characteristics, Predation Risk and Product Market Outcomes

Predation is considered an element deriving from product market competition, where firms are incentivized to survive the intense competition and gain market share through predatory actions, such as reduced prices or increased expenditure on non-price competition (i.e., advertising), with the aim of forcing an opponent to exit (Haushalter et al., 2007, Ordover and Willig, 1981). Firms typically face higher predation risk when they face greater competition in the product market (Hoberg et al., 2014). Archival evidence suggests that the prey in such predatory situations tends to be financially constrained to survive a price war or business slump. For example, Quidsi, the parent company of Diapers.com, was founded in 2005 and had nearly $300 million in annual sales in 2010 because of its booming diaper business segment. However, Amazon.com sensed an opportunity to seize market share growth in that segment and slashed its diaper prices by almost one third to force the comparatively smaller rival to exit the market. During a US recessionary economic period, Quidsi could not arrange the additional funds needed to survive the fight and was forced to sell out to Amazon (Day, 2020, Bernard, 2016).

With increased foreign competition threatening the existence of US domestic producers, predation risk is increasingly a matter of concern. To remain competitive and cost-efficient in mitigating a firm's rising predation risk, it is absolutely necessary for the CEO to play a crucial role (Dasgupta et al., 2018). Contemporary research has investigated the role of CEO characteristics in a multitude of corporate decision-making areas. For example, empire-building CEOs have been associated with taking decisions that look for excessive growth to make them more entrenched, indispensable and gain higher bargaining power (Amihud and Lev, 1981, Amihud and Lev, 1999, Glaser et al., 2013). Recent literature has also intensively studied the impact of overconfident CEOs on corporate policies. Overconfident CEOs are generally associated with external finance avoidance (considering it costly), instead preferring

to hold more cash or riskless debt (Malmendier et al., 2011). They are also considered less likely to underinvest and be higher risk-takers (with greater stock returns) than their non-overconfident counterparts (Bharati et al., 2016, Gervais et al., 2011, Goel and Thakor, 2008). Female CEOs are generally identified as conservative, with an increased propensity to make decisions that reduce firm risks (Faccio et al., 2016). However, despite the abundance of literature investigating the role of CEO characteristics in corporate policy-making, there is a scarcity of empirical literature that looks at how CEO actions drive firms against predation risk. CEO characteristics are important factors to understand in preparing against increasing predation risk faced by product market participants. Chapter 2 of this thesis aims to answer the fundamental question on whether and how CEO characteristics (i.e., empire-building, overconfidence, gender) affect the level of predation risk borne by a product market participant.

In this chapter, we answer our research question using Ordinary Least Squares (OLS) regression models to estimate the effect of CEO characteristics on predation risk. Our primary dependent variable is predation risk, which we measure by examining level of dissimilarity a firm holds in its core business operations compared with its industry rivals, through the difference in the firm's capital to labour ratio compared with the 2-digit SIC industry median value (MacKay and Phillips, 2005, Haushalter et al., 2007). The independent variables of this study are CEO characteristics, i.e., empire-building, overconfidence and gender. We measure empire-building using two proxies: Property, Plant and Equipment (PPE) Expense Growth and the Number of Acquisitions (ACQNO) made by the CEO for a given year, and we use the option-based measure for overconfidence (Chhaochharia et al., 2012, Humphery-Jenner et al., 2016). We hypothesize that empire-building CEOs use internal capital markets and excess free cash flow in hand to diversify firm operations, thereby reducing predation risk. We also hypothesize that through their documented reliance on less leverage (more internal financing) and a tendency to reduce the probability of underinvesting (Goel and Thakor, 2008,

Malmendier et al., 2011), overconfident CEOs reduce predation risk. Lastly, we hypothesize that the risk-avoidance and managerial conservatism displayed by female CEOs leads to defending against potential predatory threats (Faccio et al., 2016). Our baseline regression estimates support our hypotheses since overconfidence and empire-building characteristics play a significant positive role in reducing a firm's predation risk. Our results also indicate that female CEOs, with their risk-aversive outlook, pre-emptively position their firms to defend against possible predatory threats. Our results hold when we run our regression models with firm, industry and year fixed effects.

Our results continue to hold when we address potential endogeneity concerns in the difference-in-differences tests that exploit exogenous shocks from large US tariff reductions and CEO death. Empire-building, overconfident CEOs continue to significantly reduce predation risk post large US tariff reduction shocks and following the exogenous replacement of CEO deaths by overconfident incumbents. To further alleviate concerns over omitted variables, we include additional control variables, i.e., institutional shareholders for increased monitoring and a firm's corporate social responsibility (CSR) engagements and run further robustness tests. The results of these robustness tests demonstrate that the inclusion of these variables do not change the established relationships between predation risk and CEO characteristics. Our findings establish that firms with increased CSR engagement and greater board monitoring reduce predation risk.

We also investigate the impact of the CEO characteristics mitigating predation risk on product market and compensation outcomes. Our empirical evidence indicates that, following the reduction of predation by these CEO characteristics, firms gain higher market share growth to outgrow their product market competitors. In addition, CEOs are awarded with additional stock option grants and higher total compensation following their positive role in reducing

predation risk. These tests highlight the importance of managing predation risk in outcomes beneficial to both the firm's product market environment and the CEO's compensation.

3. Managerial Ability and Supply Chain Power

Firms are increasingly focused on optimizing their supply chains to remain competitive in the market, following global political and economic events such as Brexit and the tariff war between the US and China (Economist, 2019). A typical firm would have little choice over its customer base, but has significantly more chances of bargaining opportunities with its suppliers. Customer firms seek multiple financially dependent suppliers to optimize their supply chain and gain competitive advantage by accessing low product prices, high quality and lowest total sourcing and production costs, particularly during uncertain economic circumstances (Lee and Oakes, 1996, Flynn and Flynn, 2005, Lian, 2017, Rahaman et al., 2020). In that context, power is defined as the ability of one supply chain partner to influence the actions of another party, with customers preferring higher bargaining power over its suppliers to receive superior resource allocation and favourable contract terms (Elking et al., 2017, Handley and Benton Jr, 2012, Emerson, 1962, French et al., 1959).

The resource-based view of the firm states that businesses focus on exerting control over their bundle of resources to achieve sustainable competitive advantage (Barney, 1991, Rungtusanatham et al., 2003). Since the ability of managers is heterogeneous, firms managed by higher ability managers can bundle and deploy resources in a much superior manner by developing a level of control over their suppliers who facilitate efficient sourcing flow and benefit firms' operational performance (Hansen et al., 2004, Lippman and Rumelt, 2003, Rungtusanatham et al., 2003). Because of significant variation in the ability of managers to extract latent value from firm resources, this chapter explores the role played by a superior

manager in gaining higher levels of bargaining power over a firm's supplier network measured through greater supply chain power.

We use ordinary least squares (OLS) regression models to explore the role of managerial ability in gaining supply chain power. Because we focus on managerial ability in procuring and using resources, we use the Demerjian (2012) measure that uses Data Envelopment Analysis (DEA) to develop a less noisy and more directly attributable proxy for a manager's efficiency in managing firm resources. To create a composite index of a customer firm's supply chain power (SCP), we use the Compustat customer segment files that contain comprehensive data on major customers (identified as representing over 10% of a supplier's revenue) and revenue from their suppliers. We hypothesize that firms managed by superior ability managers should be more efficient in extracting latent value from firm resources, thereby gaining higher supply chain power that enables control over their sourcing partners. Our results support this hypothesis, as higher ability managers gain significantly higher supply chain power over their supplier network. These results remain consistent in regression models with year, firm and industry fixed effects and for an alternative proxy of supply chain power. We continue to find consistent results after mitigating endogeneity concerns by using two-staged least squares (2SLS) regression analysis using two instrumental variables and a difference-in-differences analysis using forced CEO turnovers on the full and a propensity-score matched sample.

Further analysis identifies two channels that drives the positive association between managerial ability and supply chain power. Studies have shown that a customer firm's engagement in socially responsible (CSR) activities is considered positively by suppliers, since both customer and supplier benefit from CSR engagement in the form of improved perceptions of sourcing quality and exhibiting trustworthiness in meeting financial obligations and protection against potential negative shocks (Lev et al., 2010, Godfrey et al., 2009, Zhang et

al., 2020, Li et al., 2017, Gielens et al., 2018). As higher ability managers engage more in socially responsible and less in socially irresponsible activities (Yuan et al., 2019), we expect the positive association between managerial ability and supply chain power to be stronger for firms engaged more in CSR activities. Our results confirm these expectations, as top-tier ability managers in firms engaged in higher than median CSR activities gain significantly greater supply chain power than managers with lower ability and lower than median levels of CSR engagement. Past studies have found that knowledge spill-over from customer firms with greater technological invention and production efficiency can benefit suppliers, not only to those who are linked geographically but also economically, particularly when customer demand accounts for a larger fraction of suppliers' total sales (Li, 2018, Chu et al., 2019). Past studies also found managerial ability to have a positive association with corporate innovation success (Chen et al., 2015), leading us to anticipate that suppliers would be open to forming close links with major customers managed by superior managers to receive innovation externality benefits, leading to higher supply chain power. Our findings support this argument, because top-tier managers gain significantly higher supply chain power when their innovation performance is higher than the median, as proxied by their innovation citations and number of patents filed. Though the relationship is also statistically significant and positive across the full sample, the effect is not significant for major customers with lower than median innovation performance.

To add further robustness to our findings, we examine a subsample of customer firms from the durable and nondurable goods manufacturing sectors. Generally, durable goods manufacturers produce more unique products and depend more on suppliers from the durable goods sector for their unique sourcing needs. As a result, compared with their nondurable goods manufacturing counterparts, durable goods manufacturing customer firms require a more closely linked relationship with their suppliers, since these durable and sophisticated goods

often require after-sales service and/or spare parts (Banerjee et al., 2008, Kale and Shahrur, 2007, Lian, 2017, Saccani et al., 2007). This leads us to assume that durable goods sector customers would look to gain higher supply chain power. We conduct a subsample analysis on these two groups of customers followed by a Chow-test that identifies that higher ability managers in major customer firms gain significantly greater supply chain power in the durable goods sector compared with nondurable goods sector firms. Lastly, we assess whether the increased supply chain power for customers run by superior ability managers translates into extracting greater resource and benefits from their suppliers in the form of trade credit extended. Our evidence suggests that high quality managers receive significantly higher trade credit on a customer-supplier network when the major customer has higher than median supply chain power. Though the result also holds for the full sample, the effect loses statistical significance when the customer firm possess lower than median supply chain power.

This chapter, through its battery of tests, demonstrates that higher ability managers rely on a diversified network of financially dependent suppliers, therefore gaining competitive advantage by limiting their exposure to potential supply chain disruptions that could affect regular business operations.

4. Managerial Ability and Trade Credit

In today's inter-firm commerce, trade credit is widely considered one of the most crucial sources of liquidity, financing about $1.5 trillion of assets on average in the 1990s and standing at almost 1.3 times larger than bank loans (Ng et al., 1999, Rajan and Zingales, 1995, Yang and Birge, 2018). Over a 32 year period from 1985-2017, trade payables and receivables for non-financial corporate business jumped by almost 434% and 325%, respectively (Jory et al., 2020). Following the contraction in short-term bank loans in the aftermath of the 2009 Global Financial Crisis, rising use of trade credit accumulated to almost three times as high as

bank loans, and 15 times as high as commercial paper (Ferrando and Mulier, 2013, Barrot, 2016). However, there seems to be very little literature exploring the role played by managers behind such high volumes of trade credit. This chapter looks to answer that question.

According to the resource-based theory of the firm, managers drive efforts to maximize value through the creation of resource bundles that enable novel contributions, leading them to produce greater utility or lower unit costs (Holcomb et al., 2009, Lepak et al., 2007). Managers with superior knowledge of factor markets can select valuable resources and negotiate their use on much more favourable terms than their rivals (Makadok, 2001). Top management focused towards the efficient management of corporate resources, by setting the "tone at the top" (Bertrand and Schoar, 2003), could look to conserve cash flows by availing trade credit from suppliers with the intention of paying back later, particularly after the sale of the goods and services. Greater ability managers have a sounder understanding of the firm's operating environment (Demerjian et al., 2012, Demerjian et al., 2013), thereby enabling proper alignment of managerial decisions with trade credit policies. Moreover, high managerial ability acts as a guarantee that vouches a firm's quality to outside markets to secure better credit deals (Chemmanur and Paeglis, 2005). However, developing measures for manager-specific features, i.e. ability, talent or style has been problematic in the past, since many of these measures consider aspects of the firm that are typically out of the management's direct control i.e., media mentions and abnormal stock returns and noisy in nature (Fee and Hadlock, 2003, Rajgopal et al., 2006, Tervio, 2008, Milbourn, 2003).

In chapter 4, we address this issue by using the Data Envelopment Analysis (DEA)-based Managerial Ability measure developed by Demerjian et al. (2012) that centres on firms' revenue-generating efficiency. In stark contrast to those noisy measures, Demerijian's (2012) managerial ability measure extends across industries, is less noisy and has an economically significant association with manager fixed effects. Studies using this measure for managerial

ability have found a positive association with tax savings (Koester et al., 2017), better earnings quality (Demerjian et al., 2013), higher bank liquidity creation (Andreou et al., 2016), income smoothing (Baik et al., 2020), innovation success (Chen et al., 2015) and higher credit rating (Bonsall IV et al., 2017). This measure is aligned more with a firm's overarching goal of profit-maximization and the resource-based theory of the firm, and is considerably within the manager's control. This chapter's focus is to explore whether a superior manager, determined by efficient use of corporate resources, is able to access greater trade credit from suppliers.

In this chapter, we address our research question using OLS regression models to estimate the effect of managerial ability on trade credit. Our dependent variable is trade credit, proxied by the ratios of accounts payable to cost of goods sold (AP/COGS) and accounts payable to total assets (AP/TA). The key independent variable is managerial ability, a measure of efficiency derived using firm-specific characteristics (e.g., size) and management-specific characteristics (e.g., ability to assess industry trends, that is considered a performance-based measure of innate managerial ability (Demerjian et al., 2012)). Though other managerial ability proxies based on past stock returns or ROA can be affected by both firm and management specific factors, Demerjian's measure modifies the DEA-generated measure by purging it of key firm-specific characteristics that could affect management's efforts. Our baseline results support our hypothesis; managerial ability has a positive, statistically significant relationship with trade credit proxies, implying that firms with higher ability managers can increase their payables and receive more credit from suppliers.

To address potential concern that these empirical findings could be driven by endogeneity because of latent firm characteristics or omitted correlated variables, we use a 2SLS regression analysis using two instrumental variables, average Metropolitan State Area (MSA) managerial ability and the proportion of state population holding a college degree. We also use a difference-in-differences research design using forced CEO turnovers as a robustness

test. Our baseline results continue to hold in these tests, further substantiating the positive relationship between managerial ability and trade credit. In addition, we demonstrate that engagement in socially responsible activities by higher ability managers acts as a channel to this relationship. Higher ability managers typically engage more in CSR activities (Yuan et al., 2019), and are considered more trustworthy by suppliers in meeting payment obligations and providing an insurance-like protection against potential negative shocks (Lev et al., 2010, Godfrey et al., 2009, Zhang et al., 2020), therefore receiving greater trade credit.

To add further robustness to our findings, we conduct cross-sectional variation analysis that explores the role of superior ability managers in major customer firms (identified as representing more than 10% of a supplier's revenue) in extracting greater trade credit. Higher ability managers extract more trade credit during periods of economic recession, characterized by monetary tightening and bank lending contraction (Nilsen, 2002, Meltzer, 1960, Mateut et al., 2006). Afterwards, we look at whether higher ability managers use trade credit better to deliver superior product market performance. Instead of focusing on the outcome of superior managers extracting greater trade credit on profitability measures, we focus on a firm relative to industry sales growth (Campello, 2003), a practical measure that summarizes information from the combined effects of pricing and other competitive strategies. Our results show that the extraction of high trade credit by better quality managers is associated positively with a firm's product market performance by outgrowing its industry competitors. Lastly, we show that higher ability managers provide less credit to their final customers as trade receivables.

5. Contributions

This thesis makes a number of contributions to the corporate finance literature. First, it investigates for the first time, to the best of our knowledge, the role of CEO characteristics in mitigating predation risk. Our findings provide a new behavioural insight into how some firms

are better able to defend themselves against predatory threats than others. These findings complement a growing body of research on how CEO characteristics reflect in various firm outcomes (Schoar and Zuo, 2017, Dittmar and Duchin, 2016, Doukas and Zhang, 2020, Gul et al., 2020).

Second, this thesis explores the benefits achieved by minimizing firm predation risk. Previous studies in this context mostly identified the influence of predation risk in corporate financial policies, i.e., cash holding, hedging behaviour and disclosure practices (Chi and Su, 2016, Bernard, 2016, Haushalter et al., 2007). Our findings not only point out the importance of CEO characteristics-driven decision-making in reducing predation risk, but also demonstrate that reducing predation risk through the CEO characteristics leads to significant growth in gaining market share and higher total compensation and option grants.

Third, this thesis adds to the literature on the role of managerial ability in gaining supply chain power over a firm's network of suppliers. We provide empirical evidence supporting the resource-based theory of the firm, since our findings demonstrate the heterogeneity of managerial actions in value creation and resource extraction. Firms managed by superior managers can bundle and deploy resources more efficiently; our study establishes how such strategies are formed - by gaining higher bargaining power over firms' supplier network.

Fourth, this thesis adds to the literature on managerial ability and its impact on corporate financial policy decision-making. Previous studies focused on the impact of managerial ability on a range of issues such as management of earnings forecasts, income smoothing, credit risk assessment, lending contracts, earnings quality and corporate tax avoidance (Baik et al., 2020, Baik et al., 2011, Bonsall IV et al., 2017, Bui et al., 2018, Demerjian et al., 2013, Koester et al., 2017). We add to the largely unexplored research area behind trade credit financing decisions. Upper echelon theory implies that decisions made by the most powerful actors in a

firm (i.e., top executives) resemble their values and cognitive processes (Hambrick and Mason, 1984). Using a less noisy measure of managerial ability, we demonstrate how superior managers extract greater trade credit from their suppliers while extending less credit to their customers in the form of trade receivables.

Fifth, the thesis findings also add to contemporary accounting and finance literature on supply chain power and the nexus of major customer-supplier firm relationships. Our findings demonstrate that the positive association between managerial ability and supply chain power is stronger for superior ability managers with greater engagement in socially responsible activities and higher corporate innovation performance. In addition, we find a positive association between managerial ability and trade credit is stronger for firms with greater engagement in CSR activities. These findings contribute significantly to the literature on the implications of CSR and innovation performance in financial decision-making (Zhang et al., 2020, Yuan et al., 2019, Chu et al., 2019, Li, 2018, Galasso and Simcoe, 2011)).

6. Thesis Structure

The remainder of this thesis is organised as follows. Chapter 2 investigates the impact of CEO characteristics on a firm's predation risk and the product market outcomes. Chapter 3 explores the role of managerial ability in gaining bargaining power over a firm's supply chain. Chapter 4 examines how managerial ability dictates a firm's trade credit policies. Chapter 5 concludes the thesis by providing summary of the empirical findings and discussing their contributions to the literature.

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Chapter 2: CEO Characteristics, Predation Risk and Product Market Outcomes

Abstract

This study examines the effect of CEO characteristics on mitigating firm predation risk. Our results show that firms led by overconfident, empire-building and female CEOs significantly reduce their predation risk by diversifying their operations more to become unlike their industry competitors. We use the random, exogenous passage of large US import tariff reductions and CEO deaths as quasi-natural experimental settings to combat endogeneity concerns. Our findings remain robust to alternative proxies for predation risk and alternative explanatory variables. Reduction of predation risk through CEO characteristics leads to significant growth in gaining market share and higher total compensation and option grants. These empirical results offer crucial insights into how CEO behavioural characteristics play a role in a firm's survival in competitive product markets against predatory threats.

Keywords: Predation risk, CEO overconfidence, Empire building

JEL Classifications: G00, G30, G32, G41

1. Introduction

In a competitive environment where market participants share growth opportunities, firms have incentives to engage in predatory actions, such as reducing prices or increasing expenditure on non-price competition (i.e., advertising), with the aim of forcing an opponent to exit (Haushalter et al., 2007). Predation can be considered an element deriving from product market competition since firms expect to survive intense competition and gain market share through predatory strategies (Ordover and Willig, 1981). Archival evidence suggests that the prey in such predatory situations tend to be financially constrained to survive the price war or business slump. For example, Quidsi, the parent company of Diapers.com, was founded in 2005 and had nearly $300 million in annual sales in 2010 because of their booming diaper business. However, Amazon.com sensed an opportunity to grab market share growth in that segment and slashed its diaper prices by almost one third to force the comparatively smaller rival to exit the market. During the US recessionary economic period, Quidsi could not arrange the additional funds needed to survive the fight and was forced to sell to Amazon (Day, 2020, Bernard, 2016).

However, what drives the internal rudiments of predation is still a matter of ongoing research. Studies exploring predation risk show that this risk intensifies when the two firms produce comparable items and share analogous potential investment prospects (Chi and Su, 2016). Scholarly work on predation risk has so far focused on its impact on issues such as corporate cash holding (Chi and Su, 2016, Hoberg et al., 2014), capital spending under financial constraints (Abdoh and Varela, 2018), accounting disclosures (Bernard, 2016) and hedging behaviour (Haushalter et al., 2007). In this regard, we look to identify the role of CEO characteristics in mitigating predatory threats. There is a scarcity of empirical literature looking at how CEO actions drive firms towards predatory behaviour (Benoit, 1984, Bolton and Scharfstein, 1990). This is an important dimension to focus on, since predation risk is becoming

more widespread with the increased foreign competition threatening the existence of US domestic producers. In this regard, CEOs are required to play a crucial role in the firm becoming competitive and cost-efficient in facing increased foreign competition (Dasgupta et al., 2017). Evidence suggests that proxies for CEO characteristics such as gender, empire-building and overconfidence, capture the cognitive biases that cause deviation from rational decision making. For example, female CEOs are characterised as risk-averse and have been found to reduce firm risk (Faccio et al., 2016). CEO characteristics, as such, are important factors to understand in preparing against increasing predation risk faced by product market participants. This study aims to answer the fundamental question on whether and how CEO characteristics (i.e., empire-building, overconfidence, gender) affect the level of predation risk borne by a market participant.

To answer our research question, we estimate Ordinary Least Squared (OLS regression models to find the effect of CEO characteristics on predation risk. Our initial sample consists of 2640 US-listed firms from 1992 to 2018. We consider two proxies for CEO empire-building, i.e., Property, Plant and Equipment expense growth (PPE Growth) and Number of Acquisitions made by the CEO for a given year (ACQNO) and use the option-based measure for to proxy for CEO overconfidence (Chhaochharia et al., 2012, Humphery-Jenner et al., 2016). To measure predation risk, we examine the level of dissimilarity a firm holds in its core business operations compared with its industry rivals through the difference in the firm's capital to labour ratio compared with the 2-digit SIC industry median values (MacKay and Phillips, 2005, Haushalter et al., 2007). CEO related data, i.e., age, gender, vested options and others are from Execucomp and firm related accounting data for predation risk proxies; other independent variables are extracted from Compustat.

Previous studies have demonstrated that empire-building CEOs allocate larger portions of investments from their internal capital to facilitate overinvestment and yield intra-firm

influence. However, financially constrained firms usually avoid public disclosure and use internal capital more in differentiating themselves from their competitors, thus potentially reducing their own predatory risk (Glaser et al., 2013, Bernard, 2016). We hypothesize that empire-building CEOs use internal capital markets and excess free cash flow in hand to diversify firm operations, thereby reducing predation risk. Similarly, we hypothesize that, through their reliance on less leverage (more internal financing) and the tendency to reduce the probability of underinvesting (Goel and Thakor, 2008, Malmendier et al., 2011), overconfident CEOs will also reduce predation risk. Lastly, we hypothesize that risk-avoidance and managerial conservatism displayed by female CEOs leads to defending against potential predatory threats (Faccio et al., 2016). Our findings support the hypothesis that overconfidence and empire-building characteristics play a significantly positive role in reducing a firm's predation risk. We also find that female CEOs, with their risk-aversive outlook, pre-emptively position their firms in a defensive position against possible predatory threats. For robustness, we conduct additional tests with different proxies for predation risk identified from the literature (Chi and Su, 2016, Haushalter et al., 2007). We show that empire-building and overconfident CEOs continue to reduce predation risk for alternative proxies of predation risk. To alleviate potential endogeneity caused by probable omitted variables and reverse causality, we conduct difference-in-difference tests for two different exogenous shocks – large US tariff reductions and CEO deaths – and our results remain significant. When firms faced exogenous shocks imposed through large US tariff reductions, empire-building and overconfident CEOs significantly reduced predation risk post-shock. We continue our robustness tests using the exogenous replacement by overconfident CEOs following the death of their predecessor. We run difference-in-differences analysis on both the whole and propensity-score matched sample and find empire-building characteristics to be associated with reduced predation risk, after a new overconfident CEO replaces a non-overconfident one following his/her predecessor's

death. These findings remain consistent after conducting placebo tests, validating that they are not driven by confounding factors.

To alleviate concerns over omitted variables, we include additional controls and run further robustness tests. Institutional shareholders play a crucial role in monitoring CEOs (Shleifer and Vishny, 1986, Bathala et al., 1994), therefore they could potentially limit CEOs' ability to take action against predation risk. Since predation risk management is identified through increased firm dissimilarity, which would usually require additional investment, CEOs could be limited from activating such moves if institutional investors are induced to perform monitoring activities. Research has shown that institutional monitoring can substitute for board monitoring (Shleifer and Vishny, 1986, Ahmed and Duellman, 2007) and restrict overconfidence-driven and empire-building decision-making (Kolasinski and Li, 2013, Hope and Thomas, 2008). Therefore, higher institutional ownership could force managers to focus more on improved performance, less opportunistic behaviour, less empire-building and counterbalance overconfidence, leading to reduced predation risk (Del Guercio and Hawkins, 1999, Smith, 1996). Empirical studies examining agency and shareholder theories identify corporate social responsibility (CSR) engagement to be associated with empire-building and overconfidence (Gul et al., 2020, Baron, 2008, Bouslah et al., 2013, Krüger, 2015). Therefore, CSR engagement could pose some unobservable impact on predation risk when examined through CEO characteristics. Our robustness tests show that inclusion of these variables does not change the established relationship between predation risk and CEO characteristics.

In addition, we examine the impact of the CEO characteristics in mitigating predation risk. Instead of focusing on the outcome of reduced predation risk through these CEO characteristics in profitability measures, we focus on pricing decisions in the presence of potential predatory threats. In the event of increase predatory threats, firms that can prepare in advance against predatory threats should be able to survive and prosper, even though they could

undergo a period of losses when predators engage in price cuts (Easterbrook, 1981). Based on these arguments, we look at the product market outcomes through a practical measure of performance that summarizes information from the combined effects of pricing and other competitive strategies. We measure a firm's relative-to-industry sales growth to proxy for its Product Market Performance (Campello, 2003). This measure reflects how pricing decisions affect a firm's competitive behaviour because it incorporates information from pricing and other market strategies to gain a larger share of its industry sales. We find evidence that decreased predation risk improves a firm's relative-to-industry sales growth, whereas firms headed by overconfident and empire-building CEOs who are able to minimize predation risk, improve their product market performance through increased market share growth. Because of unobservable characteristics of predation risk, it makes sense to study whether CEOs' ability to defend against predatory threats is rewarded in their compensation. Following previous research that documents the role of compensation in aligning incentives, we seek to identify whether CEOs actively looking to minimize predation risk are rewarded accordingly. Our evidence demonstrates that reduction of predation risk through these characteristics leads to significantly higher total compensation and option grants for CEOs.

Our evidence highlights the importance of CEO characteristics in positioning against possible predatory threats. With increasing product market competition affecting major industries, companies need to set appropriate corporate policies to protect themselves against predatory threats from industry rivals. Though previous studies regarding predation risk focused on corporate financial policies, i.e., cash holding, hedging behaviour and disclosure practices (Chi and Su, 2016, Bernard, 2016, Haushalter et al., 2007)), to the best of our knowledge, this is the first study to look at the role of CEOs and their characteristics in mitigating predation risk. Our findings provide a new behavioural insight into how some firms are better able to defend themselves against predatory threats than others. These findings

complement a growing body of research on how CEO characteristics reflect in various firm outcomes (Schoar and Zuo, 2017, Dittmar and Duchin, 2016, Doukas and Zhang, 2020, Gul et al., 2020).

The remainder of this paper is organized as follows. Section 2 provides a general overview of some CEO characteristics and discusses the literature on CEO characteristics, leading to the development of the hypotheses of this study. Section 3 presents the sample construction, data definitions and research model design. Section 4 discusses the empirical results followed by section 5 which identifies and mitigates endogeneity concerns. Section 6 presents the robustness tests, followed by product market and compensation outcomes of managing predation risk discussed in sections 7 and 8, respectively. Section 9 concludes the paper.

2. Literature Review and Hypothesis Development

2.1. CEO Characteristics

Existing research suggests that individual managerial traits considerably affect financial policies. Firms headed by CEOs who went through personal suffering have less debt, conserve more cash, and invest less than other firms, with stronger effects in poorly governed firms (Dittmar and Duchin, 2015). Similarly, prevailing economic circumstances at the time managers entered the labour market also impact their management style and financial decision making, i.e., recession CEOs investing less in R&D and capital expenses, higher cost cutting and running operations with lower leverage (Schoar and Zuo, 2017). Corporations and corporate leaders, such as CEOs and directors, are commonly considered to be logical and rational, yet they may have an extensive range of ideological preferences (Francia et al., 2005). The upper-echelons perspective recognizes how the individual characteristics of top management influence firm outcomes and decision making (Hambrick and Mason, 1984). This acknowledges that organizations are expected to be a reflection of their top managers.

Extensions of this theory explain that some observable characteristics of top management serve as proxies for their underlying cognitive values (Miller et al., 1998). These observable characteristics include CEO age, gender, and functional and educational background (Carpenter et al., 2004). Literature exploring further into these factors looks at how they influence corporate risk-taking (Chatterjee and Hambrick, 2007, Sanders and Hambrick, 2007) and other financial issues such as M&As (Billett and Qian, 2008) and R&D expenditure (Devers et al., 2007). In addition, research using a psychological approach demonstrates that CEO personality directly influences a firm's strategic decision making (Miller et al., 1982, Channon, 1979). Miller et al. (1982), in particular, demonstrate that aggressive, confident CEOs undertake inventive and risky strategies.

2.2. CEO Empire-building and Predation Risk

The literature shows that managers' intentions towards empire-building through diversification of firms operations and excessive growth is to serve their private interests (Xuan, 2009, Hope and Thomas, 2008). The "Free Cash Flow" theory states that managers tend to look for excessive growth if they are presented with high free cash flows and have low investment opportunities (Jensen and Meckling, 1976). Through this excessive growth, CEOs look to increase their status, prestige and compensation packages (Stulz, 1990, Shleifer and Vishny, 1989). The theory of "managerialism" in a similar vein argues that empire-building through suboptimal growth helps the manager to become entrenched and indispensable (Amihud and Lev, 1999, Amihud and Lev, 1981). Though empire-building CEOs use their power and connections to gain more bargaining power, this does not lead to improved profitability (Glaser et al., 2013). Nevertheless, such characteristics are largely unobservable, making it a typical moral hazard problem for shareholders (Dominguez-Martinez et al., 2006).

Empire-building CEOs tend to allocate larger portions of investment from their internal capital to facilitate overinvestment and firm expansion. Such larger internal capital allocations are preferred for empire-building activities because these CEOs get to wield more intra-firm influence (Glaser et al., 2013). However, financially constrained firms look to avoid public capital markets and disclosure and rely more on internal capital. In this manner, they invest the funds generated in innovative projects to develop new products and services and move ahead of their competitors. Such strategies are effective in reducing their comparability across the industry competitors, thereby resulting in increased predation risk for their potential prey in the same industry (Bernard, 2016, Bolton and Scharfstein, 1990). Interdisciplinary research on marketing and finance has found that firms possessing high levels of free cash flow tend to spend more on advertising than necessary, which theoretically could lead to predatory action against industry competitors (Joseph and Richardson, 2002). As a result, it can be hypothesized that empire-building CEOs rely more on internal capital markets and use the free cash flow primarily to diversifying operations, thereby reducing their predation risk.

Hypothesis 1 (H1): Empire-building CEOs decrease predation risk

2.3. CEO Overconfidence and Predation Risk

The literature on neoclassical economics emphasises rational choice, whereas behavioural economics concentrates on the distortion of rational choice because of the cognitive biases of individual agents (Noe and Vulkan, 2018). In the context of behavioural economics, personal behavioural biases of CEOs, such as overconfidence, are significant factors in corporate investment decisions (Adams and Ferreira, 2007, Song and Thakor, 2006, Malmendier and Tate, 2005, Judge et al., 2006). Formally, overconfidence has been defined as an overestimation of one's own ability and of outcomes relating to one's personal situation (Langer, 1975). As a cognitive bias, overconfidence relates to the manager's perception of

reality (Campbell and Foster, 2007). Overconfident CEOs overemphasize the probability of the future success of their firms. They tend to underestimate the downside risk of a project, preferring to choose more than optimal risky projects. This implies that managers who are overconfident are under the belief that they have positive private information, not known yet by the market (Huang et al., 2016, Gervais et al., 2011, Hirshleifer and Luo, 2001). Rather than being a function of period firm performance, overconfidence is estimated to be a stable behavioural characteristic (Banerjee et al., 2015, Malmendier and Tate, 2005). Overconfident CEOs also tend to overestimate future predicted cash flows of the firm and, as such, believe that the market is undervaluing their firm (Malmendier et al., 2011). They tend to avoid external financing, considering it costly and instead prefer holding cash or riskless debt (Malmendier et al., 2011).

Overconfident CEOs will be less conservative in decision making. They are high risk-takers and secure higher stock returns than their non-overconfident counterparts (Bharati et al., 2016, Gervais et al., 2011). However, overconfident CEOs offset managerial risk aversion, reducing the probability of underinvesting (Goel and Thakor, 2008). With minimization of underinvesting likely to lead towards predation risk reduction, it can be hypothesized that overconfident CEOs can offset predation risk. In addition, overconfident CEOs prefer internal financing over external financing sources, i.e., leverage while raising funds (Malmendier et al., 2011). They view external financing methods as costlier sources of capital, thus preferring to hold financial slack. Theoretical predation models predict that highly-leveraged firms are more prone to predatory behaviour by low-leveraged firms (Bolton and Scharfstein, 1990, Opler and Titman, 1994). Since overconfident CEOs are more likely to carry less leverage (more internal financing), their firms are more likely to engage in predatory behaviour. Therefore, overconfident CEOs are likely to overinvest in areas that lead firms to become different from

their core business operations compared with industry competitors, thereby reducing the firm's own predation risk.

Hypothesis 2 (H2): Overconfident CEOs reduce predation risk

2.4. CEO Conservatism and Predation Risk

Prior studies have identified various proxies to measure managerial conservatism. These proxies include the CEO's religious affiliation (Baxamusa and Jalal, 2016), possession of a pilot license (Cain and McKeon, 2016), military experience (Benmelech and Frydman, 2015), facial masculinity (Kamiya et al., 2018, Mills, 2014) and political ideology (Hutton et al., 2014). Studies show that female executives significantly differ from male executives in corporate decision making (Huang and Kisgen, 2013, Mohan and Chen, 2004). Firms headed by female CEOs tend to have lower leverage, more risk-avoidance and a greater probability of survival than similar firms run by male CEOs (Faccio et al., 2016). Therefore, a CEO's gender plays a crucial role in applying managerial conservatism in financial decision making.

Aggressive behaviour by a firm is likely to be rooted in the CEO (Bertrand and Schoar, 2003). CEOs with aggressive, risk-taking preferences tend to drive their firm towards aggressive decision making (Cen and Doukas, 2017). Such aggressive decision-making could cause the firms towards higher leverage and less sustainable financial standing, which could lead them towards facing potential predatory threats. If the competitors look for hostile predatory threats, i.e., a huge jump in advertising or profound price cuts, then aggressive firms would be in a financially vulnerable situation to defend themselves that, in turn, would increase predation risk. Therefore, it can be hypothesized that firms led by female CEOs would remain safe and through their risk-aversive strategies that will be reduce predation risk.

Hypothesis 3 (H3): Female CEOs reduce predation risk

3. Data

3.1. Sample Construction

This study examines the relationship between CEO characteristics and predation risk from 1992-2018. Details of the variables' construction are explained in Appendix A1. CEO level data, i.e., age, gender, tenure, ownership and option valuation data to measure overconfidence are from Execucomp. These data are merged with firm accounting data for the CEO empire-building variable (i.e., property, plant and equipment growth) and control variables (i.e., firm size, ROA, level of intangible assets, financial constraints) from Compustat. To construct the other proxy for empire-building, i.e., number of acquisitions (ACQNO), we collect data from the SDC Platinum database for mergers and acquisitions (M&A). We limit our M&A data to acquirers listed in the US and completed transactions. Our sample data from Execucomp and Compustat consist of 29,306 firm-year observations. After merging the SDC data, our sample drops to 19,433 firm-year observations.

3.2. Measure for Predation Risk

We construct the proxy for predation risk - dissimilarity of operations (Dissimilarity) using data from Compustat. Dissimilarity identifies whether a firm is at the technological core or fringe of its industry (MacKay and Phillips, 2005). It is measured as the absolute difference of a firm's capital to labour ratio to the industry median, scaled by the industry median capital to labour ratio. Being overly similar (lower values of dissimilarity) means that a firm is highly likely to face predation risk if a competitor engages in predatory behaviour. If competitors produce an innovative product or service or become highly capital intensive, this firm would be likely to suffer because it lacks the technological innovation core and capital intensity to counter such a predatory threat. Therefore, the more diverse and dissimilar a firm is compared with its competitors, the less predation risk it will face. We consider this particular proxy primarily because CEOs are highly likely to be able to directly influence a firm's predation risk

through the firm's capital intensity. Management literature acknowledges a firm's capital intensity as being one of the basic sources of managerial discretion shaped by the industry (Finkelstein and Boyd, 1998, Hambrick and Finkelstein, 1987). In contrast, some predation risk proxies identified in the literature, such as industry stock beta and product market fluidity, are outcomes not at the direct discretion of CEOs (Chi and Su, 2016, Haushalter et al., 2007). We conduct additional baseline analysis with these two measures and their interaction-based continuous-variable version of a composite proxy for predation risk (Appendix A2) to provide further robustness. Moreover, to account for product based rivals leading to firm's predation risk, we consider the Hoberg and Phillips (2016) measure for product similarity for a firm, and irrespective to the firm's SIC code specific industries. This time-varying measure, Similarity, is based on textual analysis of a firm's 10-K product descriptions. The analysis is presented in Appendix A2 along with the other identified proxies for predation risk.

3.3. Measures for CEO Characteristics

In terms of CEO characteristics, we use CEO gender as a proxy for managerial conservatism. Data on CEO gender are from ExecuComp. If the CEO is male, it is coded 1, and 0 otherwise. To measure a CEO's empire-building, we use two well-known proxies. The indirect proxy, a firm's property, plant and equipment expense growth (PPE Growth), is measured through the growth of a firm's property, plant and equipment expense compared with its previous year. We also look at a direct proxy of empire-building through the number of acquisitions made in a given year (ACQNO). It is derived from the SDC Platinum database, where we identify US-based acquirers and the number of completed acquisition deals for the year. We construct ACQNO from 41,456 completed M&A transactions from the SDC data to count the number of acquisitions made by each firm yearly. We further validate this acquisition based empire-building proxy by estimating the baseline regression with another related proxy, Acquisition ratio (ACQRATIO), defined as the sum of the value of all acquisitions made by a

firm for a given year divided by the firm's average market capitalization in that year (Chhaochharia et al., 2012).

To measure CEO Overconfidence, we use an options-based measurement with the rationale that if a CEO's wealth is undiversified, any rational CEO would exercise deep in-the-money options soon after the options vest. Therefore, if a CEO retains vested deep in-the-money options, that signals a degree of overconfidence (Humphery-Jenner et al., 2016). Using option data from Execucomp, a continuous confidence measure is calculated using the following formula:

$$Confidence = \frac{Average\ value\ per\ vested\ option}{Average\ strike\ price}$$

where: $Average\ value\ per\ vested\ option = \frac{value\ of\ vested\ unexcercised\ options}{Number\ of\ vested\ unexcercised\ options}$

and $Average\ Strike\ Price = Stock\ price - Average\ value\ per\ vested\ option$

The overconfidence measure, Holder_67, is a dummy variable equals to one if the confidence measure is at least 67% or more in two or more years. It indicates that if the CEO holds onto the vested options for two or more years after becoming deep in-the-money, there is a degree of overconfidence in the action.

3.4. Control Variables

We control for a number of important factors associated with predation risk, as identified in the literature. Our firm-level controls include the level of intangible assets, financial constraint (measured as changes to cash flow/total assets from the previous year), firm size, Return on Assets (ROA) and the industry sales based Herfindahl-Hirschman Index (HHI) to measure industry concentration. Firms with higher levels of intangible assets are likely to have more proprietary technology, which is presumed to reduce their predation risk. Less profitable

firms are more sensitive to potential predation risk (Bernard, 2016). This would be particularly noticeable for firms with low profitability, because they would be less likely to generate sufficient cash flows to meet their debt obligations and operating needs. A new entrant to an industry may look to exploit a competitor's financial constraint to swiftly establish itself in the market (Fudenberg and Tirole, 1986). Firm's changes in the cash flow to total assets ratio is the proxy used to measure a firm's financial constraint, since financially constrained firms value incremental cash flows much higher than unconstrained firms for future investment, potentially against any future financial constraints and to survive against competitive pressure (Almeida et al., 2004). To further control for other CEO characteristics that may influence predation risk, we include CEO's ownership of the firm and tenure as additional control variables, with data collected from Execucomp.

We include the HHI to consider industry competition, given how previous studies have found the importance of intense competition in altering a firm's product market behaviour (Benoit, 1984, Bolton and Scharfstein, 1990, Dasgupta et al., 2018). Industries dominated by large rivals seem to have higher predation risk (Fresard, 2010) and, therefore, HHI based on Compustat data is considered a control variable to account for industry competitive pressure. We include CEO age as a CEO-level control variable in this study.

3.5. Research Model

To empirically test the hypotheses, CEO characteristics are regressed on predation risk in the following Ordinary Least Squared (OLS) model:

$$PREDATION_{i,t} = \beta_0 + \beta_1 CONSERVATISM_{i,t} + \beta_2 OVERCONFIDENCE_{i,t} + \beta_3 EMPIRE_{i,t} + \beta_4 CONTROLS_{i,t} + YEAR\ FE_t + FIRM\ (INDUSTRY)\ FE_t + \varepsilon_{i,t}$$

Where: the subscripts i and t represent, respectively, the firm and the (end of the) year. All the measures of CEO overconfidence, empire-building and conservatism are considered independent variables. Dissimilarity of operations (Dissimilarity) is the primary dependent variable and proxy for predation risk (PREDATION). We include several control variables namely, CEO's ownership and tenure, level of intangible assets, firm size, ROA, financial constraint (firm's cash flow to asset sensitivity) and the Herfindahl-Hirschman Index (HHI) based on industry sales in our OLS model. Since predation risk could be driven by unobservable industry and firm related factors, we incorporate industry, firm and year fixed effects in our model. Moreover, we check variance inflation factors (VIFs) to identify potential multicollinearity problems, and report the mean VIFs for all major regression models. Throughout our analysis, mean VIFs per model is less than 2.0, signifying the absence of major multicollinearity problems in our estimates. Based on our hypotheses, we expect overconfidence and empire-building to have a positive coefficient and conservatism (gender) should have a negative coefficient.

4. Empirical Results

4.1. Summary Statistics

The descriptive statistics of our sample of 2,640 firms from 1992 to 2018 are in Table 1. Most sample firms are more similar to the industry average, with the mean value of Dissimilarity around 0.71 and median of 0.30. Over half of the firms in our sample engaged in M&A activities, with a median of 1.00 and mean of 1.18. The average CEO age is 55.93 years, with a standard deviation of 7.36 years. The oldest CEO in our sample is Walter J. Zable of Cubic Corporation, who is 95 years old and Mark Zuckerberg of Facebook Inc. is the youngest at 28 years. Only about 3% of our sample CEOs are female, signifying male dominance of the CEO workforce in the product market. The mean PPE growth of firms is approximately 13%, with a high standard deviation of almost 63%.

[INSERT TABLE 1 HERE]

Table 2 shows the correlation matrix results giving the level of correlation between the study's variables. The size of a firm has a negative correlation with dissimilarity, indicating that smaller firms spend more on reducing their predation risk by increasingly diverging themselves from competitors. Similarly, ROA, a measure of profitability, also has a negative correlation with dissimilarity, signifying firms with declining profitability focus on spending more to differentiate themselves. Both the empire-building proxies and overconfidence, however, have a positive correlation with predation risk proxies, indicating that these CEOs' behavioural traits are correlated with reduced predation risk. None of the independent and dependent variables exhibits excessive correlation levels thereby showing no possibility of multicollinearity in the dataset.

[INSERT TABLE 2 HERE]

4.2. Baseline Regressions – CEO Characteristics and Predation Risk

Table 3 reports the results from the baseline regression model specified in Eq. (1). All models are corrected for heteroscedasticity in the standard errors. Models 1-4 include year fixed effects; models 1 and 2 report the results with the inclusion of industry fixed effects and models 3 and 4 report the same results with firm fixed effects. Results with the ACQNO measure for empire-building in models 1 and 3 show a positive, statistically significant relationship at the 1% level. Models 1 and 3 results indicate that each added acquisition made by a firm leads to 1.00% and 0.28%, respectively, added dissimilarity for the firm, reducing predation risk. Moreover, the use of the alternative proxy for acquisition based empire-building proxy, ACQRATIO, also demonstrate similar findings. Though the coefficient loses significance in model 6 with firm fixed effects, ACQRATIO has a positive significant relation

with dissimilarity in model 3 with industry fixed effects. In addition, to address the potential concern that acquisition of same industry rivals reduces competition but do not actually decrease similarity, we disentangle the M&A impact by creating two additional ACQNO-based proxies, the Diversified and Similar ACQNO. Diversified ACQNO is constructed by measuring the number of targets acquired from different 2-digit SIC industries to the acquirer, while Similar ACQNO measures the number of same industry targets acquired. These results from appendix A3 demonstrates that both of these measures have a significant positive association with dissimilarity in models with year and industry fixed effects, however the positive coefficient loses significant in models with firm fixed effect. In summary, these results show that CEOs engaged in empire-building through M&A activities are able to diverge their operations and make themselves dissimilar to their competitors, therefore decreasing predation risk and fulfilling our hypothesized relationship outlined in H1.

[INSERT TABLE 3 HERE]

We further analyse the relationship between CEO empire-building and predation risk by considering the indirect proxy PPE growth in models 2 and 4. With the inclusion of year, industry and firm fixed effects, PPE growth has a strong, positive, statistically significant relationship with predation risk supporting our H1. The positive coefficient values of 0.1484 and 0.1092 in models 2 and 4 emphasize that, with a 1% increase in a firm's PPE growth, predation risk can be reduced by approximately 14.84% and 10.92%, respectively, after considering unobservable firm, industry and year factors. Empire building CEOs use excess growth in the form of PPE growth and M&A activity to ensure that their firm is naturally hedging its competitive position against possible rival predatory action. Even though empire building CEOs' initiatives towards aggressive growth do not directly correlate with improved profitability, they do reduce predation risk, which could lead to enhanced competitiveness and

better future performance. They are better able to use internally generated funds to prepare against future predatory threats, leading to their reduced predation risk.

Overconfident CEOs tend to overinvest as they reduce the possibility of facing predation risk by investing in potentially profitable projects. Results from models 1-4 in Table 3 support our hypothesis that overconfident CEOs are better able to invest in projects that diversify their technological core, reducing the risk of being preyed upon by competitors. In all the models, the effect is statistically significant, highlighting the benefits of hiring overconfident CEOs to improve firms' future competitive position. The coefficients from models 1-4 show that overconfident CEOs reduce predation risk by diverging their operations from their competitors by almost 3.77%, on average, across the regression models, supporting our hypothesized relationship H2.

Consistent with the literature, our baseline results support the hypothesized relationship in H3 that female CEOs reduce risk (Faccio et al., 2016). The coefficients from all models show that female CEOs can significantly reduce predation risk. Even though the coefficient loses significance in models 3-4, it remains consistently negative. In models 1 and 3, female CEOs reduce predation risk by almost 23.51% and 22.08%, respectively, with industry and firm fixed effects. Through their risk averse management style, female CEO-led firms shift their operation focus and naturally hedge their market position in the possible event of suddenly heightened market competitiveness or a competitor's predatory behaviour. Additionally, models 1-4 results highlight that younger CEOs significantly minimize predation risk.

The results related to the control variables are largely consistent with the literature. In general, smaller firms in less concentrated industries are likely to proactively reduce their predation risk. Surprisingly, firms rely less on their intangible assets to diversify operations. However, improved profitability does not guarantee reduced predation risk. Financially

constrained firms are more likely to face the risk of predatory threats from competitors, though the coefficients are not statistically significant across all the baseline models. Moreover the mean VIFs remain below 2.0, signifying the absence of multicollinearity driving these estimates.

Prior studies used different proxies for predation risk such as industry stock beta and product market fluidity. We do not consider them as primary proxies for predation risk because they are usually not at the direct discretion of CEOs to influence and control. However, we conduct additional baseline analysis with these different predation risk proxies for robustness tests. We measure industry stock beta to measure the interdependence of investment opportunities between a firm and its rivals. If a firm shares a greater portion of its growth opportunities with its rivals, the firm's stock price, and hence returns, should be more correlated with that of industry rivals, therefore having higher predation risk (Haushalter et al., 2007). We use Wharton Research Data Services (WRDS) Beta Suite to find firms' industry stock beta by estimating the CAPM Market Model with an estimation window of 24 monthly returns. We use a text-based measure of product market threats that measures the overlapping use of words in describing a firm's business descriptions from 10-K filings compared with its industry rivals (Hoberg et al., 2014)[1]. Following Chi and Shu (2016), we interact fluidity and industry beta to create a continuous-variable composite proxy for predation risk. We re-estimate our baseline analysis by replacing the dissimilarity proxy as dependent variable with industry stock beta, fluidity and their interaction-based proxy to explore the significance of the CEO characteristics in managing predation risk. The results presented in Appendix A2 show that our core results remain similar. Apart from model 2 with the ACQNO proxy for empire-building, the coefficients remain negative for the overconfidence and empire-building proxies.

[1] We thank Gerald Hoberg (USC) and Gordon Phillips (Dartmouth) for making the fluidity and similarity data available through the Hoberg-Phillips Data Library (https://hobergphillips.tuck.dartmouth.edu/industryconcen.htm).

Except for model 2, the results remain statistically significant and consistent for models 1-6. With regard to the composite proxy for predation risk in models 5 and 6, PPE growth and ACQNO proxies for empire-building reduce predation risk by almost 0.18% and 9.09%, respectively. Overconfident CEOs drastically reduce predation risk by approximately 1.59 times and 1.63 times, respectively. These effects remain statistically significant when controlled for year and firm fixed effects, therefore, CEO characteristics such as empire-building and overconfidence mitigate predation risk. Moreover, we continue to demonstrate consistent findings when the product based predation risk proxy, similarity is considered in models 7 and 8.

5. Endogeneity

5.1. Identification

Empirical corporate finance literature is plagued with endogeneity problems that cause bias in estimates and undermines causal inference. Most corporate finance decisions are determined endogenously within a complex set of networked relationships that result in omitted variables and reverse causality. Within the scope of this study, reverse causality might persist since the CEO labour market could be shaped by CEOs' ability to manage predatory threats. Previously, CEOs could have been hired and fired depending on their reputation as being predatory, aggressive or conservative. Like how executive compensation packages are designed in anticipation of a particular risk environment (Gormley et al., 2013), CEOs could be hired based on a firm's existing predation risk. Moreover, despite considering some critical personal characteristics, omitted variables pertaining to other behavioural biases could still remain. We address these potential endogeneity problems in various ways to validate our findings.

We regress our baseline estimates with firm, industry and year fixed-effect regressions to control for unobservable time-invariant CEO characteristics that could affect a firm's predation risk. A similar approach has been used in previous studies to eliminate such biases arising from unobservable omitted variables (Constantinides et al., 2013, Ho et al., 2016). In addition, we use quasi-natural experiments with exogenous shocks to validate our results over potential reverse causality issues. In this respect, our quasi-natural experiments include difference-in-difference estimates of exogenous shocks arising from large reductions in US import tariff rates and CEO deaths. These shocks occur naturally and they exogenously impact product market competition and CEOs' decision making.

5.2. Exogenous Shocks through Large US Tariff Reductions

In determining how CEO characteristics affect a firm's predation risk, we look at exogenous shocks that may cause significant changes in the firm's existing relationships. Research shows that industry-level competition can create exogenous shocks at the firm level. However, traditional measures of competition, such as the Herfindahl-Hirschman Index (HHI), are based on the industrial distribution of sales that could be endogenous and may instead be an outcome rather than a determinant of firm strategies. In that aspect, recent studies have used industry-level major tariff cuts as a quasi-natural experiment to document how changes in competition affect a firm's corporate policy (Ying et al., 2017, Frésard and Valta, 2016, Fresard, 2010, Dasgupta et al., 2018). Tariff reductions have a powerful impact on examining the relationship between CEOs and predation risk, because they intensify product market competition within industries. Tariff reductions are largely exogenous to the predation risk faced by a firm because they are influenced by global economic and political forces and governed by bilateral and multilateral trade agreements that affect different industries at different times (Bernard et al., 2006, Xu, 2012). Given the staggered occurrences of tariff reduction events, they also mitigate concern regarding confounding events.

We use the following difference-in-differences model specification to examine how large tariff reductions affect the relationship between CEO characteristics and a firm's predation risk.

$$PREDATION_{it} = \alpha + \beta_1 TARIFF\ CUT_{it} + \beta_2 CEO\_CHARACTERISTICS_{it} + \beta_3 TARIFF\ CUT_{it} \times CEO\_CHARACTERISTICS_t + \gamma CONTROL_{it} + FIRM_i + YEAR_t + \epsilon_{it}$$

Since a CEO's gender is observable and not controllable, we focus on the other two characteristics, empire-building and overconfidence. US import data from 1994–2018 are used to compute the tariff rate[2] for each industry-year (at the three-digit SIC level) as the duty collected at US Customs divided by the Free-On-Board custom value of imports. Following methodology in the literature, large tariff reduction events are identified as all industry-years for which the tariff rate decreases relative to the previous year by more than two and three times the median tariff rate reduction during our sample period (Huang et al., 2017). This results in identifying 103 industries in our sample data with a large tariff cuts between 1995 and 2018. We then interact the tariff cut identifier (two and three times the mean) with the empire-building and overconfidence variables to check their effect following the imposition of a large tariff reduction.

[INSERT TABLE 4 HERE]

Results in Table 4 demonstrates the impact of exogenous tariff reduction shocks interacted with CEO empire-building and overconfidence effect on predation risk. The first panel shows the results when tariff cuts are twice the mean and the second panel reports the same with tariff cuts three times the mean. All the models include year, industry and firm fixed

[2] We thank Peter Schott for making the data available in his website (http://faculty.som.yale.edu/peterschott/)

effects to control for unobservable variations. Except for models 1 and 4, where ACQNO is the proxy for empire-building, our results indicate that when interacted with empire building and overconfidence, tariff cuts have a positive impact in reducing predation risk. In models where the tariff cut is interacted with ACQNO, our coefficients are negative but statistically insignificant. Following a large tariff reduction, CEOs engaged in empire-building through PPE growth and are overconfident, significantly reduce predation risk. When faced with increased foreign competition initiated by tariff cuts, empire-building through increased PPE growth constitutes a significant defence against predatory threats. Overconfident CEOs can reduce predation risk by diversifying their business operations more following large tariff reductions. When tariff cuts are two or three times the mean, 1% PPE growth leads to almost 7.82% and 9.71% reduction, respectively, in similarity with the industry competitors, significantly decreasing risk against predatory threats. For the same levels of tariff cuts, overconfident CEOs can reduce predation risk by almost 6.7% on average across models with industry and firm fixed effects. Though empire-building through acquisitions does not have a positive effect in defending against predatory threats following large tariff cuts, overconfident CEOs through their overinvestment and empire-builders through increased PPE growth, can diversify their operations and significantly decrease the risk of facing predatory actions by both domestic and foreign industry rivals.

5.3. Exogenous Shock Through CEO Death

Several studies have used the death of a CEO as an exogenous shock to various issues pertaining to corporate governance, stock price, social networks and corporate financial policies (Bennedsen et al., 2006, Fracassi, 2017, Graham et al., 2020). The death of a CEO is plausibly exogenous and it is unlikely for the replacing CEO to have similar predatory ability and be an endogenous choice. Even if there was a succession plan in place, CEOs appointed in

a death transition are often different from their predecessor in a range of spectrums, including having less CEO power (Graham et al., 2020).

To mitigate endogeneity concerns, we use an individual's death as an exogenous shock to changes in CEO characteristics. We identify deaths in the dataset from Execucomp and hand collect deaths in our sample by manually searching CEO names in Wall Street Journal and other newspaper media sources. Our manual search coupled with the Execucomp identified deaths resulted in finding 83 CEO death events in the sample. The variable POST is measured as 1 from the year following the death of a non-overconfident predecessor and the replacing incumbent CEO is overconfident and 0 otherwise. We identify 59 cases when such an incident took place. We conduct the following difference-in-differences estimate by interacting the POST variable with proxies for empire-building. This allows us to examine the effect of an exogenous shock produced by a CEO death on the replacement in the transition and its follow-up effect on predation risk.

$$PREDATION_{it} = \alpha + \beta_1 POST_{it} + \beta_2 CEO\_CHARACTERISTICS_{it} + \beta_3 POST_{it} \times CEO\_CHARACTERISTICS_t + \gamma CONTROL_{it} + INDUSTRY_i + YEAR_t + \epsilon_{it}$$

However, the sample sizes for treated and control firms are significantly different, therefore they might differ significantly in other firm characteristics. Though the difference-in-differences method allows treated and control firms to be different (Roberts and Whited, 2013), we do some additional tests to address the potential concern that our results could be driven by the differences between the two sets of firms. We match treated firms with the control group based on propensity scores through the estimation of a logit regression predicting the probability of a firm being a treated firm. Our sample consists of 109 treated firms and 1800 control firms. For every control firm, we find a treated firm with the nearest propensity score

to obtain 109 matched pairs. Table 5, Panel A, presents the univariate analysis comparing the treated firms with the control group.

[INSERT TABLE 5 HERE]

In this difference-in-differences model, we interact the POST variable with the empire-building measures and run the regression with both year and industry fixed effects. Models 1 and 2 in Table 5, Panel B, show the results for the whole sample; models 3 and 4 demonstrate the results for the propensity score matched samples. Following replacement by an overconfident CEO, empire-building characteristics play a positive role in reducing predation risk. Through growth in PPE expenses, an incumbent CEO can diverge the firm significantly, potentially defending against predatory threats in the aftermath of the death of the predecessor CEO. In model 1 for the whole sample, a 1% increase in PPE growth by the incumbent CEO reduces predation risk by 31%, and for our propensity score matched sample, the reduction is 46.02%. Moreover, through additional M&A activity, empire-building CEOs can reduce predation risk by almost 3.62% for the whole sample in model 2. Though this effect is statistically significant in model 2, it loses statistical significance for our propensity score matched sample. However, the coefficient is positive, with predation risk reduced by almost 3.44% for one additional M&A completion. In summary, firms choosing overconfident CEOs following an exogenous event like the death of the predecessor, are better able to minimize predation risk through empire-building behavioural traits.

To further validate that our results are not driven by confounding factors, we conduct placebo tests. We assign a fake treatment dummy to the full and propensity score matched samples for one and two periods before and after the actual event. Results for the full sample, where we interact the empire-building proxies with fake POST dummy one and two periods before and after are demonstrated in panel C, and panel D reports the same for propensity score

matched sample. Panels C and D report the estimates from repeating the regressions from panel B with the fake POST dummy. Through models 1-8 in both panels C and D, with the inclusion of two empire-building proxies (PPE growth and ACQNO), coefficients for these new interaction dummies remain insignificant. These placebo test results show additional robustness to the importance of the exact timing of these POST events, further corroborating our findings that overconfident and empire-building CEOs reduce predation risk.

6. Additional Explanatory Variables

To address potential concerns over omitted variables, in addition to the inclusion of industry, firm and year fixed effects in all the regressions to account for time-invariant firm-specific characteristics, we further examine some additional explanatory variables that are potentially related to the CEO characteristics in this study and predation risk. The literature shows that CEOs might look to build firms as their own empires, as a means to defend their job (Xuan, 2009). Moreover, being overconfident could also lead to investment distortions and have a tendency to indulge in opportunistic behaviour (Malmendier and Tate, 2005). Given such viewpoints, investors could look to enforce certain mechanisms to limit such actions. In this aspect, institutional shareholders play a key role in effective monitoring leading to positive firm value (Shleifer and Vishny, 1986, Bathala et al., 1994). These institutional investors use private channels to monitor firms through greater access to management and exert managerial power by filing proxy resolutions and securities class action lawsuits when needed (Carleton et al., 1998, Gillan and Starks, 2000, Cheng et al., 2010). Therefore, effective monitoring by institutional investors can force managers to focus more on improved performance and less on opportunistic behaviour (Del Guercio and Hawkins, 1999, Smith, 1996). To explore the possibility that institutional shareholding can influence our hypothesized relationship, we re-estimate our baseline regressions by including an additional variable to capture the effect of institutional investors in overcoming predation risk.

Recently, a firm's CSR engagement has generated considerable research interest among academics and investor groups. According to the stakeholder value creation view, CSR activities support the best interests of stakeholders in addition to the shareholders, thereby having a positive impact on shareholders' wealth and mitigation of political and financial risk (Baron, 2008, Bouslah et al., 2013, Aktas et al., 2011). However, according to the agency point of view, managers may over-engage in CSR activities for private benefit, i.e., improving their own reputation and positive self-image at the expense of shareholders (Krüger, 2015, Surroca and Tribó, 2008). Research has shown that CSR engagement is negatively associated with empire-building activity. The negative effect is attenuated when CEOs are overconfident, therefore CSR engagement cannot constrain an overconfident CEO's empire-building trait (Gul et al., 2020). We look to explore the impact of these views affecting our established relationship between predation risk and CEO characteristics by controlling for CSR engagement and monitoring quality through institutional investors.

We proxy the board's monitoring quality with the firm's concentration of institutional shareholding. It is measured as the percentage of total year-end shares owned by the top five institutional shareholders compared with total shareholdings. Data are from Thomson Reuters Institutional Holdings (13F) database for the sample firms in this study from 1992 to 2018. Following the methodology implemented in prior studies, we construct adjusted CSR scores of firms from data collected from the MSCI CSR database. In this database, CSR data are broadly organized under seven dimensions: community, corporate governance, diversity, employee relations, environment, human rights, and product quality and safety. CSR engagement under these dimensions is rated into a strengths and concerns score as per a firm's engagement. MSCI assigns "+1" for strengths and "-1" for concerns under each dimension. We calculate the adjusted CSR score by dividing the accumulated strength and concern scores for each dimension by the respective number of strength and concerns scores according to that

specific dimension (Jiao, 2010). In this manner, concerns on non-availability of strength and concern indicators for different dimensions across years is addressed properly. We merge both the datasets with our existing dataset and run an OLS regression model with the existing explanatory and control variables like our baseline regression models. Because of the unavailability of data for existing firms in the MSCI database, our sample size drops to 9,612 firm-year observations.

[INSERT TABLE 6 HERE]

Table 6 shows that our core findings remain consistent with the hypotheses set earlier in this chapter. Moreover, CSR and institutional monitoring play a positive role in reducing predation risk. Our results indicate that firms engaged in positive CSR activities reduce predation risk, though the coefficients are significant in only models 1 and 2 with year and industry fixed effects. Institutional monitoring has a statistically significant, positive impact in minimizing predation risk in models 3 and 4, both with year and firm fixed effects. With the added institutional monitoring, these CEO characteristics continue to negate predatory threats; a 1% increase in the institutional ownership reduces predation risk by almost 18.66% and 13.64%, respectively, with year and firm fixed effects. Moreover, these results support our H1 and H2, since the empire-building and overconfidence proxies continue to show a positive association with dissimilarity. This adds further robustness to our findings and significance of the CEO's ability to manage firms' predation risk.

7. Product Market Outcome

Though the majority of this study deals with the implications of CEOs' behavioural traits in managing a firm's predatory threats, we also explore how managing predation risk helps establish a firm's competitive position in the product market. Instead of focusing on the outcome in profitability, we focus on pricing decisions in the presence of potential predatory

threats. In the event of increased predatory threats, the predator would expect competitors to impede their entry and induce exit by potentially raising prices or maintaining an existing market structure in which prices rose above the competitive levels for a time for the prey to survive in the market (Joskow and Klevorick, 1979). Firms that can prepare in advance against predatory threats through actions such as planning new plants in anticipation of changes in demand or guarding against breakdowns and possessing the ability to reduce costs, should survive and prosper. In addition, the prey should be able to outsell in these circumstances to survive, even though they could undergo a period of losses when predators engage in price cuts (Easterbrook, 1981). Following the application of an economically viable predation strategy, the prey could lose market share or lower product quality to preserve cash flows (Zingales, 1998).

Based on these arguments, we look at the product market outcomes of the CEO behavioural characteristics that help manage a firm's predation risk through a practical measures of performance that summarize information from the combined effects of pricing and other competitive strategies. We measure a firm's relative-to-industry sales growth to proxy its Product Market Performance (Campello, 2003). This measure reflects how pricing decisions affect a firm's competitive behaviour because it incorporates information from pricing and other market strategies to gain a larger share of its industry sales. In Table 7, we first look at the relationship between predation risk and market share growth to evaluate whether firms that have less predation risk are more able to maximize product market performance. In Table 8, we look at the combined effect of CEO behavioural characteristics and predation risk in improving a firm's market share growth.

[INSERT TABLE 7 HERE]

Table 7 reports the relationship between predation risk and product market performance (market share growth). The results show that firms that can reduce their predation risk through increased dissimilarity in operations, are better able to improve their market share growth. These results are robust to year, industry and firm fixed effects, with a 1% reduction in predation risk through increased dissimilarity of core business operations leading to almost 1.58% and 0.79% improvement in its market share growth in models 1 and 2, respectively. This effect is statistically significant at the 1% level, signifying the importance of managing predation risk in financial decision-making. Firms that are better able to distinguish their business operations, outgrow industry competitors in sales and stay better protected against potential future predatory threats.

We explore the combined impact of CEO characteristics and predation risk management on a firm's market share growth. We conduct the following regression model by interacting CEO characteristic variables with the predation risk proxy, dissimilarity. This allows us to examine how CEO characteristics mitigate firm predation risk leading to changes in firm market share growth.

$$MARKET\_SHARE\_GROWTH_{it} = \alpha + \beta_1 PREDATION_{it} + \beta_2 PREDATION_{it} \times CEO\_CHARACTERISTICS_t + \gamma CONTROL_{it} + YEAR\ FE_t + FIRM\ (INDUSTRY)\ FE_t + \epsilon_{it}$$

[INSERT TABLE 8 HERE]

Table 8 reports the results for the interaction of CEO characteristics and mitigating predation risk on a firm's market share growth. These estimates are robust to several control variables and year, industry and firm fixed effects. All three interaction variables are statistically significant and consistent with our hypothesized relationships that firms headed by overconfident and empire-building CEOs can minimize predation risk and improve their

product market performance through increased market share growth. Models 1-3 report the estimates with year and industry fixed effects and models 4-6 include year and firm fixed effects. Following a 1% reduction in predation risk by Overconfident CEOs, market share growth improves by almost 2.10% and 1.20%, respectively. With regard to empire-building characteristics proxied by PPE growth, the coefficient estimates demonstrate market share growth is increased by 0.46% and 0.24%, respectively. Through one additional acquisition made, empire-building CEOs improve market share growth by 0.74% and 0.42%, respectively. These findings highlight the significance of CEO behavioural traits in mitigating predation risk that, consequently, leads to improved product market performance. Through mitigation of predation risk, these CEO characteristics have significant importance in growing a firm's industry market share and building its ability against potential predatory threats.

8. CEO Compensation Outcomes

Executive compensation and risk-aversion have been a widely studied in the empirical literature. Agency theory, in particular, illustrates the conflict of interest between managers and shareholders, with the conflict arising from the managers' incentives to maximize utility through the consumption of perquisites or pursuing strategies to entrench their positions and differing greatly in their attitude towards risk by shareholders (Jensen and Meckling, 1976, Fama, 1980, Fama and Jensen, 1983, Morck et al., 1989, Gray and Cannella Jr, 1997). Research has shown that designing CEO incentives to maximize shareholder's wealth in a leveraged firm leads to excess risk taking incentives (Bolton et al., 2015). Designing compensation arrangements based on the degree of risk borne by the executives could be at two extreme points. At one extreme, executives have zero compensation risk if they are assigned a fixed salary. At the other extreme, executives will bear large risks if they are assigned only performance contingent compensation packages. Based on these extremes, a higher compensation level represent a risk premium that will allow the firm to attract and retain highly

qualified CEOs (Gray and Cannella Jr, 1997). Therefore, CEOs' outside employment opportunities will be greatly influenced by their firm performance (Fama and Jensen, 1983).

With regard to decision-making, option plans mitigate excessive risk aversion by incentivizing managers to adopt rather than avoiding risky projects (Hirshleifer and Suh, 1992). These option grants matter more on the class of the utility functions governing managers' behaviour and do not immediately lead to greater risk-seeking (Carpenter, 2000). Executives whose financial rewards are more closely parallel to shareholders' interests, tend to outperform other firms over the post-war period in regard to long-term stock market performance (Masson, 1971). One particular study documented that one dollar of Black–Scholes value of stock option grant generates $3.71 of future operating income over the following five years. That study concluded that the payoff is attributable to the economic determinants of option grants and is not because of questionable governance quality (Hanlon et al., 2003). However, several studies have indicated that managers, through "rent extraction", look to execute their managerial power to extract more rent, thereby receiving more than what they otherwise would under optimal contracting (Bebchuk et al., 2002, Bebchuk and Fried, 2003). Because of the unobservable characteristics of predation risk, it makes sense to study whether CEOs' ability to defend against predatory threats is rewarded in their compensation awards. Following previous research that documents the role of compensation in aligning incentives, we seek to identify whether CEOs actively looking to minimize predation risk are rewarded accordingly.

Like our previous experiment, we look at the interaction of CEOs' characteristics and predation risk on the value of CEO option grants and total compensation (TDC). We collect the options grant and TDC data from Execucomp and match it with our sample to prepare the dataset. To properly evaluate the effect, we take the lagged values of the CEO characteristics and predation risk to explore their interactions having impact on their compensation grants in

the following period. We explore the following regression model to evaluate this particular impact:

$$COMPENSATION_{it} = \alpha + \beta_1 PREDATION_{t-1} + \beta_2 PREDATION_{t-1} \times CEO\_CHARACTERISTICS_{t-1} + \gamma CONTROL_{it} + YEAR\ FE_i + FIRM(INDUSTRY)\ FE_t + \epsilon_{it}$$

[INSERT TABLE 9 HERE]

Table 9 reports the effect of CEO characteristics in reducing firm predation risk on the options granted in the following year. We take the lagged interaction terms of overconfidence and empire-building characteristics with predation risk and estimate the regression model with the inclusion of all the control variables and industry, firm and year fixed effects. Though the interaction term with the PPE growth proxy for empire-building is statistically insignificant, overconfidence and the ACQNO proxy interactions have a positive, significant relationship with total options granted. Following a 1% reduction in predation risk by overconfident CEOs, option grants rise by almost 33.32% and 11.92%, respectively in models with industry and firm fixed effects. With regards to the ACQNO proxy, a 1% reduction in predation risk by empire-building CEO raises option grants by almost 3.21% and 2.13%, respectively. These effects are economically significant and demonstrate how CEOs are rewarded with option grants following predation risk reduction. This further explains how CEOs could be motivated to defend against potential predatory threats because it leads to the accumulation of option awards.

[INSERT TABLE 10 HERE]

We further analyse the potential compensation benefit over predation risk reduction by repeating the same regression, but with total CEO compensation (TDC) as the dependent

variable. The results in Table 10 are similar, with the interaction term of predation risk and PPE growth again being statistically insignificant. However, the interaction terms with overconfidence and the ACQNO proxy for empire-building continue to be significantly positively related to TDC. If overconfident CEOs can reduce the predation risk faced by a firm by increasingly differentiating its business operations, they are rewarded with an increase in aggregate total compensation in the following period by almost 2.42% and 6.36%, respectively. With regard to the ACQNO proxy for empire-building, it leads to an increase in the TDC of approximately 0.99% and 0.14%, respectively in the following year. These findings demonstrate that, CEOs are motivated to defend against potential predatory threats by differentiating a firm's business operations, because they are eventually rewarded with future compensation benefits.

9. Conclusion

In this paper, we investigated the role of selected CEO characterises in managing predation risk. We used empire-building (proxied by property, plant and equipment growth and the number of acquisitions), overconfidence and managerial conservatism (proxied by CEO gender) as the key characteristics that bias a CEO's decision-making. For predation risk, we used the dissimilarity of operations (proxied by the absolute difference between firm and industry's median capital to labour ratio scaled by industry median capital to labour ratio) to proxy for a firm's propensity to reduce predatory threats. We find consistently significant results, indicating empire-builders and overconfident CEOs are better able to reduce the threat of predatory behaviour by industry rivals. We also show that female CEOs have a better prospect of reducing predation risk. We conduct difference-in-differences tests for exogenous shocks induced by large US tariff reductions and CEO death to tackle issues arising from potential endogeneity concerns. We also validate the robustness of our findings through the inclusion of two alternative explanatory variables, monitoring through institutional

shareholding and a firm's CSR engagement. Our results indicate that both institutional monitoring and CSR engagement have a positive impact in minimizing predation risk, while upholding our baseline results. Though our results highlight the role of CEO behavioural biases contributing to defending against predatory threats by industry rivals, we do not know whether such actions are beneficial and sustainable for the firm in the long-run. Further research is required to better understand the role of CEO characteristics in alleviating predatory threats and ways to sustain them.

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Table 1: Descriptive Statistics

This table reports the descriptive statistics for our dependent, independent and control variables. All variables are winsorized at the 1st and 99th percentile.

				Quantiles				
Variable	Obs	Mean	S.D.	Min	25%	Median	75%	Max
Dissimilarity of Operations	32,318	0.7	0.77	0.01	0.3	0.57	0.86	7.79
ACQNO	19,530	1.21	1.87	0.00	0.00	1.00	2.00	39.00
PPE Growth	32,515	0.13	0.69	-1.00	-0.02	0.03	0.15	22.87
Overconfidence (Holder_67)	29,471	0.66	0.47	0.00	0.00	1.00	1.00	1.00
Age	29,450	55.93	7.36	28.00	51.00	56.00	61.00	96.00
Gender	29,450	0.97	0.16	0.00	1.00	1.00	1.00	1.00
Tenure	30,330	5.30	4.02	1.00	2.00	4.00	8.00	15.00
CEO ownership	28,038	2.44	3.68	0.05	0.29	1.00	2.59	14.52
Size	31.718	7.22	1.61	2.02	6.12	7.14	8.28	11.79
ROA	31,615	0.03	0.11	-1.36	0.01	0.04	0.08	0.30
Level of Intangible Assets	32,718	0.16	0.19	0.00	0.01	0.07	0.25	0.83
Financial Constraints	31,929	-0.03	0.26	-8.82	-0.01	0.00	0.00	0.55
HHI	31,715	0.12	0.11	0.02	0.05	0.08	0.14	0.96
Product Market Performance	31,935	-0.03	0.16	-0.36	-0.12	-0.03	0.06	0.32
Product Market Fluidity	32,825	6.93	3.42	2.05	4.22	6.24	9.01	18.21
Industry Stock Beta	32,450	1.15	0.78	-0.32	0.61	1.06	1.59	2.99

Table 2: Correlation Matrix

This table reports the correlation matrix for the key variables in this study. All variables are winsorized at the 1st and 99th percentile.

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Dissimilarity	1.0000										
2. ACQNO	0.0170	1.0000									
3. PPE Growth	0.1328	0.0589	1.0000								
4. Overconfidence	0.0112	0.0135	0.0112	1.0000							
5. Age	-0.0783	0.0126	-0.0293	0.0378	1.0000						
6. Gender	-0.0505	0.0309	0.0062	-0.0094	0.0214	1.0000					
7. Size	-0.0013	0.2563	-0.0671	0.0690	0.0962	-0.0529	1.0000				
8. ROA	-0.0104	0.0693	0.0345	0.0856	0.0744	0.0039	0.2349	1.0000			
9. Level of Intangible Assets	-0.1210	0.1722	0.0331	0.0108	-0.0282	-0.0184	0.1672	-0.0115	1.0000		
10. Financial Constraint	-0.0682	-0.0170	-0.2293	-0.0230	0.0634	-0.0810	0.1174	-0.0883	0.0453	1.0000	
11. HHI	-0.0136	-0.0376	-0.0328	0.0088	0.0479	-0.0145	0.1109	0.0162	-0.0602	0.0612	1.0000

Table 3: Baseline Regression Estimates of CEO Characteristics on Predation Risk

This table reports the OLS estimates from the regression model with the predation risk proxy regressed against CEO Empire-building (Number of Acquisitions (ACQNO), Acquisition Ratio (ACQRATIO) and PPE Growth), Overconfidence (Holder 67), CEO Gender and the control variables. All models have standard errors corrected for heteroscedasticity and clustered at the firm and year level. Brackets contain p-values and superscripts ***, ** and * denote significance at the1%, 5% and 10% levels of significance, respectively.

Dependent Variable: Dissimilarity	(1)	(2)	(3)	(4)	(5)	(6)
Empire – ACQNO	0.0099***			0.0028***		
	(0.000)			(0.007)		
Empire – PPE Growth		0.1484***			0.1092***	
		(0.000)			(0.000)	
Empire - ACQRATIO			4.1941**			-1.2566
			(0.044)			(0.424)
Overconfidence	0.0466***	0.0447***	0.0425***	0.0169***	0.0064**	0.0130
	(0.007)	(0.002)	(0.000)	(0.000)	(0.027)	(0.275)
Gender	-0.2351***	-0.1791***	-0.2208***	-0.1327**	-0.1153***	-0.1948***
	(0.000)	(0.000)	(0.000)	(0.029)	(0.006)	(0.001)
Age	-0.2443***	-0.1266**	-0.2362***	0.0138	-0.0078	-0.1056**
	(0.000)	(0.016)	(0.000)	(0.856)	(0.901)	(0.033)
Tenure	-0.0027	-0.0040**	0.0016	-0.0009	-0.0019	-0.0003
	(0.179)	(0.019)	(0.242)	(0.542)	(0.165)	(0.778)
CEO ownership	0.0094***	0.0053***	0.0031***	0.0118***	0.0028	0.0028**
	(0.000)	(0.007)	(0.007)	(0.002)	(0.322)	(0.025)
Size	0.2443***	0.0002	0.0089*	0.0529**	0.0494***	0.0313**
	(0.000)	(0.968)	(0.066)	(0.011)	(0.001)	(0.047)
ROA	0.1038	0.0416	-0.0536	0.0837	-0.0094	-0.0335
	(0.224)	(0.511)	(0.480)	(0.263)	(0.871)	(0.630)
Intangible assets	-0.4028***	-0.4122***	-0.3347***	-0.0731	-0.1713***	-0.1398***
	(0.000)	(0.000)	(0.000)	(0.301)	(0.003)	(0.003)
Financial constraint	-0.3337***	-0.0442	-0.2252***	-0.0799	-0.0454	-0.1078**
	(0.000)	(0.352)	(0.000)	(0.261)	(0.221)	(0.029)
HHI	-0.1042	0.0145	-0.3521**	0.2063	-0.0034	-0.3338**
	(0.179)	(0.950)	(0.019)	(0.346)	(0.985)	(0.016)
Constant	1.9560***	1.4477***	1.9855***	0.3530	0.5232**	1.1238***
	(0.000)	(0.000)	(0.000)	(0.279)	(0.047)	(0.000)
Observations	19,645	32,428	16,377	19,376	32,215	16,197
Adjusted R-squared	0.0761	0.0740	0.0655	0.5840	0.5725	0.4926
Mean VIF	1.11	1.89	1.12	1.11	1.89	1.12
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	NO	NO	NO
Firm FE	NO	NO	NO	YES	YES	YES

Table 4: Effect of Import Tariff Reduction Exogenous Shock Interacted with CEO Characteristics (empire-building and overconfidence) on Predation Risk

This table reports the effect of empire-building and overconfident CEOs on predation risk measures after the exogenous shock induced by import tariff reductions. The sample begins with all firm-years from 1992 to 2018. Models 1-3 includes tariff cuts that are 2 times the mean whereas models 4-6 includes cuts that are 3 times the mean reduction. P-values in parentheses are based on standard errors adjusted for heteroscedasticity and clustered at the firm and year level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Dependent Variable: Dissimilarity	Tariff Cut Two Times the Mean			Tariff Cut Three Times the Mean		
	(1)	(2)	(3)	(4)	(5)	(6)
ACQNO*Tariff Cut	-0.0110			-0.0153		
	(0.439)			(0.236)		
PPE Growth*Tariff Cut		0.0782***			0.0971***	
		(0.000)			(0.000)	
Overconfidence*Tariff Cut			0.0657**			0.0674**
			(0.032)			(0.020)
Tariff Cut	0.0272	0.0058	-0.0245	0.0357*	0.0066	-0.0244
	(0.220)	(0.739)	(0.334)	(0.079)	(0.692)	(0.359)
Empire-building	0.0025	0.0384***	0.0051	0.0084	0.0070	0.0052
	(0.757)	(0.000)	(0.489)	(0.296)	(0.340)	(0.476)
Overconfidence	0.0105*	0.1095	0.0065	0.0500*	0.0072	0.0103
	(0.065)	(0.312)	(0.745)	(0.075)	(0.695)	(0.614)
Gender	-0.2817***	-0.2812***	-0.2793***	-0.3251***	-0.2811***	-0.2776***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Age	-0.2949***	-0.2878***	-0.2932***	-0.2086***	-0.2937***	-0.2948***
	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)	(0.000)
Tenure	-0.0025	-0.0027	-0.0026	-0.0016	-0.0037	-0.0026
	(0.183)	(0.185)	(0..165)	(0.366)	(0.195)	(0.165)
CEO ownership	0.0024	0.0025	0.0024	0.0001	0.0029	0.0096
	(0.321)	(0.313)	(0.320)	(0.986)	(0.312)	(0.309)
Size	0.043**	0.0389**	0.0402**	0.0398**	0.0378**	0.0390**
	(0.033)	(0.039)	(0.033)	(0.027)	(0.045)	(0.037)
ROA	-0.1673**	-0.1732**	-0.1688**	-0.1808**	-0.1718**	-0.1669**
	(0.034)	(0.028)	(0.032)	(0.016)	(0.029)	(0.034)
Intangible assets	-0.2737***	-0.2850***	-0.2740***	-0.3413***	-0.2920***	-0.2749***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Financial constraint	-0.1741***	-0.1530***	-0.1746***	-0.0519	-0.1433***	-0.1745***
	(0.000)	(0.001)	(0.000)	(0.243)	(0.002)	(0.000)
HHI	-0.0080	-0.0391	-0.0400	0.3383	-0.0355	-0.0365
	(0.967)	(0.864)	(0.861)	(0.121)	(0.877)	(0.873)
Constant	1.7370***	1.7711***	1.8905***	1.4722***	1.9068***	1.9024***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	9,970	14,446	14,446	9,970	14,446	14,446

Adjusted R-squared	0.4715	0.4727	0.5197	0.4406	0.5734	0.5198
Mean VIF	1.29	1.62	1.51	1.32	1.86	1.50
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table 5: Propensity Score Matching (CEO death interacted with empire-building)

This table shows the effect of the exogenous shock induced by CEO death after being replaced by overconfident CEOs on predation risk measures. The sample begins with all firm-years from 1992 to 2018. Panel A provides the results from the univariate analysis of the variables on the treated and control groups. Panel B reports the regression estimates of the whole and propensity score matched samples. In all the four models, Dissimilarity is the dependent variable. Models 1 and 2 illustrate the difference-in-difference estimates for the treatment effect (POST CEO death) interacted with CEO Empire-building proxies for the whole sample; models 3 and 4 are with the PS matched sample. Panels C and D present the results of the placebo test for both the full and the matched samples. P-values in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered at the firm and year level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Panel A: Univariate Analysis

Variable	Mean		t-stat (Difference in Means)
	Treated	Control	Treated-Control
Dissimilarity	0.6869	0.6370	2.27*
PPE Growth	0.1132	0.0802	8.01*
ACQNO	0.8938	1.1525	0.42*
Holder 67	0.7558	0.6758	0.00
Age	54.782	55.9910	1.40*
Gender	0.9883	0.9695	0.00
Size	7.7346	7.7222	1.10
ROA	0.0633	0.0635	1.31*
Intangible Assets	0.1931	0.2029	0.98
Financial Constraints	-0.0084	-0.0099	0.36*
HHI	0.1082	0.1040	0.86

Panel B: Regressions with Whole and Propensity Score Matched Sample

Dependent Variable: Dissimilarity	Whole Sample		PS Matched Sample	
	(1)	(2)	(3)	(4)
POST X PPE Growth	0.3100**		0.4602**	
	(0.045)		(0.049)	
POST X ACQNO		0.0362*		0.0354
		(0.096)		(0.416)
POST	0.0782*	0.0419	0.1234*	0.0175
	(0.067)	(0.492)	(0.080)	(0.847)
Empire-building	0.1305***	0.0168***	0.3131***	0.0566***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	2.2841***	3.1272***	2.9246**	3.9520***
	(0.000)	(0.000)	(0.011)	(0.002)
Controls	YES	YES	YES	YES
Observations	18,197	13,376	750	570
Adjusted R-squared	0.0915	0.1010	0.2851	0.3144
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Panel C – Placebo Test (Full Sample)

Dependent Variable: Dissimilarity	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PPE Growth X Fake POST + 1 period	0.1635							
	(0.553)							
PPE Growth X Fake POST + 2 period		0.0479						
		(0.678)						
PPE Growth X Fake POST - 1 period			0.1547					
			(0.610)					
PPE Growth X Fake POST - 2 period				0.1307				
				(0.676)				
ACQNO X Fake POST + 1 period					0.0143			
					(0.586)			
ACQNO X Fake POST + 2 period						0.0029		
						(0.918)		
ACQNO X Fake POST - 1 period							-0.0213	
							(0.528)	
ACQNO X Fake POST - 2 period								-0.0330
								(0.381)
Fake POST + 1 period	0.1257				0.0141			
	(0.352)				(0.870)			
Fake POST + 2 period		0.1340				0.0519		
		(0.309)				(0.579)		
Fake POST - 1 period			0.1625				0.0280	
			(0.287)				(0.772)	
Fake POST - 2 period				0.1766				0.0254
				(0.272)				(0.800)

Empire-building	0.0154*	0.0155*	0.1021***	0.0938***	0.0074	0.0073	0.0052	0.0067
	(0.072)	(0.079)	(0.003)	(0.004)	(0.511)	(0.480)	(0.689)	(0.591)
Constant	1.3280***	1.3494***	1.1214***	1.1126***	1.6540***	1.6469***	1.5418***	1.4683***
	(0.003)	(0.005)	(0.006)	(0.008)	(0.003)	(0.004)	(0.003)	(0.007)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	18,691	17,198	19,272	17,597	12,753	11,928	12,989	13,633
Adjusted R-squared	0.0518	0.0537	0.0643	0.0653	0.0607	0.0614	0.0634	0.0923
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

Panel D – Placebo Test (Propensity Score Matched Sample)

Dependent Variable: Dissimilarity	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
PPE Growth X Fake POST + 1 period	-0.2048							
	(0.204)							
PPE Growth X Fake POST + 2 period		0.2403						
		(0.172)						
PPE Growth X Fake POST - 1 period			0.2983					
			(0.131)					
PPE Growth X Fake POST - 2 period				-0.3093				
				(0.211)				
ACQNO X Fake POST + 1 period					0.0209			
					(0.758)			
ACQNO X Fake POST + 2 period						-0.0067		
						(0.916)		
ACQNO X Fake POST - 1 period							-0.0126	
							(0.831)	
ACQNO X Fake POST - 2 period								0.0455
								(0.529)
Fake POST + 1 period	0.1070				0.0309			
	(0.325)				(0.845)			
Fake POST + 2 period		0.1286				0.0079		
		(0.308)				(0.969)		
Fake POST - 1 period			0.1529				-0.0217	
			(0.193)				(0.882)	
Fake POST - 2 period				0.1563				-0.0152
				(0.187)				(0.913)

Empire-building	0.4312**	0.4306*	0.5949***	0.5637***	0.0074	-0.0192	0.0038*	0.0220
	(0.043)	(0.060)	(0.008)	(0.007)	(0.892)	(0.724)	(0.093)	(0.682)
Constant	0.5642	0.3936	0.9945	0.7549	-0.5824	-0.8335	0.1369	0.1043
	(0.508)	(0.649)	(0.196)	(0.330)	(0.470)	(0.306)	(0.878)	(0.910)
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	716	721	709	697	570	512	579	561
Adjusted R-squared	0.3266	0.3326	0.3310	0.3319	0.1615	0.1576	0.2073	0.2125
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES

Table 6: Alternative Control variables – Board Monitoring and CSR:

This table shows the effect of additional control variables, board governance and monitoring quality, as proxied by the firm's concentration of institutional shareholding and CSR activity. Institutional shareholding is measured as the percentage of total year-end shares owned by the top five institutional shareholders. Adjusted CSR score is calculated as the sum of adjusted scores from seven major dimensions of strength and concern indicators. The adjusted score for each dimension is calculated as the difference between the adjusted total strength and the adjusted total concern score for that dimension. Data were collected from Thomson Reuters Institutional Holdings (13F) and MSCI CSR database. P-values in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered at the firm and year level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Dependent Variable: Dissimilarity	(1)	(2)	(3)	(4)
Adjusted CSR	0.1274***	0.1247***	0.0158	0.0032
	(0.000)	(0.000)	(0.632)	(0.916)
Institutional Ownership	0.0787	0.0719	0.1866**	0.1364**
	(0.175)	(0.151)	(0.011)	(0.032)
Overconfidence	0.2640**	0.1135**	0.0243*	0.0049
	(0.031)	(0.048)	(0.086)	(0.956)
ACQNO	0.0347***		0.0142**	
	(0.000)		(0.049)	
PPE Growth		0.3009***		0.2426***
		(0.000)		(0.000)
Constant	2.7046***	2.5085***	1.4266***	1.3099***
	(0.000)	(0.000)	(0.000)	(0.000)
Controls	YES	YES	YES	YES
Observations	8,388	10,137	8,307	10,079
Adjusted R-squared	0.1075	0.1169	0.6127	0.6083
Mean VIF	1.14	1.22	1.15	1.22
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES

Table 7: Impact of Predation Risk in Product Market Performance (market share growth):

This table shows the effect of predation risk in Product Market Performance, proxied through a firm's market share growth, measured as sales growth minus its industry-year average. This variable measures a firm's sales growth in relation to that of its competitors (Campello, 2003). The key independent variable in this model is Dissimilarity, to proxy for predation risk. Model 1 presents the results with year and industry fixed effect and model 2 presents the results with year and firm fixed effects. P-values in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered at the firm and year level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Dependent Variable: Market Share Growth	(1)	(2)
Dissimilarity	0.0158***	0.0079***
	(0.000)	(0.000)
Tenure	-0.0001	-0.0001
	(0.815)	(0.574)
CEO Ownership	0.0006	0.0002
	(0.745)	(0.609)
Intangible Assets	0.1127***	0.1843***
	(0.000)	(0.000)
Financial Constraints	-0.2195***	-0.1446***
	(0.000)	(0.000)
Size	-0.0089***	0.0201***
	(0.000)	(0.000)
ROA	0.2275***	0.2489***
	(0.000)	(0.000)
HHI	-0.0424*	-0.0068
	(0.097)	(0.807)
Constant	0.0052	-0.2175***
	(0.401)	(0.000)
Observations	30,308	30,051
Adjusted R-Squared	0.1145	0.2187
Mean VIF	1.10	1.10
Year FE	YES	YES
Industry FE	YES	NO
Firm FE	NO	YES

Table 8: Outcome of CEO Characteristics and Predation Risk in Product Market Performance:

This table shows the effect of predation risk interacted with CEO characteristics (empire-building and overconfidence) in Product Market Performance. We proxy Product Market Performance with the firm's market share growth, measured as sales growth minus its industry-year average, so that this variable measures a firm's sales growth in relation to that of its competitors (Campello, 2003). Market Share Growth is the dependent variable in models 1-3. The key independent variables in models 1-3 are Dissimilarity interacted with empire-building proxies (PPE growth and the number of acquisitions made) and overconfidence. P-values in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered at the firm and year level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Dependent Variable: Market Share Growth	(1)	(2)	(3)	(4)	(5)	(6)
Dissimilarity*Overconfidence	0.0210***			0.0120***		
	(0.000)			(0.000)		
Dissimilarity*PPE Growth		0.0046***			0.0024***	
		(0.000)			(0.001)	
Dissimilarity*ACQNO			0.0074***			0.0042***
			(0.000)			(0.000)
Dissimilarity	0.0011	0.0140***	0.0092***	-0.0005	0.0065***	0.0038*
	(0.551)	(0.000)	(0.000)	(0.824)	(0.000)	(0.095)
Tenure	-0.0039	-0.0001	0.0002	-0.0003	-0.0001	0.0003
	(0.110)	(0.826)	(0.637)	(0.336)	(0.598)	(0.908)
CEO Ownership	-0.0003	-0.0001	0.0001	-0.0002	-0.0002	-0.0007**
	(0.860)	(0.723)	(0.950)	(0.512)	(0.607)	(0.059)
Intangible Assets	0.1128***	0.1118***	0.1106***	0.1842***	0.1831***	0.1880***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Financial Constraints	-0.2150***	-0.2127***	-0.2309***	-0.1842***	-0.1413***	-0.1550***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.0087***	-0.0087***	-0.0118***	-0.0200***	-0.0079***	-0.0182***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.2181***	0.2275***	0.2305***	0.2451***	0.2488***	0.2485***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI	-0.0463*	-0.0461*	-0.0649**	-0.0118	-0.0104	-0.0362
	(0.069)	(0.071)	(0.039)	(0.672)	(0.711)	(0.298)
Constant	0.0065	0.0048***	0.0296***	-0.2150***	-0.2192***	-0.2054***
	(0.297)	(0.445)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	30,308	30,202	19,127	30,051	29,966	18,871
Adjusted R-Squared	0.1191	0.1160	0.1283	0.2388	0.2387	0.2270
Mean VIF	1.46	1.12	1.21	1.46	1.12	1.21
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	NO	NO	NO
Firm FE	NO	NO	NO	YES	YES	YES

Table 9: Outcome of CEO Characteristics and Predation Risk in CEO Option Grants:

This table shows the effect of predation risk interacted with CEO characteristics (empire-building and overconfidence) in CEO option grants. The dependent variable in models 1-6 is the natural logarithm of CEO option grants, collected from Execucomp. The key independent variables in models 1-6 are Dissimilarity interacted with empire-building proxies (PPE growth and the number of acquisitions made) and overconfidence. P-values in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered at the firm and year level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Dependent Variable: CEO Option Grant	(1)	(2)	(3)	(4)	(5)	(6)
Lagged Dissimilarity*Overconfidence	0.3332***			0.1192***		
	(0.000)			(0.000)		
Lagged Dissimilarity*ACQNO		0.0321**			0.0213*	
		(0.030)			(0.082)	
Lagged Dissimilarity*PPE Growth			-0.0003			-0.0007
			(0.579)			(0.819)
Lagged Dissimilarity	0.1581***	0.1365***	0.1569***	0.0087	0.0055***	0.0133
	(0.000)	(0.000)	(0.000)	(0.618)	(0.803)	(0.470)
Tenure	-0.0054*	0.0025	0.0003	-0.0059**	-0.0039	-0.0067**
	(0.067)	(0.475)	(0.925)	(0.023)	(0.197)	(0.014)
CEO Ownership	0.0322**	0.0273	0.0242	0.0511**	0.0759*	0.0563**
	(0.044)	(0.393)	(0.142)	(0.016)	(0.060)	(0.012)
Level of intangible assets	0.3570***	0.3294***	0.4588***	-0.1292	0.0133	-0.2342*
	(0.000)	(0.002)	(0.000)	(0.293)	(0.931)	(0.069)
Financial constraints	-1.0259***	-1.0695***	-1.0154***	-0.4366***	-0.3791***	-0.5047***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.4164***	0.4583***	0.4511***	0.4181***	0.4582***	0.4770***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.3173***	0.2134	0.1200	0.2670***	0.5140***	0.2559**
	(0.001)	(0.101)	(0.233)	(0.008)	(0.000)	(0.015)
HHI	0.0468	0.7310	0.1874	0.9246***	1.6072***	0.7389**
	(0.907)	(0.159)	(0.649)	(0.006)	(0.000)	(0.035)
Constant	3.7187***	3.6165***	3.7197***	3.9014***	3.5768***	3.7184***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	10,208	6,348	10,122	9,932	6,108	9,854
Adjusted R-squared	0.3868	0.3911	0.3792	0.7080	0.7129	0.6935
Mean VIF	1.26	1.67	1.24	1.26	1.67	1.24
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	NO	NO	NO
Firm FE	NO	NO	NO	YES	YES	YES

Table 10: Outcome of CEO Characteristics and Predation Risk in CEO Total Compensation (TDC)

This table shows the effect of predation risk interacted with CEO characteristics (empire-building and overconfidence) in CEO option grants. The dependent variable in models 1-3 is the natural logarithm of CEO total compensation (TDC), collected from Execucomp. The key independent variables in models 1-6 are Dissimilarity interacted with empire-building proxies (PPE growth and the number of acquisitions made) and overconfidence. P-values in parentheses are based on robust standard errors adjusted for heteroscedasticity and clustered at the firm and year level. ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Dependent Variable: TDC	(1)	(2)	(3)	(4)	(5)	(6)
Lagged Dissimilarity*Overconfidence	0.0242***			0.0636***		
	(0.007)			(0.000)		
Lagged Dissimilarity*ACQNO		0.0099**			0.0014*	
		(0.039)			(0.074)	
Lagged Dissimilarity*PPE Growth			-0.0001			-0.0001
			(0.259)			(0.703)
Lagged Dissimilarity	0.0241***	0.0688***	0.0416***	0.0269***	0.0035	0.0189***
	(0.004)	(0.000)	(0.000)	(0.003)	(0.691)	(0.004)
Tenure	0.0019*	0.0034**	0.0021*	0.0012	0.0011	0.0016
	(0.094)	(0.011)	(0.064)	(0.244)	(0.384)	(0.140)
CEO Ownership	-0.0213***	-0.0196***	-0.0212	-0.0099***	-0.0053***	-0.0097***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Level of intangible assets	0.3573***	0.3565***	0.3570***	0.0327	0.0501	0.0252
	(0.000)	(0.000)	(0.000)	(0.422)	(0.317)	(0.538)
Financial constraints	-0.6829***	-0.8120***	-0.6871***	-0.3610***	-0.4205***	-0.3661***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.3978***	0.4049***	0.3973***	0.3352***	0.3442***	0.3353***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.0715*	0.1576***	0.0798**	0.3748***	0.5392***	0.3949***
	(0.075)	(0.002)	(0.046)	(0.000)	(0.000)	(0.000)
HHI	0.0226	0.2420	0.0009	0.0339	0.1040	0.0262
	(0.851)	(0.104)	(0.994)	(0.756)	(0.133)	(0.811)
Constant	5.0250***	4.9350***	5.0286***	5.5528***	5.4842***	5.5470***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	32,609	19,763	32,406	32,388	19,500	32,191
Adjusted R-squared	0.5247	0.5331	0.5245	0.7108	0.7166	0.7101
Mean VIF	1.11	1.12	1.09	1.11	1.12	1.09
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	NO	NO	NO
Firm FE	NO	NO	NO	YES	YES	YES

Appendix A1: Variable Definitions

Variable	Formula/derivation
Dissimilarity	$Dissimiliarity = \frac{\lvert Firm\ capital\ to\ labor\ ratio - Industry\ median\ capital\ to\ labor\ ratio \rvert}{Industry\ median\ capital\ to\ labor\ ratio}$
Number of Acquisitions (ACQNO)	The number of mergers and acquisitions (M&As) completed in a year.
Acquisition Ratio (ACQRATIO)	Sum of the value of all acquisitions made by a firm for a given year divided by the acquiring firm's average market capitalization in that year
PPE Growth	$Property, Plants\ and\ Equipment\ growth = \frac{PPE_t - PPE_{t-1}}{PPE_{t-1}}$
Overconfidence (holder_67)	A CEO is classified as overconfident by identifying whether the executive retains vested deep in-the-money options. Using option data from Execucomp, a continuous confidence measure is calculated using the following formula: $Confidence = \frac{Average\ value\ per\ vested\ option}{Average\ strike\ price}$ Where: $Average\ value\ per\ vested\ option = \frac{value\ of\ vested\ unexcercised\ options}{Number\ of\ vested\ unexcercised\ options}$ Average strike price=stock price-Average value per vested option Afterwards, Holder_67 measure as an indicator equals one if the confidence measure is at least 67% in two or more years, thus defining the CEO as overconfident from the first time period when the confidence measure was at least 67%.
CEO's gender (Gender)	If the CEO is male, then it is coded 1, and 0 if female.
CEO age (age)	Measure the age of the CEO from ExecuComp, taken as natural logarithms.
CEO Tenure	Natural logarithm of the number of years as CEO of the firm
CEO Ownership	Percentage of common shares owned by the CEO
Firm size (size)	Firm size is calculated as the Natural logarithm of firm's sales
Return on asset (ROA)	Calculated in Compustat as: $ROA = \frac{Net\ Income}{Total\ Assets}$

Level of intangible assets	Level of intangible Assets is calculated as follows: $$INTANGIBLE = \frac{Intangible\ assets}{Total\ assets}$$
Herfindahl-Hirschman Index (HHI)	HHI is measured by summing the squared market shares of all firms based on the 3-digit SIC industry. It measures the industry concentration.
Financial constraint	Financial constraint is calculated as follows: $$Financial\ constraint = \frac{Cash\ flows}{Total\ assets_t} - \frac{Cash\ flows}{Total\ assets_{t-1}}$$
Concentration of Institutional shareholders	Concentration of institutional shareholder of a firm is measured as the percentage of total year-end shares owned by the top five institutional shareholders compared to total shareholdings
Adjusted CSR score	The adjusted CSR score is the sum of adjusted scores from seven major dimensions of strength and concern indicators. The adjusted score for each dimension is calculated as the difference between the adjusted total strength and the adjusted total concern score for that dimension.
Product Market Performance	Measured as a firm's relative-to-industry sales growth, based on the 3-digit SIC industry
Industry Stock Beta	Firms' industry stock beta is measured by estimating the CAPM Market Model with an estimation window of 24 monthly returns – using Wharton Research Data Services (WRDS) Beta Suite.
Product Market Fluidity	Based on textual analysis of business descriptions in firms' 10-K filings, fluidity captures the intensity that a firm's rivals are moving toward the firm's product space. Data is collected from the author's personal website - https://hobergphillips.tuck.dartmouth.edu/industryconcen.htm

Appendix A2: Baseline Regression Estimates of CEO Characteristics on Alternative Proxies for Predation Risk

This table reports the OLS estimates from the regression model with the alternative predation risk proxies, Product Market Fluidity, Industry Stock Beta and the interaction of fluidity and stock beta, regressed against CEO empire-building (Number of Acquisitions (ACQNO) and PPE Growth), Overconfidence (Holder 67), CEO Gender and the control variables. Models 1 and 2 present the estimates with Product Market Fluidity as the dependent variable and alternate proxy for predation risk. Models 3 and 4 present the estimates with Firm's Industry Stock Beta as the dependent variable and alternate proxy for predation risk. Models 5 and 6 present the estimates with the interaction of stock beta and fluidity as the continuous-variable proxy for predation risk as the dependent variable. Models 7 and 8 present the estimates with the Hoberg and Phillips (2016) time-varying Product Similarity measure as the dependent variable and proxy for predation risk, based on textual analysis of firm's 10-K product descriptions. All models have standard errors corrected for heteroscedasticity and clustered at the firm and year level. Brackets contain p-values and superscripts ***, ** and * denote significance at 1%, 5% and 10% levels of significance, respectively.

VARIABLE	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Empire-Building - PPE Growth	-0.0017***		-0.0144**		-0.0018***		-0.0004**	
	(0.000)		(0.041)		(0.002)		(0.011)	
Empire-building - ACQNO		0.0139		-0.0145***		-0.0909***		-0.0003***
		(0.101)		(0.000)		(0.000)		(0.000)
Overconfidence	-0.4576**	-0.3490	-0.1939***	-0.2591**	-1.5909***	-1.6314*	-0.0004***	-0.0004*
	(0.032)	(0.184)	(0.010)	(0.034)	(0.009)	(0.088)	(0.000)	(0.060)
Gender	0.4485***	0.3195**	0.0205	-0.0033	0.3199	0.1548	-0.0028***	-0.0036***
	(0.000)	(0.027)	(0.571)	(0.944)	(0.199)	(0.669)	(0.000)	(0.000)
Age	-0.2092*	0.0511	-0.0844*	-0.0588	-0.5831	0.1775	0.0029***	0.0024***
	(0.077)	(0.733)	(0.059)	(0.307)	(0.122)	(0.698)	(0.000)	(0.005)
Size	-0.2839***	-0.2008***	-0.0259***	-0.0216*	-0.6169***	-0.6009***	0.0004***	0.0039***
	(0.000)	(0.000)	(0.007)	(0.093)	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.9958***	-1.2042***	-0.3132***	-0.2168***	-3.9451***	-3.4297***	0.0005	-0.0008
	(0.000)	(0.000)	(0.000)	(0.008)	(0.000)	(0.000)	(0.147)	(0.163)
Level of Intangible Assets	-0.1958	-0.0111	0.0322	0.0329	-0.9321**	-0.2365	0.0052***	0.0042***
	(0.105)	(0.942)	(0.512)	(0.591)	(0.027)	(0.641)	(0.000)	(0.000)
Financial Constraint	-0.0769***	-0.5234***	-0.0612	-0.0244	-0.1149***	-1.2037	0.0003*	-0.0003

	(0.000)	(0.000)	(0.183)	(0.754)	(0.000)	(0.130)	(0.083)	(0.231)
HHI	-0.1282	-1.2642***	-0.4095***	-0.5211***	-3.7243***	-6.2134***	0.0008	0.0043*
	(0.652)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.340)	(0.085)
Constant	9.5201***	7.6024***	1.9418***	1.9392***	16.6353***	13.7043***	0.0588***	0.0358***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	28,750	19,174	30,135	18,053	31,323	18,470	24,461	16,265
Adjusted R-squared	0.6957	0.7109	0.3266	0.3522	0.4246	0.4619	0.3912	0.4302
Mean VIF	1.25	1.44	1.12	1.16	1.32	1.38	1.06	1.07
Year FE	YES	YES	YES	YES	YES	YES	NO	NO
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES

Appendix A3: Baseline Regression Estimates of CEO Characteristics on disentangled M&A based proxy of Empire-building (ACQNO)

This table reports the OLS estimates from the regression model with the disentangled M&A based empire-building proxy (ACQNO). The dependent variable in models 1-4 is Dissimilarity. Key independent variable in models 1 and 3 is Diversified ACQNO, measured as the number of targets of an acquiring firm from different 2-digit SIC industries. In models 2 and 4, the independent variable is Similar ACQNO, measured as the number of targets of an acquiring firm from the same 2-digit SIC industries. All models have standard errors corrected for heteroscedasticity and clustered at the firm and year level. Brackets contain p-values and superscripts ***, ** and * denote significance at the1%, 5% and 10% levels of significance, respectively.

Dependent Variable: Dissimilarity	(1)	(2)	(3)	(4)
Empire-Building - Diversified ACQNO	0.0231*		0.0071	
	(0.056)		(0.592)	
Empire-Building - Similar ACQNO		0.0441***		0.0048
		(0.004)		(0.729)
Overconfidence	0.1252***	0.1242***	0.0670***	0.0701***
	(0.000)	(0.000)	(0.009)	(0.009)
Gender	-0.1876**	-0.1912**	-0.0420	-0.0426
	(0.015)	(0.013)	(0.664)	(0.660)
Age	-0.6553***	-0.6549***	-0.3320***	-0.3327***
	(0.000)	(0.000)	(0.001)	(0.001)
Tenure	-0.0016	-0.0014	-0.0022	-0.0021
	(0.587)	(0.639)	(0.392)	(0.396)
CEO Ownership	0.0004	0.0003	0.0019	0.0019
	(0.885)	(0.922)	(0.578)	(0.579)
Size	0.0205**	0.0220***	0.0254	0.0258
	(0.012)	(0.006)	(0.275)	(0.266)
ROA	0.0984	0.0972	0.2217*	0.2194*
	(0.410)	(0.416)	(0.082)	(0.085)
Level of Intangible Assets	-0.8442***	-0.8412***	-0.3168***	-0.3162***
	(0.000)	(0.000)	(0.001)	(0.001)
Financial Constraint	-0.4886***	-0.4812***	-0.1560***	-0.1564***
	(0.000)	(0.000)	(0.006)	(0.006)
HHI	-0.3557	-0.3560	-0.1016	-0.1021
	(0.244)	(0.244)	(0.722)	(0.721)
Constant	3.5695***	3.5336***	1.9838***	1.9832***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	15,227	15,227	14,855	14,885
Adjusted R-squared	0.1368	0.1378	0.6117	0.6116
Mean VIF	1.06	1.05	1.06	1.05
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES

Chapter 3: Managerial Ability and Supply Chain Power

Abstract

This paper investigates how major customer firms managed by superior ability managers can gain bargaining power over their suppliers. Our results document a positive association between managerial ability and the supply chain power a major customer firm holds over its suppliers. This relationship is stronger for durable goods manufacturing customers because of their unique sourcing needs. The results are robust to endogeneity concerns tested through two-stage least squares (2SLS) regressions using instrumental variables and difference-in-differences estimates surrounding forced CEO turnover. We identify that engagement in socially responsible activities by higher ability managers works as a channel that enhances supply chain power. We also show that the major customer firms' corporate innovation performance drives this positive association. Finally, we provide evidence that higher ability managers use the enhanced bargaining power to procure greater trade credit from their supply chain partners.

Keywords: Managerial Ability, Supply Chain Power, Major Customer

JEL Classifications: G00, G30

1. Introduction

Recently, managing an efficient supply chain is becoming an increasingly crucial concern for firms to remain market competitive. Firms are constantly looking for ways to restructure their supply chains to gain competitive advantage, particularly following significant political and economic events such as the Brexit and the tariff war between the US and China (Economist, 2019). Typically, firms have relatively little choice in their customer base but have more bargaining opportunities in managing their suppliers. To remain competitive by ensuring low product prices, high quality and lowest total sourcing and production costs, firms look to optimize their supply chain by having multiple competing financially dependent suppliers (Lee and Oakes, 1996, Flynn and Flynn, 2005, Lian, 2017). A relatively competitive supplier market allows firms to efficiently manage their market competitiveness, particularly during uncertain economic environments (Rahaman et al., 2020).

In the context of supply chain management, power can be defined as one supply chain partner's ability to influence the actions of another party (Emerson, 1962, French et al., 1959). Studies have shown that customers try to gain significant bargaining power over their supplier base to receive superior resource allocation and favourable contract terms (Elking et al., 2017, Handley and Benton Jr, 2012). However, the exact role played by managers in gaining this supply chain power is still not clear. According to the resource-based view of the firm, businesses look to exert control over their resource bundle to achieve a sustainable competitive advantage (Barney, 1991, Rungtusanatham et al., 2003). From this perspective, firms managed by higher ability managers can bundle and deploy resources in a much superior manner, since the managers' ability is heterogeneous in nature (Hansen et al., 2004, Lippman and Rumelt, 2003). Managers who can create good linkages with their suppliers and have a level of control over their supplier base, should facilitate an efficient sourcing flow from their suppliers that would benefit the customer firm's operational performance (Rungtusanatham et al., 2003).

Though value creation can be a function of resource heterogeneity, significant variation can still exist because of varying managerial ability in extracting latent value from firm resources. In this context, the study's focus is to explore the role played by a superior manager in gaining higher levels of bargaining power over a firm's supplier network, measured through greater supply chain power.

Managerial ability is difficult to define since it derives from previous experience and is tacit in nature. It is therefore difficult to imitate but can affect value creation through better optimized operational processes (Hitt et al., 2001, Kor, 2003, Peteraf, 1993, Holcomb et al., 2009). Managers with superior knowledge of factor markets enables them to select valuable resources and negotiate their use on more favourable terms than their rivals (Makadok, 2001). Higher ability managers are also more knowledgeable in forecasting industry trends and product demands and have a thorough understanding of the firm's operating environment (Demerjian et al., 2013, Demerjian et al., 2012). They can use this understanding in bundling and deploying resources more efficiently than their competitors (Lippman and Rumelt, 2003, Hansen et al., 2004), which they can potentially achieve by having more control over the firm's supply chain. Having a higher degree of supply chain power enables these managers to procure valuable resources more conveniently because suppliers are highly likely to prioritize their requests and allocation of materials and capacity to meet a major customer firm's demands (Pulles et al., 2014). In the event of operational disruption, higher ability managers with greater supply chain power will be better prepared to continue uninterrupted business operations with the help of dependent suppliers making necessary adjustments to the changing economic environment. One potential example of this argument is the case of how Amazon continued to post record profits during the Covid-19 pandemic while most other businesses were making losses. When the economy started suffering from the Covid-19 shock, Amazon, managed by founder and CEO Jeff Bezos, was able to pivot the way it operates because of its wide network

of dependent suppliers. Though Amazon struggled at the start of the pandemic, it quickly made the necessary adjustments such as focusing primarily on shipping essential goods, in-house order fulfilment and changing inventory policy to meet the rising consumer demand for online shopping (Mercer, 2021, Palmer, 2020). Jeff Bezos' superior managerial ability and the Amazon management team led them to read shifting industry trends faster and react promptly by utilizing the high bargaining power they held over their suppliers that eventually resulted in positive operational outcomes in the form of record profits.

However, identifying a proper measure of managerial ability has been widely debated in the literature. Most previous research in the area looked at proxies considering firm characteristics that are typically outside the direct control of management such as media mentions, abnormal stock returns and CEO tenure and pay (Fee and Hadlock, 2003, Rajgopal et al., 2006, Tervio, 2008, Milbourn, 2003). These measures contain noise and are difficult to attribute solely to efforts by management. Some studies use Data Envelopment Analysis (DEA) to measure managerial talent for firms in a single industry such as consumer goods, banking and insurance, and mutual funds (Leverty and Grace, 2012, Murthi et al., 1997, Murthi et al., 1996). In contrast, Demerjian's (2012) managerial ability measure extends across industries, is less noisy and has an economically significant association with manager fixed effects. Studies using this measure of managerial ability have found positive association with tax savings (Koester et al., 2017), better earnings quality (Demerjian et al., 2013), income smoothing (Baik et al., 2020), innovation success (Chen et al., 2015) higher credit rating (Bonsall IV et al., 2017) and better post-merger operating performance and announcement period returns while avoiding the adverse effects of information asymmetry through higher earnings smoothing (Doukas and Zhang, 2020). In this study, we use Demerjian's (2012) measure as our proxy of managerial ability.

We follow the approach developed by Rahaman et al. (2020) in measuring a customer firm's supply chain power. SFAS No. 14 (before 1997) and SFAS No. 131 (after 1997) require suppliers (regardless of the number of segments operated) to disclose the presence and sales to all major customers representing more than 10% of their revenue. The Compustat Customer Segment dataset contains major customer-supplier sales data based on historical customer data from Compustat segment files and CRSP company data using a fuzzy name-matching algorithm (Cen et al., 2017, Cohen and Frazzini, 2008). Using this dataset, we construct three different firm-level supply chain power measures. First, we measure the density of suppliers (NUMSAPP) by taking the natural logarithm of one plus the number of suppliers disclosing the firm as a major customer. Having a number of suppliers working for a major customer helps the customer to have a diversified network of financially dependent suppliers and potentially hedge their sourcing channels in case any of these suppliers faces operational disruption. Secondly, we consider the dispersion in the dollar amount of inputs sourced from different suppliers (SDISPERSION) to measure the degree to which a firm relies on heterogeneous input sources for its productive operation. Thirdly, we measure a modified Lerner's index (MKTPOWER) to determine the ability of the customer firm to extract more supplies and impose greater power over its supply chain. These three measures are combined into developing the composite Supply Chain Power (SCP) index, by extracting the first component from a Principal Component Analysis (PCA) analysis (Rahaman et al., 2020). For robustness purposes, we also consider an alternative proxy for supply chain power - Customer Firm Reliance - measured through the total purchases from all Compustat-listed manufacturing sector suppliers that record the current firm as (one of) their major customer(s), as a proportion of Cost of Goods Sold of the customer firm (Banerjee et al., 2008). Higher values of this measure signify the dependence of the major customer firm on fewer suppliers, potentially

exposing the major customer to unforeseen disruptions in the supply chain and decreasing its power over the suppliers.

In our regression models, we use this SCP index as our dependent variable and the Demerjian (2012) managerial ability measure as the independent variable, along with some firm-specific control variables (i.e., Tobin's Q, book leverage, asset tangibility, firm size and current ratio). Our baseline results show that a major customer firm's managerial ability has a positive, statistically significant association with supply chain power. Except for the MKTPOWER proxy (where the coefficient is positive but not statistically significant), managerial ability continues to hold a positive and statistically significant coefficient across the other two proxy and the composite SCP index, with the inclusion of firm, industry and year fixed effects. Managerial ability continues to hold a positive association with supply chain power when we use the alternative proxy, Customer Firm Reliance. These results show that higher ability managers rely on a diversified network of suppliers, therefore keeping a diversified pool of suppliers to limit their exposure to potential supply chain disruptions that could affect regular business operations.

Latent firm characteristics or omitted correlated variables could drive our findings, causing endogeneity concerns affecting the causality behind the positive relationship found between managerial ability and supply chain power. We use two-stage least squares (2SLS) regression analysis using two instrumental variables, average Metropolitan Statistical Area (MSA) managerial ability, and the proportion of the state's population holding a college degree. We also use a difference-in-differences analysis using forced CEO turnover on the full and a propensity-score matched sample to provide further robustness to our findings. These tests further validate the positive association between managerial ability and supply chain power.

We identify two channels that may drive the positive association between managerial ability and supply chain power. First, we find that this positive association is more pronounced when the major customer firm managed by a superior ability manager is more engaged in socially responsible activities. Suppliers consider the value of its customer firms engaging in Corporate Social Responsibility (CSR) activities with increasing importance, with a stronger relationship existing between customer-supplier exchange and customer's CSR performance (Liu et al., 2021, Kim and Choi, 2018, Klassen and Vachon, 2003). Not only the customer firm's CSR engagement influences suppliers adoption to certain CSR practices (such as complying with customer's CSR codes of conduct or to meet CSR-specific performance specifications), it also leads to improved perception of sourcing quality among downstream customers (Li et al., 2017, Gielens et al., 2018). Suppliers value socially responsible customers more, since such engagement signals higher levels of trustworthiness in meeting financial obligations, higher growth prospects and providing an insurance-like protection in meeting payments against prospective negative shocks (Lev et al., 2010, Godfrey et al., 2009, Zhang et al., 2020). In addition, higher ability managers typically conduct more socially responsible and fewer socially irresponsible activities (Yuan et al., 2019). Our results confirm these expectations; firms with managers at the top quartile of the managerial ability measure engaged in higher than median CSR activities, and gain significantly greater supply chain power than managers with lower levels of ability. This positive association is statistically significant for firms engaged in higher than median levels of CSR, compared with those with lower levels of CSR engagement, where the coefficient is insignificant. Secondly, we argue that the positive association between managerial ability and supply chain power is stronger for major customers with high corporate innovation performance. Studies show cross-sectional evidence of positive innovation outputs of customer firms increases their supplier profitability. Knowledge spill-over from customer firms with greater technological invention and production efficiency can

benefit suppliers, not only those who are linked geographically but also economically, particularly when customers' demand accounts for a larger fraction of suppliers' total sales (Li, 2018, Chu et al., 2019). Moreover, past studies found managerial ability to have a positive association with corporate innovation success (Chen et al., 2015). So, it is reasonable to expect that suppliers will be motivated to form close links with major customers managed by higher ability managers to receive innovation externality benefits while improving their own future performance, leading to higher supply chain power. Our results support this expectation. Top tier managers (managerial ability in the top quartile) gain significantly higher supply chain power when their innovation performance is higher than the median, as proxied by their innovation citations and number of patents filed. Though the relationship statistically significant and positive across the full sample, the effect is not significant for major customers with lower than median innovation performance. These findings indicate that the engagement in socially responsible activities and higher innovation performance by higher ability managers running major customer firms act as channels that drive the positive association between managerial ability and supply chain power.

To add further robustness to our study, we examine a subsample of customer firms from the durable and nondurable goods manufacturing sectors. Firms that manufacture durable goods usually require higher dependence on their suppliers because of their greater need for sourcing unique products. In contrast, nondurable goods manufacturers typically procure standardized products. As a result, durable goods manufacturers require a more closely linked relationship with their suppliers since durable and sophisticated goods often require after-sales service and/or spare parts (Banerjee et al., 2008, Kale and Shahrur, 2007, Lian, 2017, Saccani et al., 2007). Therefore, because of the need for durable goods sector customers to buy unique products, it would be logical for these firms to gain higher supply chain power, so that they can have more dependent suppliers than nondurable goods sector customers. We conduct a

subsample analysis on these two groups of major customers and find that managerial ability is positively associated with supply chain power for both of the subsamples. However, the coefficient of managerial ability for durable goods sector customers is higher. A Chow-test for their p-values indicates that the effect is more pronounced for durable goods customers than their non-durable goods counterparts.

We explore whether this increased supply chain power for customers run by superior ability managers translates into extracting greater resources and benefits. One resource would be trade credit extended by suppliers to major customers. Research on a firm-level database of Chinese firms documented that suppliers with weak bargaining power are more likely to provide trade credit (Fabbri and Klapper, 2016). However, the role played by higher ability managers in this context is yet to be explored. We conduct tests with Accounts Payables to Total Assets (AP/TA) for major customers as a proxy for trade credit received from their suppliers. We find evidence that top-tier managers (with top quartile managerial ability values) receive significantly higher trade credit on a customer-supplier network when the major customer has higher than median supply chain power. Though the result also holds for the full sample, the effect loses statistical significance when the customer firm possess lower than median supply chain power. This indicates the value of supply chain power in extracting credit from suppliers since trade credit is considered one of the most crucial sources of inter-firm financing with almost 80% US firms selling their products on credit (Tirole, 2010).

Our study adds to the contemporary literature in finance and supply chain in three ways. First, we add to the literature on the resource-based view of the firm. We demonstrate the heterogeneity of managerial actions in value creation and resource extraction for the firm. Firms managed by superior managers can bundle and deploy resources more efficiently; our study establishes how such strategies are formed to achieve them. Better ability managers can devise such strategies by gaining higher bargaining power over their supplier network, which

facilitates an array of benefits such as receiving higher trade credit from their suppliers. Secondly, we add to the literature on the role managerial ability plays on finance and accounting issues (Baik et al., 2020, Demerjian et al., 2013, Doukas and Zhang, 2020, Bonsall IV et al., 2017). We illustrate how customer firms form and develop strong economic ties with their suppliers. Thirdly, supply chain interactions have gathered a lot of attention in recent times, yet financial research in this context has mostly looked at issues related to financing policies and operational outcomes (Banerjee et al., 2008, Lian, 2017, Rahaman et al., 2020, Wang, 2012, Costello, 2020). We address an issue that has not been explored much from a financial standpoint – 'How do firms gain control and power over their suppliers?' We provide a comprehensive analysis that not only explores the significance of managerial ability in gaining supply chain power, but also identifies two channels through which suppliers are motivated to form closely linked economic ties with major customers.

The rest of the chapter is organized as follows. Section 2 explains the data, main variables and the regression design. Section 3 presents the baseline results with a primary and alternative proxy for supply chain power along with the subsample analysis for robustness, followed in section 4 by tests to mitigate endogeneity concerns. Section 5 presents the channel analysis. Section 6 explores the role of managerial ability with higher supply chain power on extracting trade credit and section 7 concludes the chapter.

2. Data and Variables

2.1. Data

We collect unbalanced firm-level panel data from 1992-2018 to examine the relationship between managerial ability and supply chain power. Supply chain data are from the Compustat customer segment dataset from WRDS. We use a publicly available dataset

provided by Demerjian (2012) to collect data on managerial ability[3]. Accounting data for our control variables are from Compustat. After merging these datasets and excluding the utility sector (SIC codes: 4900-4990) and finance industry (SIC codes: 6000-6990) for the regulated and different nature of their industries, our final sample consists of 11,031 firm-year observations. All the variables are winsorized at the 1st and 99th percentile.

2.2. Dependent Variable

Our dependent variable of interest in this study is Supply Chain Power (SCP). To construct this proxy, we use data from Compustat customer segment files from WRDS. This dataset provides comprehensive data on major customers and sales from their suppliers based on historical customer data from Compustat segment files and CRSP company data, using a fuzzy name-matching algorithm (Cohen and Frazzini, 2008; (Cen et al., 2017, Cohen and Frazzini, 2008). This information is publicly available because SFAS No. 14 (before 1997) and SFAS No. 131 (after 1997) require firms (regardless of the number of segments operated) to disclose the existence and sales to principal customers representing more than 10% of total firm revenue. Our dataset contains data from 1992-2018. Lanier et al. (2019) used the natural logarithm of one added to the number of suppliers disclosing the firm as a major component as the key proxy for supply chain power, with the assumption that a higher density of suppliers implies greater power for the firm with regard to its suppliers. In addition, we use the extent of dispersion in the dollar amounts of inputs sourced from different suppliers to measure the degree to which a firm relies on heterogeneous input sources for its productive operations. To measure the ability of a firm to extract more surplus from its supply chain, thereby giving it a greater incentive to rely on the chain, we use a modified version of a Lerner's index. All these measures are combined into a single Supply Chain Power (SCP) index through the extraction

[3] The managerial ability (MA-score) data are available at: https://peterdemerjian.weebly.com/managerialability.html

of the first component from a Principal Component Analysis (PCA), a methodology previously used by Rahaman et al. (2020).

2.3. Independent Variables

Our primary independent variable of interest is managerial ability. For our purposes, we use the managerial ability (MA score) proxy developed by Demerjian et al. (2012). This measure is estimated first by estimating firm efficiency in industries, by comparing the firm sales conditional on the following inputs used by the firm: Cost of Goods Sold; Selling and Administrative Expenses; Net Operating Leases; Net R&D; Net PP&E; Purchased Goodwill; and Other Intangible Assets. This DEA estimated efficiency measure can be attributed to both the firm and the manager, therefore it contains similar noise to other managerial ability measures such as better able manager predicting trends (regardless of firm size) and bigger firms negotiating better terms with suppliers regardless of manager quality. As a result, this DEA-generated efficiency measure is modified by purging it of key firm-specific characteristics that could aid or hinder management's efforts, such as firm size and age, market share, positive free cash flow and complex international and multi-segment operations. These firm-level variables are included as independent variables on a Tobit-regression with the DEA-generated efficiency scores; the residual from the estimation is considered a measure of managerial ability. This residual is attributed to the management team and is validated by a number of tests in Demerjian et al. (2012). This measure has been widely used in accounting (Baik et al., 2011, Demerjian et al., 2012, Demerjian et al., 2013, Baik et al., 2020, Koester et al., 2017) and finance literature (Albuquerque et al., 2013, De Franco et al., 2017, Bui et al., 2018, Doukas and Zhang, 2021).

We control for a host of firm-specific determinants of supply chain power as noted in the literature, to reduce the probability that managerial ability will capture the effect of these

characteristics on supply chain power (Lanier Jr et al., 2019, Rahaman et al., 2020). These controls include firm size, Tobin's Q, Book Value of Leverage, Asset Tangibility and Current Ratio. Moreover, to address market and economic conditions that may influence customer's supply chain power and may not be picked up by year fixed effects, we include some additional control variables i.e., industry Herfindahl–Hirschman Index (HHI), US unemployment rate, inflation rate and GDP growth rate and re-estimate the baseline regressions. Furthermore, to control for CEO characteristics that may also impact supply chain power and not captured by the managerial ability measure, we include CEO tenure as an additional control. All control variables are defined in the Appendix and are winsorized at the 1st and 99th percentile.

2.4. Research Model

To test our hypothesized relationship between managerial ability and supply chain power (SCP), we estimate the following model:

$$SCP_{i,t} = \beta_0 + \beta_1 Managerial\ Ability_{i,t} + Controls_{i,t} + YEAR\ FE + FIRM\ (INDUSTRY)\ FE + \varepsilon_{i,t}$$

Where subscripts i and t relate to firm and year respectively. We use the composite SCP index based on Principal Component Analysis as the dependent variable and the managerial ability proxy measured by Demerjian (2012) as the key independent variable. For robustness purposes, we also consider three individual measures for SCP as dependent variables in our baseline analysis. We include both year and industry fixed effects to control for time-invariant industrial factors and time-varying unobservable factors. In addition, we include firm fixed effects to capture the average impact of unobservable time-invariant firm characteristics, consistent with previous research on managerial ability (Koester et al., 2017). If our hypothesize relationship holds, then we expect the coefficient β_1 to be positive.

2.5. Summary Statistics

[INSERT TABLE 1 HERE]

Table 1 presents the summary statistics of the study variables. The mean and median value of the SCP index are 0.12 and 1.43, respectively, with the quantile distribution demonstrating significant variation across firms. The mean value of managerial ability is 0.06, with a standard deviation of 0.06, as reported in previous studies (Koester et al., 2017, Demerjian et al., 2012). Mean and median values of the control variables reveal that, on average, major customer firms have significant book leverage and asset tangibility (0.26 and 0.30, respectively) and over double current assets compared with current liabilities, indicating no significant liquidity concerns.

[INSERT TABLE 2 HERE]

The correlation matrix is reported in Table 2. We do not detect any significant values of correlation among the variables, negating the potential concern of multicollinearity. Managerial ability and SCP have a positive correlation (0.3816) but managerial ability records a negative correlation with asset tangibility and book leverage and a positive correlation with Tobin's Q, current ratio and firm size. In contrast, SCP has a weak negative correlation with Tobin's Q and book leverage. We further verify by checking the variance inflation factors (VIFs) and report the mean VIFs for all major regression models. Mean VIFs do not exceed 2.0 across the models, confirming the absence of multicollinearity in our results.

3. Results

3.1. Baseline Regression

We report the baseline OLS regression estimates in Table 3. For robustness, we report the estimates with the three SCP components (NUMSAPP, SDISPERSION and MKTPOWER) in models 1-3 with year and industry fixed effects and in models 5-7 with year and firm fixed

effects. Models 4 and 8 report the estimates with SCP as the dependent variable with industry and firm fixed effects, respectively, along with year fixed effects in both models. Standard errors are adjusted for heteroscedasticity and clustered by year and firm level across models 1-8 to draw statistical inference.

[INSERT TABLE 3 HERE]

Except for models 3 and 7, the coefficients for managerial ability remain positive and statistically significant. When MKTPOWER is the dependent variable, the effect is positive but not statistically significant. The effect is positively significant at the 1% level for the composite SCP index. However, these coefficients may reflect cross-sectional variation between firms (managers) with the exclusion of firm fixed effects. With the inclusion of firm fixed effects to eliminate cross-firm variations in each variable and to identify the association between the variables arising from variation in the firm characteristics over time, we find that one standard deviation increase in managerial ability increases the composite SCP index value of an average major customer by 21.0% (0.4199 X 0.06 X 100)/0.12). Adjusted R^2 values for the models with SCP index as the dependent variable increase from 51.53% to 76.47% after including firm fixed effects, highlighting that stationary characteristics varying across firms explain a significant portion of SCP variation, providing empirical evidence supporting the positive association between managerial ability and supply chain power. To further address market or economic conditions and CEO characteristics such as tenure impacting supply chain power and not being captured by year fixed effect or the managerial ability measure, we re-estimate our baseline models with the inclusion of several control variables i.e., US unemployment and inflation rate, GDP growth, industry Herfindahl–Hirschman Index (HHI) based on sales and CEO tenure. Results reported in appendix B2 and B3 provides consistent findings to our baseline findings, ensuring additional robustness to our primary association between managerial ability and supply chain power.

In terms of the control variables, Tobin's Q, asset tangibility and firm size retain mostly a positive relationship with our dependent variables. With regard to our control variables, size, cash ratio, ROA, leverage and CAPEX ratio retain a consistent relationship with our dependent variables, except in models 3 and 7 with MKTPOWER as the dependent variable. Firms that are larger, carry a lower current ratio and leverage, higher asset tangibility and have greater growth potential (higher Tobin's Q), continue to have a positive relationship with SCP and its NUMSAPP and SDISPERSION proxies. Major customers with greater supply chain power may have lower liquidity because of efficient supply chain linkages and greater demand data sharing, leading customers to have shortened inventory turnover periods and lag time, therefore carrying lean levels of current assets, which reduces supply chain related costs (Lee et al., 2007, Cachon and Fisher, 2000).

3.2. Alternative Proxy for Supply Chain Power

To provide further robustness to our baseline findings, we consider an alternative measure of supply chain power. This measure considers the importance of purchases from firms' dependent suppliers. We measure Customer Firm Reliance as the total purchases from all Compustat-listed manufacturing sector suppliers that record the customer firm as (one of) their principal customer(s), as a proportion of Cost of Goods Sold of the customer firm (Banerjee et al., 2008). It quantifies a major customer's COGS sourcing from suppliers with regard to its total COGS sourcing from all suppliers. Higher values imply a customer firm's dependence on fewer suppliers, thereby exposing the major customer to potential disruptions in its supply chain and decreases the power it has over its supply chain. Therefore, we hypothesize that managerial ability would have a negative coefficient with this alternate measure of supply chain power.

[INSERT TABLE 4 HERE]

Table 4 reports the OLS estimate of the effect of managerial ability on the alternative measure of supply chain power. Models 1 and 2 report the estimates with industry and firm fixed effects. Our results imply that higher ability managers are better able to diversify their sourcing channels, leading to dependence on fewer concentrated suppliers for its COGS sourcing. One standard deviation increase in managerial ability decreases an average customer firm's reliance on fewer concentrated suppliers by 0.75% (-0.0956 X 0.06 X 100)/0.76) and 0.26% (-0.0325 X 0.06 X 100)/0.76), respectively, in models with industry and firm fixed effects (mean value of the customer firm reliance variable in our sample is 0.76). This result agrees with the resource-based theory since superior managers are better able to bundle and deploy resources by decreasing reliance on fewer customers and better diversification of its supplier network that ensures that the major customer is less susceptible to disruptions in its supply chain and having to shift suppliers if one faces interruptions. If any supplier falters in its production lead times, superior managers in major customer firms have the flexibility of weighing the benefits of procuring from a diversified supplier base, thereby minimizing disruptions in production (Whitney et al., 2014). This reiterates our primary findings that better ability managers retain significant bargaining power over their supply chain partners.

3.3. Subsample Analysis (Durable versus Non-durable Goods Manufacturer)

Manufacturing firms in the durable goods sector generally produce more unique products. Most of these firms source their unique inputs from durable goods sector suppliers and deal with mostly nondurable goods sector suppliers for standardized product sourcing. However, manufacturers in the nondurable sector produce fewer unique goods and mostly procure general purpose products from suppliers in both the durable and nondurable goods sectors. Because of these distinctive sourcing patterns, customer firms that purchase higher quantities of inputs from their dependent suppliers maintain lower leverage, which acts as a way to encourage their suppliers to commit to higher relationship-specific investments

(Banerjee et al., 2008, Titman and Wessels, 1988). These customers are also motivated to maintain a close relationship with their suppliers because the durable, sophisticated goods often require after-sales service and/or spare parts and might require frequent interactions and transactions (Banerjee et al., 2008, Kale and Shahrur, 2007, Lian, 2017, Saccani et al., 2007). To maximize efficiency in resource procurement, it would make more sense for superior managers in the durable goods sector customer firms to gain higher supply chain power so that they can have a diversified network of dependent suppliers who can satisfy their unique demands.

We group our sample customer firms based on their primary SIC codes into the durable or nondurable goods manufacturing sector. Firms with primary SIC codes from 3,400 to 3,990 are classified as durable goods manufacturing major customers and those with primary SIC codes between 2,000 and 3,400 as nondurable goods manufacturing major customers. Based on these classifications, we have 2,816 firm-year observations for major customers in the durable goods manufacturing sector and 2,648 firm-year observations in the non-durable goods manufacturing sector. The remaining firms are in the service sector that we do not consider in this subsample analysis.

[INSERT TABLE 5 HERE]

Table 5 reports the regression estimates based on the industry classification. Consistent with our baseline results, managerial ability continues to have a positive relationship with supply chain power. However, the effect is much stronger in the durable goods sector than the nondurable goods sector. An increase in managerial ability from the 25^{th} percentile to 75^{th} percentile leads to almost 19.30% (0.9651 X (0.14 – (-0.06)) increase in the supply chain power for a durable goods manufacturing major customer, compared with 11.61% (0.5806 X (0.14 – (-0.06)) increase for the non-durable goods manufacturing customer in models with year and

industry fixed effects. Moreover, the coefficient of managerial ability remains statistically significant for durable goods manufacturers after including firm fixed effects, but it loses statistical significance for nondurable goods manufacturers. We conduct a Chow test to identify whether these coefficients are statistically distinct. Our Chow test p-value is 0.1853, which means we reject the null hypothesis that the coefficients are statistically indifferent at the 10% significance level. These results provide a robust outlook to our primary hypothesis, demonstrating that, though superior managers, in general, seek greater supply chain power, the relationship is stronger for durable goods manufacturers, because they have a greater need to better synchronize their production inputs for their unique sourcing needs.

4. Mitigating Endogeneity Bias

Our baseline results and the additional robustness tests with an alternative proxy and subsample analysis consistently indicate a positive relationship between managerial ability and supply chain power. However, these results could be driven by latent firm characteristics or omitted correlated variables and might not indicate a causal effect of managerial ability on supply chain power. To address this potential endogeneity concern, we conduct 2SLS regression analysis using two instrumental variables and a difference-in-differences analysis using forced CEO turnovers.

4.1. Instrumental Variable – Average MSA Managerial Ability

In this section, we analyse the causality of our identified relationship between managerial ability and supply chain power through instrumental variables. For a variable to be considered an instrument, it needs to be related to managerial ability but unrelated to supply chain power. The first instrument considered is the availability of high-ability managers in the customer firm's local labour market. It is expected that greater availability of higher-ability managers in the local labour market would increase the likelihood of the firm's directors

considering more high-ability managers in their hiring network that, ceteris paribus, should lead to a higher likelihood of employing high-ability managers (Demerjian et al., 2020). There is no particular theory that links the availability of high-ability managers in the local labour market with a firm's supply chain network, satisfying the exclusion criterion for it to be considered a valid instrumental variable. We create the first instrumental variable as the average managerial ability of executives in each metropolitan statistical area (MSA). We match the customer firm headquarters' zip code in each MSA to find the average managerial ability for its geographical location.

[INSERT TABLE 6 HERE]

Table 6 reports the results of the 2SLS regression analysis using average MSA Managerial Ability as the instrumental variable. Column 1 reports the first stage regression outputs where the average MSA Managerial Ability is regressed against the dependent variable, managerial ability, with all control variables and the inclusion of year and industry fixed effects. Column 2 reports the second stage regression outputs with the fitted managerial ability as the key independent variable and supply chain power (SCP) as the dependent variable. In this regression, our instrument has a significantly positive coefficient. We conduct two diagnostic tests, i.e., the underidentification and weak instrument tests. Both, based on the critical values of Stock and Yogo (2005) and Cragg-Donald Wald F statistics, reject the null that the instrument is irrelevant and weak. The second stage regression results demonstrate a statistically significant, positive relationship between the instrumented managerial ability measure and supply chain power. In summary, these results further corroborate our baseline results and establish that differences in managerial ability, instead of omitted firm characteristics, influence the difference in customer firm's supply chain power.

4.2. Instrumental Variable - Proportion of State Population Holding a College Degree

Empirical evidence demonstrates a positive association between a CEO's education background and managerial ability (Berry et al., 2006, Chevalier and Ellison, 1999, Palia, 2000). Despite the prospect of hiring potential CEOs from overseas, the CEO labour market holds a domestic matching bias, with firms being five times more likely to hire local managers than expected (Yonker, 2017). Based on these arguments and their use in the literature (Bui et al., 2018), we assume a state-level demographic variable – a College Degree, measured as the percentage of state population holding a college degree where a firm is headquartered – would serve as a reasonable proxy for the quality of the local CEO labour pool holding a positive association with the managerial ability of a firm. Moreover, it is highly unlikely to directly affect the supply chain power of a customer firm because it is a state-level demographic variable. Nevertheless, to ease concerns that a college degree might capture the effect of other state-level variables that could affect supply chain power, we add the additional state-level control variables per capital personal income, unemployment rate, house price and crime rate. We collect the state-wise college degree data from the US Census Bureau, crime rate data from FBI Uniform Crime Reports website and the other state-level variables from St. Louis FED website. Because of the lack of available data before 2010 from these sources, our sample period for this test is 2010 - 2018, significantly reducing the number of firm-year observations to 2,614.

[INSERT TABLE 7 HERE]

Table 7 reports the results of the instrumental variable 2SLS regressions. In model 1, we regress college degree as the key independent variable along with all the usual control variables from the baseline analysis and the four state-level controls introduced in this section. The coefficients for College Degree are positive and statistically significant at the 5% level.

Like our previous instrumental variable analysis, our diagnostic tests reject the null that the instrument is irrelevant and weak. In model 2, we regress the fitted values of managerial ability on supply chain power (SCP) and all the firm and state-level control variables from the first stage regressions. The results show that coefficients of fitted managerial ability remain positive and statistically significant at the 1% level for both proxies. These results further add robustness to our argument that high-ability managers gain significant supply chain power.

4.3. Difference-in-Differences Test – CEO Forced Turnover

We use a difference-in-differences test exploiting forced CEO turnover to address further endogeneity concerns driving our baseline findings in providing a robust identification of the relationship between managerial ability and supply chain power. If managerial ability truly captures the manager effect, then we can expect to observe a change in supply chain power after a new CEO with different ability joins the firm. However, if some omitted variable(s) irrelevant to the change in managers affect managerial ability, then CEO turnover might not significantly influence changes to supply chain power. To examine changes in supply chain power arising from changes in managerial ability because of CEO turnover events, we examine the following difference-in-differences regression estimate:

$$\Delta SCP3_{it} = \beta_0 + \beta_1 \Delta Managerial\_Ability3_{it} + \beta_2 Turnover_{it} + \beta_3 \Delta Managerial\_Ability3_{it}\ X\ Turnover_{it} + \Delta Controls_{it} + YEAR\ FE + FIRM\ (INDUSTRY)\ FE + \varepsilon_{it}$$

where subscripts *i* and *t* relate to firm and year, respectively. The dependent variable, ΔSCP3, is the difference between a major customer firm *i*'s supply chain power in *t* + 1 through *t* + 3 and *t* - 3 through *t*-1. ΔManagerial_ability3 is the difference between firm *i*'s managerial ability score summed over *t* + 1 through *t* + 3 (representing the new CEO's ability) and *t* - 3 through *t* - 1 (reflecting the prior CEO's ability). Turnover is an indicator variable that equals one if a

CEO had a forced turnover from firm *i* in year *t* and zero otherwise. Though we use the same control variables as our baseline regression, in difference-in-differences we measure the difference in their values summed from *t* + 1 through *t* + 3 and *t* - 3 through *t* - 1. Using these differentiated controls help us further isolate the manager-specific effect attributed to CEO turnover. In this difference-in-differences test, our identification strategy relies on the assumption that changes in managerial ability for firms with CEO forced turnovers are more likely to arise because of the change in the management team. For that purpose, the coefficient of the interaction term between ΔManagerial_ability3 and turnover captures the manager-specific effect on supply chain power following a forced turnover. Therefore, finding the coefficient of this interaction term to be positive and significant would be consistent with the assumption that firms with a higher ability CEO gain greater supply chain power than a lower ability predecessor following a forced turnover.

Though the difference-in-differences method allows for treated and control firms to be different (Roberts and Whited, 2013), to rule out the effects generated from potentially correlated omitted variables related to CEO forced turnover and supply chain power and for the differences in sample size of firms that had a CEO turnover incident, we identify control firms using propensity score matching (PSM). We model the probability of a forced CEO turnover based on a logistic regression as a function of the control variables and managerial ability. We use a publicly available dataset for CEO departures in the S&P 1500 firms from 2000-2018 to identify forced CEO turnover events in our sample firms[4] (Gentry et al., 2021). This dataset contains CEO departures for a variety of reasons, ranging from voluntary to involuntary turnover. Based on the forced turnovers or dismissals, the propensity scores generated help us create a matched sample of 1,176 treatment and 1,176 control observations.

[4] CEO turnover data are available from - https://doi.org/10.5281/zenodo.4543893

[INSERT TABLE 8 HERE]

Table 8, Panel A, presents the univariate analysis comparing treated firms with the control group. Apart from firm size and current ratio, the mean differences for the remaining variables are statistically indistinguishable. Therefore, we conclude that though some variables have statistical significance in differences in means between the treatment and control samples, they are not big enough to be economically significant.

Table 8, Panel B, presents the results from estimating the difference-in-differences regression using the full sample and the PS-matched sample of 1,176 treatment and 1,176 control samples. The interaction term between ΔManagerial_ability3 and turnover remains positive and statistically significant for models 1-4 for the full and PS-matched samples, with year, industry and firm fixed effects. This implies that a new CEO with higher ability can gain more supply chain power than a lower-ability predecessor. The coefficient of ΔManagerial_ability3 is also positive, signifying that incumbent CEOs with higher ability are positively associated with greater supply chain power.

As a further robustness test, we conduct placebo tests to justify that these findings are not because of confounding factors. We assign a treatment dummy to the propensity score matched sample for one and two periods before and after the actual forced turnover event (Fake Turnover). Panel C presents the results where we interact the ΔManagerial_ability3 with fake turnover dummy one and two years before and after the actual turnover incidents for the full sample and we consider the propensity score matched sample in Panel D. We repeat the regressions in Panel B with the fake turnover dummy for supply chain power proxies in Panels C and D. Coefficients for these new interaction dummies remain insignificant in models 1-4 in both panels. The placebo test provides additional robustness to the importance of the exact

timing of the turnover events, further supporting our findings that superior managers improve a customer firm's supply chain power.

5. Channel Analysis

Our results have consistently shown that higher ability managers gain greater supply chain power over their supplier network. In this section, we explore the potential channels through which a customer firm's managerial ability influences supply chain power. The first channel we examine is whether customer firms managed by socially responsible superior managers are viewed as more trustworthy in meeting payment obligations and considered more important by suppliers, which leads to greater supply chain power. Our second channel analysis examines whether the possibilities of knowledge spill-over from the major customers entices suppliers to form close linkages, leading to greater supply chain power.

5.1. CSR Engagement

Socially responsible activities entice both suppliers and customers to form close linkages in a supply chain. Customer firm's CSR engagement is increasingly becoming a matter of significant importance in the customer-supplier exchange nexus performance (Liu et al., 2021, Kim and Choi, 2018, Klassen and Vachon, 2003). This exchange of CSR engagement in a customer-supplier network impacts both parties. In many cases, customer firms influence suppliers to adopt to certain CSR practices (i.e., complying with a customer's CSR codes of conduct or meeting CSR-specific performance benchmarks), which improves perceptions of sourcing quality among downstream customers (Li et al., 2017, Gielens et al., 2018) and protects their interests against potential supply chain scandals such as the Rana Plaza incident in 2013 (De Bettignies and Robinson, 2018, Dai et al., 2021, Sinkovics et al., 2016). Studies have shown that a customer firm's CSR engagement is viewed positively by its suppliers because they consider such customers to be more trustworthy and capable of meeting financial

obligations. This effect is stronger for firms that engage in CSR activities that are more ethical, leading suppliers to consider such customers as less likely to engage in strategic payment delays that could cause liquidity crunches (Zhang et al., 2020). In addition, suppliers view socially responsible customers positively for having higher growth prospects and providing an insurance-like protection in meeting payments against prospective negative shocks (Lev et al., 2010, Godfrey et al., 2009). Superior managers partake in more socially responsible and fewer socially irresponsible activities (Yuan et al., 2019). Based on these arguments, we expect major customers managed by superior managers who undertake higher CSR activities to gain higher supply chain power. To test this hypothesis, we estimate an OLS regression for the following model:

$$SCP_{i,t} = \beta_0 + \beta_1 High\_Managerial\ Ability_{i,t} + \beta_2 Net\ CSR_{i,t} + \beta_3 High\_Managerial\_Ability\ X\ Net\_CSR_{\ i,t} + Controls_{i,t} + YEAR\ FE + FIRM\ (INDUSTRY)\ FE + \varepsilon_{i,t}$$

We use the MSCI ESG Kinder, Lydenberg and Domini (KLD) database to construct a customer firm's social performance by measuring its Net CSR engagement (Zhang et al., 2020, Flammer, 2015, Di Giuli and Kostovetsky, 2014, Jiao, 2010). The KLD database provides a score for a firm's social performance by evaluating its actions in seven dimensions: community, corporate governance, diversity, environmental protection, employee relations, product quality and human rights. Based on previous work in this area, we capture a firm's Net CSR score (i.e., strengths minus concerns) in five dimensions excluding the corporate governance and human rights (Jiao, 2010). Because of the varying number of indicators in each dimension across years, we first calculate the CSR strengths and concerns scores across the five dimensions as the ratio of strengths (concerns) values to the total number of strengths (concerns) indicators. The Net CSR score is calculated as the difference between CSR strengths and CSR concerns scores. With regard to adequately capturing the effect of top tier managers

in using their socially responsible activities as a channel for gaining supply chain power, we construct the High Managerial Ability proxy as a dummy variable equal to 1 if a firm's managerial ability score in a particular year is in the top quartile across all firms. Because of the unavailability of data in the KLD database, merging these two datasets leave us with 6,518 firm-year observations.

[INSERT TABLE 9 HERE]

Table 9, models 1-3, report estimates of the channel effect based on the specified regression model with year and industry fixed effects; models 4-6 include year and firm fixed effects. We break down the full sample into two groups, one where the customer firm has a higher than or equal to median CSR score and the other with lower than median CSR score. Models 3 and 6 report the estimates for the full sample. Our variable of interest in this table is the interaction term between high managerial ability and net CSR. The interaction term remains positive and statistically significant for the high CSR group and the full sample. However, the interaction is not significant for the low CSR group, with the coefficient even being negative in the model with year and firm fixed effects. These results indicate that when a major customer is involved in higher levels of socially responsible activities, top-tier managers can gain significantly higher supply chain power over their supplier network. In our model with year and firm fixed effects, superior managers in the top quantile with higher than median socially responsible engagement, the coefficient figures from model 4 indicate that a 1% increase in net CSR engagement secures 2.27% higher supply chain power. For the full sample, coefficient figures from model 6 show that a 1% increase in net CSR by a superior manager leads to 0.5% greater supply chain power. However, such effect does not apply to major customers with lower than median CSR engagement. These findings highlight the significance of socially responsible superior managers in gaining considerable bargaining power over their supplier network.

5.2. Corporate Innovation

A number of studies have explored the effect of innovation externalities in the customer-supplier nexus. With regard to developing a new product, close collaboration between customer and supplier assists in building higher levels of trust, commitment and communication (Koufteros et al., 2005), leading to shorter product development period, lower development costs and better product quality (Petersen et al., 2005, Clark, 1989). In a close-linked customer-supplier relationship, customers tend to maximize existing efficient relationships instead of seeking out new or additional partners (Ireland and Webb, 2007). Prior studies have identified the importance of geographical proximity between suppliers and customers in supplier innovation, highlighting that such close proximity allows timely feedback from customers along with lower transport costs that increase customer demand (Chu et al., 2019). Economic links between customers and suppliers also play a crucial role. Research shows that positive innovation outputs of customer firms enhances their suppliers' profitability, mostly driven by knowledge diffusion from customers to suppliers. This effect is stronger for customers whose demand accounts for a larger fraction of suppliers' total sales (Li, 2018). Moreover, managerial ability has a positive association with corporate innovation success (Chen et al., 2015). So it is reasonable to expect that suppliers will be motivated to form close links with major customers managed by higher ability managers to receive innovation externality benefits while improving their own future performance. Therefore, we expect major customers managed by superior ability managers to have higher corporate innovation performance to gain higher supply chain power. To test this hypothesis, we estimate the OLS regression for the following model:

$$SCP_{i,t} = \beta_0 + \beta_1 High\_Managerial\ Ability_{i,t} + \beta_2 Corporate\_Innovation_{i,t} + \beta_3 High\_Managerial\_Ability\ X\ Corporate\_Innovation_{i,t} + Controls_{i,t} + YEAR\ FE + FIRM\ (INDUSTRY)\ FE + \varepsilon_{i,t}$$

Based on previous research conducted on corporate innovation, we use the total number of patents filed by a firm in a given year (Patent) and the total number of citations ultimately received from the patents filed during the given year (Citation) as two proxies to capture corporate innovation performance (Hirshleifer et al. 2012; Faleye et al., 2014; Bernstein, 2015; Kogan et al., 2017: (Kogan et al., 2017, Hirshleifer et al., 2012, Faleye et al., 2014, Bernstein, 2015, Hasan et al., 2020). Because of the time lag between filing and the patent grant year, we use the filing year to reflect the timing, quantity and quality of corporate innovation (Trajtenberg, 1990). We collect firm-level patent and citation data from the KPSS database and set the patent and citation data to zero if the KPSS database did not report any patent or citation for a firm in a given year. Like our previous channel analysis, we construct the High Managerial Ability proxy as a dummy variable that equals 1 if the firm's managerial ability score in a particular year is in the top quartile across all firms.

[INSERT TABLE 10 HERE]

Table 10, Models 1-3, report the estimates with the citation proxy of innovation and models 4-6 consider the patent proxy. Models 1-6 include year and firm fixed effects. (Untabulated results for models with year and industry fixed effects show similar results.) Consistent with the innovation literature, we measure the variables as log(1 + Innovation). Whereas models 3 and 6 consider the full sample, we divide the sample into two groups, one where the customer firm has a higher than or equal median innovation (citation and patent) value and the other with lower than median innovation value. Our variable of interest in this table is the interaction term between high managerial ability and corporate innovation. We find the interaction variable to remain positive and statistically significant for the high innovation (citation and patent) and full sample. However, the interaction is not statistically significant for low innovation sample, with the coefficient being negative in the low patent sample. These results indicate that, when a major customer has strong innovation performance with higher

levels of citations and patents, top-tier managers can gain significantly higher supply chain power over their supplier network. Based on the coefficient estimates from model 1, superior managers in the top quantile of firms with higher than median citations, with a 1% increase in innovation citations, secure a 15.39% higher supply chain power. For the full sample in model 3, a 1% increase in citations by a superior manager leads to 5.60% greater supply chain power. With regards to the number of patents filed, based on the coefficients from model 4, a 1% increase in patents by a superior manager in a firm with higher than median patents, gains 23.10% more supply chain power. For the full sample in model 6, that leads to a 9.26% greater supply chain power. However, such an effect is not applicable to major customers with lower than median innovation performance. To add further robustness by taking into accounting that some innovative firms that do not file patents, we consider innovation input proxied by R&D scaled by book assets to verify these findings. This innovation input variable is constructed based on data from Compustat. Results reported in appendix B4 further confirms the significance of superior managers in higher innovation input, as the coefficient of the interaction term remains positive and statistically significant in models with industry and firm fixed effects. These findings highlight the significance of superior managers engaged in top-notch corporate innovation, in gaining significant power over their suppliers.

6. The Impact of Managerial Ability and Supply Chain Power in Extracting Trade Credit

After establishing the positive association between managerial ability and supply chain power, we focus on how superior ability managers use this bargaining power in regular business operations. In the context of inter-firm financing, trade credit comprises a large portion, with almost 80% of US firms selling their products on credit (Tirole, 2010); it is a loan that a supplier provides to its customers. Within complex product networks, firms simultaneously operate both as suppliers and customers of trade credit. Studies show that more

upstream firms borrow more from suppliers and lend more to customers (Gofman and Wu, 2022). Research on Chinese firms documents that suppliers with weak bargaining power are more likely to provide trade credit (Fabbri and Klapper, 2016). Based on the resource based view of the firm, superior ability managers should be able to extract valuable resources and bundle and deploy them with greater efficiency (Barney, 1991, Rungtusanatham et al., 2003). In this context, higher ability managers in customer firms with greater supply chain power should be able to extract more trade credit from their suppliers. To test this proposition, we estimate the OLS regression for the following model:

$$Trade\_Credit_{i,t} = \beta_0 + \beta_1 High\_Managerial\ Ability_{i,t} + \beta_2 SCP_{i,t} + \beta_3 High\_Managerial\_Ability\ X\ SCP_{i,t} + Controls_{i,t} + YEAR\ FE + FIRM\ (INDUSTRY)\ FE + \varepsilon_{i,t}$$

We consider Accounts Payables to Total Assets (AP/TA) as the proxy for trade credits received by a major customer. Firm-level trade credit data are collected from Compustat. We construct the High Managerial Ability proxy as a dummy variable equal to 1 if a firm's managerial ability score in a particular year is in the top quartile across all firms. To measure the effect of higher ability managers with greater supply chain power on trade credit received, we consider the AP/TA variable our dependent variable.

[INSERT TABLE 11 HERE]

Table 11 reports the estimates for our regression models. Models 1-3 report the estimates with year and industry fixed effects and models 4-6 include year and firm fixed effects. Like our previous analysis, we break the full sample into two groups, one where the major customer has higher than or equal to median SCP value and the other with lower than the median SCP. Models 3 and 6 consider the full sample. Our variable of interest in this table

is the interaction between high managerial ability and SCP. Except for models 2 and 5 with low SCP sample, in models 1-6 the interaction term is positive and statistically significant. This indicates that superior managers in the top quartile of managerial ability who gained more supply chain power, can secure greater trade credit from their suppliers. For one standard deviation increase in SCP, superior managers in the high SCP sample, on average, extract 0.12% ((0.0020 X 0.06 X 100)/0.10) additional trade credit to total assets in models with year and firm fixed effects (mean value of AP/TA in our sample is 0.10). This is considerably higher than the 0.078% ((0.0013 X 0.06 X 100)/0.10) and 0.042% ((0.0007 X 0.06 X 100)/0.10) additional trade credit to total assets on average received by the full and low SCP sample for the same level of change in SCP. These results highlight the significant role played by the bargaining power higher ability managers in major customer firms hold over their supplier network in extracting trade credit.

7. Conclusion

This chapter examines the role of managerial ability in major customer firms in securing greater bargaining power over their supplier network. Our study adds to the literature on the resource-based view of the firm. According to this theory, firms seek control over their bundle of resources to achieve sustainable competitive advantage (Barney, 1991, Rungtusanatham et al., 2003). More able managers should be able to bundle and deploy resources in a much superior manner since the ability of managers is heterogeneous in nature (Hansen et al., 2004, Lippman and Rumelt, 2003). Our results provide empirical proof that managers with significant control over their suppliers can facilitate an efficient sourcing flow from their suppliers (Rungtusanatham et al., 2003). We provide consistent evidence that more able managers are associated with greater supply chain power. Our results show that one standard deviation increase in managerial ability is associated with a 21.0% increase in the composite supply chain power (SCP) index, in models with year and firm fixed effects. This effect is stronger for

customer firms in the durable goods manufacturing sector because of their unique source needs closer links with their supplier network. This positive relationship remains consistent for alternative measures of supply chain power in 2SLS analysis using two instrumental variables (average Metropolitan Statistical Area (MSA) managerial ability and the proportion of state population holding a college degree) to mitigate the endogeneity concerns from omitted variables. In addition, our results hold for the full and propensity score matched samples in difference-in-differences tests using forced CEO turnover. Further tests also reveal that this relationship is stronger for major customers engaged in socially responsible activities and with higher corporate innovation performance. We demonstrate that higher ability managers in major customer firms possessing higher than median supply chain power can extract comparatively more trade credit from their suppliers than lower supply chain power customers. These findings provide an outlook on how managers looking to efficiently extract and manage resources, can do so by putting importance in securing a well-diversified network of dependent suppliers.

We acknowledge that our study has some limitations. It is conceivable that the proxy we use for managerial ability may capture some aspect of a firm's operating environment that is not adequately controlled in our tests. However, we expect our use of difference-in-differences tests and the use of firm fixed effects are likely to reduce the noise brought forward by environmental characteristics driving our inferences. However, we cannot completely rule out such a possibility. Nevertheless, this study contributes not only to the managerial ability and financial literature on the supply chain by identifying how executives' ability to manage resources efficiently works towards gaining higher bargaining power over their suppliers, but also adds to the growing literature on the significance of managing a diversified network of financially reliant suppliers.

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Table 1: Summary Statistics

This table reports the descriptive statistics for our dependent, independent and control variables. All variables are winsorized at the 1st and 99th percentile.

				Quantile				
Variable	Obs	Mean	S.D.	Min	0.25	Median	0.75	Max
SCP	10,667	0.12	1.43	-1.28	-1.03	0.61	1.05	4.26
MARKET POWER	11,023	0.36	0.27	-0.93	0.20	0.34	0.52	1.00
SDISPERSION	11,023	0.22	0.29	0.00	0.00	0.10	0.48	0.95
NUMSAPP	11,153	0.55	0.33	0.30	0.30	0.48	0.70	1.56
Managerial Ability	11,031	0.05	0.06	-0.16	-0.06	0.02	0.14	0.42
Firm Size	11,031	8.00	1.95	2.63	6.66	8.13	9.45	12.84
Tobin's Q	10,485	2.08	1.51	0.53	1.23	1.61	2.35	23.08
Book Leverage	10,991	0.26	0.20	0.00	0.11	0.24	0.37	1.36
Asset Tangibility	11,029	0.30	0.22	0.00	0.13	0.24	0.45	0.93
Current Ratio	10,656	2.01	1.49	0.11	1.16	1.61	2.36	15.36
Customer Firm Reliance	11,153	0.07	0.12	0.00	0.00	0.02	0.07	0.69
Net CSR	11,023	-0.03	1.78	-3.00	-1.00	0.00	1.00	4.00
Patent	11,054	14.46	26.86	0.00	1.00	3.00	12.00	106.00
Citation	11,054	160.43	294.24	1.00	11.00	44.00	136.00	1197.00

Table 2: Correlation Matrix

This table reports the correlation matrix of the key variables in this study. All variables are winsorized at the 1st and 99th percentile.

Variable	SCP	Managerial Ability	Tobin's Q	Book Leverage	Asset Tangibility	Current Ratio	Firm Size
SCP	1.0000						
Managerial Ability	0.3816	1.0000					
Tobin's Q	-0.0092	0.2214	1.0000				
Book Leverage	-0.0339	-0.1917	-0.1956	1.0000			
Asset Tangibility	0.0431	-0.0923	-0.1575	0.2442	1.0000		
Current Ratio	-0.2036	0.0026	0.2352	-0.2841	-0.3521	1.0000	
Firm Size	0.2905	0.2597	-0.0776	0.1341	0.1932	-0.3471	1.0000

Table 3: Baseline Regressions

This table reports the baseline regression results with regard to managerial ability on supply chain power (SCP) measures. The dependent variable in models 1-3 and 5-6 are the individual components of supply chain power, (1) NUMSAPP - Log (1+Number of Suppliers), capturing the thickness of the supply chain; (2) SDISPERSION - input-based Herfindahl index, capturing supplier dispersion and (3) MKTPOWER - input-weighted Lerner's index, capturing the firm's market power over its suppliers, respectively. The dependent variable in models 4 and 8 is the composite Supply Chain Power (SCP) index, constructed as the first principal component from a principal component analysis consisting of the three previous measures. The key independent variable for models 1-8 is Managerial ability, proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Models 1-4 include year and industry fixed effects and models 5-8 include year and firm fixed effects. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	NUMSUPP	SDISPERSION	MKTPOWER	SCP	NUMSUPP	SDISPERSION	MKTPOWER	SCP
Managerial Ability	0.3447***	0.2179***	0.0215	1.4157***	0.1078***	0.0485**	0.0022	0.4199***
	(0.000)	(0.000)	(0.257)	(0.000)	(0.000)	(0.010)	(0.916)	(0.000)
Tobin's Q	0.0009	0.0026	0.0046**	0.0107	0.0032**	0.0036*	-0.0052**	0.0190**
	(0.573)	(0.119)	(0.015)	(0.164)	(0.046)	(0.074)	(0.019)	(0.023)
Book Leverage	-0.0926***	-0.0695***	-0.0277*	-0.3858***	-0.0071	-0.0112	-0.0303	-0.0657
	(0.000)	(0.000)	(0.064)	(0.000)	(0.636)	(0.546)	(0.135)	(0.388)
Asset Tangibility	0.0088	0.0299*	0.0054	0.0907	0.0936***	0.1076***	-0.0501	0.4870***
	(0.590)	(0.074)	(0.000)	(0.232)	(0.000)	(0.001)	(0.146)	(0.000)
Current Ratio	-0.0081***	-0.0079***	-0.0089***	-0.0380***	-0.0097***	-0.0091***	-0.0036	-0.0442***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.204)	(0.000)
Firm Size	0.1057***	0.0823***	-0.0049***	0.4521***	0.1241***	0.0978***	-0.0074	0.5328***
	(0.000)	(0.000)	(0.005)	(0.000)	(0.000)	(0.000)	(0.141)	(0.000)
Constant	-0.2718***	-0.4288***	0.4286***	-3.4458***	-0.4572***	-0.5824***	-0.4463***	-4.2554***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	10,093	10,093	10,093	9,743	9,596	9,596	9,596	9,258
Adjusted R-squared	0.5571	0.4074	0.1489	0.5153	0.8108	0.6396	0.4923	0.7647
Mean VIF	1.44	1.44	1.44	1.45	1.44	1.44	1.44	1.45
Year FE	YES	YES	YES	NO	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	NO	NO	NO	NO
Firm FE	NO	NO	NO	NO	YES	YES	YES	YES

Table 4: Baseline Results – Alternate Proxy for Supply Chain Power

This table reports the baseline regression results with regard to managerial ability and an alternative measure of supply chain power (SCP). The dependent variable in models 1-2 is Customer Firm Reliance, measured through the total purchases from all Compustat-listed manufacturing sector suppliers that record the current firm as (one of) their principal customer(s), as a proportion of Cost of Goods Sold of the customer firm. The key independent variable across models 1-2 is Managerial ability, proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

	(1)	(2)
Dependent Variable	Customer Firm Reliance	Customer Firm Reliance
Managerial Ability	-0.0956***	-0.0325***
	(0.000)	(0.000)
Tobin's Q	0.0012	0.0016*
	(0.157)	(0.053)
Book Leverage	0.0142**	-0.0038
	(0.035)	(0.617)
Asset Tangibility	0.0132	0.0102
	(0.120)	(0.431)
Current Ratio	0.0051***	0.0002
	(0.000)	(0.820)
Firm Size	0.0134***	0.0027
	(0.000)	(0.163)
Constant	0.1478***	0.0426**
	(0.000)	(0.011)
Observations	10,093	9,596
Adjusted R-squared	0.0994	0.6026
Mean VIF	1.24	1.24
Year FE	YES	YES
Industry FE	YES	NO
Firm FE	NO	YES

Table 5: Subsample Analysis (Durable versus Non-Durable Goods Manufacturer)

This table reports the regression results of the subsample analysis of Durable and Non-Durable goods manufacturing major customer firms. The dependent variable in models 1-6 is the composite Supply Chain Power (SCP) index. Model-1 considers a sample of firms from the durable goods manufacturing sector (primary SIC from 3,400 to 3,990). Model-2 considers a sample of firms from the non-durable goods manufacturing sector (primary SIC from 2000 to 3,390). A Chow test is conducted to explore the significance of difference in the coefficient values of Managerial Ability across the samples of durable and non-durable goods manufacturing major customers. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable: SCP	Durable Goods Sector		Non-durable Goods Sector	
	(1)	(2)	(3)	(4)
Managerial Ability	0.9651***	0.1644*	0.5806***	0.2652
	(0.000)	(0.092)	(0.000)	(0.126)
Tobin's Q	0.06441***	0.0306*	-0.0106	-0.0013
	(0.000)	(0.075)	(0.442)	(0.915)
Book Leverage	-0.1292	0.0771	0.1985	0.2720*
	(0.225)	(0.617)	(0.101)	(0.052)
Asset Tangibility	-0.0355	0.2121	-0.4971***	0.2344
	(0.773)	(0.379)	(0.002)	(0.372)
Current Ratio	-0.0203	-0.0262	0.0203	-0.0160
	(0.182)	(0.238)	(0.194)	(0.339)
Firm Size	0.3592***	0.4238***	0.5284***	0.7511***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-3.1379***	-3.7033***	-4.0207***	-5.7910***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,816	2,688	2,648	2,525
Adjusted R-squared	0.4522	0.6829	0.4967	0.7827
Mean VIF	1.57	1.57	1.88	1.88
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES
Chow Test p-value	0.1853			

Table 6: Instrumental Variable – Average Metropolitan State Area (MSA) Managerial Ability

This table presents the results of two-stage lease-squares regression analysis using Mean Metropolitan Statistical Area (MSA) Managerial Ability as the instrumental variable. Model 1 presents the results from the first stage OLS regression analysis where managerial ability is the dependent variable. In model 2, the fitted managerial ability values from model 1 is used as an independent variable along with the control variables, with SCP as dependent variable. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

VARIABLE	(1)	(2)
	Managerial Ability	Supply Chain Power
Fitted Managerial Ability		5.4846***
		(0.000)
MSA Average Managerial Ability	0.5366***	
	(0.000)	
Tobin's Q	0.0200***	-0.0979***
	(0.000)	(0.000)
Book Leverage	-0.1051***	-0.0363
	(0.000)	(0.761)
Asset Tangibility	-0.0504***	-0.0752
	(0.005)	(0.475)
Current Ratio	-0.0021	-0.0439***
	(0.186)	(0.000)
Firm Size	0.0263***	0.3079***
	(0.000)	(0.000)
Constant	-0.2737***	-2.3006***
	(0.000)	(0.000)
Observations	9,663	9,663
Adjusted R-squared	0.3197	0.3010
Year FE	YES	YES
Industry FE	YES	YES
	Statistics	p value
Cragg-Donald F-statistic	332.001	<0.10
Hansen J Statistic	323.922	<0.10

Table 7: Instrumental Variable – the Proportion of State Population Holding a College Degree

This table presents the results of two-stage lease-squares regression analysis using Proportion of State Population holding a college degree (College) as the instrumental variable. Model 1 presents the results from the first stage OLS regression analysis where managerial ability is the dependent variable. In model 2, the fitted managerial ability value from model 1 is used as an independent variable along with the control variables, with SCP as dependent variable. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

VARIABLE	(1)	(2)
	Managerial Ability	Supply Chain Power
Fitted Managerial Ability		5.6907***
		(0.000)
College Degree	0.0049**	
	(0.027)	
Tobin's Q	0.0291***	0.1249***
	(0.000)	(0.004)
Book Leverage	-0.0669**	-0.3615
	(0.010)	(0.151)
Asset Tangibility	-0.0180	-0.0071
	(0.687)	(0.978)
Current Ratio	0.0008	-0.0976**
	(0.872)	(0.018)
Firm Size	0.0309***	0.4093***
	(0.000)	(0.000)
Crime	-0.0279	-0.1489
	(0.276)	(0.520)
Unemployment	-0.0389	0.5043***
	(0.276)	(0.006)
Per Capital Income	1.5705	-5.0882
	(0.145)	(0.432)
Mean Housing Price	0.0017	0.2669
	(0.963)	(0.311)
Constant	-3.7239	-2.3006***
	(0.123)	(0.000)
Observations	2,614	2,614
Adjusted R-squared	0.2998	0.2513
Year FE	YES	YES
Industry FE	YES	YES
	Statistics	p value
Cragg-Donald F-statistic	13.341	<0.10
Hansen J Statistic	13.642	<0.10

Table 8: Difference-in-Differences Test – CEO Forced Turnover using a Propensity Score Matched (PSM) Sample

This table presents the results of CEO forced turnover analyses using a difference-in-differences design. Panel A presents the results from a comparison of means for treatment and propensity score matched control observations. Panel B presents the results from a difference-in-differences analysis estimating OLS regressions for both the propensity score matched sample and the full sample. Panels C and D present the results of the placebo test for both the full and the matched sample. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Panel A: Univariate Analysis

Variable	Mean		t-stat (Difference in Means)
	Treated	Control	Treatment-Control
Supply Chain Power	0.44	0.19	0.99
Managerial Ability	0.05	0.04	0.96
Tobin's Q	2.01	2.09	0.90
Book Leverage	0.25	0.26	0.89
Size	8.54	8.12	0.69*
Current Ratio	1.85	1.98	0.65*
Asset Tangibility	0.30	0.30	0.89

Panel B: Regression with full and propensity score matched sample

Dependent Variable: ΔSCP	(1) Full Sample	(2) PSM Matched Sample	(3) Full Sample	(4) PSM Matched Sample
ΔMASCORE3 X Turnover	0.9330***	0.5505**	0.5747***	0.6487*
	(0.000)	(0.049)	(0.000)	(0.095)
ΔMASCORE3	0.6899***	1.0242***	0.9838***	0.7992***
	(0.000)	(0.000)	(0.000)	(0.009)
Forced Turnover	-0.4781*	-0.4823*	-0.2575***	-0.4718***
	(0.090)	(0.085)	(0.000)	(0.001)
ΔTobin's Q	-0.0117	-0.0464***	-0.0353***	-0.0282
	(0.148)	(0.008)	(0.000)	(0.318)
ΔBook Leverage	-0.3317***	-0.5386***	-0.4605***	-0.2670
	(0.000)	(0.000)	(0.000)	(0.145)
ΔAsset Tangibility	-0.1485**	-0.3090**	-0.3127***	-0.2479
	(0.022)	(0.033)	(0.000)	(0.258)
ΔCurrent Ratio	-0.0999***	-0.2119***	-0.1447***	-0.2338***
	(0.000)	(0.000)	(0.000)	(0.000)
ΔFirm Size	0.0102**	0.0709***	0.0488***	0.0609***
	(0.013)	(0.000)	(0.000)	(0.000)
Constant	0.1316***	-3.1219	0.1084***	0.0178
	(0.000)	(0.206)	(0.000)	(0.867)
Observations	10,093	2,352	10,005	1,752
Adjusted R-squared	0.0863	0.1484	0.1115	0.3952
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Firm FE	NO	NO	NO	NO

Panel C: Placebo Test – Full Sample

Dependent Variable: ΔSCP	(1)	(2)	(3)	(4)
ΔMASCORE3 X (Fake Turnover + 1 period)	0.2456			
	(0.440)			
ΔMASCORE3 X (Fake Turnover + 2 periods)		-0.2361		
		(0.430)		
ΔMASCORE3 X (Fake Turnover - 1 period)			0.4275	
			(0.401)	
ΔMASCORE3 X (Fake Turnover - 2 periods)				1.1364
				(0.199)
Fake Forced Turnover + 1 period	0.0926			
	(0.303)			
Fake Forced Turnover + 2 periods		0.1179		
		(0.186)		
Fake Forced Turnover - 1 period			-0.2020	
			(0.123)	
Fake Forced Turnover - 2 periods				-0.0129
				(0.884)
ΔMASCORE3	0.7691***	0.8398***	0.7627***	0.6803**
	(0.007)	(0.004)	(0.006)	(0.010)
Constant	0.0696***	0.0636***	0.1051***	0.0838***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	10,093	10,093	10,093	10,093
Adjusted R-squared	0.0795	0.0797	0.0804	0.0821
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Panel D: Placebo Test – PSM Sample

Dependent Variable: ΔSCP	(1)	(2)	(3)	(4)
ΔMASCORE3 X (Fake Turnover + 1 period)	-0.5405			
	(0.315)			
ΔMASCORE3 X (Fake Turnover + 2 periods)		-1.0909		
		(0.187)		
ΔMASCORE3 X (Fake Turnover - 1 period)			0.8797	
			(0.233)	
ΔMASCORE3 X (Fake Turnover - 2 periods)				-1.1057
				(0.105)
Fake Forced Turnover + 1 period	0.3155*			
	(0.081)			
Fake Forced Turnover + 2 periods		-0.1951		
		(0.347)		
Fake Forced Turnover - 1 period			-0.1653	
			(0.283)	
Fake Forced Turnover - 2 periods				0.0244
				(0.852)
ΔMASCORE3	1.4385***	1.4316***	1.2621***	1.4379***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.1349**	-0.0188	-0.0692	-0.0941
	(0.021)	(0.811)	(0.228)	(0.134)
Observations	2,350	2,350	2,350	2,350
Adjusted R-squared	0.1399	0.0983	0.1386	0.1387
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Table 9: Channel Analysis – CSR Engagement

This table reports the regression results with regard to a firm's CSR engagement as the channel effect of managerial ability on supply chain power. The dependent variable in models 1-3 is the composite Supply Chain Power (SCP) index. Net CSR score is calculated as the difference between CSR strengths score minus the CSR concerns score, with data from the MSCI KLD database. Managerial ability is proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. High Ability is a dummy variable equal to 1 if the firm's MA-score in a particular year is in the top quartile across all firms. The key independent variable in this table is the interaction between High Ability and Net CSR. Models 1 and 2 present the results for sample where the CSR value is above the median (High CSR) and below the median (Low CSR) value of CSR. Model 3 presents the result for the full sample. Models 1-3 includes year and industry fixed effects and models 4-6 includes year and firm fixed effects. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable: SCP	(1) High CSR	(2) Low CSR	(3) Full Sample	(4) High CSR	(5) Low CSR	(6) Full Sample
High Managerial Ability X Net CSR	0.0709***	0.0493	0.0295**	0.0227**	-0.0279	0.0050*
	(0.002)	(0.187)	(0.024)	(0.048)	(0.244)	(0.095)
Net CSR	0.0405**	0.0333	0.0216*	0.0018	0.0196	0.0043
	(0.035)	(0.163)	(0.060)	(0.881)	(0.330)	(0.607)
High Managerial Ability	0.1246	0.4534***	0.4373***	0.0208	0.0861	0.1121**
	(0.419)	(0.000)	(0.000)	(0.818)	(0.106)	(0.019)
Tobin's Q	0.0373*	0.0205	0.0219	0.0597**	0.0354*	0.0468***
	(0.094)	(0.425)	(0.336)	(0.016)	(0.095)	(0.001)
Book Leverage	-0.8056**	-0.3632*	-0.4536**	-0.3187	-0.1444	-0.1263
	(0.016)	(0.080)	(0.029)	(0.474)	(0.426)	(0.428)
Asset Tangibility	-0.0725	-0.1892	-0.1023	0.8831**	0.3214	0.4748
	(0.862)	(0.581)	(0.765)	(0.034)	(0.344)	(0.112)
Current Ratio	-0.0454	-0.0459**	-0.0393*	-0.0692***	-0.0582***	-0.0526***

	(0.123)	(0.048)	(0.083)	(0.003)	(0.006)	(0.001)
Firm Size	0.5813***	0.4489***	0.4917***	0.7439***	0.6479***	0.6384***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-4.5400***	-3.4089***	-3.7772***	-6.1675***	-5.1806***	-5.1801***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,454	4,064	6,518	2,185	4,061	6,246
Adjusted R-squared	0.4940	0.4862	0.5323	0.8199	0.7738	0.7899
Mean VIF	1.63	1.47	1.33	1.63	1.47	1.33
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	NO	NO	NO
Firm FE	NO	NO	NO	YES	YES	YES

Table 10: Channel Analysis – Corporate Innovation

This table reports the regression results with regards to firm's innovation performance as the channel effect of managerial ability on supply chain power. The dependent variable in models 1-6 is the composite Supply Chain Power (SCP) index. Innovation is measured through two proxies: (1) log (1 + Citations) using the number of forward citations received from the firm's patents in a given year; and (2) log (1 + Patents), using the number of patents filed by a firm in a given filing year, using data from the KPSS database. Managerial ability is proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. High Ability is a dummy variable equal to 1 if the firm's MA-score in a particular year is in the top quartile across all firms. The key independent variable in this table is the interaction between High Ability and Innovation proxies. Models 1-3 consider the innovation citation proxy and models 4-6 consider the innovation patent proxy. Models 1 and 2 present the results for the sample where the innovation citation proxy value is above the median (High Citation) and below the median (Low Citation) value of Citation; model 3 presents the result for the full sample. Models 4 and 5 present the results for the sample where the innovation patent proxy value is above the median (High Patent) and below the median (Low Patent) value of Patent; model 6 presents the results for the full sample. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

	Innovation - Citation			Innovation - Patent		
Dependent Variable: SCP	(1) High Citation	(2) Low Citation	(3) Full Sample	(4) High Patent	(5) Low Patent	(6) Full Sample
High Managerial Ability X Log (1 + Innovation)	0.1539***	0.0329	0.0560***	0.2310***	-0.0304	0.0926***
	(0.000)	(0.233)	(0.001)	(0.000)	(0.352)	(0.000)
Log (1 + Citations)	0.0071	0.0310*	0.0229**			
	(0.617)	(0.051)	(0.021)			
Log (1 + Patents)				0.0772***	-0.0133	0.0421***
				(0.000)	(0.503)	(0.000)
High Managerial Ability	0.2044***	0.4831***	0.4294***	0.2647***	0.4837***	0.3438***
	(0.003)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Tobin's Q	0.0295***	-0.0059	0.0127*	0.0390***	-0.0099	0.0099

	(0.004)	(0.606)	(0.096)	(0.000)	(0.382)	(0.191)
Book Leverage	-0.4270***	-0.4090***	-0.4244***	-0.3788***	-0.4180***	-0.3936***
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Asset Tangibility	-0.1421	0.0748	0.0520	-0.2989**	0.1736*	0.0585
	(0.257)	(0.436)	(0.497)	(0.013)	(0.075)	(0.438)
Current Ratio	-0.0326***	-0.0463***	-0.0387***	-0.0343***	-0.0401***	-0.0370***
	(0.006)	(0.000)	(0.000)	(0.003)	(0.001)	(0.000)
Firm Size	0.4633***	0.4318***	0.4445***	0.4296***	0.3863***	0.4166***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-3.5690***	-3.2810***	-3.4334***	-3.5624***	-2.9085***	-3.2581***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	3,516	6,233	9,749	4,052	5,697	9,749
Adjusted R-squared	0.5677	0.4924	0.5177	0.5926	0.4870	0.5227
Mean VIF	1.76	1.31	1.41	1.81	1.32	1.57
Year FE	YES	YES	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES	YES	YES

Table 11: Impact of Managerial Ability and Supply Chain Power in Extracting Trade Credit from Suppliers

This table reports the regression results with regard to a firm's supply chain power and managerial ability in extracting trade credit from its suppliers in the form of accounts payable. The dependent variable in models 1-6 is Accounts Payable scaled by Total Assets (AP/TA), as the proxy for trade credit received from a firm's suppliers. SCP is the composite Supply Chain Power (SCP) index. Managerial ability is proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. High Managerial Ability is a dummy variable equal to 1 if the firm's MA-score in a particular year is in the top quartile across all firms. The key independent variable in this table is the interaction between High Ability and SCP. Models 1 and 2 present the results for the sample where the SCP value is above the median (High SCP) and below the median (Low SCP) value, and model 3 presents the result for the full sample. Models 4 and 5 present the results for the sample where the SCP value is above the median (High SCP) and below the median (Low SCP) value and model 6 presents the result for the full sample. Models 1-3 include year and industry fixed effects and models 4-6 include year and firm fixed effects. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable: AP/TA	(1) High SCP	(2) Low SCP	(3) Full Sample	(4) High SCP	(5) Low SCP	(6) Full Sample
High Managerial Ability X SCP	0.0056***	0.0031	0.0070***	0.0020**	0.0007	0.0013*
	(0.002)	(0.235)	(0.000)	(0.071)	(0.640)	(0.078)
SCP	0.0098***	0.0199**	0.0080***	0.0042***	0.0053	0.0034***
	(0.000)	(0.032)	(0.000)	(0.000)	(0.447)	(0.000)
High Managerial Ability	0.0262***	0.0395	0.0201***	0.0093***	0.0162	0.0251***
	(0.000)	(0.129)	(0.000)	(0.000)	(0.282)	(0.000)
Tobin's Q	-0.0047***	-0.0022***	-0.0030***	-0.0027***	0.0011	-0.0007*
	(0.000)	(0.002)	(0.000)	(0.000)	(0.101)	(0.091)
Book Leverage	-0.0662***	-0.0292***	-0.0420***	-0.0374***	-0.0043	-0.0248***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.468)	(0.000)
Asset Tangibility	-0.1163***	-0.0823***	-0.0968***	-0.0848***	-0.0865***	-0.0691***

	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Current Ratio	-0.0322***	-0.0210***	-0.0244***	-0.0177***	-0.0136***	-0.0149***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm Size	-0.0225***	-0.0125***	-0.0162***	-0.0147***	-0.0145***	-0.0215***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.4132***	0.2880***	0.3250***	0.3049***	0.2600***	0.3365***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	4,918	4,823	9,741	4,748	4,254	9,002
Adjusted R-squared	0.5755	0.3845	0.4796	0.9018	0.8270	0.8728
Mean VIF	1.80	1.51	1.59	1.80	1.51	1.59
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	NO	NO	NO
Firm FE	NO	NO	NO	YES	YES	YES

Appendix B1: Variable Definitions

Variable	Formula/derivation	Data Source
Firm-level Variable		
NUMSAPP	Logarithm of one plus the number of suppliers who identified the customer as a major customer (capturing 10% of supplier's total sales)	Compustat customer-segment file
SDISPERSION	$SDISPERSION_{it} = 1 - \sum_{s=1}^{N} \left(\frac{SUPP_{st}}{TOTALSUPP_{it}}\right)^2$	Compustat customer-segment file
MKTPOWER	We first calculate the Lerner index as operating profits (before depreciation, interest, special items and taxes) over sales. Then we define $SPOWER_{it}$ as, $SPOWER_{it} = 1 - \sum_{s=1}^{N} \left(\frac{SUPP_{st}}{TOTALSUPP_{it}} \times LINDEX_{st}\right)$ Then, we define MKTPOWER as $\log(1 + SPOWER_{it})$	Compustat customer-segment file
Supply Chain Power (SCP)	SCP is constructed as the first principal component based on a principal component analysis (PCA) using NUMSAPP, SDISPERSION and MKTPOWER.	
Customer Firm Reliance	Total purchases from all Compustat-listed manufacturing sector suppliers that record the current firm as (one of) their principal customer(s), as a proportion of Cost of Goods Sold of the customer firm	Compustat
Managerial Ability	MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Data is made available at the author's personal website - https://peterdemerjian.weebly.com/managerialability.html	Author personal website
Size	Natural Logarithm of total assets	Compustat
Cash Ratio	Total cash to total book value of assets	Compustat
R&D to Sales	Research and development expenses to total sales	Compustat
Return on Asset (ROA)	Operating income before depreciation to the total book value of assets	Compustat
Leverage	Long-term (total) debt plus current (total) liabilities to the total book value of assets	Compustat
Asset Tangibility	Net property, plant and equipment/total assets	Compustat
CAPEX Ratio	Capital expenditures to the total book value of assets	Compustat
CEO Tenure	Natural logarithm of the number of years as CEO of the firm	Execucomp
Net CSR	CSR strengths and concerns scores across five dimensions in the KLD database (community, diversity, environmental protection, employee relations and product quality) are calculated as the ratio of strengths (concerns) values to the total number of strengths (concerns) indicators. Afterwards, Net CSR is calculated as the difference between CSR strengths score and the CSR concerns score	MSCI KLD

Corporate Innovation (Patent)	Natural logarithm of one plus the total number of patent a firm filed in a filing year	KPSS
Corporate Innovation (Citation)	Natural logarithm of one plus the total number of citations a firm received from the patents it filed in a filing year	KPSS
R&D Input	R&D scaled by book assets.	Compustat
Trade Payable (AP/TA)	Accounts payable to total assets	Compustat
State-level Variables		
College	The percentage of the population holding a college degree in the US state where a sample firm is headquartered	US Census Bureau
Per Capita Personal Income	The natural log of annual per capita personal income in a given US state	St. Louis FED
Unemployment Rate	Average unemployment rate (in percentage) over the 12 months in a given year for a given US state	St. Louis FED
House Price Index	Average all-transactions house price index over the four quarters in a given year for a given US state. The index equals 100 in the first quarter of 1980.	St. Louis FED
Crime Rate	The natural log of total number of reported crimes per 100,000 people in a given year for a given US state.	FBI Uniform Crime Reports
Country-level Variables		
Unemployment Rate	Unemployment rate refers to the share of the labor force that is without work but available for and seeking employment.	World Bank
Inflation Rate	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.	World Bank
GDP Growth	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars.	World Bank

Appendix B2: Baseline Regression with the Inclusion of Market and Economic Control Variables

This table reports the baseline regression results with regard to managerial ability on supply chain power (SCP) measures, with the inclusion of some market and economic control variables to pick up variability ignored by year fixed effect. The dependent variable in models 1-3 and 5-6 are the individual components of supply chain power, (1) NUMSAPP - Log (1+Number of Suppliers), capturing the thickness of the supply chain; (2) SDISPERSION - input-based Herfindahl index, capturing supplier dispersion and (3) MKTPOWER - input-weighted Lerner's index, capturing the firm's market power over its suppliers, respectively. The dependent variable in models 4 and 8 is the composite Supply Chain Power (SCP) index, constructed as the first principal component from a principal component analysis consisting of the three previous measures. The key independent variable for models 1-8 is Managerial ability, proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Models 1-4 include industry fixed effect and models 5-8 include firm fixed effect. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	NUMSUPP	SDISPERSION	MKTPOWER	SCP	NUMSUPP	SDISPERSION	MKTPOWER	SCP
Managerial Ability	0.3692***	0.2402***	0.0070	1.5110***	0.1303***	0.0656***	0.0142	0.4973***
	(0.000)	(0.000)	(0.721)	(0.000)	(0.000)	(0.000)	(0.546)	(0.000)
Tobin's Q	-0.0004	0.0010	-0.0044**	0.0039	0.0005	0.0010	-0.0036	0.0063
	(0.786)	(0.527)	(0.045)	(0.592)	(0.751)	(0.613)	(0.212)	(0.472)
Book Leverage	-0.0994***	-0.0750***	-0.0120	-0.4173***	-0.0214	-0.0267	-0.0116	-0.1476*
	(0.000)	(0.000)	(0.421)	(0.000)	(0.153)	(0.144)	(0.595)	(0.068)
Asset Tangibility	0.0497***	0.0738***	-0.0330*	0.2758***	0.1574***	0.1908***	-0.1248***	0.8139***
	(0.002)	(0.000)	(0.079)	(0.000)	(0.000)	(0.000)	(0.003)	(0.000)
Current Ratio	-0.0100***	-0.0096***	-0.0077***	-0.0467***	-0.0092***	-0.0078***	0.0024	-0.0404***
	(0.000)	(0.000)	(0.004)	(0.000)	(0.000)	(0.002)	(0.551)	(0.000)
Firm Size	0.0979***	0.0749***	0.0023	0.4168***	0.0959***	0.0648***	0.0275***	0.3914***
	(0.000)	(0.000)	(0.152)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
HHI	0.0251	0.0210	0.0539**	0.0931	-0.1057***	-0.1011***	0.0026	-0.4952***

	(0.262)	(0.363)	(0.030)	(0.324)	(0.000)	(0.000)	(0.911)	(0.000)
Unemployment Rate	0.0105***	0.0048***	0.0100***	0.0364***	0.0128***	0.0063***	0.0085***	0.0460***
	(0.000)	(0.006)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
GDP Growth	0.0112***	0.0124***	-0.0048**	0.0538***	0.0035**	0.0036**	0.0017	0.0145**
	(0.000)	(0.000)	(0.042)	(0.000)	(0.020)	(0.045)	(0.418)	(0.047)
Inflation Rate	0.0122***	0.0100***	-0.0005	0.0583***	0.0034*	0.0018	0.0045	0.0165*
	(0.000)	(0.000)	(0.897)	(0.000)	(0.076)	(0.446)	(0.142)	(0.094)
Constant	-0.3431***	-0.4669***	0.3209***	-3.7082***	-0.3123***	-0.3649***	0.1152**	-3.4160***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.026)	(0.000)
Observations	10,392	10,392	10,392	10,030	9,900	9,900	9,900	9,550
Adjusted R-squared	0.5475	0.3959	0.1365	0.5044	0.8034	0.6324	0.4842	0.7569
Mean VIF	1.23	1.23	1.25	1.23	1.23	1.23	1.25	1.23
Industry FE	YES	YES	YES	YES	NO	NO	NO	NO
Firm FE	NO	NO	NO	NO	YES	YES	YES	YES

Appendix B3: Baseline Regression with the Inclusion of CEO Characteristics (Tenure) as Control Variable

This table reports the baseline regression results with regard to managerial ability on supply chain power (SCP) measures, with the inclusion of CEO characteristics i.e., CEO Tenure as control variable to pick up variability not captured by the managerial ability measure. The dependent variable in models 1-3 and 5-6 are the individual components of supply chain power, (1) NUMSAPP - Log (1+Number of Suppliers), capturing the thickness of the supply chain; (2) SDISPERSION - input-based Herfindahl index, capturing supplier dispersion and (3) MKTPOWER - input-weighted Lerner's index, capturing the firm's market power over its suppliers, respectively. The dependent variable in models 4 and 8 is the composite Supply Chain Power (SCP) index, constructed as the first principal component from a principal component analysis consisting of the three previous measures. The key independent variable for models 1-8 is Managerial ability, proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Models 1-4 include year and industry fixed effects and models 5-8 include year and firm fixed effects. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	NUMSUPP	SDISPERSION	MKTPOWER	SCP	NUMSUPP	SDISPERSION	MKTPOWER	SCP
Managerial Ability	0.3194***	0.2251***	0.0200	1.2883***	0.1333***	0.0712***	0.0459*	0.4444***
	(0.000)	(0.000)	(0.413)	(0.000)	(0.000)	(0.009)	(0.077)	(0.000)
Tobin's Q	0.0059**	0.0077***	-0.0069**	0.0353***	0.0013	0.0038	-0.0029	0.0167
	(0.010)	(0.001)	(0.011)	(0.001)	(0.546)	(0.170)	(0.295)	(0.131)
Book Leverage	-0.1653***	-0.1082***	-0.0109	-0.6769***	-0.0574**	-0.0376	0.0272	-0.2973**
	(0.000)	(0.000)	(0.641)	(0.000)	(0.021)	(0.231)	(0.363)	(0.018)
Asset Tangibility	0.0377	0.0730***	-0.0330	0.2702**	0.1950***	0.1817***	-0.0563	0.9435***
	(0.104)	(0.003)	(0.217)	(0.013)	(0.000)	(0.001)	(0.269)	(0.000)
Current Ratio	-0.0197***	-0.0174***	-0.0074**	-0.0893***	-0.0064**	-0.0054	-0.0008	-0.0280*
	(0.000)	(0.000)	(0.030)	(0.000)	(0.038)	(0.176)	(0.850)	(0.081)
Firm Size	0.1295***	0.0932***	0.0053**	0.5333***	0.1013***	0.0613***	0.0277***	0.3930***
	(0.000)	(0.000)	(0.045)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
CEO Tenure	-0.0066	-0.0021	-0.0126***	-0.0218	0.0112**	0.0145**	-0.0118*	0.0615**

	(0.111)	(0.634)	(0.009)	(0.273)	(0.041)	(0.033)	(0.065)	(0.027)
Constant	-0.4684***	-0.5381***	0.3788***	-4.1497***	-0.3385***	-0.3512***	0.1618**	-3.4288***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.011)	(0.000)
Observations	5,252	5,252	5,252	5,092	5,126	5,126	5,126	4,695
Adjusted R-squared	0.5933	0.4128	0.1648	0.5398	0.8177	0.6359	0.5005	0.7689
Mean VIF	1.20	1.21	1.20	1.20	1.20	1.21	1.20	1.20
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	NO	NO	NO	NO
Firm FE	NO	NO	NO	NO	YES	YES	YES	YES

Appendix B4: Channel Analysis – R&D Input (R&D scaled by Book Value of Assets) as a Proxy for Corporate Innovation

This table reports the regression results with regards to firm's innovation performance as the channel effect of managerial ability on supply chain power. The dependent variable in models 1-6 is the composite Supply Chain Power (SCP) index. Corporate innovation is measured by R&D input, proxied through R&D scaled by book value of assets. Model 1 and 2 present the results with the inclusion of industry and firm fixed effects, respectively. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P-values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable: SCP	(1)	(2)
High Managerial Ability X R&D to Asset	5.3822***	1.5246*
	(0.000)	(0.098)
R&D to Asset	1.7465***	0.5913
	(0.000)	(0.185)
High Managerial Ability	0.4689***	0.2143***
	(0.000)	(0.000)
Tobin's Q	0.0562***	-0.0110
	(0.000)	(0.139)
Book Leverage	-0.1575**	-0.1014
	(0.017)	(0.159)
Asset Tangibility	1.2248***	0.8972***
	(0.000)	(0.000)
Current Ratio	-0.1952***	-0.0306***
	(0.000)	(0.007)
Firm Size	0.0050***	0.0023***
	(0.000)	(0.000)
Unemployment Rate	0.02898***	0.0105*
	(0.000)	(0.087)
GDP Growth	0.0635***	0.0036
	(0.000)	(0.609)
Inflation Rate	0.1183***	-0.0127
	(0.000)	(0.184)
Constant	-1.3841***	-0.5056***
	(0.000)	(0.000)
Observations	10,831	10,299
Adjusted R-squared	0.6663	0.9066
Mean VIF	1.67	1.67
Year FE	YES	YES
Industry FE	YES	NO
Firm FE	NO	YES

Chapter 4: Managerial Ability and Trade Credit

Abstract

This chapter investigates how firms managed by executives with superior ability can extract greater trade credit from their suppliers. Our results document a positive association between managerial ability and the trade credit received by a firm. These results are robust to two-stage least squares (2SLS) regressions using instrumental variables, mitigating endogeneity concerns. We identify that engagement in socially responsible activities by higher ability managers works as a channel that leads to receiving higher trade credit from their suppliers. Cross-sectional analysis demonstrates that the positive association is stronger for higher ability managers in major customer firms and during economic recessions. We provide evidence that higher ability managers use trade credit to outgrow their industry competitors and improve their product market performance while preserving more cash in hand by reducing trade receivables.

Keywords: Managerial Ability, Trade Credit Policies

JEL Classifications: G00, G30, G32

1. Introduction

Trade credit is one of the most crucial liquidity sources for inter-firm commerce, financing about $1.5 trillion of assets, on average, in the 1990s and standing at almost 1.3 times larger than bank loans (Ng et al., 1999, Rajan and Zingales, 1995, Yang and Birge, 2018). According to the US Flow of Funds Account data, trade payables and receivables for non-financial corporate businesses grew by almost 434% and 325%, respectively, over a 32 year period from 1985 - 2017 (Jory et al., 2020). Following the 2009 Global Financial Crisis, the strong decline in short-term bank loans was compensated for by rising use of trade credit (Ferrando and Mulier, 2013). The total dollar value of accounts payable on nonfinancial US business sectors' aggregate balance sheets was three times as high as bank loans, and 15 times as high as commercial paper (Barrot, 2016). According to the resource-based theory of the firm, managers drive efforts to maximize value through the creation of resource bundles that enable novel contributions, e.g., producing outputs of greater utility or at reduced unit cost (Holcomb et al., 2009, Lepak et al., 2007). Firms can look to generate a sustainable competitive advantage based on a manager's ability to effectively use valuable firm resources (Barney et al., 2001). The ability of managers to manage resources and synchronize managerial processes is heterogeneous; higher ability managers can lead towards superior bundling and deployment of resources (Hansen et al., 2004, Lippman and Rumelt, 2003). Though resource heterogeneity can have latent potential for value creation, significant variation can still exist because of varying managerial ability to extract latent value from firm resources. Even though the term managerial ability itself is difficult to define, it usually derives from experience and is tacit in nature, therefore making it difficult to imitate, but it significantly affects the level of value creation through optimized operational processes (Hitt et al., 2001, Kor, 2003, Peteraf, 1993, Holcomb et al., 2009). Superior managers looking for efficient

management of resources seek out higher trade credit, given its importance in inter-firm commerce. We hypothesize that a higher ability managers can procure greater trade credit from their suppliers as a way to extract greater resources. However, developing measures for manager-specific features, i.e., ability, talent or style, has been problematic in the past, since many of the measures consider aspects of the firm that are typically out of the management's direct control, e.g., media mentions and abnormal stock returns. In this study, we use the Data Envelopment Analysis (DEA)-based Managerial Ability measure developed by Demerjian et al. (2012) that centres on managers' revenue-generating efficiency. This measure is aligned more with a firm's overarching goal of profit-maximization and is considerably within a manager's control. This study's focus is to explore whether superior managers, determined by their efficient use of corporate resources, can access greater trade credit from their suppliers.

Though prior literature has identified trade credit to be positively associated with enhanced firm performance, stock returns and competitiveness, reduced information asymmetry and contribution to the growth of the industry (Fisman and Love, 2003, Hill et al., 2012, Molina and Preve, 2009), there is a lack of research that looks at how managerial ability affects trade credit decisions. Managers with superior knowledge of factor markets can select valuable resources and negotiate their use on much more favourable terms than their rivals (Makadok, 2001). Superior ability managers typically are more efficient than their industry peers in transforming firm resources to revenue. They have a better understanding of technology and industry trends, are better at forecasting product demand and are more efficient in managing employees than less able managers. More able managers are also highly knowledgeable on their client base, therefore have a sounder understanding of their firm's operating environment enabling proper alignment of managerial decisions with trade credit policies (Demerjian et al., 2012, Demerjian et al., 2013).

Moreover, high managerial ability acts as a guarantee that vouches a firm's quality to outside markets to secure better credit deals because such managers can convey their firm's intrinsic value more credibly to outsiders, leading to reduced informational asymmetry in equity markets. Firms with higher management quality and reputation also attract more reputable underwriters when they decide to go public (Chemmanur and Paeglis, 2005). Lastly, higher ability managers with better knowledge of the firm and industry trends are likely to be more effective in bundling and deploying resources than their competitors, leading to superior value creation through well-designed strategies (Hansen et al., 2004, Lippman and Rumelt, 2003, Miller, 2003). Based on these arguments, we posit that firms with higher ability managers will be able to secure greater trade credit from their suppliers.

Though prior research has used various measures to account for manager-specific features (talent, style, ability), most of these proxies consider various characteristics of the firm that are beyond management's control (such as media mentions, abnormal stock returns and CEO tenure and pay) (Fee and Hadlock, 2003, Rajgopal et al., 2006, Tervio, 2008, Milbourn, 2003). However, it is generally acknowledged that these measures contain noise and are not easily attributable solely to the manager. Few studies have used DEA to measure managerial talent for firms in a single industry, focusing on industries such as consumer goods, banking and insurance, and mutual funds (Leverty and Grace, 2012, Murthi et al., 1997, Murthi et al., 1996). Compared with these various measures, Demerijian's (2012) managerial ability measure extends across industries, is less noisy and has an economically significant association with manager fixed effects. Studies using this measure of managerial ability have found positive associations with tax savings (Koester et al., 2017), better earnings quality (Demerjian et al., 2013), income smoothing (Baik et al., 2020), innovation success (Chen et al., 2015) and higher credit rating (Bonsall IV et al., 2017). Moreover,

an acquiring firm's managerial ability is positively related to announcement period returns, post-merger operating performance, and it avoids adverse information asymmetry effects through higher earnings smoothing (Doukas and Zhang, 2020).

We empirically test our hypothesis using a large sample of US non-financial firms. We consider two alternative proxies for trade credit for the customer firms: the ratios of accounts payable to cost of goods sold (AP/COGS) and accounts payable to total assets (AP/TA). To proxy for managerial ability, we use Demerijian's (2012) managerial ability measure using DEA methodology[5]. Though other managerial ability proxies based on past stock returns or ROA can be affected by both firm and management specific factors, Demerjian's measure modifies the DEA-generated measure by purging it of key firm-specific characteristics that could affect management's efforts. Data for trade credit and other control variables are Compustat. Our baseline results support our hypothesis that managerial ability has a positive, statistically significant relationship with trade credit proxies, implying that firms with higher ability managers can increase their payables and receive more credit from their suppliers.

Our cross-sectional analysis highlights the role of superior managers in major customer firms (identified as representing more than 10% of a supplier's revenue) in extracting greater trade credit, which has a significantly pronounced impact on their performance, with a potential threat to their supplier's existence if these customers default (Hertzel et al., 2008, Jacobson and Von Schedvin, 2015). Therefore, these suppliers are more likely to grant more trade credit to these important customers to uphold their business relationship and ensure their financial stability. In

[5] To formulate Demerijian's (2012) managerial ability proxy, a measure of firm efficiency using firm-specific characteristics (e.g., size) and management-specific characteristics (e.g., ability to assess industry trends) is derived. To isolate manager-specific effects, the firm-level measure is regressed on market share, size, the number of firm segments and foreign operations, and firm fixed effects. The residual from this regression is the measure of managerial ability.

addition, during economic crises and monetary tightening, bank lending contraction leads to a higher dependency on trade credit (Nilsen, 2002, Meltzer, 1960, Mateut et al., 2006). Our cross-sectional analysis shows that higher ability managers can gain more trade credit in economic recessions. Furthermore, the relationship between trade credit and managerial ability is more pronounced when customer firms run by higher ability managers are engaged more in corporate social responsibility (CSR). Suppliers of trade credit value socially responsible customers more, since CSR activity signals more trustworthiness to meet financial obligations, higher growth prospects and provides an insurance-like protection in meeting payments against prospective negative shocks (Lev et al., 2010, Godfrey et al., 2009, Zhang et al., 2020). Firms run by higher ability managers conduct more socially responsible activities and fewer socially irresponsible activities (Yuan et al., 2019). Our results support these expectations, since more socially responsible firms led by higher ability managers receive more trade credit.

We further establish that this extraction of high trade credit by better quality managers is associated positively with the firm's product market performance by outgrowing its industry competitors as measured by the firm's sales growth relative to industry sales growth (Campello, 2003). Better ability managers can design strategies that bundle and deploy resources to create more value and increase resource productivity than their rivals (Hansen et al., 2004, Lippman and Rumelt, 2003, Miller, 2003). To identify such an outcome of superior managers extracting more trade credit, we focus on a practical measure that summarizes the information from the combined effects of pricing and other competitive strategies. Firm's sales growth relative to industry sales growth reflects how pricing decisions affects a firm's competitive behaviour, because it incorporates information from pricing and other market strategies in gaining a larger share of industry sales (Campello, 2003). Higher ability managers can better use their greater extraction of

trade credit to outgrow their competitors. Lastly, we show that higher ability managers value cash holding more and provide less credit to its final customers as trade receivables. All this evidence provides a strong positive association between managerial ability and trade credit.

Our empirical findings could be driven by latent firm characteristics or omitted correlated variables, therefore we face endogeneity concerns affecting the causality behind the positive association found between managerial ability and trade credit. To address these endogeneity concerns, we use a two-staged least squared (2SLS) regression analysis using two instrumental variables, mean MSA managerial ability and proportion of state population holding a college degree. We also use a difference-in-differences research design using forced CEO turnovers as a robustness test. These tests further substantiate the positive relationship between managerial ability and trade credit.

Our study makes significant contributions to three strands of literature. First, this study adds to the literature on managerial ability and its impact on corporate financial policies. Previous studies have studied the impact of managerial ability on a range of issues such as management earnings forecasts, income smoothing, credit risk assessment, lending contracts, earnings quality and corporate tax avoidance (Baik et al., 2020, Baik et al., 2011, Bonsall IV et al., 2017, Bui et al., 2018, Demerjian et al., 2013, Koester et al., 2017). Secondly, our empirical evidence adds to the trade credit literature because it explores an important factor behind the surging volume of trade credit, by providing support behind the signalling hypothesis as suppliers providing greater trade credit to customers run by high ability managers signals positively to banks, leading to greater access to cheaper bank credit (Zhang et al., 2020, Petersen and Rajan, 1997, D'Mello and Toscano, 2020, Box et al., 2018). It also adds to the largely unexplored research area behind CEOs and trade credit financing decisions. Upper echelon theory implies that decisions made by the most powerful

actors in a firm (i.e., the top executives) resemble their values and cognitive processes (Hambrick and Mason, 1984). Though there has been many studies on how executives' characteristics can explain variation in corporate policies, to the best of our knowledge, only one study has explored the impact of such characteristics on trade credit (Xu et al., 2021). However, the focus of that study was on the role of CEO's sensation-seeking characteristics, whereas this study focusses more on a CEO's ability to efficiently manage firm resources according to the resource-based theory of the firm. This study adds to the literature on how executives' ability to manage resources efficiently determines the trade credit policy of their firm.

The remainder of the chapter is organized as follows. Section 2 reviews the relevant literature and develops testable hypotheses. Section 3 describes the key variables and data sources, followed by the research design and the descriptive statistics. Section 4 presents the baseline results and the robustness tests to mitigate endogeneity concerns, followed by channel analysis in section 5. Section 6 presents additional robustness tests and section 7 concludes the chapter.

2. Literature Review and Hypothesis Development

Almost 80% US firms offer their products on credit (Tirole, 2010), with recent studies identifying accounts payable and receivables to be worth over 10% and 16%, respectively, of a firm's assets (Freeman, 2020, D'Mello et al., 2020, Petersen and Rajan, 1997). Research on 34 countries shows that trade credit accounts for almost a quarter of an average firm's total liabilities, therefore, playing a crucial role in inter-firm finance (Levine et al., 2018). A typical firm receives trade credit by procuring materials and services from its suppliers on credit and the same firm extends trade credit to its customers by selling its final goods and services on receivables. In this customer-supplier spectrum, customers are important for suppliers to thrive and grow their business operations; a strong relationship between customers and suppliers benefits both parties.

From a supplier perspective, having significant customers can benefit it in the form of reduced selling, general and administrative expenses, enhanced operating efficiencies and asset utilization (Ak and Patatoukas, 2016, Patatoukas, 2012), lower audit complexity and fees (Krishnan et al., 2015) and certifying supplier project quality (Johnson et al., 2010). Such a strong relationship also benefits customers since their suppliers are likely to prioritize their requests and predominantly allocate materials and capacity to customer demands (Pulles et al., 2014). Based on this mutually beneficial relationship, it makes sense for suppliers to extend trade credit to their customers because they hold a lending advantage over financial institutions, arising from access to better information, lower borrower opportunism and liquidation advantage (Biais and Gollier, 1997, Burkart and Ellingsen, 2004, Fabbri and Menichini, 2010).

Despite the high implied cost of trade credit, research shows evidence of a positive correlation between trade credit use and the quality of a firm's investments. The effect is stronger when firms are led by economically motivated CEOs (Aktas et al., 2012). However, prior studies mostly hold the general assumption that managers are homogenous entities, largely ignoring the impact of managerial ability on firm policies. Moreover, the ability of executives in efficiently managing resources could be positively related to extracting trade credit for a variety of reasons. According to the resource based view of the firm, managerial ability is an important determinant of value creation and firm performance (Barney, 1991). Top management focused on the efficient management of corporate resources by setting the "tone at the top" (Bertrand and Schoar, 2003), could look to conserve cash flows by availing trade credit from suppliers with the intention of paying back at a later period, particularly after the sale of those goods and services. Superior managers with in-depth knowledge of factor markets should be able to select valuable resources and negotiate more favourable terms than their competitors (Makadok, 2001). Higher ability

managers are more knowledgeable about updated technology and industry trends, better at predicting product demand and possess a comprehensive understanding of the firm's operating environment, which would enable them to properly align managerial decisions with trade credit policies (Demerjian et al., 2013, Demerjian et al., 2012). Most importantly, their understanding of the firm and industry trends leads them towards more effective bundling and deploying of resources than their competitors, which would ultimately lead them towards greater value creation through well-designed strategies while reducing informational asymmetry to outside investors (Hansen et al., 2004, Lippman and Rumelt, 2003, Miller, 2003, Chemmanur and Paeglis, 2005).

In an effort to develop a quantitative measure for the top management team's unobservable characteristics, i.e., knowledge, skills and experience, managerial ability is a term that is frequently seen in the literature. As executives' ability to efficiently manage resources is not directly observable, ability must be inferred from observable outcomes of executives' resource allocation decisions. Prior studies used 'noisy' proxies that are not directly attributable to managers, e.g., prior industry-adjusted stock returns; the CEO's financial press visibility (through past media mentions); and CEO tenure and executive pay to proxy managerial ability (Fee and Hadlock, 2003, Rajgopal et al., 2006, Tervio, 2008, Milbourn, 2003). In contrast, Demerijian's (2012) managerial ability measure extends across industries, is less noisy and has an economically significant association with manager fixed effects. Demerijian's measure quantifies managerial ability based on a manager's efficiency (relative to their industry peers) in converting managed resources into revenue, therefore aligning a manager's ability to generate revenue with the goal of profit maximization and the resource-based theory of the firm.

Higher ability managers are more knowledgeable about their stakeholders and macro-economic conditions with regard to estimating potential bad debt expenses and in synthesizing

information for reliable forward-looking estimates on product demand and industry trends than their industry peers (Demerjian et al., 2013, Demerjian et al., 2012). They are also more efficient in transforming firm resources to revenue by developing strategies that bundle and deploy the resources better than their competitors (Hansen et al., 2004, Lippman and Rumelt, 2003). Therefore, we hypothesize that firms with higher managerial ability are able to access greater trade credit from their suppliers:

Hypothesis 1: Firms with higher managerial ability are able to access higher trade credit.

3. Data and Variables

3.1. Data

We collect unbalanced firm-level panel data from 1980-2019 to examine the relationship between managerial ability and trade credit. We obtain accounting data from Compustat for constructing trade credit and other control variables. We obtain the publicly available dataset on managerial ability[6], provided by Demerjian (2012). After merging these two datasets and excluding the utility sector (SIC code: 4900-4990) and financial industry (SIC code: 6000-6990) for the regulated and different nature of their industries, our final sample consists of 111,849 firm-year observations. All the variables are winsorized at the 1st and 99th percentile.

3.2. Variables

Data from Compustat are used to measure the primary dependent variable of this study, trade credit. We require firms to have valid information about accounts payable (AP) in Compustat. We use two proxies for trade credit received by customer firms. The first is accounts payable (AP) scaled by the cost of goods sold (AP/COGS). This particular measure implicitly

[6] The managerial ability (MA-score) data are available at: https://peterdemerjian.weebly.com/managerialability.html

controls for fluctuations in operating activities under varied economic conditions (Love et al., 2007, Chemmanur and Toscano, 2019, D'Mello and Toscano, 2020). The second measure we use for trade credit is accounts payable (AP) scaled by total assets (AP/TA). This measure allows us to examine a customer firm's use of trade credit from an operational perspective instead of a firm-wide financial view. It also allows us to avoid the noise generated from variations in a firm's unique corporate finance policies (Chen et al., 2017).

We use the measure of managerial ability (MA score) developed by Demerjian et al. (2012) as our primary independent variable. This measure is estimated first by estimating firm efficiency within industries, by comparing firm sales conditional on the following inputs used by the firm: Cost of Goods Sold, Selling and Administrative Expenses, Net Operating Leases, Net R&D, Net PP&E, Purchased Goodwill and Other Intangible Assets. However, the DEA estimated efficiency measure can be attributed to both the firm and the manager, therefore it contains 'noise' like other managerial ability measures such as more able managers predicting trends (regardless of firm size) and bigger firms negotiating better terms with suppliers regardless of manager quality. As a result, Demerjian et al. (2012) modifie the DEA-generated efficiency measure by purging it of key firm-specific characteristics that could aid or hinder management's efforts, such as firm size and age, market share, positive free cash flow and a complex international and multi-segment operations. These firm-level variables are included as independent variables in a Tobit-regression with the DEA-generated efficiency scores; the residual from the estimation is considered the measure of managerial ability. This residual is attributed to the management team and is validated by a number of tests in Demerjian et al. (2012). This measure has been extensively used in accounting (Baik et al., 2011, Demerjian et al., 2012, Demerjian et al., 2013, Baik et al., 2020, Koester et al., 2017)

and finance literature (Albuquerque et al., 2013, De Franco et al., 2017, Bui et al., 2018, Doukas and Zhang, 2021). The dataset is publicly available from the researcher's personal website.

We control for a host of firm-specific determinants of trade credit as noted in previous literature, to reduce the probability that managerial ability will capture the effect of these characteristics on trade credit (D'Mello and Toscano, 2020, Zhang et al., 2020). These controls include firm size, cash ratio, R&D to sales, profitability (proxied by Return on Assets), leverage and CAPEX ratio. Moreover, to address market and economic conditions that may influence customer's supply chain power and may not be picked up by year fixed effects, we include some additional control variables i.e., industry Herfindahl–Hirschman Index (HHI), US unemployment rate, inflation rate and GDP growth rate and re-estimate the baseline regressions. Furthermore, to control for CEO characteristics that may also impact supply chain power and not captured by the managerial ability measure, we include CEO tenure as an additional control. All control variables are defined in the appendix and winsorized at the 1st and 99th percentile.

3.3. Research Model

To test our hypothesized relationship between managerial ability and trade credit, we estimate the following model:

$$Trade\ Credit_{i,t} = \beta_0 + \beta_1 Managerial\ Ability_{i,t} + Controls_{i,t} + YEAR\ FE + FIRM\ (INDUSTRY) + \varepsilon_{i,t}$$

where: subscripts *i* and *t* relate to firm and year, respectively. We use the two trade credit proxies, AP/COGS and AP/TA, as the dependent variables and managerial ability, as measured by Demerjian (2012), as the key independent variable and proxy for managerial ability. Since trade

credit varies across industries and changes over time (Petersen and Rajan, 1997, Love et al., 2007, Ng et al., 1999), we include both year and industry fixed effects to control for time-invariant industrial factors and time-varying unobservable factors. In addition, we include firm fixed effects to capture the average impact of unobservable time-invariant firm characteristics, consistent with previous research on managerial ability (Koester et al., 2017). If H1 holds, then we expect the coefficient β_1 to be positive.

3.4. Summary Statistics

[INSERT TABLE 1 HERE]

Table 1 presents the descriptive statistics of the study's main variables. The means of AP/COGS and AP/TA are approximately 19% and 11%, with the medians being 19% and 9%, respectively. This indicates the critical role trade credit plays as a financing source for firm operations. Though these figures are comparably less than those reported in some previous trade credit literature (Zhang et al., 2020), the differences could be attributed to the different time periods of the studies. Most previous studies have data starting from around 1992, whereas this study goes back to 1980, a time period when trade credit was still gaining prominence as a source of financing for firm operations. As a result, our study's figures are more similar to studies that analysed data from the 1980s (D'Mello and Toscano, 2020). The mean value of managerial ability is 0.01, with a standard deviation of 0.09. These values are similar to those reported in previous studies (Koester et al., 2017, Demerjian et al., 2012).

[INSERT TABLE 2 HERE]

We report the correlation matrix in Table 2. Correlations between the variables of the regression models do not show significant variations and the presence of potential multicollinearity issue. Among the control variables, only one single pair (ROA and R&D to sales) show a significant

negative correlation (-0.6126). We further verify by checking the variance inflation factors (VIFs) and report the mean VIFs for all major regression models. Mean VIFs do not exceed 2.0 across the models, confirming the absence of multicollinearity in our results.

4. Results

4.1. Baseline Regression

The results of the baseline OLS regression are presented in Table 3. We report the results for the first trade credit proxy, AP/COGS, as the dependent variable in columns 1 and 2, and the second proxy, AP/TA, in columns 3 and 4. Models 1-4 include year fixed effects. Models 1 and 3 report the results with the inclusion of industry fixed effects and models 2 and 4 include firm fixed effects to separate the effects of unobservable time-invariant firm (manager) characteristics. We include heteroscedasticity-robust standard errors clustered at the firm and year level in all the regressions to draw statistical inference.

[INSERT TABLE 3 HERE]

Across models 1-4, the coefficients of our primary independent variable of interest, managerial ability, are positive and statistically significant at the 1% level. For models 1 and 3, with year and industry fixed effects holding all else equal, one standard deviation increase in managerial ability increases the average firm trade credit compared with the cost of goods sold (AP/COGS) by 14.54% ((0.3069 X 0.09 X 100)/0.19) and trade credit compared with total assets (AP/TA) by 6.97% ((0.0852 X 0.09 X 100)/0.11). However, with the exclusion of firm fixed effects, these coefficients reflect cross-sectional variation between firms (managers). To remove cross-firm variation in each variable and identify the association between our variables of interest arising from variation in firm characteristics across time, we review the results from models 2 and 4 after including firm fixed effects. In such cases, one standard deviation increase in managerial

ability increases average firm trade credit compared with the cost of goods sold (AP/COGS) by 7.51% and trade credit compared with total assets (AP/TA) by 4.35%. The inclusion of firm fixed effects raises the adjusted R^2 from 21.80% to 61.44% for AP/COGS and 30.68% to 71.20% for AP/TA. These figures highlight that stationary characteristics varying across firms explain a significant portion of trade credit variations, providing empirical evidence in support of H1.

Our control variables: size, cash ratio, ROA, leverage and CAPEX ratio, retain a consistent relationship with our dependent variables. Firms that are smaller, suffering from liquidity issues, are less profitable, highly leveraged and greater CAPEX ratio continue to have a positive relationship with trade credit, as in the literature in this area (D'Mello and Toscano, 2020, El Ghoul and Zheng, 2016). Though it seems alarming that customer firms with lower liquidity levels continue to access greater trade credit, suppliers could still continue to grant credit because they possess superior credit assessment of the customers from their normal course of operations such as supplier representatives repeatedly visiting customer premises to check their credit-worthiness (Mian and Smith Jr, 1992, Smith, 1987). Only the coefficient signs for R&D to sales appear inconsistent in our baseline analysis, with positive signs in models 1-2 (AP/COGS as the dependent variable) and negative signs in models 3-4 (AP/TA as the dependent variable). All control variables show coefficients that are significant across models 1-4. To further address market or economic conditions and CEO characteristics such as tenure impacting supply chain power and not being captured by year fixed effect or the managerial ability measure, we re-estimate our baseline models with the inclusion of several control variables i.e., US unemployment and inflation rate, GDP growth, industry Herfindahl–Hirschman Index (HHI) based on sales and CEO tenure. Results reported in appendix C2 and C3 provides consistent findings to our baseline findings, ensuring

additional robustness to our primary association between managerial ability and supply chain power.

4.2. Mitigating Endogeneity Bias

Our baseline results indicating a positive relationship between managerial ability and trade credit could be driven by latent firm characteristics or omitted correlated variables, and might not indicate a causal effect of managerial ability on trade credit. To address this potential endogeneity concern, we conduct 2SLS regression analysis using two instrumental variables.

4.2.1. Instrumental Variable – Mean MSA Managerial Ability

We consider instrumental variables to assess the causality in our hypothesized relationship with trade credit. For a variable to be considered an instrument, it needs to be related to managerial ability but unrelated to a firm's trade credit policies. The first instrument we consider is the availability of high-ability managers in the customer firm's local labour market. We expect that a greater supply of higher-ability managers in the local labour market increases the likelihood of the firm's directors considering more high-ability managers in their hiring network that, ceteris paribus, should lead to a higher likelihood of employing high-ability managers (Demerjian et al., 2020). There is no particular theory that links the availability of high-ability managers in the local labour market with a firm's trade credit policies, satisfying the exclusion criterion for it to be considered a valid instrumental variable. We create the first instrumental variable as the average managerial ability of executives in each metropolitan statistical area (MSA). We match the firm headquarters zip code with each MSA to find the average managerial ability for its geographical location.

[INSERT TABLE 4 HERE]

Table 5 reports the results of the 2SLS regression analysis using Average MSA Managerial Ability as the instrumental variable. Columns 1 and 3 report the first stage regression outputs where the Average MSA Managerial Ability is regressed against the dependent variable, managerial ability, with all control variables and the inclusion of year and industry fixed effects. Columns 2 and 4 report the second stage regression outputs with the fitted managerial ability as the key independent variable using the two trade credit proxies (AP/COGS and AP/TA) as the dependent variables. Across the models, our instrument has a significantly positive coefficient.

We also conduct two diagnostic tests, i.e., the underidentification and weak instrument tests. Both tests, based on the critical values of Stock and Yogo (2005) and Cragg-Donald Wald F statistics, reject the null that the instrument is irrelevant and weak. Moreover, the second stage regression results demonstrate a statistically significant positive relationship between the instrumented managerial ability measure and trade credit. In summary, these results corroborate our hypothesized relationship and establish that differences in managerial ability instead of omitted firm characteristics, influence the differences in firms' trade credit.

4.2.2. Instrumental Variable - Proportion of State Population with College Degree

Empirical evidence suggests that a CEO's education background is positively associated with managerial ability (Berry et al., 2006, Chevalier and Ellison, 1999, Palia, 2000). Even though CEOs can be hired from overseas, research shows that the CEO labour market holds a domestic matching bias, with firms being five times more likely to hire local managers than expected (Yonker, 2017). Based on this argument and its use in a prior study (Bui et al., 2018), we assume a state-level demographic variable, College Degree, measured as the percentage of the state's population where a firm is headquartered holding a college degree, would serve as a reasonable proxy for the quality of the local CEO labour pool holding positive association with the managerial

ability of the firm. It is highly unlikely to directly affect the trade credit policies of a specific firm because it is a state-level demographic variable. We use additional state-level control variables such as per capital personal income, unemployment rate, house price and crime rate to alleviate concern that a college degree might capture the effect of other state-level variables that could affect trade credit. We collect the state-wide college degree data from US Census Bureau, crime rate data from FBI Uniform Crime Reports website and the other state-level variables from St. Louis FED website. Because of the lack of availability of data before 2010 from these sources, our sample period for this test is 2010 - 2019, significantly reducing the number of observations to 18,506.

[INSERT TABLE 5 HERE]

Table 6, Models 1-4 report the results of the instrumental variable regressions on the two proxies of trade credit, using 2SLS to estimate the coefficients. In models 1 and 3, we regress college degree as the key independent variable along with all the usual control variables from the baseline analysis and the four state-level controls introduced in this section. The coefficients for college degree are positive and statistically significant at the 10% and 1% levels, respectively. Like our previous instrumental variable analysis, our diagnostics tests reject the null that the instrument is irrelevant and weak. In models 2 and 4, we regress our trade credit proxies (AP/COGS and AP/TA) on the fitted values of managerial ability and all the firm and state-level control variables from the first stage regressions. The results show that coefficients on fitted managerial ability remain positive and statistically significant at the 1% level for both proxies. These results support our idea that high-ability managers can secure higher trade credit from their suppliers.

5. Cross-Sectional Variation Analysis

Our study has identified a consistently positive association between managerial ability and trade credit. We evaluate this relationship further by examining whether the cross-sectional evidence remains consistent when the customer firm managed by a superior ability manager is considered a major customer firm and the extraction of trade credit is during economic recessions.

5.1. Major Customer Status

In this cross-sectional analysis, we examine the effect of a customer firm's importance to its suppliers in the documented positive relationship between managerial ability and trade credit. SFAS No. 14 (before 1997) and SFAS No. 131 (after 1997) require suppliers (regardless of the number of segments operated) to disclose the presence of and sales to principal customers who represent over 10% of total firm revenue. Research has shown that these important customers capturing over 10% of suppliers' businesses have a significantly pronounced impact on their performance, with a potential threat to a supplier's existence if the customers default (Hertzel et al., 2008, Jacobson and Von Schedvin, 2015). It seems rational that suppliers would grant more trade credit to these important customers to uphold their business relationship and ensure their financial stability. In this regard, we hypothesize that superior ability managers should be able to extract even greater trade credit for their major customer firms than less able managers. To empirically test this hypothesis, we estimate an OLS regression for the following model:

$$
\begin{aligned}
Trade\ Credit_{i,t} &= \beta_0 + \beta_1 High\_Managerial\ Ability_{i,t} + \beta_2 Major\ Customer_{i,t} \\
&+ \beta_3 High\_Managerial\_Ability\ X\ Major\_Customer_{i,t} + Controls_{i,t} \\
&+ Year\ FE + FIRM\ (INDUSTRY)\ FE + \varepsilon_{i,t}
\end{aligned}
$$

We construct the firm-level major customer status data based on the Compustat customer-segment database. We identify customer firms listed as a major customer in this database and create a dummy variable, Major Customer, with a value of 1 if the sample firm is a major customer and zero otherwise. In our dataset, 11,827 observations (or 11.11% of all observations) belong to the major customers. We classify High Managerial Ability as a dummy variable equal to one for firms whose managerial ability score in a particular year is in the top quartile across all firms and zero otherwise. In this way, we can separate the effect of trade credit extraction for the top-tier managers with higher ability compared with their regular counterparts.

[INSERT TABLE 6 HERE]

Table 6 reports the results of the cross-sectional analysis. Models 1-4 report the results based on the regression model with AP/COGS as the dependent variable in the first two models and AP/TA as the dependent variable in the latter two. Models 1 and 3 examine the relationship with the inclusion of year and industry fixed effects for the two trade credit proxies as dependent variables. Models 2 and 4 include the year and firm fixed effects. The interaction term between high managerial ability and major customer is positive and statistically significant across all models. With firm fixed effects, a higher ability manager in a major customer firm can secure 7.22% and 4.37% more trade credit (for the two proxies) compared with firms that are considered ordinary customers for their suppliers in the models with year and firm fixed effects. These figures increase to 22.24% and 7.69% in models with year and industry fixed effects. These results further highlight the significant role of major customer firms in extracting greater trade credit from their suppliers compared with regular customers.

5.2. Trade Credit During Recession

We provide further robustness to the existing relationship between managerial ability and trade credit through this cross-sectional analysis of extracting trade credit during economic recessions. Research has shown that during economic crises and monetary tightening, bank lending contraction leads to a higher dependency on trade credit (Nilsen, 2002, Meltzer, 1960, Mateut et al., 2006). In the face of tighter monetary policies brought on by macro-financial shocks, trade credit promotes interfirm financing (Choi and Kim, 2005); firms rely more on credit from their suppliers (Love et al., 2007). Therefore, we hypothesize that during economic recessions when credit becomes difficult to access, higher ability managers will be able to extract greater trade credit to continue operating without experiencing any liquidity crunch. To test this conjecture, we create a dummy variable, Recession, equal to one when the data fiscal year is 1990, 1991, 2001, 2007, 2008 or 2009 and zero otherwise. These years are classified as recessionary periods based on the business cycle reference date documented by the National Bureau of Economic Research (NBER). We then run the following OLS regression model, with the interaction between Recession and Managerial Ability as our key independent variable:

$$Trade\ Credit_{i,t} = \beta_0 + \beta_1 Managerial\ Ability_{i,t} + \beta_2 Recession_{i,t} + \beta_3 Managerial\_Ability\ X\ Recession_{i,t} + Controls_{i,t} + Year\ FE + FIRM\ (INDUSTRY)\ FE + \varepsilon_{i,t}$$

We do not control for the year fixed effects in these regressions, since the values for Recession are the same for all firms in a given year. Therefore, we report our estimates based on firm and industry fixed effects.

[INSERT TABLE 7 HERE]

Table 7 reports the estimates from the OLS regressions. Models 1 and 3 include industry fixed effects for the two trade credit proxies and models 2 and 4 include the firm fixed effects. As expected, the coefficients for Recession are negative across models 1-4, indicating a reduction in trade credit during recessions. However, the interaction term between managerial ability and Recession is positive and statistically significant at the 1% level across all models. This provides further evidence on our hypothesized relationship, by indicating that higher ability managers can extract more trade credit during recessions. In a recession, one standard deviation increase in managerial ability in an average firm leads to extracting almost 20.91% additional trade credit compared with the cost of goods sold (AP/COGS) and approximately 12.37% additional trade credit compared with total assets (AP/TA) when the model includes industry fixed effects. With the inclusion of firm fixed effects, the increases in trade credit compared with the cost of goods sold and total assets are approximately 2.32% and 3.56%, respectively, for an average firm. Therefore, though previous studies showed that financially constrained suppliers reduced the supply of trade credit during the 2007-08 Global Financial Crisis (Garcia-Appendini and Montoriol-Garriga, 2013), our results illustrate how superior ability managers extract higher trade credit from their suppliers in periods of monetary constraint with limited credit supply.

6. Channel Analysis – Socially Responsible Customers

Our results provide consistent evidence that high-ability managers gain higher trade credit amounts from their suppliers. One primary question arising from our base hypothesis is: 'Why would suppliers provide higher trade credit to better quality managers?' One potential channel we explore is whether high ability managers appear more trustworthy to suppliers in meeting their financial obligations and the terms of the trade credit supplied. International evidence points out

the positive role of trust in facilitating trade credit during crises (Levine et al., 2018). Research shows that suppliers view a customer's engagement in corporate social responsibility (CSR) activities as a sign of trustworthiness and possessing the capacity to meet financial obligations. This occurs mostly because firms engaged in more CSR activities are more ethical in nature and are less likely to engage in strategic payment delays that could lead suppliers towards a liquidity crunch. As a result, socially responsible customers are considered more trustworthy in receiving greater trade credit from suppliers (Zhang et al., 2020). Consequently, firms with higher ability CEOs are associated with more socially responsible activities and fewer socially irresponsible activities (Yuan et al., 2019). Therefore, we hypothesize that firms with higher managerial ability associated and greater socially responsible activities can gain more trade credit from their suppliers. To empirically test this hypothesis, we estimate an OLS regression for the following model:

$$
\begin{aligned}
Trade\ Credit_{i,t} \\
&= \beta_0 + \beta_1 High\_Managerial\ Ability_{i,t} + \beta_2 Net\ CSR_{i,t} \\
&+ \beta_3 High\_Managerial\_Ability\ X\ Net\_CSR_{\ i,t} + Controls_{i,t} + Year\ FE \\
&+ FIRM\ (INDUSTRY)\ FE + \varepsilon_{i,t}
\end{aligned}
$$

We use the Kinder, Lydenberg and Domini (KLD) database to construct a firm's social performance by measuring their Net CSR engagement (Zhang et al., 2020, Flammer, 2015, Di Giuli and Kostovetsky, 2014, Jiao, 2010). The KLD database provides score of a firm's social performance by evaluating its actions in seven dimensions: community, corporate governance, diversity, environmental protection, employee relations, product quality and human rights. We capture the firm's Net CSR score (i.e., strengths minus concerns) in five dimensions, excluding the corporate governance and human rights (Jiao, 2010). Because of the varying number of

indicators in each dimension across years, we first calculate the CSR strengths and concerns scores across these five dimensions as the ratio of strengths (concerns) values to the total number of strengths (concerns) indicators. The Net CSR score is calculated as the difference between the CSR strengths score minus the CSR concerns score. To adequately capture the effect of managerial ability in using their socially responsible activities as a channel for trade credit, we construct a High Managerial Ability proxy as a dummy variable equal to 1 if the firm's managerial ability score in a particular year is in the top quartile across all firms. Merging these two datasets, because of the unavailability of data in the KLD database, leaves us with a dataset consisting 11,804 observations.

[INSERT TABLE 8 HERE]

Table 8, models 1-4 report the results of the channel effect based on the regression model, with AP/COGS as the dependent variable in the first two models and AP/TA as the dependent variable in the latter two. Models 1 and 3 examine the relationship with the inclusion of year and industry fixed effects for the two trade credit proxies as dependent variables and models 2 and 4 include the year and firm fixed effects. The interaction term between high managerial ability and Net CSR is positive and statistically significant for models 1-3, but the coefficient in model 4 is positive but not significant. With firm fixed effects, a higher ability manager with a 1% increase in Net CSR engagement can secure 1.8% higher trade credit compared with the cost of goods sold, and 2.3% when the model employs industry fixed effects. With regard to the AP/TA proxy, a 1% increase in Net CSR engagement by a more able manager is related to almost 7% increase in trade credit when the model uses industry fixed effects. These results point out the significant role of socially responsible, better quality, managers in gaining trade credit from their suppliers.

7. Robustness Tests

7.1. Propensity Score Matched Difference-in-differences Estimation using Forced CEO Turnovers

To rule out the possibility of omitted variables driving our baseline findings and to provide a stronger, robust identification of the relationship between managerial ability and trade credit, we use a difference-in-differences test that exploits forced CEO turnovers. If managerial ability truly captures the manager effect, then we can expect to observe a change in trade credit after a new CEO with a different ability joins a firm. If some omitted variables irrelevant to the change in managers affect managerial ability, then CEO turnover events might not significantly influence changes to trade credit. To examine changes in trade credit arising from changes in managerial ability because of CEO turnover, we look at the following difference-in-differences regression estimate:

$$\Delta Trade\_Credit3_{it} = \beta_0 + \beta_1 \Delta Managerial\_Ability3_{it} + \beta_2 Turnover_{it} + \beta_3 \Delta Managerial\_Ability3_{it}\ X\ Turnover_{it} + \Delta Controls_{it} + Year\ FE + FIRM\ (INDUSTRY)\ FE + \varepsilon_{it}$$

where: subscripts *i* and *t* relate to firm and year, respectively. The dependent variable, ΔTrade_Credit is the difference between firm *i*'s trade credit in *t* + 1 through *t* + 3 and *t* - 3 through *t*-1. ΔManagerial_ability3 is the difference between firm *i*'s managerial ability score summed over *t* + 1 through *t* + 3 (representing the new CEO's ability) and *t* - 3 through *t* - 1 (reflecting the prior CEO's ability). Turnover is an indicator variable equal to one if a CEO had a forced turnover from firm *i* in year *t* and zero otherwise. Though we use the same control variables as our baseline regression, here we measure the difference in their values summed from *t* + 1 through *t* + 3 and *t* -

3 through *t* - 1. Using these differentiated controls help us further isolate manager-specific effects attributed to CEO turnover. In this difference-in-differences test, our identification strategy relies on the assumption that changes in managerial ability for firms with CEO forced turnovers are more likely to arise because of a change in the management team. For that purpose, the coefficient of the interaction term between ΔManagerial_ability3 and turnover captures the manager-specific effect on trade credit following a forced turnover. Therefore, finding the coefficient of this interaction term is positive and significant would be consistent with the assumption that firms with a higher ability CEO extract greater trade credit than a lower ability predecessor.

Though the difference-in-differences method allows the treated and control firms to be different (Roberts and Whited, 2013), to rule out effects generated from potentially correlated omitted variables related to CEO forced turnover and trade credit and for the differences in sample size of firms that had a CEO turnover incident, we identify control firms using the propensity score matching (PSM) technique. We model the probability of a forced CEO turnover based on a logistic regression as a function of the control variables and managerial ability. We use an open-source dataset for CEO departures in S&P 1500 firms from 2000-2019 to identify forced CEO turnover events in our sample firms[7] (Gentry et al., 2021). This dataset contains CEO departures for a variety of reasons, ranging from voluntary to involuntary turnover. Based on forced turnovers or dismissals, the propensity scores generated help us create a matched sample of 1,136 treatment and 1,136 control observations.

[INSERT TABLE 9 HERE]

[7] CEO turnover data are available from - https://doi.org/10.5281/zenodo.4543893

Table 9, Panel A, presents the univariate analysis comparing treated firms with the control group. Apart from AP/COGS, R&D to sales and CAPEX ratio, the mean differences for the remaining variables are statistically indistinguishable. For the AP/COGS variable, the mean difference between the treatment and control group is only around 1%, whereas R&D to sales and the CAPEX ratio are different by a margin of less than 1%. Therefore, we conclude that for some of variables that have statistical significance in difference in means between the treatment and control samples, they are not big enough to appear to be economically significant.

Table 9, Panel B, presents the results from estimating the difference-in-differences regression using the PSM sample of 1,136 treatment and 1,136 control samples. The interaction term between ΔManagerial_ability3 and turnover remains positive and statistically significant for all the models with firm, year and industry fixed effects, except for model 3, where the coefficient is positive but not statistically significant. This implies that a new more able CEO can secure more trade credit from suppliers than a lower-ability predecessor. Though the coefficient of ΔManagerial_ability3 is positive, signifying that incumbent CEOs with higher ability are positively associated with higher trade credit, the coefficients are insignificant across models 1-4. We attribute this insignificant result to the substantially reduced sample of CEO turnovers for this particular test (Cadman et al., 2010, Koester et al., 2017). Despite these limitations, the findings from this difference-in-differences test reiterate our primary inference that higher-ability managers can secure greater trade credit from their suppliers.

To provide further robustness, we conduct placebo tests to justify that the findings are not because of confounding factors. We assign a treatment dummy to the propensity score matched sample for one and two periods before and after the actual forced turnover events (Fake Turnover). Table 9, Panel C, presents the results where we interact the ΔManagerial_ability3 with the fake

turnover dummy one and two years after actual turnovers; Panel D includes the interaction between ΔManagerial_ability3 and fake turnover dummy one and two years before the actual turnover incidents. We repeat the regressions from Panel B with the fake turnover dummy for both the trade payable proxies in Panels C and D. The coefficients of these new interaction dummies remain insignificant throughout models 1-8 in both panels. The placebo test provides further robustness to the importance of the exact timing of the turnover events, further supporting our findings that superior managers extract greater trade credit.

7.2. Outcome of Managerial Ability and Trade Credit on Product Market Performance

Following our empirical evidence on the positive relationship between trade credit and managerial ability, we now look to illustrate how more able managers can use trade credit from their suppliers to outperform their product market competitors. Instead of focusing on the outcome of superior managers extracting greater trade credit on profitability measures, we focus on a practical measure that summarizes information from the combined effects of pricing and other competitive strategies. To measure a firm's Product Market Performance (PMP), we look at the firm's relative-to-industry sales growth as the key proxy (Campello, 2003). This measure reflects how pricing decisions affect a firm's competitive behaviour because it incorporates information from pricing and other market strategies to gain a larger share of its industry sales. We look at the interaction between managerial ability and trade credit proxies as our key independent variable with PMP as our dependent variable, to determine how more able managers use the high volume of trade credit extracted from their suppliers to gain a larger market share of their industry relative to their competitors. To explore this relationship, we run the following OLS regression model:

$$PMP_{i,t} = \beta_0 + \beta_1 Managerial\ Ability_{i,t} + \beta_2 Trade\_Credit_{i,t} + \beta_3 Managerial\_AbilityX\ Trade\_Credit_{i,t} + Controls_{i,t} + FIRM\ (INDUSTRY)\ FE + \varepsilon_{i,t}$$

[INSERT TABLE 10 HERE]

Table 10 reports the estimates for this regression model. Models 1 and 2 report the estimates with the interaction between managerial ability and the first trade credit proxy (AP/COGS) with year, industry and firm fixed effects. Models 3 and 4 consist of the interaction between managerial ability and the second trade credit proxy (AP/TA). Our results show that the coefficients of trade credit proxies by themselves across models 1-4 remain positive and statistically significant, signifying the positive role of trade credit in outselling competitors. The coefficients of managerial ability across all models are positive and significant, demonstrating how more able managers can outperform industry competitors. Though the interaction term in model 1 is not significant, it is positive across all the models and statistically significant in models 2-4. With the inclusion of firm fixed effects, a one standard deviation increase in managerial ability and a 1% increase in trade credit lead to 19.70% and 39.05% jumps in product market performance for an average firm, validating that our results are economically significant. These results further validate that more able managers can deploy resources to create more value and increase resource productivity than their rivals, as is visible by the utilization of trade credit in outgrowing industry competitors (Hansen et al., 2004, Lippman and Rumelt, 2003, Miller, 2003). These results add to that literature by demonstrating that more able managers can use the high trade credit received from the suppliers to outperform their industry competitors through increased sales.

7.3. Trade Receivables, Managerial Ability and Product Market Performance

Throughout this chapter, we focus on customer firms receiving trade credit from their suppliers. However, a firm can also work as a provider of trade credit, by selling its products on credit and accruing accounts receivables and preserving cash in hand. More able managers use free cash flow better, creating higher marginal value of cash. The market perceives a higher value of cash if it is managed by higher ability managers (Gan and Park, 2017). More able managers can pursue positive NPV projects more effectively with available cash (Demerjian et al., 2012). In this regard, selling most of its products in cash to final customers would be beneficial in managing a positive cash flow for the firm. Based on these arguments, we posit that more able managers would provide less credit to their final customers and focus more on reducing the firm's accounts receivable. We modify our existing baseline OLS regression model by replacing the trade payable variable with trade receivable in the following manner:

$$Trade\_Receivables_{i,t} = \beta_0 + \beta_1 Managerial\ Ability_{i,t} + Controls_{i,t} + Year\ FE + FIRM\ (INDUSTRY)\ FE + \varepsilon_{i,t}$$

To proxy for the supply of trade credit in the form of trade receivables, we scale the Accounts Receivables of the firm *i* at time *t* with Total Sales (TR/SALE) (D'Mello and Toscano, 2020). For robustness, we also create another proxy for trade receivables by scaling Accounts Receivables with Total Assets (TR/ASSETS).

[INSERT TABLE 11 HERE]

Table 11 reports the results for these models. In models 1 and 2, we reorganize the baseline model by replacing the trade credit proxies with TR/SALE with the inclusion of industry and firm

fixed effects; models 3 and 4 use the TR/ASSETS proxy. Models 1-4 show that managerial ability has a negative, statistically significant relationship at the 1% level with trade receivables. This illustrates how more able managers sell their products less on receivables and more on cash. One standard deviation increase in managerial ability decreases trade receivables by almost 1.74% and 1.02% compared with total sales, respectively, in models with industry and firm fixed effects for an average firm. Models 3 and 4 show a negative, statistically significant association between managerial ability trade receivables, with one standard deviation increase in managerial ability reducing an average firm's receivables by almost 11.44% and 8.70% compared with total assets, respectively, in models with industry and firm fixed effects. These results indicate how more able managers preserve valuable cash more by selling less in receivables while continuing to extract more trade credit from their suppliers.

8. Conclusion

We examine how firms run by more able managers can manage their resources efficiently to extract greater trade credit from their suppliers. Our results support the resource-based theory of the firm, because more able managers are more efficient in bundling and deploying resources while possessing a better understanding of the firm's operating environment, leading them to extract more trade credit from their suppliers. We find empirical evidence that consistently demonstrates that more able managers are associated with greater trade credit. Our results show that one standard deviation increase in managerial ability is associated with 14.54% (7.51%) increase in trade credit relative to the cost of goods sold and 6.97% (4.35%) increase relative to total assets, in our models with the inclusion of industry (firm) fixed effects. This positive relationship between managerial ability and trade credit remains strong for 2SLS regression analysis using two instrumental variables (average MSA managerial ability and the proportion of

state population holding a college degree) to mitigate endogeneity concerns from omitted variables. Our results continue to hold for additional robustness tests using propensity score matched difference-in-differences tests with forced CEO turnovers. Further tests reveal that this relationship is channelled through the socially responsible engagement and cross-sectional variation analysis find the effect stronger for major customer firms and during economic recessions. Our results illustrate how suppliers of trade credit perceive greater engagement in CSR activities by more able managers as a signal of trustworthiness and capacity to meet financial obligations. Firms with more able managers that are major customers of suppliers can use this closely linked business relationship to derive more trade credit. We also add further robustness to our findings by demonstrating how more able managers can extract more trade credit during economic recessions and this high volume of trade credit is used to generate better product market performance compared with industry competitors. Lastly, we show that more able managers supply less trade credit themselves to their final customers as a way to hold more cash.

Our study is subject to some limitations. It is possible that the proxy we use for managerial ability may capture some aspect of a firm's operating environment that is not adequately controlled in our tests. Our use of difference-in-differences tests and firm fixed effects are likely to reduce the noise brought forward by environmental characteristics driving our inferences, but we cannot completely rule out such a possibility. Nevertheless, this study contributes not only to the managerial ability and trade credit literature by identifying how executives' ability to manage resources efficiently works towards extracting greater trade credit from suppliers and addresses the growing literature strand on how managerial characteristics can explain variations in trade credit.

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Table 1: Descriptive Statistics

This table reports the descriptive statistics for our dependent, independent and control variables. All variables are defined in the appendix and winsorized at the 1st and 99th percentile.

				Quantile				
Variable	Obs	Mean	S.D.	Min	0.25	Median	0.75	Max
AP/COGS	111,849	0.19	0.19	0.03	0.08	0.12	0.21	0.83
AP/TA	111,815	0.11	0.09	0.01	0.04	0.08	0.15	0.32
AR/SALES	111,820	0.17	0.11	0.01	0.10	0.16	0.22	0.44
AR/TA	111,795	0.17	0.12	0.01	0.07	0.15	0.24	0.43
Managerial Ability	111,808	0.01	0.09	-0.16	-0.08	0.02	0.03	0.23
Firm Size	111,784	5.11	2.33	0.83	3.35	5.06	6.88	9.16
Cash Ratio	111,778	0.09	0.12	0.00	0.01	0.05	0.13	0.47
R&D to Sales	111,755	0.13	0.23	0.00	0.01	0.05	0.13	0.93
ROA	111,759	0.06	0.18	-0.52	0.03	0.10	0.17	0.28
Leverage	111,755	0.29	0.22	0.00	0.11	0.25	0.42	0.80
CAPEX Ratio	111,758	0.06	0.06	0.00	0.02	0.04	0.09	0.23
Product Market Performance	111,839	-0.02	0.23	-0.36	-0.18	-0.05	0.11	0.44
Net CSR	12,842	-0.33	1.56	-3.00	-1.00	0.00	1.00	3.00

Table 2: Correlation Matrix

This table reports the correlation matrix of the key variables of this study. All variables are defined in the appendix and winsorized at the 1st and 99th percentile.

Variable	AP/COGS	AP/TA	Managerial Ability	Firm Size	Cash Ratio	R&D to Sales	ROA	Leverage	CAPEX Ratio
AP/COGS	1.0000								
AP/TA	0.3696	1.000							
Managerial Ability	0.0999	0.0213	1.0000						
Firm Size	-0.2222	-0.2705	-0.0647	1.0000					
Cash Ratio	0.1301	-0.1766	0.1223	-0.1748	1.0000				
R&D to Sales	0.2761	-0.1005	-0.0302	-0.2308	0.4148	1.0000			
ROA	-0.3750	-0.2177	0.1923	0.4701	-0.2868	-0.6126	1.0000		
Leverage	0.0680	0.2115	-0.1563	0.0231	-0.3345	-0.1240	-0.0753	1.0000	
CAPEX Ratio	-0.0131	0.0308	-0.0165	0.0306	-0.1556	-0.1003	0.1206	0.0411	1.0000

Table 3: Baseline Regression Estimates

This table reports the baseline regression results of managerial ability on trade credit measures. The dependent variable in models 1-2 is AP/COGS and AP/TA in models 3-4. The key independent variable across models 1-4 is Managerial ability, proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable	(1) AP/COGS	(2) AP/COGS	(3) AP/TA	(4) AP/TA
Managerial Ability	0.3069***	0.1586***	0.0852***	0.0532***
	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.0061***	-0.0031**	-0.0084***	-0.0209***
	(0.000)	(0.017)	(0.000)	(0.000)
Cash Ratio	-0.0458***	-0.0444***	-0.0862***	-0.0792***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D to Sales	0.0553***	0.1530***	-0.0817***	-0.0457***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.2526***	-0.0775***	-0.1291***	-0.0605***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.0756***	0.0549***	0.0459***	0.0412***
	(0.000)	(0.000)	(0.000)	(0.000)
CAPEX Ratio	0.2111***	0.0763***	0.0759***	0.0644***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.1870***	0.1674***	0.1487***	0.2014***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	106,320	104,695	106,437	104,803
Adjusted R-squared	0.2180	0.6144	0.3068	0.7120
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Table 4: Two-Stage Least-Squares Regression Analysis using Average MSA Managerial Ability as Instrumental Variable

This table presents the results of two-stage least-squares regression analysis using Average Metropolitan Statistical Area (MSA) Managerial Ability as the instrumental variable. Models 1 and 3 present the results from the first stage OLS regression analysis where managerial ability is the dependent variable. In models 2 and 4, the fitted managerial ability values from models 1 and 3 are used as independent variables along with the control variables, with AP/COGS and AP/TA as dependent variables, respectively. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

VARIABLE	(1)	(2)	(3)	(4)
	Managerial Ability	AP/COGS	Managerial Ability	AP/TA
Fitted Managerial Ability		0.5583***		0.1577***
		(0.014)		(0.000)
Mean MSA Managerial Ability	0.5938***		0.5936***	
	(0.000)		(0.000)	
Size	-0.0068***	-0.0009***	-0.0069***	-0.0065***
	(0.000)	(0.001)	(0.000)	(0.000)
Cash Ratio	0.0704***	-0.0115***	0.0708***	-0.1035***
	(0.000)	(0.009)	(0.000)	(0.000)
R&D to Sales	0.0133***	0.0491***	0.0127***	-0.0981***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.1594***	-0.3225***	0.1592***	-0.1468***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.0096***	0.0697***	-0.0093***	0.0430***
	(0.000)	(0.000)	(0.000)	(0.000)
CAPEX Ratio	0.0078	0.1437***	0.0064	0.0399***
	(0.160)	(0.000)	(0.250)	(0.000)
Constant	0.0247***	0.1644***	-0.0132**	0.1470***
	(0.000)	(0.000)	(0.030)	(0.000)
Observations	106,322	106,322	106,439	106,439
R-squared	0.2041	0.1701	0.2038	0.2108
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
	Statistics	p value	Statistics	p value
Underidentification Test	1615.84	<0.01	1611.615	<0.01
Weak Instrument Test	1639.12	<0.01	1634.748	<0.01

Table 5: Two-Stage Least-Squares Regression Analysis Using Proportion of State Population Holding a College Degree as Instrumental Variable

This table presents the results of two-stage lease-squares regression analysis using Proportion of State Population holding a college degree (College) as the instrumental variable. Models 1 and 3 present the results from the first stage OLS regression analysis where managerial ability is the dependent variable. In models 2 and 4, the fitted managerial ability values from models 1 and 3 are used as independent variables along with the firm and state-level control variables, with AP/COGS and AP/TA as dependent variables, respectively. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

VARIABLE	(1)	(2)	(3)	(4)
	Managerial Ability	AP/COGS	Managerial Ability	AP/TA
Fitted Managerial Ability		0.5069***		2.3436***
		(0.000)		(0.000)
College Degree	0.1302*		0.1432***	
	(0.061)		(0.000)	
Size	-0.0311***	-0.0055***	-0.0313***	-0.0336**
	(0.000)	(0.000)	(0.000)	(0.044)
Cash Ratio	0.0165***	-0.0579***	0.0167***	0.1435
	(0.009)	(0.000)	(0.008)	(0.529)
R&D to Sales	-0.0321***	-0.0308***	-0.0330***	-0.9655***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	0.1988***	-0.3429***	0.1984***	-1.5901***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.0036	0.1057***	0.0040	0.8337***
	(0.383)	(0.000)	(0.330)	(0.000)
CAPEX Ratio	0.1016***	0.0651**	0.0989***	-0.3601
	(0.000)	(0.033)	(0.000)	(0.616)
Crime Rate	0.0006	0.0001	-0.0004	-0.0006
	(0.821)	(0.341)	(0.853)	(0.870)
Unemployment Rate	-0.0024**	-0.0003	0.0024**	0.0237
	(0.022)	(0.599)	(0.021)	(0.128)
Per Capita Personal Income	0.0513*	0.0206	0.0514*	0.4989
	(0.067)	(0.164)	(0.066)	(0.153)
House Price Index	-0.0002	-0.0002*	-0.0002	-0.0007*
	(0.517)	(0.099)	(0.549)	(0.078)
Constant	0.0247***	-0.0163	-0.3885	-4.8085
	(0.000)	(0.918)	(0.178)	(0.196)
Observations	18,484	18,484	18,506	18,506
R-squared	0.6853	0.2272	0.6858	0.0115

Year FE	YES	YES	YES	YES
Firm FE	YES	YES	YES	YES
	Statistics	p value	Statistics	p value
Underidentification Test	13.81	<0.01	14.38	<0.01
Weak Instrument Test	13.77	<0.01	14.33	<0.01

Table 6: Cross-sectional Variation Analysis – Major Customer Firms

This table reports the regression results with regard to the cross-sectional variation analysis of the effect of a firm's Major Customer Status on managerial ability and trade credit. The dependent variable in models 1-2 is AP/COGS and is AP/TA in models 3-4. Major Customer is a dummy variable equals to 1 if the sample firm is identified as a major customer capturing over 10% business of a supplier, as identified from the Compustat Customer Segment data. Managerial ability is proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. High Ability is a dummy variable equal to 1 if the firm's MA-score in a particular year is in the top quartile across all firms. The key independent variable in this table is the interaction between High Ability and Major Customer. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable	(1) AP/COGS	(2) AP/COGS	(1) AP/TA	(2) AP/TA
High Ability x Major Customer	0.2224***	0.0722**	0.0769***	0.0437***
	(0.000)	(0.015)	(0.000)	(0.001)
High Managerial Ability	0.0099***	0.0063***	0.0011	0.0003
	(0.000)	(0.000)	(0.204)	(0.576)
Major Customer	0.0199***	0.0038	0.0149***	0.0045***
	(0.000)	(0.146)	(0.000)	(0.000)
Size	-0.0082***	-0.0053***	-0.0092***	-0.0217***
	(0.000)	(0.000)	(0.000)	(0.000)
Cash Ratio	-0.0262***	-0.0420***	-0.0780***	-0.0783***
	(0.002)	(0.000)	(0.000)	(0.000)
R&D to Sales	0.0612***	0.1479***	-0.0801***	-0.0472***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.2080***	-0.0490***	-0.1158***	-0.0514***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.0732***	0.0559***	0.0451***	0.0417***
	(0.000)	(0.000)	(0.000)	(0.000)
CAPEX Ratio	0.2144***	0.0971***	0.0760***	0.0706***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.1900***	0.1780***	0.1508***	0.2047***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	106,320	104,695	106,437	104,803
Adjusted R-squared	0.1987	0.6116	0.3003	0.7105
Mean VIF	1.45	1.45	1.40	1.40
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Table 7: Cross-sectional Variation Analysis – Trade Credit during Recessionary Periods

This table reports the regression results with regard to the cross-sectional variation analysis between managerial ability and trade credit in periods of economic recession. The dependent variable in models 1-2 is AP/COGS and is AP/TA in models 3-4. Recession is a dummy variable equal to 1 if the data fiscal year is 1990, 1991, 2001, 2007, 2008 or 2009 and zero otherwise. These years are classified as recessionary periods documented by the National Bureau of Economic Research (NBER). Managerial ability is proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. The key independent variable in this table is the interaction between Managerial Ability and Recession. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable	(1) AP/COGS	(2) AP/COGS	(3) AP/TA	(2) AP/TA
Managerial Ability x Recession	0.4415***	0.1512***	0.0489***	0.0436***
	(0.000)	(0.000)	(0.001)	(0.000)
Managerial Ability	0.0948***	0.0641***	-0.0042	0.0054
	(0.000)	(0.000)	(0.642)	(0.343)
Recession	-0.0022	-0.0076***	-0.0021***	-0.0049
	(0.225)	(0.000)	(0.002)	(0.351)
Size	-0.0063***	-0.0032**	-0.0099***	-0.0189***
	(0.017)	(0.017)	(0.000)	(0.000)
Cash Ratio	-0.0142	-0.0379***	-0.0762***	-0.0715***
	(0.126)	(0.000)	(0.000)	(0.000)
R&D to Sales	0.0507***	0.1434***	-0.0793***	-0.0507***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.2192***	-0.0448***	-0.1122***	-0.0545***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.0807***	0.0546***	0.0497***	0.0448***
	(0.000)	(0.000)	(0.000)	(0.000)
CAPEX Ratio	0.1873***	0.0955***	0.0815***	0.0553***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.1889***	0.1762***	0.1547***	0.1948***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	82,361	81,106	82,452	81,190
Adjusted R-squared	0.1877	0.6165	0.3151	0.7300
Mean VIF	1.42	1.42	1.42	1.42
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Table 8: Channel Analysis – CSR Engagement

This table reports the regression results with regard to a firm's CSR engagement as the channel effect of managerial ability on trade credit. The dependent variable in models 1-2 is AP/COGS and is AP/TA in models 3-4. Net CSR score is calculated as the difference between CSR strengths score minus the CSR concerns score, with data from the KLD database. Managerial ability is proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. High Ability is a dummy variable equal to 1 if the firm's MA-score in a particular year is in the top quartile across all firms. The key independent variable in this table is the interaction between High Ability and Net CSR. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable	(1) AP/COGS	(2) AP/COGS	(3) AP/TA	(4) AP/TA
High Ability x Net CSR	0.0023**	0.0018**	0.0070*	0.0003
	(0.041)	(0.043)	(0.089)	(0.298)
Net CSR	0.0010	0.0004	0.0003	-0.0001
	(0.109)	(0.489)	(0.233)	(0.470)
High Managerial Ability	0.0364***	0.0058	0.0128***	0.0020***
	(0.000)	(0.127)	(0.000)	(0.002)
Size	0.0057***	0.0073***	-0.0019***	-0.0202***
	(0.000)	(0.001)	(0.000)	(0.000)
Cash Ratio	0.0524***	0.0025	-0.0152***	-0.0251***
	(0.000)	(0.785)	(0.000)	(0.000)
R&D to Sales	0.0268***	0.1580***	-0.0816***	-0.0116***
	(0.001)	(0.000)	(0.000)	(0.001)
ROA	-0.1016***	0.0016	-0.0623***	0.0029
	(0.000)	(0.892)	(0.000)	(0.425)
Leverage	0.0379***	0.0010	0.0033	0.0035
	(0.000)	(0.896)	(0.157)	(0.125)
CAPEX Ratio	0.2496***	0.1374***	0.0921***	0.0896***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.0730***	0.0669***	0.0961***	0.2007***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	11,802	11,290	11,804	11,290
Adjusted R-squared	0.1182	0.6678	0.3664	0.8653
Mean VIF	1.54	1.54	1.54	1.54
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Table 9: Propensity Score Matched Estimates using Forced CEO Turnovers

This table presents the results of CEO turnover analyses using a difference-in-differences design. Panel A presents the results from comparing the means for treatment and propensity score matched control observations. Panel B presents the results from a difference-in-differences analysis estimating OLS regressions. Panel B regression estimates use a sample of 1,136 propensity-score matched firm pairs. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Panel A: Univariate Analysis

Variable	Mean		t-stat (Difference in Means)
	Treated	Control	Treatment-Control
AP/COGS	0.1470	0.1570	0.86*
AP/TA	0.1456	0.1458	1.06
Managerial Ability	-0.0054	0.0033	1.00
Size	7.1556	6.9783	0.90
Cash Ratio	0.1055	0.1091	0.95
R&D to Sales	0.0814	0.0963	0.62*
ROA	0.0721	0.0988	1.01
Leverage	0.2697	0.2409	1.05
CAPEX Ratio	0.0528	0.0621	0.70*

Panel B: Regression with propensity score matched sample

Dependent Variable	(1) ΔAP/COGS	(2) ΔAP/TA	(3) ΔAP/COGS	(4) ΔAP/TA
ΔMASCORE3 x Turnover	0.0570*	0.0485*	0.1477	0.1928***
	(0.051)	(0.077)	(0.129)	(0.000)
ΔMASCORE3	0.0830	0.0004	0.2407	0.1241
	(0.138)	(0.977)	(0.250)	(0.528)
Forced Turnover	-0.0019	0.0143	0.0557	-0.0006
	(0.762)	(0.123)	(0.147)	(0.961)
ΔSize	0.0179***	0.0121***	0.0410***	0.0181***
	(0.000)	(0.000)	(0.000)	(0.000)
ΔCash Ratio	0.0064	-0.0075	-0.4218***	-0.0955***
	(0.655)	(0.573)	(0.000)	(0.000)
ΔR&D to Sales	0.1029***	-0.0174	0.7632***	-0.0941***
	(0.000)	(0.198)	(0.001)	(0.003)
ΔROA	-0.0190	-0.0977***	-0.0857	-0.0858***
	(0.172)	(0.000)	(0.207)	(0.000)
ΔLeverage	-0.0225***	0.0556***	-0.0285	-0.0083
	(0.009)	(0.000)	(0.581)	(0.443)
ΔCAPEX Ratio	-0.0153	0.1135***	0.0954	0.1138*
	(0.667)	(0.000)	(0.653)	(0.055)
Constant	0.0073	0.0104	0.1799	-0.0778
	(0.899)	(0.882)	(0.669)	(0.337)
Observations	2,266	2,272	2,266	2,272
Adjusted R-squared	0.4646	0.4020	0.5645	0.7169
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES

Panel C: Placebo Test with Fake CEO Turnovers One and Two Periods After the Actual Turnover

Dependent Variable	(1) AP/COGS	(2) AP/TA	(3) AP/COGS	(4) AP/TA	(5) AP/COGS	(6) AP/TA	(7) AP/COGS	(8) AP/TA
ΔMASCORE3 X (Fake Turnover + 1 period)	0.1366	0.4538	0.1093	0.2159				
	(0.538)	(0.106)	(0.631)	(0.297)				
ΔMASCORE3 X (Fake Turnover + 2 periods)					0.0237	0.1580	0.0278	-0.3447
					(0.927)	(0.414)	(0.925)	(0.195)
ΔMASCORE3	0.0241	-0.0421	0.0768	0.0493	0.0315***	-0.0226	0.0063	-0.0385
	(0.553)	(0.167)	(0.422)	(0.571)	(0.037)	(0.147)	(0.0812)	(0.105)
Fake Forced Turnover + 1 period	0.0008	-0.0331	0.0164	0.0142				
	(0.976)	(0.104)	(0.561)	(0.580)				
Fake Forced Turnover + 2 periods					-0.0005	0.0333**	0.0182	0.0481*
					(0.985)	(0.047)	(0.511)	(0.055)
Constant	0.1283***	0.0003	0.1320***	0.0156	0.1288***	-0.0014	0.1308***	0.0104
	(0.000)	(0.939)	(0.000)	(0.132)	(0.000)	(0.745)	(0.000)	(0.318)
Observations	2,272	2,272	2,266	2,830	2,272	2,272	2,266	2,830
Adjusted R-squared	0.4348	0.3131	0.5660	0.5071	0.4357	0.3118	0.5650	0.5145
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	NO	NO	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES	NO	NO	YES	YES

Panel D: Placebo Test with Fake CEO Turnovers One and Two Periods after the Actual Turnover

Dependent Variable	(1) AP/COGS	(2) AP/TA	(3) AP/COGS	(4) AP/TA	(5) AP/COGS	(6) AP/TA	(7) AP/COGS	(8) AP/TA
ΔMASCORE3 X (Fake Turnover - 1 period)	0.1513	0.3904	0.2058	0.1786				
	(0.512)	(0.147)	(0.406)	(0.426)				
ΔMASCORE3 X (Fake Turnover - 2 periods)					-0.1136	-0.0952	0.1250	0.0672
					(0.653)	(0.616)	(0.634)	(0.777)
ΔMASCORE3	0.0337**	0.0166	0.0004	-0.0316	0.0312**	0.0229**	0.0058	-0.0391
	(0.029)	(0.726)	(0.989)	(0.198)	(0.040)	(0.045)	(0.828)	(0.105)
Fake Forced Turnover - 1 period	0.0149	-0.0212	-0.0055	0.0001				
	(0.597)	(0.482)	(0.854)	(0.996)				
Fake Forced Turnover - 2 periods					0.0105	-0.0112	0.0126	-0.0217
					(0.693)	(0.576)	(0.667)	(0.415)
Constant	0.1287***	0.0009	0.1331***	0.0163	0.1286***	-0.0002	0.1320***	0.0169
	(0.000)	(0.998)	(0.000)	(0.114)	(0.000)	(0.962)	(0.000)	(0.101)
Observations	2,272	2,272	2,266	2,830	2,272	2,272	2,266	2,830
Adjusted R-squared	0.4358	0.3126	0.5660	0.5086	0.4358	0.3109	0.5650	0.5087
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	NO	NO	YES	YES	NO	NO
Firm FE	NO	NO	YES	YES	NO	NO	YES	YES

Table 10: Robustness test - Outcome of managerial ability and trade credit on product market performance

This table reports the regression results with regard to the outcome of the positive relationship between managerial ability and trade credit on Product Market Performance (PMP). The dependent variable in models 1-4 is PMP, defined as the firm's relative-to-industry sales growth. Managerial ability is proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Trade credit is proxied by AP/COGS in models 1-2 and is by AP/TA in models 3-4. The key independent variable in this table is the interaction between Managerial Ability and trade credit proxies. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable: PMP	(1)	(2)	(3)	(4)
Managerial Ability x AP/COGS	0.1474	0.4159**		
	(0.318)	(0.011)		
Managerial Ability x AP/TA			0.4773**	1.3419***
			(0.044)	(0.000)
AP/COGS	0.0883***	0.0596***		
	(0.000)	(0.000)		
AP/TA			0.0955***	0.3556***
			(0.000)	(0.000)
Managerial Ability	0.2203***	0.3394***	0.2308***	0.3073***
	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.0021***	0.0228***	-0.0017***	0.0301***
	(0.000)	(0.000)	(0.000)	(0.000)
Cash Ratio	0.1174***	0.0303***	0.1203***	0.0528***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D to Sales	0.1234***	-0.0346***	0.1355***	-0.0114
	(0.000)	(0.000)	(0.000)	(0.124)
ROA	0.2250***	0.3868***	0.2156***	0.4016***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.0257***	-0.0158***	-0.0236***	-0.0266***
	(0.000)	(0.002)	(0.000)	(0.000)
CAPEX Ratio	0.6226***	0.5602***	0.6326***	0.5409***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	-0.0872***	-0.1744***	-0.0854***	-0.2358***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	95,953	94,562	96,035	94,643
Adjusted R-squared	0.0926	0.2425	0.0899	0.2452

Mean VIF	1.46	1.46	1.88	1.88
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	NO	YES
Firm FE	NO	YES	YES	NO

Table 11: Robustness test - Trade Receivables and Managerial Ability

This table reports the regression results demonstrating the relationship between managerial ability and trade receivables in models 1-2. Models 3-4 report the regression estimates between managerial ability and net credit. The dependent variable in models 1-2 is Accounts Receivables to Sales (TR/SALE) and in models 3-4, the dependent variable is Accounts Receivables to Total Assets (TR/ASSETS). Managerial ability is proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. The key independent variables in models 1-4 is Managerial Ability. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

Dependent Variable	(1) TR/SALE	(2) TR/SALE	(3) TR/ASSETS	(4) TR/ASSETS
Managerial Ability	-0.0367***	-0.0216***	-0.1399***	-0.1063***
	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.0030***	0.0147***	-0.0103***	0.0228***
	(0.000)	(0.000)	(0.000)	(0.000)
Cash Ratio	-0.0630***	-0.0597***	-0.1387***	-0.1319***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D to Sales	0.0398***	0.0641***	-0.1151***	-0.0963***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.0243***	-0.0205***	-0.0326***	-0.0462***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	-0.0305***	-0.0200***	-0.0031	-0.0058**
	(0.000)	(0.000)	(0.338)	(0.039)
CAPEX Ratio	-0.1163***	-0.0444***	-0.1378***	-0.0036
	(0.000)	(0.000)	(0.000)	(0.652)
Constant	0.1773***	0.1129***	0.2601***	0.3058***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	106,047	104,413	106,047	104,413
Adjusted R-squared	0.2404	0.6283	0.3502	0.7370
Mean VIF	1.48	1.48	1.48	1.48
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Appendix C1: Variable Definitions

Variable	Formula/derivation	Data Source
Firm-level Variables		
AP/COGS	Accounts payable to cost of goods sold	Compustat
AP/TA	Accounts payable to total assets	Compustat
AR/Sale	Accounts receivables to total sales	Compustat
(AR-AP)/Sale	Net Credit Ratio, measured as the difference between Accounts receivables and payables scaled by Sales	Compustat
Managerial Ability	MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Data is made available at the author's personal website - https://peterdemerjian.weebly.com/managerialability.html	Author's personal website
Size	Natural logarithm of total assets	Compustat
Cash Ratio	Total cash to total book value of assets	Compustat
R&D to Sales	Research and development expenses to total sales	Compustat
Return on Asset (ROA)	Operating income before depreciation to the total book value of assets	Compustat
Leverage	Long-term (total) debt plus current (total) liabilities to the total book value of assets	Compustat
CAPEX Ratio	Capital expenditure to the total book value of assets	Compustat
CEO Tenure	Natural logarithm of the number of years as CEO of the firm	Execucomp
Product Market Performance	Measured as a firm's relative-to-industry sales growth, based on the 3-digit SIC industry	Compustat
Net CSR	CSR strengths and concerns scores across five dimensions in the KLD database (community, diversity, environmental protection, employee relations and product quality) are calculated as the ratio of strengths (concerns) values to the total number of strengths (concerns) indicators. Afterwards, Net CSR is calculated as the difference between CSR strengths score and the CSR concerns score	KLD
State-level Variables		
College	The percentage of the population holding a college degree in the US state where a sample firm is headquartered	US Census Bureau
Per Capita Personal Income	The natural log of annual per capita personal income in a given US state	St. Louis FED
Unemployment Rate	Average unemployment rate (in percentage) over the 12 months in a given year for a given US state	St. Louis FED
House Price Index	Average all-transactions house price index over the four quarters in a given year for a given US state. The index equals 100 in the first quarter of 1980.	St. Louis FED
Crime Rate	The natural log of total number of reported crimes per 100,000 people in a given year for a given US state.	FBI Uniform Crime Reports
Country-level Variables		

Unemployment Rate	Unemployment rate refers to the share of the labor force that is without work but available for and seeking employment.	World Bank
Inflation Rate	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly. The Laspeyres formula is generally used.	World Bank
GDP Growth	Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2015 prices, expressed in U.S. dollars.	World Bank

Appendix C2: Baseline Regression with the Inclusion of Market and Economic Control Variables

This table reports the baseline regression results of managerial ability on trade credit measures, with the inclusion of market and economic control variables i.e., HHI, GDP growth rate, inflation rate and unemployment rate. The dependent variable in models 1-2 is AP/COGS and AP/TA in models 3-4. The key independent variable across models 1-4 is Managerial ability, proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable	AP/COGS	AP/COGS	AP/TA	AP/TA
Managerial Ability	0.3031***	0.1620***	0.0795***	0.0524***
	(0.000)	(0.000)	(0.000)	(0.000)
Size	-0.0043***	-0.0010	-0.0090***	-0.0179***
	(0.000)	(0.452)	(0.000)	(0.000)
Cash Ratio	-0.0354***	-0.0391***	-0.0839***	-0.0743***
	(0.000)	(0.000)	(0.000)	(0.000)
R&D to Sales	0.0463***	0.1478***	-0.0814***	-0.0486***
	(0.000)	(0.000)	(0.000)	(0.000)
ROA	-0.2615***	-0.0773***	-0.1270***	-0.0645***
	(0.000)	(0.000)	(0.000)	(0.000)
Leverage	0.0783***	0.0554***	0.0486***	0.0438***
	(0.000)	(0.000)	(0.000)	(0.000)
CAPEX Ratio	0.1813***	0.0730***	0.0832***	0.0544***
	(0.000)	(0.000)	(0.000)	(0.000)
HHI	-0.0192	0.0049	0.0397*	-0.0053
	(0.627)	(0.899)	(0.089)	(0.829)
Unemployment Rate	-0.0016***	-0.0005	-0.0003	-0.0008
	(0.004)	(0.282)	(0.144)	(0.647)
GDP Growth	-0.0006	0.0023***	0.0003	-0.0001
	(0.301)	(0.000)	(0.244)	(0.400)
Inflation Rate	-0.0060***	-0.0012**	-0.0007**	-0.0018***
	(0.000)	(0.044)	(0.044)	(0.000)
Constant	0.2105***	0.1610***	0.1497***	0.1951***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	87,695	86,403	87,790	86,487
Adjusted R-squared	0.2068	0.6172	0.3193	0.7252
Mean VIF	1.40	1.40	1.40	1.40
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Appendix C3: Baseline Regression with the Inclusion of CEO Characteristics (Tenure) as Control Variable

This table reports the baseline regression results of managerial ability on trade credit measures, with the inclusion of CEO tenure as control variable. The dependent variable in models 1-2 is AP/COGS and AP/TA in models 3-4. The key independent variable across models 1-4 is Managerial ability, proxied by the MA-score developed by Demirijian et al. (2012) through a DEA-based methodology. Standard errors are adjusted for heteroscedasticity and clustered at the firm and year level. P values are in parentheses. Significance at the 10%, 5% and 1% level is indicated by *, **, and ***, respectively.

	(1)	(2)	(3)	(4)
Dependent Variable	AP/COGS	AP/COGS	AP/TA	AP/TA
Managerial Ability	0.3060***	0.1368***	0.0175***	0.0195***
	(0.000)	(0.000)	(0.002)	(0.000)
Size	0.0045***	0.0020	-0.0019***	-0.0160***
	(0.000)	(0.286)	(0.000)	(0.000)
Cash Ratio	0.0037	-0.0035	-0.0291***	-0.0334***
	(0.765)	(0.767)	(0.000)	(0.000)
R&D to Sales	0.0648***	0.0547*	-0.1207***	-0.0289***
	(0.000)	(0.096)	(0.000)	(0.000)
ROA	-0.1151***	-0.0466***	-0.1047***	-0.0149***
	(0.000)	(0.006)	(0.000)	(0.003)
Leverage	0.0263***	0.0227***	0.0054*	0.0120***
	(0.000)	(0.009)	(0.053)	(0.000)
CAPEX Ratio	0.1373***	0.1448***	0.1179***	0.0914***
	(0.000)	(0.000)	(0.000)	(0.000)
CEO Tenure	-0.0002	-0.0005***	-0.0003***	-0.0002***
	(0.224)	(0.001)	(0.000)	(0.003)
Constant	0.1070***	0.1194***	0.1081***	0.1840***
	(0.000)	(0.000)	(0.000)	(0.000)
Observations	14,467	14,386	14,467	14,386
Adjusted R-squared	0.1971	0.6408	0.3261	0.8286
Mean VIF	1.40	1.40	1.40	1.40
Year FE	YES	YES	YES	YES
Industry FE	YES	NO	YES	NO
Firm FE	NO	YES	NO	YES

Chapter 5: Conclusion

1. A Summary of the Findings

This thesis conducts in-depth analysis of different aspects of corporate finance decision-making of publicly listed US companies. The aspects are predation risk, supply chain power and trade credit. In chapter 2, we investigate the role of CEO characteristics on predation risk, whereas chapters 3 and 4 investigate how managerial ability influences firms' supply chain power and trade credit. We hypothesize that CEO characteristics such as overconfidence, empire building and gender will have a significant impact in reducing firm predation risk. We also hypothesize that their managerial ability would have a positive association with gaining bargaining power over a firm's supplier network and in extracting trade credit from its suppliers. The main findings from these chapters are as follows.

First, we demonstrate how CEO behavioural characteristics play a crucial role in firms surviving predatory threats in a competitive product market environment. Our results show that empire-building CEOs, with their use of excess free cash flow in hand, and overconfident CEOs with their reliance of internal finance and reduced probability of underinvesting, reduce predation risk by diversifying the firm's business operations. Female CEOs, by nature, are conservative and position themselves to reduce predation risk. These results remain consistent when we alleviate potential endogeneity concerns from omitted variables through difference-in-differences analysis for exogenous passage of large US tariff reductions and CEO deaths. We further mitigate concerns over omitted variables by including institutional shareholding and engagement in Corporate Social Responsibility (CSR) activities as additional controls. The positive role of CEO characteristics in reducing predation risk leads them to outperform their product market competitors through increased market share growth. Lastly, we show that the

reduction in predation risk allows the CEOs to gain higher total compensation and option grants.

Second, we demonstrate that superior managers running major customer firms gain significant bargaining power over their suppliers. Our results identify a positive association between managerial ability and the customer firm's supply chain power. We alleviate endogeneity concerns through the utilization of 2SLS regressions using instrumental variables and in difference-in-differences estimates following exogenous forced CEO turnover events. The positive association is stronger for more able managers with better corporate innovation performance and for those engaged in socially responsible activities. The positive effect is stronger for durable goods manufacturing customers managed by superior managers, because of their unique sourcing requirements. We also find that more able managers use greater supply chain power to extract resources, i.e., trade credit, from their suppliers.

Third, we find that firms run by managers with superior ability extract greater trade credit from their suppliers. This relationship is stronger when more able managers are engaged in more socially responsible activities that magnify their trustworthiness. Cross-sectional analysis demonstrates that the association remains consistent and strong during recessions characterized by bank lending constraints and when more able managers manage major customer firms, as identified by these firms representing 10% or more of business revenue of suppliers. These results remain robust to endogeneity concerns, mitigated by 2SLS regressions using instrumental variables. Following a CEO turnover, incumbent CEOs with greater ability extract more trade credit in a difference-in-differences setting. In addition, superior ability managers can use greater trade payables to outperform their product market competitors, through increased market share growth, while reducing their own trade receivables.

2. Contributions to the Literature

This thesis makes a number of contributions to the corporate finance literature. First, it investigates for the first time, to the best of our knowledge, the role of CEO characteristics in mitigating predation risk. Previous studies investigating predation risk focused on corporate financial policies, i.e., cash holding, hedging behaviour and disclosure practices (Chi and Su, 2016, Bernard, 2016, Haushalter et al., 2007). Our findings provide a new behavioural insight on how empire-building, overconfident and female CEOs better diversify firm operations in anticipation of potential predatory threats in reducing predation risk. These findings augment a growing body of research on how CEO characteristics variation reflect in various firm outcomes (Schoar and Zuo, 2017, Dittmar and Duchin, 2016, Doukas and Zhang, 2020, Gul et al., 2020). Notably, this thesis demonstrates the benefits achievable by a firm through reduction of predation risk. Not only do our findings note the importance of CEO characteristics-driven decision-making in decreasing predation risk, but also illustrate how minimized predation risk through these characteristics leads to significant growth in gaining market share and higher total compensation and option grants.

Second, this thesis provides a valuable contribution to contemporary accounting, finance and management literature on the nexus of the customer-supplier relationship. Recent studies have looked at how supply chain power leads customer firms towards favourable credit market interactions (i.e., loan terms and spreads), real earnings management and the spill-over of bank financing shocks to downstream customers (Rahaman et al., 2020, Lanier Jr et al., 2019, Costello, 2020). However, there is very little literature that identifies possible sources behind gaining this bargaining power. Our findings demonstrate the importance of the heterogeneity of managerial actions in value creation and resource extraction for a firm from its suppliers, providing empirical evidence to the resource-based theory of the firm (Rungtusanatham et al., 2003, Barney, 1991). We provide robust results in support of a

manager's ability to efficiently bundle and deploy resources to gain operational benefits. A superior ability manager manages customer firms from a closely linked network of financially dependent suppliers that assists them against potential supply chain disruptions and extracts valuable resources (i.e., trade credit) and operational outcomes (i.e., market share growth). These findings add significantly to the context's growing literature.

Third, this thesis adds to the literature on managerial ability and its impact on corporate financial policy decision-making. Upper echelon theory implies that decisions made by the most powerful actors in a firm (i.e., the top executives) resemble their values and cognitive processes (Hambrick and Mason, 1984). Though there have been many studies on how executives' characteristics can explain variations in corporate policies, we focus more on managers' ability to efficiently manage firm resources. In the past, studies used considerably broader, yet less precise, proxies for managerial ability that are outside the direct control of managers and are positively correlated with larger firms, i.e., prior industry-adjusted stock returns, CEO's financial press visibility (through past media mentions), CEO tenure and executive pay to infer managerial ability (Fee and Hadlock, 2003, Rajgopal et al., 2006, Tervio, 2008, Milbourn, 2003). In contrast, we use the less noisy, DEA based measure of managerial ability developed by Demerjian et al. (2012), based on a firm's revenue generating efficiency, that extends across industries and has an economically significant association with manager fixed effects. This thesis' findings add to this largely unexplored research area behind managerial impact on trade credit financing decisions.

Fourth, this thesis adds to the growing literature on the significance of a firm's engagement in socially responsible actions. Prior studies have long argued whether a firm's corporate social responsibility (CSR) engagements are favourable to financial outcomes and decision-making (Liu et al., 2021, Kim and Choi, 2018, Klassen and Vachon, 2003, Li et al., 2017, Dai et al., 2021, Zhang et al., 2020). We find consistent evidence that CSR engagement

is beneficial to financial outcomes. In chapter 2, our baseline findings remain consistent through the inclusion of a firm's net CSR activities and shows that an increase in CSR leads to decreased predation risk. Socially responsible engagement has a channel effect on our findings in both chapters 3 and 4. More able managers engage more in socially responsible activities and such engagement acts as a channel that enhances trustworthiness with the supply chain partners, evidently leading to stronger positive association between managerial ability and supply chain power and trade credit. Through these empirical findings, this thesis contributes to the vast literature on firms' socially responsible engagement.

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