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The Role of CRM Implementation in Internal Capital Markets

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Abstract

Purpose

The purpose of this paper is to investigate how customer relationship management (CRM) implementation affects internal capital allocation efficiency, the efficiency with which a firm allocates its capital across its business segments.

Design/methodology/approach

We use a statistical regression method to analyze a sample of 801 unique firms in the U.S. from COMPUSTAT and the Computer Intelligence database. This analysis examines the relation between CRM implementation and internal capital allocation efficiency and identifies the conditions under which firms benefit more from CRM implementation. We also use instrumental variables (IVs) to address endogenous concerns with a two-stage least squares (2SLS) model.

Findings

We find that CRM implementation is positively related to internal capital allocation efficiency. Our results are robust to the 2SLS analysis with IVs. This positive relation is more pronounced for firms with effective internal control and for those operating in highly competitive markets.

Originality

We reveal a previously overlooked aspect of marketing accountability by suggesting marketing's impact on internal capital markets. We also enrich the body of literature on CRM benefits by showing a cross-functional benefit from marketing to finance (or capital allocation).

Managerial implications

Our research implies that that CRM can have a significant cross-functional effect on corporate financing and budgeting. This also suggests that when chief marketing officers plan marketing initiatives and implement CRM, they should communicate to chief financial officers not only the direct effect but also the indirect strategic benefits of such initiatives to a firm.

Keywords: CRM; internal capital markets; capital allocation efficiency; marketing accountability.
Article classification: Original Article

Introduction

Establishing marketing accountability is critical for justifying marketing investment in the boardroom (Kumar, 2015; Kumar *et al.*, 2011); thus, research connecting marketing investment to firm performance is critical (Mintz and Currim, 2013; Peltier *et al.*, 2013; Srinivasan and Hanssens, 2009). A range of prior studies has demonstrated marketing investment's impact on firm performance in the stock market (e.g., Anderson *et al.*, 2004; Currim *et al.*, 2012; Rao and Bharadwaj, 2008). These studies help heighten marketing's stature in the boardroom because a firm's performance in the *external* capital market is important to corporate boards. However, there is a research gap concerning marketing accountability as it pertains to a firm's *internal* capital allocation efficiency. Investigating a firm's internal capital market, in which it allocates capital accumulated through earnings and fundraising among its business segments, is vital because the long-term health of a firm is determined by how it allocates its limited resources (e.g., Alchian, 1969; Gertner *et al.*, 1994; Lamont, 1997; Stein, 1997).

One of the most significant problems that plagues multidivisional firms is the inefficiency of internal capital markets (e.g., Berger and Ofek, 1995; Lang and Stulz, 1994; Rajan *et al*., 2000). Forbes (2018) reported that General Electric lost over $160 billion in market value due to shortsighted and inefficient capital allocation, which resulted in its chief executive officer (CEO) and half of its board members being replaced. Ernst & Young's survey of 1,050 chief financial officers (CFOs) across different sectors reports that 80% of CFOs say that their capital allocation process "needs to be improved"(Ernst & Young, 2021). These CFOs named top management's inability to access sufficient data as the primary barrier to optimal capital allocation. This is consistent with prior academic research (e.g., Duchin and Sosyura, 2013; Harris and Raviv, 1996; Rajan *et al*., 2000) that largely attributes capital allocation inefficiency to information asymmetry between corporate headquarters and

divisional managers, with the former making capital allocation decisions and the latter having first-hand information regarding their respective businesses. Headquarters rely on detailed information concerning performance and investment prospects provided by better-informed divisional managers to effectively allocate internal capital. Hence, some companies, such as Chobani and Unilever, have invested in systems to collect, integrate, and analyze their divisional business information (e.g., customer trends and performance) in hopes of increasing capital allocation efficiency (Ernst & Young, 2019a).

Inspired by these industry examples, we posit that customer relationship management (CRM) implementation, which facilitates the collection of and access to the most critical data on granular, customer-level profitability and growth (i.e., customer and sales data), can help mitigate the information asymmetry associated with multidivisional firms, and therefore, improve the efficiency of internal capital markets. Theoretically, CRM implementation can potentially increase capital allocation efficiency. CRM consists of "a set of information processes and technology tools that enable the development of firm–customer relationships" (Krasnikov *et al.*, 2009, p. 61). It supports customer-oriented activities, including marketing, sales, and post-sales support (Zablah *et al.*, 2012). It also stores data generated from these activities in centralized databases, which further supports analytics used to discover and predict market demand. This creates an integration effect, facilitating the smooth dissemination of customer knowledge throughout an organization and enhancing the quality of decision-making (Jayachandran et al. 2005; Ryals 2005; Krasnikov et al. 2009).With these functions, CRM provides the top management team (TMT) with comprehensive market demand knowledge so that they can better identify future investment opportunities across different business divisions and make informed decisions with respect to capital allocation (we provide more detailed reasoning in our hypotheses development section).

Understanding CRM's impact on internal capital allocation, if any, bears high economic

significance, not only because capital allocation plays a crucial role in firm survival and growth, but also because CRM continues to be one of the most important marketing investments that firms make (Gartner, 2018;[1] Kalaignanam et al., 2013; Krasnikov *et al*., 2009; Mithas *et al.*, 2005). From a financial perspective, CRM can easily become a million-dollar investment (Rigby *et al.*, 2002). Moreover, implementing CRM as one of a firm's strategic moves generally involves a significant time commitment for top managers and lower-tier employees alike; consulting firms suggest that large-scale CRM implementation can take as long as five years to carry out these changes (The Boston Consulting Group, 2007). Can these substantial investments and efforts pay off? Previous studies have examined the influence of CRM on various performance measures, including customer satisfaction, customer loyalty, sales, costs, and profitability (e.g., Migdadi, 2021; Cao and Tian, 2020; Homburg *et al.*, 2008; Jayachandran *et al.*, 2005; Mithas *et al*., 2005; Kumar and Shah, 2004). However, to the best of our knowledge, extant research in this body of literature has not yet examined the impact of CRM on capital allocation efficiency.

Our first research question asks, "To what extent can CRM implementation help increase capital allocation efficiency?" We address this question by using a sample generated from the combination of COMPUSTAT and the Computer Intelligence (CI) database. Our sample consists of 3,958 firm-year observations of 801 unique firms from 2000 to 2010. We construct a measure of internal capital allocation efficiency using the COMPUSTAT data based on the latest accounting and finance literature. The CI database is one of the most authoritative data sources for firms' implementation of information technology tools, including CRM (e.g., Dewan and Ren, 2011). We find that CRM implementation is positively related to internal capital allocation efficiency: full implementation of CRM at both the headquarter and division levels is associated with an increase of internal capital allocation efficiency by 2.23%. This finding is comparable to an increase in capital allocation efficiency

of 3.64% due to the effect of a new segment reporting regulation (Cho, 2015). As such, the impact of CRM implementation on capital allocation efficiency is economically meaningful.

Our second research question asks, "Which firms can benefit more from CRM implementation in terms of increasing capital allocation efficiency?" Answering this question can provide a practical guideline for certain types of firms that should pursue CRM more proactively. Using a systematic theorizing and empirical analysis, we find that the positive relation between CRM implementation and internal capital allocation efficiency is more pronounced for firms operating in more competitive industries (i.e., firms whose managers have stronger incentives to improve efficiency) and for firms with effective internal control (i.e., the mechanisms that enhance the quality of capturing and processing data into information used to assist decision-making).

We offer several contributions to the literature with our study. First, we uncover one missing aspect of marketing accountability by suggesting marketing's impact on internal capital markets. Second, we enrich the body of literature on CRM benefits by showing a cross-functional benefit from marketing to finance (or capital allocation), emphasizing that CRM benefits are multifaceted across corporate functions. Third, we broaden the boundary condition of the emerging literature on capital allocation efficiency by highlighting that, in addition to accounting and finance policies, *technologies themselves matter* when developing an efficient internal capital market. These three contributions provide new directions for future research.

Related Literature and Hypotheses Development

CRM

Since the 1990s, CRM has been discussed and studied not only in academia but also by industry practitioners. Hobby (1999) defines CRM as a management approach that enables

organizations to identify, attract, and increase the retention of profitable customers by managing relationships with them. With the development of IT, CRM is now considered an IT application that helps companies implement "information-intensive strategies" (Glazer, 1997) and marketing strategies (Albert *et al.*, 2004). Considering the significant cost and high failure rate of CRM implementation (e.g., Suoniemi *et al.*, 2022), marketing executives must comprehensively assess the potential of CRM implementation with respect to the value it offers their firms. Extant CRM research indicates that CRM benefits firms in terms of customer satisfaction and loyalty (Jayachandran *et al*., 2005; Mithas *et al*., 2005; Kumar and Shah, 2004), word-of-mouth publicity, and firm profitability (Krasnikov *et al.*, 2009; Boulding *et al*., 2005) through the dual creation of both firm and customer value. However, research on the strategic, cross-functional value of CRM remains sparse.

Previous literature has put forth arguments on how CRM improves resource allocation efficiency. In the theoretical framework of CRM proposed by Zeithaml *et al.* (2001), CRM's key objective is to facilitate resource allocation for different customer tiers, in which the customer's tier membership depends on the economic value of that customer or segment to the firm. Reinartz *et al.* (2004) argue that CRM enables firms to investigate resource allocations that are made against the customer relationship profitability distribution. Other studies conclude that CRM applications lead to superior organizational performance due to an increase in resource allocation efficiency (e.g., Migdadi, 2021; Cao and Tian, 2020; Homburg *et al*., 2008; Reinartz *et al.*, 2004; Zablah *et al.*, 2004). Consistent with these views, we hypothesize that firms can use CRM proactively to enhance the allocation of capital investment across firm divisions in internal capital markets. To our knowledge, we are the first to test this hypothesis empirically.

CRM and Internal Capital Markets

There is a consensus among researchers that internal capital allocation is inefficient (e.g.,

Berger and Ofek, 1995; Lang and Stulz, 1994; Rajan *et al.*, 2000). Prior studies attribute inefficient internal capital allocation to (i) a lack of perfect knowledge about divisional investment opportunities (i.e., information asymmetry between headquarters and divisions) and (ii) agency problems that are associated with complex organizational structures (D'Mello *et al.*, 2017; Duchin and Sosyura, 2013). Agency problems and information asymmetry are interrelated. Divisional managers are motivated to bargain for more resources from company headquarters (Scharfstein and Stein, 2000). Without perfect information, agency problems can be further exacerbated, with already limited resources being diverted to low-performing divisions. Firms have recently realized that investing in building data processes leads to better capital allocation decisions. A survey by Ernst & Young (2019b) reveals that companies understand the need to use customer data to make unbiased capital allocation decisions. Unilever, for example, invested in systems to gather and process customer data and to ensure that data are available to those who made capital allocation decisions (Ernst & Young, 2019a). Thus, we hypothesize that CRM can potentially improve internal capital allocation efficiency by alleviating the issues of information asymmetry and agency problems.

First, CRM generates comprehensive segmented customer knowledge, enabling headquarters to identify potential market demand and investment opportunities across different divisions. Customer contact employees in business divisions use CRM to record relevant information about each customer transaction; such information can be processed and converted into customer knowledge as soon as it is captured based on information-processing rules and organizational policies (Ledro *et al.*, 2022; Kumar and Misra, 2021; Mithas *et al.*, 2005). Divisions can then use this integrated customer knowledge to make more precise market forecasts for future market demand (Verhoef *et al.*, 2010), resulting in more efficient processes for budgeting and utilizing capital. The customer information and knowledge captured by divisions are also available for headquarters due to the integration effect of CRM

systems. This effect facilitates the smooth dissemination of customer knowledge throughout an organization to improve the quality of decision-making (Krasnikov et al. 2009; Jayachandran et al. 2005; Ryals 2005). Owing to the integration effect, TMT in headquarters receive more comprehensive market demand knowledge based on the vast amount of current and potential customer demand information from their respective divisions (Krasnikov et al. 2009). This empowers the headquarters to better identify each division's future growth potential using the analytical functions of CRM (e.g., customer trends and lifetime value). Consequently, the TMT at the headquarters can allocate internal capital more efficiently according to these divisions' growth opportunities. Second, CRM mitigates agency problems between top management and divisional managers based on improved information environments in which the existing and potential market demands of the divisions are made transparent to TMT members. As discussed previously, customer information and knowledge in divisions are transmitted via CRM to their headquarters because of the integration effect of CRM. Accordingly, TMTs can use this improved information environment to monitor existing capital investment progress and performance, thereby greatly reducing the opportunistic behavior of divisional managers. As a result, agency problems between TMTs and divisional managers can be mitigated.

In sum, implementing CRM can improve *internal* capital allocation efficiency, due not only to improved abilities in identifying investment opportunities across divisions, but also to the reduction of information asymmetry between TMTs and divisional managers, thus reducing agency problems in capital allocation. This leads to the following hypothesis:

H_1: CRM implementation is positively associated with internal capital allocation efficiency.

The Moderation Effect of Market Competition

Studies suggest that product market competition in an industry affects managerial

decisions (Nickell, 1996; Porter, 1990). Baggs and De Bettignies (2007) show that competition has a positive effect on managerial incentives. Economic studies support the common view that competition helps mitigate agency problems (e.g., Raith, 2003; Schmidt, 1997; Tang, 2018). Based on these prior studies, we argue that TMTs, when faced with highly competitive product markets, have greater incentives to use CRM to improve capital allocation efficiency because competitive pressures impose a liquidation threat on top managers (Schmidt, 1997). In addition, since competitive markets represent dynamic, volatile environments with complex actions (Hou and Robinson, 2006; Kamien and Schwartz, 1982), CRM provides managers with better analytical tools to make timely and effective capital investments that respond to uncertainties in firms' respective environments. Thus, we expect that the positive relation between CRM implementation and capital allocation efficiency is more pronounced for firms facing greater market competition. Therefore, our second hypothesis is as follows:

H_2: The positive association between CRM implementation and capital allocation efficiency is stronger for firms facing higher market competition than for firms facing lower market competition.

The Moderation Effect of Internal Control Effectiveness

Following the Sarbanes-Oxley Act of 2002 in the United States, public disclosure of internal control effectiveness is now available. Ineffective internal controls indicate that firms' corporate information is unreliable and of low quality. Feng *et al*. (2009) document a negative relation between internal control ineffectiveness and the quality of management forecasts used for managerial decision-making. D'Mello *et al.* (2017) find that internal control ineffectiveness is associated with inefficient internal capital allocation. Before data sharing of customer information within a firm between its divisions and headquarters can commence, CRM requires the collection, standardization, and integration of customer data

(Peltier *et al.*, 2013). Without effective internal control, the customer information that CRM generates and shares can be biased, unreliable, and inaccurate; thus, any decision regarding capital allocation based on noisy or distorted information is potentially problematic and may reduce decision effectiveness. Li *et al.* (2012) suggest that if internal control weaknesses (i.e., ineffective internal control) impact the capturing or processing of data within management information systems, then the information produced by such a system may be less effective in its ability to aid in decision-making. In sum, because CRM functions rely on the effectiveness of internal controls to ensure the quality of information, we expect that CRM implementation improves capital allocation efficiency more effectively for firms with effective internal controls than for those with internal control weaknesses. Therefore, we hypothesize the following:

H_3: The positive association between CRM implementation and capital allocation efficiency is stronger in firms with effective internal controls than in firms with internal control weaknesses.

Data and Sample

The data that we use in this study come from several sources. We obtain segment- and firm-level accounting data from COMPUSTAT to construct measures for capital allocation efficiency and most of our control variables by following Cho (2015). We also use the CI database to obtain information about CRM implementation. The CI database covers more than 500,000 business sites in the United States and Canada (e.g., Chwelos *et al.*, 2010; Dewan *et al.*, 2007; Forman, 2005; Kleis *et al.*, 2012). Each site is identified as an "ultimate headquarters," a "division," or a "branch." As discussed in Rajan *et al.* (2000), the segments reported by most firms represent distinct organizational units (divisions, groups, or separately incorporated subsidiaries) or the aggregation of such units in similar industries. As a result, we only include information on headquarters and divisions from the CI database. In addition,

we use data from the input–output tables from the U.S. Bureau of Economic Analysis to calculate the measure of vertical relatedness, following Fan and Lang (2000).

After merging these datasets with available information, our main sample consists of 3,958 firm-year observations from 2000 to 2010, covering 801 diversified firms. In addition, we obtain internal control effectiveness data from Audit Analytics, a market competition database from Hoberg and Phillips (2016), as well as flight route data from the T-100 Domestic Segment Database and driving data from Google Maps API in our subsequent analyses. The number of observations in our subsequent analyses varies, depending on the availability of the variables that we use in our regressions.

Measurement of Development and Regression Model

Measurement of Capital Allocation Efficiency

We follow previous studies (e.g., Guo et al. 2023; Zhou 2022; Devos and Li 2021; Cho 2015) and estimate internal capital allocation efficiency, a measure that captures the efficiency with which firms allocate capital from low- to high-opportunity business segments in the following three steps. First, we calculate the capital allocation deviation for segment *j* of firm *i* in year *t* (*CAPX deviation*$_{ijt}$). The capital allocation deviation is the difference between the percentage of segment capital expenditure in total capital expenditure and the percentage of segment sales in total sales as follows:

$$\text{CAPX deviation}_{ijt} = \frac{\text{CAPX}_{ijt}}{\sum_{j=1}^{m} \text{CAPX}_{ijt}} - - \frac{\text{Sale}_{ijt}}{\sum_{j=1}^{m} \text{Sale}_{ijt}} ,$$

in which $CAPX_{ijt}$ is the capital expenditures of segment *j* of firm *i* in year *t*. $Sale_{ijt}$ is the sales of segment *j* of firm *i* in year *t*, and *m* is the number of segments in firm *i*.

Second, we then calculate *Signed CAPX deviation* for each segment as follows:

$$\text{Signed CAPX deviation}_{ijt} = (+1) \times \text{CAPX deviation}_{ijt} \quad \text{if } q_{ijt} > \bar{q}_{it} ,$$

$$\text{Signed CAPX deviation}_{ijt} = (-1) \times \text{CAPX deviation}_{ijt} \quad \text{if } q_{ijt} \leqslant \bar{q}_{it},$$

where q_{ijt} is the *q* for segment *j* of firm *i* in year *t*, and $\bar{q}_{it}$ is the corresponding asset-weighted average *q* of firm *i*'s remaining segments (excluding segment j) in year *t*. According to the prior studies (e.g., Guo et al. 2023; Zhou 2022; Devos and Li 2021; Cho 2015), q_{ijt} is equal to the median *q* of single-segment firms operating in the same industry (4-digit SIC code).

Last, we calculate Capital Allocation Efficiency for each firm i as follows:

(1) $$\text{Capital Allocation Efficiency}_{it} = \sum_{j=1}^{m} \text{asset weight}_{ijt} \times \text{Signed CAPX deviation}_{ijt},$$

$$\text{in which asset weight}_{ijt} = \text{asset}_{ijt} \Big/ \sum_{j=1}^{m} \text{asset}_{ijt}$$

$asset\ weight_{ijt}$ is the book asset of segment *j* of firm *i* in year *t*, and *m* is the number of segments in firm *i*.

Measure of CRM Implementation

The CI database records site-level information about CRM implementation. Although firms have different company structures due to their operational philosophy, they generally have one headquarters and several divisions. Based on data we obtain from the CI database, we infer that when there is more CRM in divisions, together with CRM in headquarters, TMTs receive better information regarding future investment opportunities among these divisions. We measure the *intensity* of CRM implementation for a firm as the proportion of its divisions and headquarters with CRM relative to the number of its total sites, conditional on the existence of CRM in that firm's headquarters. To construct our measure of CRM implementation, we consider the process by which CRM affects a firm's capital allocation. First, CRM, when implemented by a firm's divisions, helps the firm conduct various activities, such as managing customer contacts, analyzing customer behavior, determining latent needs, and generating sales forecasts. Second, with the vast amount of information created and shared by divisions, CRM in headquarters functions as a nerve center, generating

integrated knowledge about future market prospects within each division. Whether or not CRM is implemented by a firm's headquarters is important from a capital allocation viewpoint because CRM in headquarters is responsible for integrating subsidiaries' information and providing knowledge. Following this argument, we calculate the following:

$$(2)\quad \text{CRM implementation}_{it} = \begin{cases} (1+\sum_{j=1}^{n} \text{CRM}_{ijt}) / (1+n) & \text{Headquarters with CRM;} \\ 0 & \text{Headquarters without CRM.} \end{cases}$$

In Equation (2), CRM_{ijt} denotes the status of CRM implementation at division *j*, and equals 1 if division *j* has CRM in year *t*, and equals 0 otherwise. *n* denotes the total number of divisions of firm *i* in year *t*. Our measure of CRM implementation equals 0 if a firm's headquarters does not have CRM.

Regression Model

To test H_1 and determine whether CRM implementation improves internal capital allocation efficiency, we estimate Equation (3) using ordinary least squares.

$$(3)\ \text{Capital Allocation Efficiency}_{it} = \beta_1\ \text{CRM Implementation}_{it} + \Sigma_j \gamma_j\ \text{Controls}_{it} + \alpha_{it} + \varepsilon_{it}$$

The controls in Equation (3) include the variables of segments and firm characteristics suggested by Cho (2015), which may affect capital allocation efficiency and CRM implementation.[2] For segment characteristics, we use the ranked segment concentration (*Segment Concentration*) to control segment industry competitiveness. In addition, we calculate vertical relatedness (*Vertical Relatedness*) to control for the industry relatedness between segments, following Fan and Lang (2000). For firm characteristics, our model includes the control variables of business diversity (*Number of Segments*), firm size (*Size*), operating performance (*Cash Flow*), capital expenditure levels (*CAPEX*), capital expenditure changes (*CAPEX Change*), asset mix (*NonCAPEX* and *Tangibility*), and financing constraints (*External Financing*, *Cash*, *Leverage*, and *Dividend*). In addition, we follow Mizik and Jacobson (2007) and include marketing spending (*Marketing Spending*) as a control because it may affect CRM implementation. To control for the unobserved invariant industry- and

year-specific factors that may affect CRM implementation and internal capital allocation efficiency, we also include the industry fixed effect and year fixed-effect in our model.[3]

We employ the same regression model used in Equation (3) to test H_2 and H_3, except we split our sample into two sub-groups and run our regressions separately. Specifically, to test H_2, we use the proxy for market concentration (*Market Concentration*), following Hoberg and Phillips (2016).[4] A low market concentration indicates more severe market competition. We split the sample into two sub-groups along the median value of the overall sample: firms with a value below the median value are designated to the lower market concentration group (i.e., a highly competitive market), and firms with a value above the median value are designated to higher market concentration group (i.e., a less-competitive market). We run regressions separately in these two sub-samples and compare the differential effect of CRM implementation on capital market allocation efficiency across the two sub-samples. For H_3, we use an indicator variable (*ICW*) to represent firms' internal control ineffectiveness. We divide the sample into two sub-groups: firms with internal control deficiencies (*ICW*=1) and firms with effective internal controls (*ICW*=0). We then compare the effect of CRM implementation in these two sub-samples.

Summary Statistics

Table 1 provides the detailed definition and data source of each variable. Table 2 reports our summary statistics and the correlations of our main variables. All continuous variables are winsorized at the 1st and 99th percentiles. With respect to the correlations, CRM implementation and firm size are significantly positively related to capital allocation efficiency, and vertical relatedness and external financing are significantly negatively correlated to capital allocation efficiency.

(Insert Table 1 about here)

(Insert Table 2 about here)

Results

Table 3 reports the results of the regression of capital allocation efficiency on CRM implementation according to Equation (3). The coefficient on *CRM Implementation* in column 1 is 0.0276 and statistically significant ($p < .01$) with controls for the year and industry-fixed effects. This result implies that firms with full CRM implementation in both headquarters and divisions can allocate more capital to segments with greater opportunities by 2.76% of their total capital expenditure compared with those without CRM. Cho (2015) finds that firms increase capital allocation efficiency by 3.64%, on average, after adopting SFAS 131 (i.e., a new accounting standard improving firm transparency); for comparative purposes, the magnitude of our coefficient is economically significant and plausible. This result supports H_1, which hypothesizes that CRM implementation is positively related to internal capital allocation efficiency.[5] After adding control variables, the coefficient on CRM implementation (0.0223) in column 2 is still significantly positive ($p < .05$). With respect to control variables, the coefficients on marketing spending and firm size are significantly positive ($p < .10$ and $p < .01$, respectively), and the coefficient on cash flow is significantly negative ($p < .10$). These results support the findings of Cho (2015), suggesting that larger firms make more efficient capital allocation decisions and that firms with higher cash flows tend to make less efficient capital allocation decisions.[6]

(Insert Table 3 about here)

Instrumental Variables and 2SLS model

CRM implementation is potentially endogenous because firms self-select to have CRM. Although we include year and industry fixed effects in Equation (3) to control for variations

caused by macroeconomic and industry factors, there may still be omitted variables that correlate with CRM implementation and capital allocation efficiency, thus giving rise to endogeneity. Therefore, we address the issue of endogeneity using instrumental variables (IVs).

We include three IVs in our two-stage least squares (2SLS) model. The first IV is novel and based on the opening of new airline routes. An alternative approach for a firm to acquire information about its divisions is to physically visit them. Enhanced geographical proximity to its subsidiaries makes it easier for the firm's headquarters to monitor and acquire information about subsidiaries (Giroud, 2013). Giroud finds that headquarters in closer geographical proximity (due to new airline route openings) enable firms to acquire and monitor their subsidiaries more easily. Giroud also shows that information technologies, such as CRM, facilitate information flows across company units, reducing the need to personally travel to subsidiaries. Following Giroud (2013), we expect a substitution relation between CRM and physical proximity to the headquarters, and measure geographic proximity by using data reporting newly opened airline routes. The opening of new airline routes matches one of the requirements of instrumental variables in that it is totally exogenous yet still related to CRM implementation.

Following Giroud (2013), we obtain data on airline routes from the T-100 Domestic Segment Database. We calculate the driving time between each headquarters and its divisions using Google Maps API. We then combine this data to construct an instrumental variable (*Airline Open*) based on whether there are new airline routes that reduce the travel time between a firm's headquarters and its divisions in year *t*. Specifically, the instrumental variable (*Airline Open*) equals 1 if a new airline route reduces the travel time between headquarters and divisions in year *t*, and 0 otherwise.

Th other two IVs include the average level of CRM implementation in the same two-

digit SIC industry (*Industrial Average CRM Implementation*) in the previous year and firms' lagged CRM implementation *(Lagged CRM Implementation*).

Panel A of Table 4 reports the first-stage results of our 2SLS model and shows that the coefficient of *Airline Open* is negative and statistically significant ($p < .05$), indicating that firms with closer geographic proximity to their divisions tend to have a lower level of CRM implementation.[7] The coefficients on the other two IVs (*Industrial Average CRM Implementation* and *Lagged CRM Implementation*) are both positive and significant ($p < .01$ and $p < .01$, respectively) as well. Our overidentification tests provide insignificant statistics, implying that our IVs are exogenous with respect to the current year's *CRM Implementation*. Panel B of Table 4 shows the second-stage results of our 2SLS model and we find that the coefficient of $\widehat{\text{CRM}}$ implementation is .0363, which is positive and statistically significant ($p < .01$). This supports a causal interpretation of the positive effect of CRM implementation on capital allocation efficiency. This 2SLS result consistently supports H_1, indicating that the effect of CRM implementation on capital allocation efficiency is still positive after the endogenetic effect is excluded as much as possible.

(Insert Table 4 about here)

Moderation Effects of Market Competition and Internal Control

Panels A and B in Table 5 present the results of testing the moderating roles of market competition and internal control effectiveness. In Panel A, we split the sample according to whether *Market Concentration* (*MC*)[8] of the industry that a firm belongs to is greater than the median value of *MC* in our sample. Column 1 (column 2) reports the relation between *CRM Implementation* and *Capital Allocation Efficiency* in highly(less) competitive markets. The coefficient on *CRM Implementation* in the sub-sample in highly competitive markets (column

1) is positive and statistically significant, while the coefficient in the sub-sample in less-competitive markets (column 2) is not significant. These results suggest that the positive effect of CRM implementation on capital allocation efficiency is mainly experienced by firms facing higher market competition. In a more competitive market, firms are more motivated to improve their competitiveness in order to survive, and thus are more active in improving the efficiency of internal resource allocation. Moreover, the coefficients on CRM implementation in the two sub-groups are different and are significant at the 10% level (p =.594).

In Panel B, we follow prior literature (Tang et al. 2015; Kim et al. 2011; Feng et al. 2009) to measure the effectiveness of a firm's internal control. We construct an indicator variable (*ICW*)[9] to determine whether a firm in year *t* has internal control weaknesses or not. Subsequently, we partition the sample based on the value of *ICW*. When the firm reports internal control weaknesses in year *t*, this firm's internal control is considered ineffective (*ICW*=1). Otherwise, the firm is considered to have effective internal controls for that year. Column 1 of Panel B includes the sub-sample of firms with effective internal controls, while column 2 reports the relation between *CRM Implementation* and *Capital Allocation Efficiency* for firms with internal control weaknesses. The coefficients on *CRM Implementation* for firms with effective internal controls and for those with internal control weaknesses are 0.0387 ($p < .01$) and −0.0202 (insignificant), respectively. These results suggest that the effect of CRM implementation on capital allocation efficiency is positive when a firm's internal control is effective. As shown in Panel B of Table 5, firms with full CRM implementation can allocate more capital to segments with greater opportunities by 3.87% of their total capital expenditure if they have effective internal controls (i.e., they do not have any internal control weaknesses). Firms with internal control weaknesses may cut capital to segments with greater opportunities by 2.02% of their total capital expenditure. The effects of CRM implementation are significantly different between the two sub-groups at the

5% level.

In sum, these results indicate that the impact of CRM implementation on internal capital allocation is influenced by the competition level which firms face and by the quality of firms' internal control. These findings support H_2 and H_3 in that the positive relation between CRM implementation and capital allocation efficiency is more pronounced in firms facing high market competition or those that have effective internal controls.

(Insert Table 5 about here)

Discussion

In this study, we investigate an unexplored aspect of marketing accountability: the role of marketing assets such as CRM in internal capital allocation. We find that CRM implementation has a positive effect on internal capital allocation efficiency. Our main results demonstrate that firms with full CRM implementation at both headquarter and division levels can allocate more capital to business segments with greater opportunities by 2.23% of their total capital expenditure compared with those firms that do not implement CRM. This finding is comparable to the positive effect of SFAS 131, which increases capital allocation efficiency by 3.64%. We further document two conditions (i.e., higher market competition and internal control effectiveness) under which the effect of CRM on internal capital allocation efficiency is more pronounced.

Implications for Research

First, we uncover one aspect of marketing accountability by suggesting marketing's impact on firms' internal capital allocation efficiency. Our study of the *internal* capital market complements prior research on *external* capital markets. Prior studies (e.g., Alchian 1969) suggest the unique scenario of the internal capital market in investigating various firm

performance metrics (e.g., the performance of marketing investments) because headquarter-level executives can better collect and evaluate various information, including marketing performance metrics in a firm's internal capital market. Therefore, examining internal capital markets helps provide incremental and unique insights regarding the impact of marketing on firm value. Future research can investigate how marketing assets, capabilities, and actions help determine the valuation of divisions within a firm's internal capital market. For example, as the extant literature suggests that brand metrics are important to the external capital market (Mizik and Jacobson, 2009), future research should explore whether brand metrics affect the internal assessment of divisional managers and internal capital allocations since brand assets are expected to enhance divisional cash flow growth and reduce risk. Moreover, because marketing assets are expected to create value for both divisions and firm headquarters, understanding how firm headquarters allocate marketing assets internally to create firm value offers an internal capital market viewpoint with respect to a marketing–finance interface, which is an important complement to the extant external capital market viewpoint.

Second, this study enriches the body of literature on CRM benefits. The benefit measures used in the extant literature are either specific to marketing processes (e.g., customer satisfaction loyalty) or aggregated yet still directly related to marketing (e.g., sales and profit). We suggest another pathway through which CRM may go beyond sales and marketing to benefit another business activity: financial decisions for allocating capital internally. In so doing, we respond to the repeated calls by Kumar (2015) and Johnston (2023) to examine marketing as an integral part of a firm's decision-making framework and to engage in multidisciplinary research in marketing, accounting, and finance. By extension, future research can tap into CRM benefits that cross over into different functions and make efficient use of information generated by CRM. For example, when generating accounting earnings numbers, managers must make estimates and judgments for things like bad debts.

Generally, firms simply use historical averages for the sake of convenience. CRM, however, has the potential to provide detailed and updated data on each individual customer's status, thereby enabling managers to make more accurate estimates, which improves accounting accuracy.

Third, we broaden the boundary condition of the emerging literature on avenues to increase capital allocation efficiency. This literature is largely focused on accounting and finance practices and policies. A key implication of our research with respect to this body of literature is that technologies (e.g., CRM technology) matter; hence, the literature should consider new technologies that can provide information and generate intelligence about market demand and investment opportunities. For instance, "robo-advisors" based on artificial intelligence (AI) offer a practical, disruptive innovation in the personal capital allocation field. An interesting question emerges: To what extent can robo-advisors disrupt corporate capital allocation in the same way (Davenport *et al.*, 2018)? New ideas in marketing embrace the co-evolutionary changes of marketing-mix functions and the influence of technological innovations (Kumar, 2015), and we believe that marketers—together with practitioners and scholars in related fields—can play a pioneering role in advancing firm knowledge about market demand and facilitating firm decision-making for capital allocation in the era of big data and AI.

Managerial Implications

Our study is likely to be of interest to both organizations that implement CRM as well as CRM technology vendors. First, our findings underscore the fact that CRM can have a significant cross-functional effect on corporate financing and budgeting, both of which are important responsibilities of CFOs. This implies that when CMOs plan marketing initiatives and implement CRM, CMOs must communicate to CFOs not only the direct effect but also the indirect strategic benefits of such initiatives to a firm as a whole, including other

functional areas. More specifically, our study implies that CRM implementation extends beyond marketing and information technology and should instead be regarded as central to a firm strategy that incorporates knowledge regarding customer and market demand across diversified product and geographical markets. This is particularly important to a firm's CEO and his/her TMT who focus entirely on strategic decision-making. Our findings also offer implications for divisional managers. Since CRM implementation allows headquarters to gain knowledge of divisions' market demand and potential for internal capital allocation decisions, divisional managers—who have identified growth opportunities but need to compete for internal resources from headquarters—should strive to facilitate CRM implementation and upgrade their technology accordingly, so that headquarters can rely on hard evidence when providing capital support to divisions with potential. Moreover, our findings are relevant to CRM vendors themselves. The cross-functional advantages of CRM imply that CRM vendors would benefit from developing products that streamline CRM with other firm functions (e.g., accounting, finance) to help clients obtain more optimal value from CRM implementation, instead of only emphasizing the direct benefits of CRM.

Second, our documented moderation factors for the relation between CRM and capital allocation efficiency are also relevant to managers and CRM vendors. We find that the positive effect of CRM on capital allocation efficiency is more pronounced for firms operating in highly competitive environments and for companies with effective internal controls. As firms in highly competitive environments must efficiently use their resources to remain competitive, our findings imply that if these firms can implement CRM across most of their divisions, they benefit more from efficiency gained from internal capital allocation when compared with firms that operate in less-competitive environments. CRM vendors themselves may want to customize their CRM for clients facing high competition by enhancing the communication and analytical tools that accompany CRM between

headquarters and firm divisional sites so that their clients can reap greater rewards from investing in CRM. Moreover, to optimize the benefits of CRM, firms must ensure the effectiveness of internal controls so that corporate information is both reliable and of high quality.

Limitations

This study has several limitations. First, our archival data provide information about CRM implementation at the divisional level, but do not provide details regarding how TMTs specifically use CRM. Detailed field investigations may help address this issue. Second, we have only investigated one (major) category of marketing assets: CRM. As such, the benefits of marketing with respect to capital allocation are likely to be underestimated; thus, future research should consider the other strategic aspects of marketing within a firm. Third, given the nature of our data, we are able to show associations but not causality. Thus, mixed-method research (e.g., in-depth case studies and experiments) is needed to better draw causal inferences. Fourth, because our measure for capital allocation efficiency is a newly designed one, it requires further testing, validation, and improvement. Fifth, our sample period predates the rise of modern-day AI applications. Future research could use more recent data to validate our findings.

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Endnotes

[1] According to Gartner (2018), worldwide CRM software revenue amounted to $39.5 billion in 2017 and overtook database management systems revenue, which reached $36.8 billion in the same year.

[2] Our focus is on CRM systems that have been successfully implemented. Conceptually, these implemented CRM systems collect and analyze customer information, and are expected to affect managers' decision-making concurrently. Consequently, we anticipate a contemporaneous relation between CRM implementation and internal capital allocation efficiency. Nevertheless, as a robustness check, we test the relation using lagged CRM implementation and internal capital allocation efficiency, under the assumption that the intensity of CRM implementation remains unchanged from the previous year to the current one. We find that our conclusion remains unchanged (see Table OA-2 in Section OA-2 of the Online Appendix).

[3] We use two-digit SIC codes as industry classifications.

[4] Using web crawling and text parsing algorithms in analyzing 10-K annual filings on the SEC, Hoberg and Phillips (2016) built a new classification system (TNIC). We thank Gerard Hoberg and Gordon Phillips for sharing their competition data at http://hobergphillips.tuck.dartmouth.edu/.

[5] We also adopt an alternative measure for internal capital allocation efficiency, as utilized in the finance literature (e.g., Rajan et al. 2000; Duchin 2010), for a robustness check. We find similar results as shown in Table OA-3 of Section OA-3 in the Online Appendix.

[6] One potential concern is that our results could be influenced by an omitted variable that affects both management efficiency, through improving internal capital allocation efficiency, and the implementation of CRM. To address this concern, we follow prior studies (Demerjian et al. 2012) and include a variable, *Managerial Ability*, which captures the management team's efficiency in generating revenues. Our results remain robust even when controlling for this factor (see Table OA-1 in Section OA-1 of the Online Appendix). We express our gratitude to Professor Peter Demerjian for sharing their data on managerial ability.

[7] This does not necessarily imply that opening an airline route, which shortens travel time, would prompt a firm to abandon its related division's CRM. Implementing CRM is influenced by multiple factors, all of which are included in our first stage model. In practice, it is more likely that opening an airline route that reduces travel time diminishes the motivation to further increase a firm's CRM implementation intensity.

[8] The detailed definition of *Market Concentration* (*MC*) is included in Table 1.

[9] The detailed definition of *ICW* is included in Table 1.

TABLE 1
Data Descriptions and Sources

Variables	Description	Source
Capital Allocation Efficiency	Efficiency of internal capital markets, with which firms actively allocate capital from low- to high-opportunity segments	COMPUSTAT
CRM Implementation	Intensity of a firm's CRM implementation, calculated as the total number of divisions and the headquarters with CRM divided by the total sites in the firm, and is conditional upon the existence of CRM at the headquarter level	CI database
Marketing Spending	Marketing expenditure intensity, calculated as general administrative (SG&A) expenditures minus R&D expenditures divided by assets, following Mizik and Jacobson (2007)	COMPUSTAT
Vertical Relatedness	Intersegment vertical business relatedness in the diversified firm, following Fan and Lang (2000)	U.S. Bureau of Economic Analysis
Size	Firm size, calculated as the natural logarithm of total assets	COMPUSTAT
Cash Flow	Cash flow, to proxy for firm operating performance, calculated as the firm's operating cash flow scaled by total assets at the beginning-of-period	COMPUSTAT
CAPEX	Capital expenditures level, calculated as a firm's capital expenditure scaled by total sales	COMPUSTAT
CAPEX Change	Percentage change in capital expenditure from the previous year to the current years	COMPUSTAT
NonCAPEX	An indicator variable that equals 1 for firms reporting positive amounts of R&Ds or intangibles, and 0 otherwise	COMPUSTAT
Tangibility	Tangibility of assets, calculated as the net PP&E scaled by total assets	COMPUSTAT
Cash	Cash holdings, measured as the sum of cash and cash equivalents scaled by total assets	COMPUSTAT
Leverage	Leverage, calculated as the ratio of total liabilities to total assets	COMPUSTAT
Number of Segments	The number of business segments in a firm	COMPUSTAT
External Financing	Firm external financing activities, measured as the net external financing divided by capital expenditure	COMPUSTAT

Segment Concentration	Segment industry competitiveness, measured as the decile rank of the industry Herfindahl index in which the segment operates	COMPUSTAT
Dividend	An indicator variable for dividend payments, which equals 1 for firms reporting positive amounts of dividends for common stocks, and 0 otherwise	COMPUSTAT
Market Concentration	Product market concentration where the firm operates by following Hoberg and Phillips's (2016) study	Hoberg and Phillips (2016)
ICW	An indicator variable for internal control weaknesses, which equals 1 in the firm-year of the reporting of internal control weaknesses, and 0 otherwise	Audit Analytics
Airline Open	An indicator variable that equals 1 if a new airline route which reduces the drive time between the headquarters and any division is opened, and 0 otherwise	T-100 Domestic Segment Database
Industrial Average CRM Implementation	Average intensity of CRM implementation in the same two-digit SIC industry	CI database
Lagged CRM Implementation	Intensity of a firm's CRM implementation in the beginning of the year	CI database

(Table source: Authors' own work)

TABLE 2
Summary Statistics and Correlations

Panel A: Summary Statistics

Variables [a]	M	SD	Min	Max
(1) Capital Allocation Efficiency	0.0011	0.1303	-0.5000	0.4732
(2) CRM Implementation	0.0548	0.1677	0	1
(3) Marketing Spending	0.2008	0.1502	0.0109	0.8908
(4) Vertical Relatedness	0.0332	0.0463	0	0.2168
(5) Size	7.4128	1.8265	2.5339	12.5269
(6) Cash Flow	0.0964	0.0718	-0.1428	0.3311
(7) CAPEX	0.0474	0.0618	0.0020	0.5789
(8) CAPEX Change	-0.1340	0.6602	-3.5813	0.7648
(9) NonCAPEX	0.9550	0.2073	0	1
(10) Tangibility	0.2626	0.1710	0.0135	0.8408
(11) Cash	0.0742	0.0783	0.0003	0.4449
(12) Leverage	0.2521	0.1836	0	0.9551
(13) Number of Segments	3.5321	1.6215	2	15
(14) Segment Concentration	1.4227	1.5218	0	7
(15) External Financing	1.7103	8.9601	-19.4423	75.2535
(16) Dividend	0.6281	0.4834	0	1
(17) Market Concentration	0.2659	0.2134	0.0249	1
(18) ICW	0.1519	0.3590	0	1

Note: We define all variables in Table 1. (Source: Authors' own work)

TABLE 2
Continued

Panel B: Correlation Matrix

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1)	1																
(2)	.04*	1															
(3)	.01	.06***	1														
(4)	-.04*	-.00	-.14***	1													
(5)	.04*	.01	-.32***	.07***	1												
(6)	-.01	.01	.036*	-.01	.11***	1											
(7)	.00	-.04*	-.27***	.15***	.14***	.14***	1										
(8)	-.00	.03	-.08***	-.02	.16***	.17***	.16***	1									
(9)	-.01	.03	.01	-.03	.14***	-.01	-.11***	0.07***	1								
(10)	.00	-.00	-.22***	.15***	.05***	.16***	.50***	-0.01	-.18***	1							
(11)	-.01	.00	.02	-.02	-.10***	.10***	-.03	-0.03	-.01	-.23***	1						
(12)	-.01	-.03	-.10***	.09***	.06***	-.17***	.07***	-0.06***	.01	.18***	-.32***	1					
(13)	.00	-.01	-.14***	-.02	.32***	-.03*	-.05**	0.04*	.09***	-.09***	-.02	-.00	1				
(14)	-.01	.02	.14***	.10***	-.16***	.03	.06***	-0.06***	-.08***	.07***	.05**	-.00	-.39***	1			
(15)	-.04**	-.01	-.02	.04**	-.06***	-.12***	-.04*	0.01	.02	-.08***	-.09***	.22***	-.03*	.02	1		
(16)	.03	.03	-.00	-.06***	.35***	.21***	-.02	0.10***	.04*	.06***	-.08***	-.15***	.12***	-.12***	-.15***	1	
(17)	-.01	.01	.13***	-.10***	-.23***	-.02	-.12***	-.04*	.03	-.16***	.04*	-.03*	-.03*	-.02	.03	-.07***	1
(18)	.02	-.03	.02	.03*	-.12***	-.13***	.01	-0.02	.04*	-.02	.04**	.03	.02	-.01	.04*	-.12***	.03

Note: *** $p < .01$, ** $p < .05$, * $p < .10$

[a] All continuous variables are winsorized at the 1st and 99th percentiles; We define all variables in Table 1. (Source: Authors' own work)

TABLE 3
Results of CRM Implementation on Capital Allocation Efficiency

	(1)		(2)	
	Coefficient	t-stat	Coefficient	t-stat
CRM Implementation	0.0276	(2.685)***	0.0223	(2.568)**
Marketing Spending			0.0342	(1.689)*
Vertical Relatedness			-0.0399	(-0.640)
Size			0.0045	(2.691)***
Cash Flow			-0.0779	(-1.942)*
CAPEX			0.0365	(0.482)
CAPEX Change			-0.0035	(-0.781)
NonCAPEX			-0.0049	(-0.352)
Tangibility			-0.0042	(-0.159)
Cash			0.0247	(0.637)
Leverage			-0.0105	(-0.748)
Number of Segments			0.0002	(0.108)
Segment Concentration			-0.0016	(-0.612)
External Financing			-0.0003	(-1.030)
Dividend			0.0025	(0.472)
Intercept			-0.0273	(-0.571)
# of observations	3,958		3,794	
R^2	4.30%		4.90%	
Year & Industry dummies	Yes		Yes	

Note: Dependent variable = Capital Allocation Efficiency; We define all variables in Table 1; Robust t-statistics in parentheses; *** $p < .01$, ** $p < .05$, * $p < .10$. (Source: Authors' own work)

TABLE 4
Results of CRM Implementation on Capital Allocation Efficiency (2SLS Model)

Panel A: First Stage of 2SLS Model

	Dep. Var.= CRM Implementation	
	Coef.	t-stat
Airline Open	-0.0086	(-2.398)**
Industrial Average CRM Implementation	0.1508	(3.709)***
Lagged CRM Implementation	0.9379	(42.11)***
Intercept	0.0383	(0.819)
Controls	Included	
# of observations	2,943	
R^2	78.20%	
Test of overidentifying		
Basmann chi2(2) = 2.36 (p = .3068)		
Sargan (score) chi2(2) = 2.41 (p = .2993)		
Test of weak instruments		
The first-stage partial F-statistic = 771.578 (p < .001)		
Hausman Test		
p = .0513		
DWH Test		
p = .3484		

Note: Robust t-statistics in parentheses; *** p < .01, ** p < .05, * p < .10. (Source: Authors' own work)

TABLE 4
Continued

Panel B: Second Stage of 2SLS model		
	Coefficient	t-stat
$\widehat{CRM}$ Implementation	0.0363	(2.720)***
Marketing Spending	0.0154	(0.749)
Vertical Relatedness	-0.0553	(-0.831)
Size	0.0033	(1.911)*
Cash Flow	-0.0299	(-0.672)
CAPEX	0.118	(1.320)
CAPEX Change	-0.0029	(-0.597)
NonCAPEX	0.0002	(0.008)
Tangibility	-0.0193	(-0.643)
Cash	0.0320	(0.801)
Leverage	-0.0113	(-0.756)
Number of Segments	0.0009	(0.559)
Segment Concentration	0.0001	(0.031)
External Financing	-0.0005	(-1.453)
Dividend	0.0041	(0.715)
Intercept	-0.1021	(-2.963)***
# of observations	2,943	
R^2	5.04%	
Year & Industry dummies	Yes	

Note: Dependent variable = Capital Allocation Efficiency; We define all variables in Table 1; Robust t-statistics in parentheses; *** $p < .01$, ** $p < .05$, * $p < .10$. (Source: Authors' own work)

TABLE 5
Sub-sample Analysis

Panel A: The Moderation Effect of Market Competition

	(1) Higher Market Competition (MC<= the sample median)		(2) Lower Market Competition (MC>the sample median)	
	Coefficient	t-stat	Coefficient	t-stat
CRM Implementation	0.0532	(2.682)***	0.0130	(0.814)
Marketing Spending	0.0631	(1.629)	0.0298	(1.032)
Vertical Relatedness	0.0598	(0.641)	-0.2670	(-2.676)***
Size	0.0062	(1.926)*	0.0053	(2.014)**
Cash Flow	-0.0754	(-1.155)	-0.0912	(-1.584)
CAPEX	0.1010	(1.029)	-0.1310	(-0.860)
CAPEX Change	-0.0074	(-1.069)	0.0005	-0.079
NonCAPEX	-0.0059	(-0.272)	-0.0063	(-0.298)
Tangibility	-0.0102	(-0.264)	0.0363	(0.894)
Cash	0.0544	(0.919)	0.0090	(0.148)
Leverage	-0.0076	(-0.291)	-0.0280	(-1.148)
Number of Segments	-0.0004	(-0.167)	0.0016	(0.671)
Segment Concentration	-0.0051	(-1.399)	0.0018	(0.455)
External Financing	-0.0004	(-0.904)	-0.0002	(-0.384)
Dividend	-0.0007	(-0.077)	0.0006	-0.074
Intercept	-0.0003	(-0.007)	-0.0006	(-0.009)
# of observations	1,696		1,822	
R^2	8.00%		5.90%	
Year & Industry dummies	Yes		Yes	
$\beta_{1(MC \leq median)} = \beta_{1\,(MC > median)}$			Chi-Squared Stat. = 3.55 *p*-value = 0.0594	

Note: Dependent variable = Capital Allocation Efficiency; We define all variables in Table 1; Robust t-statistics in parentheses; *** p < .01, ** p < .05, * p < .10. (Source: Authors' own work)

TABLE 5
Continued

Panel B: The Moderation Effect of Internal Control Effectiveness

	(1) Firms with effective internal controls (ICW=0)		(2) Firms with internal control weaknesses (ICW=1)	
	Coefficient	t-stat	Coefficient	t-stat
CRM Implementation	0.0387	(3.081)***	-0.0202	(-0.551)
Marketing Spending	0.0316	(1.405)	0.0820	(1.357)
Vertical Relatedness	0.0020	-0.027	-0.3080	(-2.083)**
Size	0.0057	(2.947)***	0.0080	(1.546)
Cash Flow	-0.0930	(2.045)**	-0.0132	(-0.122)
CAPEX	0.0253	(0.295)	0.2900	(1.614)
CAPEX Change	-0.0029	(-0.562)	-0.0082	(-0.722)
NonCAPEX	-0.0115	(-0.750)	-0.0348	(-0.862)
Tangibility	-0.0098	(-0.323)	-0.0547	(-0.705)
Cash	0.0177	(0.439)	0.0445	(0.351)
Leverage	-0.0051	(-0.331)	-0.0627	(-1.312)
Number of Segments	-0.0018	(-1.119)	0.0046	(0.989)
Segment Concentration	-0.0039	(-1.374)	0.0033	(0.506)
External Financing	-0.0002	(-0.587)	-0.0011	(-1.355)
Dividend	0.0042	(0.693)	-0.0026	(-0.158)
Intercept	0.0080	(0.134)	-0.0774	(-0.747)
# of observations	3,081		534	
R^2	5.60%		19.50%	
Year & Industry dummies	Yes		Yes	
$\beta_{1(ICW=0)} = \beta_{1\,(ICW=1)}$			Chi-Squared Stat. = 5.97 *p*-value = 0.0146	

Note: Dependent variable = Capital Allocation Efficiency; We define all variables in Table 1; Robust t-statistics in parentheses; *** p < .01, ** p < .05, * p < .10. (Source: Authors' own work)

Online Appendix. Robustness checks

OA-1. Analysis Controlling for Managerial Ability.

Table OA-1: Effect of CRM Implementation on Capital Allocation Efficiency: A Control for Managerial Ability

	Dep. Var. = Capital Allocation Efficiency	
	coefficient	t-stat
CRM Implementation	0.0257	(2.355)**
Managerial Ability	0.0191	(2.187)**
Marketing Spending	0.0270	(1.303)
Vertical Relatedness	-0.0036	(-0.059)
Size	0.0048	(2.909)***
Cash Flows	-0.1000	(-2.463)***
CAPEX	0.0770	(1.044)
CAPEX Change	-0.0036	(-0.788)
NonCAPEX	0.0006	(-0.039)
Tangibility	0.0095	(0.348)
Cash	0.0327	(0.850)
Leverage	-0.0051	(-0.356)
Number of Segments	-0.0006	(-0.402)
Concentration Rank	-0.0025	(-0.973)
External Financing	-0.0004	(-1.200)
Dividend	0.0009	(0.169)
Intercept	-0.0442	(-0.918)
# of observations	3,731	
R-squared	5.20%	
Year & Industry dummies	Yes	

Note: This table presents the effect of *CRM Implementation* on *Capital Allocation Efficiency* when controlling firms' managerial ability; *Managerial Ability* is a firm's managerial ability score in year t ranked in decile by industry and year; Managerial ability score is provided by Demerjian et al. (2012) and captures the firm's management team's efficiency in generating revenues; All other variables are defined in Table 1; Robust t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1. (Source: Authors' own work)

OA-2: Relation between *Lagged CRM Implementation* and *Capital Allocation Efficiency*

Table OA-2:
Relation between Lagged CRM Implementation and Capital Allocation Efficiency

	Dep. Var = Capital Allocation Efficiency	
	coefficient	t-stat
Lagged CRM Implementation	0.0344	(2.737)***
Marketing Spending	0.0163	(0.791)
Vertical Relatedness	-0.0541	(-0.819)
Size	0.0034	(1.942)*
Cash Flows	-0.0407	(-0.938)
CAPEX	0.1180	(1.309)
CAPEX Change	-0.0022	(-0.474)
NonCAPEX	-0.0009	(-0.048)
Tangibility	-0.0212	(-0.715)
Cash	0.0307	(0.769)
Leverage	-0.0135	(-0.899)
Number of Segments	0.0010	(0.604)
Concentration Rank	0.0004	(0.160)
External Financing	-0.0004	(-1.352)
Dividend	0.0041	(0.707)
Intercept	-0.0992***	(-2.920)***
# of observations	3,034	
R-squared	5.80%	
Year & Industry dummies	Yes	

Note: This table presents the effect of *Lagged CRM Implementation* on *Capital Allocation Efficiency;* All variables are defined in Table 1; Robust t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1. (Source: Authors' own work)

OA-3: Analysis using an alternative measure of internal capital allocation efficiency.

Table OA-3:
Results using the internal capital allocation efficiency measure developed by Rajan et al. (2000)

	Dep. Var = Capital Allocation Efficiency $_{Rajan}$	
	coefficient	t-stat
CRM Implementation	0.0137	(2.041)**
Marketing Spending	-0.0298	(-1.239)
Vertical Relatedness	-0.1140	(-1.359)
Size	-0.0003	(-0.254)
Cash Flows	0.0172	(0.472)
CAPEX	0.0835	(1.075)
CAPEX Change	-0.0027	(-1.291)
NonCAPEX	-0.0072	(-1.372)
Tangibility	-0.0019	(-0.088)
Cash	0.0038	(0.272)
Leverage	-0.0130	(-1.016)
Number of Segments	0.0014	(1.880)*
Concentration Rank	0.0010	(0.792)
External Financing	0.0001	(1.607)
Dividend	-0.0074	(-2.223)**
Intercept	-0.0143	(-0.804)
# of observations	3,134	
R-squared	6.00%	
Year & Industry dummies	Yes	

Note: This table presents the effect of CRM implementation on internal capital allocation efficiency, as measured by *Capital Allocation Efficiency* $_{Rajan}$. This is calculated by aggregating the adjusted investment ratio at the segment level to the firm level value, as described by Rajan et al. (2000); All other variables are defined in Table 1; Robust t-statistics in parentheses; *** p<0.01, ** p<0.05, * p<0.1. (Source: Authors' own work)

Specifically, *Capital Allocation Efficiency* $_{Rajan}$ is estimated by using the internal capital allocation efficiency method proposed by following Rajan et al. (2000). This measure is based on the weighted sum of adjusted investment ratio, which captures the difference between segments in conglomerates and its stand-alone peers operating in the same industry. To be specific, we first calculate the adjusted investment ratio for segment *j* of firm *i* in year *t* as follow:

$$\text{Adjusted Investment Ratio}_{ijt} = \frac{\text{CAPX}_{ijt}}{Asset_{ijt-1}} - \left(\frac{\text{CAPX}_{ijt}}{Asset_{ijt-1}}\right)_{ind} - \sum_{j=1}^{m} asset\ weight_{ijt}\left(\frac{\text{CAPX}_{ijt}}{Asset_{ijt-1}} - \left(\frac{\text{CAPX}_{ijt}}{Asset_{ijt-1}}\right)_{ind}\right)$$

where $\frac{\text{CAPX}_{ijt}}{Asset_{ijt-1}}$, segment investment ratio, is the segment *j*'s capital expenditure to beginning-of-the-period asset ratio. $\frac{\text{CAPX}_{ijt}}{Asset_{ijt-1}} - \left(\frac{\text{CAPX}_{ijt}}{Asset_{ijt-1}}\right)_{ind}$ is the segment investment ratio less the average industry investment ratio. *Adjusted Investment Ratio* is the segment *j*'s industry-adjusted investment ratio less the weighted average industry-adjusted investment ratio across all the segments of the firm *i*. The weight, $asset\ weight_{ijt} = asset_{ijt}/\sum_{j=1}^{m} asset_{ijt}$, is the segment *j*'s share of the total asset of firm *i*. *m* is the number of segments in firm *i*. Then we determine the S*igned Adjusted Investment Ratio* for each segment as follows:

$$Signed\ Adjusted\ Investment\ Ratio_{ijt} = (+1) \times \text{Adjusted Investment Ratio}_{ijt} \quad if\ q_{ijt} > \bar{q}_{it},$$

$$Signed\ Adjusted\ Investment\ Ratio_{ijt} = (-1) \times \text{Adjusted Investment Ratio}_{ijt} \quad if\ q_{ijt} \leq \bar{q}_{it},$$

where q_{ijt} is the *q* for segment *j* of firm *i* in year *t*, which is equal to the median *q* of single-segment firms operating in the same industry (4-digit SIC code). $\bar{q}_{it}$ is the corresponding asset-weighted average *q* of firm *i*'s remaining segments (excluding segment *j*) in year *t*.

Finally, we calculate *Capital Allocation Efficiency* $_{Rajan}$ for each firm *i* in year *t* as follows:

$$Capital\ Allocation\ Efficiency\ _{Rajan\ it} = \sum_{j=1}^{m} asset\ weight_{ijt} \times Signed\ Adjusted\ Investment\ Ratio_{ijt}\ .$$

Reference:

Demerjian, P., B. Lev, and S. McVay (2012), "Quantifying Managerial Ability: A New Measure and Validity Tests", *Management Science* Vol. 58, No. 7, pp1229-1248.

Rajan, R., Servaes, H., and Zingales, L. (2000), "The Cost of Diversity: The Diversification Discount and Inefficient Investment", *The Journal of Finance* Vol. 55, No. 1, pp. 35-80.