# **Managerial Ability and Supply Chain Power**

G M Wali Ullah[[1]](#footnote-1) Juan Luo[[2]](#footnote-2) Alfred Yawson[[3]](#footnote-3)

**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

## **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.

## **Data and Variables**

## **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[[4]](#footnote-4). 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.

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

## **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.

## **Research Model**

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

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 to be positive.

## **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.

## **Results**

## **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 R2 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 2 and 3 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).

## **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.

## **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 25th percentile to 75th 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.

## **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.

## **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.

## **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.

## **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:

where subscripts *i* and *t* relate to firm and year, respectively. The dependent variable, ∆SCP3, 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. ∆Managerial\_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 ∆Managerial\_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[[5]](#footnote-5) (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.

[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 ∆Managerial\_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 ∆Managerial\_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 ∆Managerial\_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.

## **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.

## **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:

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.

## **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:

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 4 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.

## **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:

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.

## **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: ∆SCP | (1) | (2) | (3) | (4) |
| Full Sample | PSM Matched Sample | Full Sample | PSM Matched Sample |
|  |  |  |  |  |
| ∆MASCORE3 X Turnover | 0.9330\*\*\* | 0.5505\*\* | 0.5747\*\*\* | 0.6487\* |
|  | (0.000) | (0.049) | (0.000) | (0.095) |
| ∆MASCORE3 | 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) |
| ∆Tobin's Q | -0.0117 | -0.0464\*\*\* | -0.0353\*\*\* | -0.0282 |
|  | (0.148) | (0.008) | (0.000) | (0.318) |
| ∆Book Leverage | -0.3317\*\*\* | -0.5386\*\*\* | -0.4605\*\*\* | -0.2670 |
|  | (0.000) | (0.000) | (0.000) | (0.145) |
| ∆Asset Tangibility | -0.1485\*\* | -0.3090\*\* | -0.3127\*\*\* | -0.2479 |
|  | (0.022) | (0.033) | (0.000) | (0.258) |
| ∆Current Ratio | -0.0999\*\*\* | -0.2119\*\*\* | -0.1447\*\*\* | -0.2338\*\*\* |
|  | (0.000) | (0.000) | (0.000) | (0.000) |
| ∆Firm 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: ∆SCP | (1) | (2) | (3) | (4) |
|  |  |  |  |  |
| ∆MASCORE3 X (Fake Turnover + 1 period) | 0.2456 |  |  |  |
|  | (0.440) |  |  |  |
| ∆MASCORE3 X (Fake Turnover + 2 periods) |  | -0.2361 |  |  |
|  |  | (0.430) |  |  |
| ∆MASCORE3 X (Fake Turnover - 1 period) |  |  | 0.4275 |  |
|  |  |  | (0.401) |  |
| ∆MASCORE3 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) |
| ∆MASCORE3 | 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: ∆SCP | (1) | (2) | (3) | (4) |
|  |  |  |  |  |
| ∆MASCORE3 X (Fake Turnover + 1 period) | -0.5405 |  |  |  |
|  | (0.315) |  |  |  |
| ∆MASCORE3 X (Fake Turnover + 2 periods) |  | -1.0909 |  |  |
|  |  | (0.187) |  |  |
| ∆MASCORE3 X (Fake Turnover - 1 period) |  |  | 0.8797 |  |
|  |  |  | (0.233) |  |
| ∆MASCORE3 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) |
| ∆MASCORE3 | 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) | (2) | (3) | (4) | (5) | (6) |
| High CSR | Low CSR | Full Sample | High CSR | Low CSR | 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) | (2) | (3) | (4) | (5) | (6) |
| High Citation | Low Citation | Full Sample | High Patent | Low Patent | 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) | (2) | (3) | (4) | (5) | (6) |
| High SCP | Low SCP | Full Sample | High SCP | Low SCP | 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 1: Variable Definitions**

|  |  |  |
| --- | --- | --- |
| Variable | Formula/derivation | Data Source |
| Firm-level Variables | | |
| 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 |  | 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 SPOWERit as,  Then, we define MKTPOWER as log(1 + SPOWERit) | 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 2: 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 3: 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 4: 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 |

1. Adelaide Business School, University of Adelaide, Australia. Email: gm.waliullah@adelaide.edu.au [↑](#footnote-ref-1)
2. Adelaide Business School, University of Adelaide, Australia. Email: jane.luo@adelaide.edu.au [↑](#footnote-ref-2)
3. Adelaide Business School, University of Adelaide, Australia. Email: alfred.yawson@adelaide.edu.au [↑](#footnote-ref-3)
4. The managerial ability (MA-score) data are available at: https://peterdemerjian.weebly.com/managerialability.html [↑](#footnote-ref-4)
5. CEO turnover data are available from - https://doi.org/10.5281/zenodo.4543893 [↑](#footnote-ref-5)