

Strong shareholder rights, internal capital allocation efficiency, and the moderating role of market competition and external financing needs

Maximilian Sturm¹ · Stephan Nüesch²

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Abstract This study investigates the effect of strong shareholder rights on the internal capital allocation efficiency of multi-segment firms and how market competition and the firm's need for external financing moderate this association. For this purpose, we use panel data from North American multi-segment firms covering the years 1998 through 2006 with dynamic firm fixed effect models, which enable us to control for unobserved and time-invariant firm heterogeneity as well as for a dynamic nature of the internal capital allocation process. We confirm previous findings of Chen and Chen (J Bank Finance 36(2):395–409, 2012) and show that strong shareholder rights significantly increase the internal capital allocation efficiency. Further, we find that market competition moderates this association by significantly weakening this positive effect. However, the moderating effect of external financing needs is not found to be significant. These findings indicate that strong shareholder rights are crucial for ensuring efficient internal capital allocations within multi-segment firms, especially when market competition is low.

✉ Maximilian Sturm
maximilian.sturm@wiwi.uni-muenster.de

Stephan Nüesch
stephan.nueesch@wiwi.uni-muenster.de

¹ Business Management Group, University of Muenster, Georgskommende 26, 48143 Muenster, Germany

² Chair of Business Management, University of Muenster, Georgskommende 26, 48143 Muenster, Germany

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1 Introduction

One of the core functions of corporate managers within a multi-segment firm is the allocation of capital across business units. In such internal capital markets (Williamson 1975) corporate managers arise as the allocation authority with final say. Theoretical studies (Williamson 1975; Gertner et al. 1994; Fluck and Lynch 1999) argue that because corporate managers have better access to relevant internal information than outsiders, investments made by corporate managers within internal capital markets are more likely to be efficient than investments made by the external capital market. Empirical evidence, however, shows contrary results (Berger and Ofek 1995; Lamont 1997; Shin and Stulz 1998; Scharfstein 1998; Rajan et al. 2000; Scharfstein and Stein 2000): Corporate managers tend to allocate capital *less* efficiently across business units than the external capital market. Rationales for this value-destroying attribution of internal capital allocations made by corporate managers are the cross-subsidizations of unpromising business units by promising ones (Lamont 1997; Shin and Stulz 1998), the lower effectiveness of corporate control and monitoring mechanisms within multi-segment firms (Berger and Ofek 1995; Scharfstein 1998), the power struggle between corporate managers and divisional managers (Rajan et al. 2000), and the rent-seeking behavior and empire-building actions of corporate managers (Scharfstein 1998; Scharfstein and Stein 2000; Gormley and Matsa 2011). All these aspects are likely to result in a distortion of capital allocations that reduces the efficiency of the internal capital allocation process.

Although the literature provides plausible explanations for inefficient internal capital allocations, the role of corporate governance in this context is under-researched. Our study addresses this gap in the literature by developing and testing the implications of good corporate governance on the internal capital allocation process. In doing so, we aim to achieve a better understanding of the determinants of the efficiency of the internal capital allocation process within multi-segment firms.

Corporate governance can help to alleviate agency problems between corporate managers and outsiders. Shleifer and Vishny (1997: 737) define corporate governance as the “ways in which suppliers of finance assure themselves of getting a return on their investment”. Bebchuk (2005, 2007), and Gompers et al. (2003) indicate that good corporate governance helps to better align the decision-making of managers with the interests of outside investors and, thus, to enhance firm value. Accordingly, we argue that corporate governance is a crucial determinant of the efficiency of internal capital allocations.

Prior research in the corporate governance literature indicates that strong shareholder rights help to reduce agency costs caused by conflicts of interest

between the corporate manager and shareholders (Jiraporn et al. 2006; Masulis et al. 2007; Chen et al. 2011). In particular, Chen et al. (2011) show that strong shareholder rights decrease the cost of equity and that this effect is amplified in the presence of free cash flow. In addition, Masulis et al. (2007) indicate that firms with strong shareholder rights tend to make fewer corporate management-initiated empire-building acquisitions. Further, Jiraporn et al. (2006) find that strong shareholder rights make focal firms less likely to pursue value-destroying diversification strategies and that multi-segment firms with weak shareholder rights have a higher diversification discount. While Jiraporn et al. (2006) highlight that strong shareholder rights increase the overall value of multi-segment firms, we specifically focus on the effect of strong shareholder rights on the internal capital allocation efficiency that has been shown by previous researches (e.g., Scharfstein and Stein 2000; Arrfelt et al. 2014) to be a crucial factor in determining the valuation of such firms. Hence, this work can be viewed as a step forward in building knowledge about how corporate governance affects the internal capital allocation process initiated by the corporate manager. By examining this association, we contribute to existing literature in two ways.

First, there is to our best knowledge only one other study that examines the effect of strong shareholder rights on the internal capital allocation efficiency, namely Chen and Chen (2012), who find in their analysis that strong shareholder rights significantly increase the internal capital allocation efficiency. Unlike Chen and Chen (2012), we investigate not only the direct effect of strong shareholder rights but also how contextual factors influence the effectiveness of these rights. In this context, we have identified the level of market competition and the firm's need for external financing as moderators in the association between strong shareholder rights and the corporate manager's internal capital allocation decisions. We argue that high market competition weakens the beneficial effect of strong shareholder rights on the internal capital allocation efficiency. High market competition decreases the firm's rents and so the corporate manager's discretion, which reduces the necessity of the disciplining effect of strong shareholder rights to ensure efficient internal capital allocations. Further, we argue that external financing needs weaken the association between strong shareholder rights and internal capital allocations. This is because with the firm's need for external financing the pressure on the corporate manager for more efficient internal capital allocations increases. This in turn lowers the corporate manager's discretion in investment decisions, which weakens the beneficial effect of strong shareholder rights through the reduction of such discretion. By examining the moderating role of these two contextual factors, we are the first to empirically test how the firm's market structure and the firm's financial structure influence the effect of strong shareholder rights on the internal capital allocation process. Our results emphasize the importance of the firm's market competition when shareholder rights are used to reduce value-destroying investment decisions of corporate managers.

Second, deviating from the cross-sectional analyses of Chen and Chen (2012) we use panel data and dynamic firm fixed effect models to identify our effects because the strength of the shareholder rights is a result of bargaining processes between shareholders and the corporate management and is therefore subject to high path-

dependencies. By testing the impact of *changes* in the strength of shareholder rights on *changes* of internal capital allocation efficiency, we control for unobserved and time-invariant firm heterogeneity, which is particularly important for corporate governance studies (Himmelberg et al. 1999; Hermalin and Weisbach 2003). Moreover, the panel data enables us to take dynamics of the internal capital allocation processes into account. Based on these arguments, we believe that our study yields stronger empirical evidence in investigating the effect of strong shareholder rights on the internal capital allocation efficiency.

To test our hypotheses we used data from North American multi-segment firms for the years 1998 through 2006, which we analyze with the generalized method of moments (GMM) estimator for dynamic modeling of panel data introduced by Arellano and Bond (1991). Unlike ordinary least squares (OLS) estimator, the dynamic panel GMM estimator directly allows us to control for endogeneity caused by the dynamic nature of the association between corporate governance and a firm's action (Hermalin and Weisbach 1998; Wintoki et al. 2012). Ignoring this dynamic nature would lead to inconsistent coefficients and thus reduce the reliability of any inference of a relationship between strong shareholder rights and internal capital allocation efficiency. The results of our study indicate that strong shareholder rights significantly increase internal capital allocation efficiency and that the firm's market competition moderates this relationship by significantly weakening the positive effect of strong shareholder rights on the internal capital allocation efficiency. The moderating effect of external financing needs is not statistically significant.

The remainder of the paper is as follows: First, in Sect. 2 we construct our hypotheses based on theoretical frameworks and form the study's specific hypotheses. Then in Sect. 3 we explain our methods and in Sect. 4 present the main results. In Sect. 5 we discuss our findings and their limitations, and propose future research directions, before summarizing the study in Sect. 6.

2 Theory and hypotheses

2.1 Strong shareholder rights and internal capital allocation efficiency

Multi-segment firms can make use of an internal capital market in which the corporate manager allocates capital across business units. The efficiency of the internal capital allocation is a crucial factor in determining the business unit performance and, by extension, that of the firm (Billett and Mauer 2003; Arrfelt et al. 2014).

Prior research (e.g., Lamont 1997; Scharfstein and Stein 2000) indicates that the corporate manager's discretionary power in making investment decisions is an important driver of the efficiency of the internal capital allocation process. The objectives of the corporate manager do not necessarily coincide with those of shareholders. Whereas the shareholders want to maximize the shareholder value, the corporate manager wants to maximize his own utility function, which also includes private aspects that may not be associated with higher firm performance (e.g.,

empire building). Thus, with greater managerial discretion, potential agency costs increase.¹

Based on this logic, we assume that strong shareholder rights decrease a corporate manager's discretionary power and, thus, increase the internal capital allocation efficiency of multi-segment firms. Bebchuk et al. (2009) show that the following six provisions reduce the strength of shareholder rights: Limitations on amending bylaws, limitations on amending the charter, a staggered board, the requirement for a supermajority to approve a merger, golden parachutes, and poison pills. We argue that all of these provisions affect the internal capital allocation efficiency, albeit for different reasons.

Limitations on amending bylaws and limitations to amending the charter make a change of the corporate bylaw and corporate charter through shareholders more complicated and thus less likely. The corporate bylaw and the corporate charter define the strategic long-term orientation of the firm including the capital allocation process, the board composition, the ownership structure, and the rights and power of the corporate management. Limitations on amending bylaws and charter reduce the shareholders' disciplining power over the corporate manager's actions. Consequently, in the context of internal capital allocations the presence of such provisions complicates the interest alignment of shareholders and the corporate management in investment decision-making. We therefore argue that an absence of limitations on amending bylaws and the charter increases internal capital allocation efficiency.

A staggered board, the requirement of a supermajority to approve a merger, golden parachutes, and poison pills are four measures that make corporate takeovers more difficult. In a staggered board, the directors of the board are assigned to different classes from which the directors of only one class can be replaced per year. Therefore, any bidder must wait at least one year before gaining full control of the board, in which time the existing board may insert one or more of the following measures to further obstruct a takeover. Supermajority to approve a merger delineate that the approval of a merger requires a supermajority of shareholder votes. Golden parachutes means that the termination of existing corporate management requires the firm to pay them costly benefits. A poison pill (e.g., dual-class shares) is a deliberate defensive tactic used against a takeover. However, all four provisions make the firm less attractive for an acquisition and decrease the effectiveness of the market for corporate control. The market for corporate control gives shareholders "both power and protection commensurate with their interest in corporate affairs" (Manne 1965: 112). Inefficient internal capital allocations decrease firm valuation and share prices (Hubbard and Palia 1999), an effect that is observable even to otherwise uninformed shareholders. An effective market for corporate control allows external investors to acquire inefficiently managed firms and to replace the management. Even though an effective removal of the management is a fairly extreme—and therefore unlikely—action, even the anticipation of the (unlikely) threat of removal disciplines the corporate managers.

¹ Here we argue from the agency perspective that greater managerial discretion makes value-destroying investment decisions of the corporate manager more likely to occur. We acknowledge, however, that the stewardship perspective (Davis et al. 1997) implies that managerial discretion can also lead to *more* efficient internal capital allocations.

An ineffective market for corporate control, however, increases the corporate manager's discretion and facilitates internal capital allocations that maximize the manager's utility (e.g., empire-building) but not necessarily the firm's performance. Therefore, an absence of these anti-takeover provisions, namely a staggered board, the requirement of a supermajority to approve a merger, golden parachutes, and poison pills, makes it more likely for shareholders to enforce their interests in the investment decisions of corporate managers, which in turn increases the internal capital allocation efficiency. Formally stated:

Hypothesis 1 Strong shareholder rights will increase internal capital allocation efficiency.

2.2 Strong shareholder rights, contextual factors, and internal capital allocation efficiency

Aguilera et al. (2008), Tosi (2008), and Filatotchev and Boyd (2009) highlight that the effects of corporate governance are not universal but rather embedded in and determined by the firm's context. Because managerial discretion is an important channel of the effect of strong shareholder rights on internal capital allocation efficiency, especially those contextual factors that influence managerial discretion are relevant for us. Giroud and Mueller (2011) show that firms operating in industries with low market competition are characterized by higher managerial discretion. Chae et al. (2009) find that the need for external financing decreases agency problems. In such a context corporate managers have less discretionary power to make investments with private benefits at the cost of shareholders. Furthermore, Dittmar et al. (2003) show that firms with a need for external financing have a lower managerial discretion and therefore a greater investment-cash holding sensitivity than firms without a need of external financing. Based on these findings, we argue that the level of market competition and the firm's need for external financing are two important factors that are likely to influence the effect of strong shareholder rights on the internal capital allocation efficiency.

We argue that firms with a high level of market competition benefit less from the disciplining effect of strong shareholder rights. High market competition is typically characterized by competitive actions such as the introduction and announcement of new products and price cuts (Young et al. 1996), which lower the firm's rents that can be extracted by the corporate manager and so reduces the corporate manager's discretion in the internal capital allocation process. Corporate managers of a firm operating in an environment of high market competition have less discretion and thus less opportunity to extract private benefits at the cost of shareholders. Hence, in the context of high market competition, the need for strong shareholder rights to ensure efficient internal capital allocations is reduced. Overall, the beneficial effect of strong shareholder rights on the efficiency of internal capital allocations is likely to be weakened by high market competition. In other words, we argue strong shareholder rights and market competition to be substitutes in their impact on the effectiveness of internal capital allocation. Formally stated:

Hypothesis 2 Market competition moderates the positive relation between strong shareholder rights and internal capital allocation efficiency. The positive effect is weaker when market competition is high.

The second contextual factor that is likely to influence the effect of strong shareholder rights on the internal capital allocation efficiency is the firm's need for external financing. If the internally generated cash flow is not sufficient to finance profitable investment opportunities, the firm requires external capital and issues new securities. The affairs of such firms are rigorously reviewed by new investors. Because inefficient internal capital allocations reduce firm performance (Arrfelt et al. 2014), new investors would demand a risk premium and so increase the cost of external capital for firms with less efficient internal capital allocations. Hence, corporate managers of firms with a need for external financing experience greater pressure to enhance the internal capital allocation process to lower capital costs and to sustain growth. This in turn reduces the corporate manager's discretionary power in investment decision-making, which weakens the channel through which strong shareholder rights increases internal capital allocation efficiency. Formally stated:

Hypothesis 3 External financing needs moderate the positive relation between strong shareholder rights and internal capital allocation efficiency. The positive effect is weaker when external financing needs increase.

3 Methods

3.1 Sample

To test our hypotheses, we collected data at the business unit, firm, and industry levels from Compustat (Fundamental, Industry Segment, and Execucomp) and the CRSP database and matched information on the governance index E-Index provided by Bebchuk et al. (2009).² The sample period covers the years 1998 through 2006. We did not include earlier data because in December 1997 a major change in the financial reporting standards of multi-segment firms with business units whose sales exceed 10% of consolidated totals took effect (SFAS 131 superseded the SFAS 14). This change in reporting standards hinders a direct comparison of reported business unit data before and after this date (Berger and Hann 2003; Villalonga 2004). As the E-index data is only available up to 2006, we could not include more recent data.

In line with previous studies, we excluded from the initial sample all business units that lack direct competitors, all business units with a single-year appearance, and all business units with a missing primary SIC code (McGahan and Porter 1997; Cleary 1999; Mackey 2008). Additionally, we excluded all firms operating in unclassified industries (SIC codes above 9000), all firms operating in financial industries (SIC codes in 6000s), and all firms with a missing primary SIC code. Further, we excluded all firms with missing E-Index data. Further, all focal firms

² E-Index data are available on <http://www.law.harvard.edu/faculty/bebchuk/data.shtml>.

were excluded from our sample because only firms with at least two business units can make use of capital allocations within an internal capital market. Finally, all observations that had missings were excluded. These adjustments result in a final sample of 1129 firm-year observations from 273 firms with business units from 106 separate industries on four-digit SIC-level for investigation.

3.2 Measures

3.2.1 Measure of internal capital allocation efficiency

Measurements of internal capital allocation efficiency reflect the efficiency of the internal capital allocation process by comparing the investments made by the corporate manager in high-Tobin's q (hereafter, q) business units relative to low- q business units. To determine the efficiency of the internal capital allocation in multi-segment firms we use the measure introduced by Rajan et al. (2000). The following formula is used for calculation:

$$Efficiency = \sum_{j=1}^n \omega_j (q_j - \bar{q}) \left\{ \frac{Capex_j}{BA_j} - \left(\frac{Capex}{BA} \right)_{indj} - \sum_{j=1}^n \omega_j \left[\frac{Capex_j}{BA_j} - \left(\frac{Capex}{BA} \right)_{indj} \right] \right\} \quad (1)$$

where ω_j is the portion of business unit j assets to firm's total assets, q_j is the q of the business unit j , which is approximated by the q of at least five focal firms operating in the same industry as the business unit in question, \bar{q} the mean q of all segments within the considered multi-segment firm, $Capex_j$ the capital expenditure of the business unit j , BA_j the book value of business unit j assets, and $\left(\frac{Capex}{BA} \right)_{indj}$ the ratio of capital expenditure to book value of assets of at least five focal firms operating in the same industry as the business unit in question. Subscript n is the total number of business units within the multi-segment firm. To calculate q_j and $\left(\frac{Capex}{BA} \right)_{indj}$, we used data of focal firms operating in the same industry as the business unit in question. To satisfy the criterion that at least five focal firms were included for the calculation, we performed a stepwise integration of focal firms on four-, three- and two-digit SIC levels. Specifically, when a business unit had an insufficient number of counterparts in the respective industry on the four-digit SIC-level, we included the relevant value of single-segment firms from the broader three-digit (two-digit) SIC-level until the criterion was fulfilled. Finally, and to ensure an easier interpretation of our regression results, we multiplied the measured values of the internal capital allocation efficiency by 100.

A positive value of the construct indicates efficient internal capital allocations where high- q business units are assigned relatively more capital than low- q business units, which is beneficial for firm performance. A negative value of the construct indicates that low- q business units receive relatively more capital than high- q ones, which has a value-destroying effect for the firm. The higher the value of this measurement the more efficient is the internal capital allocation process.

3.2.2 Measure of strong shareholder rights

To measure the strength of shareholder rights we use the E-index introduced by Bebchuk et al. (2009) based on the Investor Responsibility Research Center (IRRC) data. The E-Index incorporates six provisions that describe the strength of shareholder rights: Limitations on amending bylaws, limitations on amending the charter, a staggered board, the requirement of a supermajority to approve a merger, golden parachutes, and poison pills. Bebchuk et al. (2009) show that such shareholder rights positively correlate with firm performance and help to explain differences in firm valuation.

Because the E-Index database provides data only every second year, we followed the advice of prior research and imputed the corporate governance index for each missing firm-year observation in our sample by using the E-index data of the previous year (e.g., Dittmar and Mahrt-Smith 2007; Bhagat and Bolton 2008). This procedure allows us to increase the number of observations and, therefore, the statistical power of our analyses.

The E-Index can take a value between 0 and 6, where a greater value is associated with decreasing shareholder rights. Our variable *strong shareholder rights* is defined as the median E-index for each year and industry on the two-digit SIC-level minus the firm's E-Index. Thus, the variable is positive (negative) for firms with strong (weak) shareholder rights.

3.2.3 Measure of market competition

Market competition reflects the firm's competitive environmental conditions and takes into account the number of competitors within the industries the multi-segment firm is operating in as well as the distribution of market shares among those firms. The following formula is used for the calculation:

$$\text{Market Competition}_{it} = 1 - \sum_{j=1}^n (\text{marketshare}_{ijt})^2 \quad (2)$$

where *market share* is the business unit j 's contribution of sales to consolidated totals within the industry on the four-digit SIC-level. Subscript i denotes the firm, j the business units, and t the year. A higher value of market competition indicates a more competitive environment in the industries in which the firm is operating.

3.2.4 Measure of external financing needs

External financing needs, as derived from Demirgüç-Kunt and Maksimovic (1998), is operationalized as the difference between the actual firm growth rate and the sustainable firm growth rate. The sustainable firm growth rate reflects the maximum potential growth rate a firm could attain without access to external long-term funding. The actual firm growth rate is defined as the yearly growth rate of the firm's assets. The sustainable firm growth rate is calculated as the ratio of return on equity (ROE) to (1-ROE), where ROE is net income divided by shareholder's

equity. A positive value of the construct suggests that the internal capital that is needed to sustain the firm growth is not sufficient and, thus, external financing is needed. A negative value of the variable shows that the internal capital is greater than the capital needed to sustain the firm growth and, thus, external financing is not needed.

3.2.5 Measures of controls

We included several firm and industry-adjusted measures in our model to control for any effect on the internal capital allocation efficiency. *Tobin's Q* is calculated as the ratio of the value of equity plus book value of total assets minus book value of equity to total assets. *Firm size* is measured as the natural logarithm of firm assets. *Cost of capital* is calculated as the ratio of total interest expense to the sum of short-term liabilities constituting debt and long-term debt for each firm and year. *Industry-adjusted leverage* is measured by the leverage in the primary industry a multi-segment firm is operating in minus its industry mean. *Industry-adjusted capital intensity* is calculated as the capital expenditure scaled by assets in the primary industry a multi-segment firm is operating in minus its industry mean. *Industry-adjusted Return on Assets* is the firm's ratio of net income to total assets minus the mean ratio of net income to total assets of all firms operating in the same primary industry as the firm in question. For calculating the industry-adjusted measures, we took the respective values of at least five focal firms classified at the same narrowest SIC-level classification as the primary industry of the multi-segment firm in question. To fulfill the criterion that at least five focal firms were included in the calculation, we used the same procedure as described previously. Further, because the CEO's characteristics are likely to have an important impact on the internal capital allocation decisions, we also control for *CEO tenure*, *CEO duality*, *CEO age*, and *CEO gender*.³ *CEO tenure* measures the years the CEO is working in the firm. *CEO duality* is defined as a dummy variable, where a coding of 1 indicates that the CEO is the chairman of the board and 0 otherwise. *CEO age* is defined as the CEO's age in years. *CEO gender* is a dummy variable, where a coding of 1 indicates that the CEO is male and 0 otherwise. In addition, all continuous variables in our final regression model were winsorized at the 1st and 99th percentile. To control for industry- and time-specific differences, industry and year dummies were included in all regression models.

3.3 Model specification and estimation

Like almost all corporate governance aspects, shareholder rights are not exogenously given but the result of path-dependencies and a bargaining process between

³ Here, we assume that the CEO, as the controlling entity of the firm, has the final say in the capital allocation process and, thus, solely his characteristics are likely to determine the internal capital allocation efficiency. In fact, the internal capital allocation decision process is characterized by a more complex interplay among different entities within the firm (e.g., other entities than the CEO are the CFO and business unit manager; for an overview see Bower 1986). However, not least because of a lack of relevant data and the opaqueness of this interplay, we find it reasonable to limit our investigations to CEO characteristics.

(founding) shareholders and the management. Therefore, we have to address potential endogeneity concerns. As discussed in Wintoki et al. (2012), three types of endogeneity could play a role in this context: unobservable heterogeneity, simultaneity, and a dynamic relationship between current values of the independent variables (here, strong shareholder rights) and past values of the dependent variable (here, internal capital allocation efficiency).

For estimation, we use a four-step procedure. First, we enter all right-hand variables in the regression model with a 1-year time lag. The 1-year time lag is reasonable because the actual capital allocation within a firm precedes its budget planning (Arrfelt et al. 2014) and, thus, does not become effective until the next period. Second, we include lagged values of the dependent variable on the right-hand side of the regression as internal instruments to control for a potential dynamic relationship between strong shareholder rights and internal capital allocation efficiency. The assumption of such a dynamic relationship seems reasonable because inefficient internal capital allocations are likely to intensify pressures to improve shareholder rights to ensure a greater efficiency of internal capital allocations in the future. Thus, past internal capital allocation decisions may affect current shareholder rights, which will in turn affect future internal capital allocation decisions. To determine how many lags have to be included in our model, we estimated OLS models of current internal capital allocation efficiency on up to five lags of past internal capital allocation efficiency. Results in Table 3 in the Appendix show that among the estimations we run, lags of one, two, and three years were statistically significant and, therefore, were included in the final regression model. Third, we first-difference all variables included in the model. This procedure enables us to control for any unobserved firm heterogeneity and simultaneity. Fourth, we estimate the regression model by using the dynamic panel GMM estimator introduced by Arellano and Bond (1991). Unlike the OLS or FE estimators, the dynamic panel GMM estimator relaxes the condition that all independent variables need to be strictly exogenous—a condition that no longer holds when lagged values of the dependent variable are included on the right-hand side of our regression model. Thus, while OLS or FE estimators would yield inconsistent estimators, the dynamic GMM estimator is the most adequate approach to reliably inferring the effect of strong shareholder rights on the internal capital allocation efficiency.

4 Results

4.1 Descriptive statistics

Table 1 presents the mean and standard deviation of each of our raw variables and the correlations between these variables. The firms in our sample have a mean internal capital market efficiency of -0.05 and a standard deviation of 0.50 , which is consistent with the findings of prior literature that the internal capital market is on average inefficient (e.g., Shin and Stulz 1998; Scharfstein 1998; Stein 2003). The variable strong shareholder rights has a mean of 0.04 and standard deviation of 1.27 .

Table 1 Descriptive statistics of variables used for regression

Variable	#Obs	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Internal capital allocation efficiency	1129	-0.05	0.50													
2. Strong shareholder rights	1129	0.04	1.27	0.04												
3. Market competition	1129	0.90	0.22	0.05	-0.04											
4. External financing needs	1129	-0.06	0.18	0.04	-0.02	-0.04										
5. Tobin's q	1129	1.72	0.83	0.04	0.15	0.09	-0.19									
6. Firm size	1129	7.93	1.39	0.06	0.20	-0.23	-0.05	0.08								
7. Cost of capital	1129	6.90	22.09	-0.00	-0.02	0.03	-0.01	-0.03	-0.12							
8. Industry-adjusted capital intensity	1129	-0.00	0.04	-0.00	-0.00	0.06	0.02	0.13	-0.04	-0.02						
9. Industry-adjusted leverage	1129	0.19	0.90	-0.01	0.04	-0.04	-0.04	-0.13	0.13	0.02	-0.11					
10. Industry-adjusted ROA	1129	-0.07	0.09	0.01	0.05	-0.02	0.06	0.24	0.05	-0.07	0.04	-0.18				
11. CEO tenure	1129	13.04	8.35	-0.02	0.06	0.04	-0.06	0.01	-0.19	0.08	-0.02	-0.08	0.07			
12. CEO duality	1129	0.85	0.35	0.06	0.01	-0.07	0.02	0.03	0.14	-0.08	-0.00	-0.01	0.05	0.16		
13. CEO age	1129	57.36	7.11	-0.07	0.09	-0.06	-0.02	-0.06	-0.03	-0.04	-0.03	-0.03	0.00	0.23	0.13	
14. CEO gender	1129	0.99	0.07	0.03	-0.04	-0.02	0.03	0.01	0.03	0.02	-0.02	-0.03	0.01	-0.00	0.10	0.03

Absolute correlations of 0.04 and above are significant at the 0.10 level

Market competition has a mean of 0.90 and a standard deviation of 0.22. External financing needs has a mean of -0.06 and a standard deviation of 0.18. The variables strong shareholder rights and internal capital allocation efficiency have a correlation of 0.04. Even though the positive correlation seems to be small, it is statistically significant at the 10 percent level. The two moderators (market competition and external financing need) also positively correlate with internal capital allocation efficiency.

4.2 Multivariate analysis

In this study, we examine the effect of strong shareholder rights on the internal capital allocation efficiency of multi-segment firms and how the level of market competition and the firm's need for external financing influence this association. For this purpose, we have developed arguments to predict their interdependencies and have empirically tested these arguments with dynamic panel GMM regressions, whose results are reported in Table 2.

Hypothesis 1 predicts a positive effect of strong shareholder rights on the internal capital allocation efficiency. Regression results for Model 2 indicate that the effect is statistically positive (Model 2: $b = 0.110$, $p < 0.05$). Thus, Hypothesis 1 is supported. That is, strong shareholder rights increase the efficiency of internal capital allocations.

Model 3 additionally includes an interaction term of strong shareholder rights and market competition to test Hypothesis 2, which predicts a negative moderating effect of market competition on the association between strong shareholder rights and internal capital allocation efficiency. Results of this test show that the moderating effect is negative and (marginally) significant (Model 3: $b = -0.039$, $p < 0.10$) and so Hypothesis 2 is supported. Hence, high market competition weakens the positive effect of strong shareholder rights on the efficiency of internal capital allocations.

Model 4 includes an interaction term of strong shareholder rights and external financing needs to test Hypothesis 3, which predicts a negative moderating effect of external financing needs on the relationship between strong shareholder rights and internal capital allocation efficiency. In contrast to our predictions, we do not find that the firm's need for external financing moderates the relationship between strong shareholder rights and internal capital allocation efficiency (Model 4: $b = -0.025$, $p > 0.10$). Therefore, Hypothesis 3 is not supported. Hence, the beneficial effect of strong shareholder rights seems not to be affected by a firm's need for external financing.

For all regression models we find that our control variables *Tobin's q*, *firm size*, *industry-adjusted leverage*, *industry-adjusted ROA*, and *CEO gender* all significantly increase and *CEO age* significantly decrease internal capital allocation efficiency.

Table 2 Results of dynamic panel GMM estimation of first-differenced variables with firm-clustered robust standard errors and internal capital allocation efficiency as dependent variable with a 1-year time lagging structure of the right-hand variables

Model	1	2	3	4
Strong shareholder rights (SSR)		0.110* (0.061)	0.109 [^] (0.060)	0.108 [^] (0.060)
SSR × market competition			-0.039 [^] (0.022)	
SSR × external financing needs				-0.025 (0.028)
Market competition	0.230 (0.185)	0.237 (0.183)	0.236 (0.182)	0.241 (0.182)
External financing needs	0.139*** (0.036)	0.133** (0.036)	0.132** (0.041)	0.132** (0.037)
Internal capital allocation efficiency (lag 1)	0.106 [^] (0.061)	0.105 (0.063)	0.102 (0.061)	0.102 (0.061)
Internal capital allocation efficiency (lag 2)	-0.092 [^] (0.050)	-0.092 [^] (0.051)	-0.094 [^] (0.051)	-0.093 [^] (0.052)
Internal capital allocation efficiency (lag 3)	-0.148** (0.051)	-0.137* (0.052)	-0.130* (0.053)	-0.150* (0.053)
Tobin's q	0.139*** (0.030)	0.151*** (0.030)	0.145*** (0.030)	0.140*** (0.031)
Firm size	0.284 [^] (0.149)	0.267 [^] (0.151)	0.262 [^] (0.151)	0.269 [^] (0.151)
Cost of capital	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)
Industry-adjusted leverage	0.083* (0.034)	0.086* (0.035)	0.085* (0.035)	0.081* (0.036)
Industry-adjusted capital intensity	0.025 (0.022)	0.026 (0.023)	0.026 (0.022)	0.026 (0.023)
Industry-adjusted ROA	0.154* (0.072)	0.149 [^] (0.074)	0.143 [^] (0.073)	0.151 [^] (0.073)
CEO tenure	-0.007 (0.006)	-0.008 (0.006)	-0.008 (0.007)	-0.008 (0.007)
CEO duality	0.087 (0.078)	0.081 (0.081)	0.088 (0.080)	0.076 (0.080)
CEO age	-0.009* (0.004)	-0.010* (0.004)	-0.010* (0.004)	-0.009 [^] (0.005)
CEO gender	1.419** (0.472)	1.400** (0.473)	1.522** (0.472)	1.444** (0.472)
Intercept	-0.421	-0.434	-0.399	-0.410
Industry dummies	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
AR(1) test (<i>p</i> value)	0.00	0.00	0.00	0.00

Table 2 continued

Model	1	2	3	4
AR(2) test (<i>p</i> value)	0.67	0.66	0.72	0.68
<i>N</i>	1129	1129	1129	1129

AR(1) and AR(2) tests for serial correlation in the first- and second-order of first-differenced residuals with the null hypothesis that no serial correlation exists. In parentheses are corrected standard errors clustered for firms

[^] $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

5 Discussion, limitations, and future research

The purpose of this study was to develop and test arguments for the effect of strong shareholder rights on the internal capital allocation efficiency of multi-segment firms and to assess the extent to which the firm's market competition and external financing needs influence this relationship. In doing so, we deepen understanding on the interplay between corporate governance, internal and external environmental conditions, and corporate managers' internal capital allocation decisions.

Prior theoretical and empirical works show that strong shareholder rights have important beneficial implications for the firm valuation in several aspects, including restraining empire-building actions that lead to value-destroying acquisition (Masulis et al. 2007), lowering equity costs (Chen et al. 2011), and increasing pay-for-performance sensitivity (Fahlenbrach 2008). However, the question to what extent these rights affect internal capital allocations remains under-researched in literature. We provide evidence that firms with strong shareholder rights are more likely to (re-)allocate capital from unpromising business units to promising ones than firms with weak shareholder rights. One explanation for the positive effect of strong shareholder rights on the internal capital allocation efficiency may be that the greater shareholder rights allow the shareholders to discipline the corporate manager to refrain from indulging in value-destroying investment decisions. Even though shareholders are usually not able to observe internal capital allocation decisions, inefficient internal capital allocations still decrease firm valuation and share prices (Hubbard and Palia 1999), an observable factor of great relevance for shareholders. Thus, shareholders will use their rights to ensure that the corporate manager does not exploit the discretionary power to make investments with private benefits at the cost of shareholders. Strong shareholder rights increase the monitoring effectiveness and result in a greater fit in capital investment and capital deployment. The direct effect of strong shareholder rights on internal capital allocation efficiency is in line with previous findings by Chen and Chen (2012) based on a cross-sectional data set.

Our results also show that high market competition weakens the positive effect of strong shareholder rights on the internal capital allocation efficiency. Corporate managers of underperforming firms in highly competitive environments are under greater pressure to increase the efficiency of the internal capital allocation process and so the need for a disciplining mechanism through strong shareholder rights is reduced. This perspective is also in line with Hambrick and Finkelstein (1987), who

indicate that the restriction of managerial discretion through environmental conditions renders organizational factors, here the internal capital allocation process, more critical for firm performance.

In contrast to our predictions, we do not find that the firm's need for external financing moderates the relationship between strong shareholder rights and internal capital allocation efficiency. That is, the beneficial effect of strong shareholder rights seems not to be affected by a firm's need for external financing. One explanation for this finding could be that external capital can be both new equity and new debt. Whereas shareholders hold residual claims and, therefore, directly suffer from inefficient internal capital allocations through reduced shareholder value, debt capital providers typically receive a fixed return on their investment. As long as the firm generates sufficient income to pay the fixed return, the debt capital providers are not likewise motivated to put pressure on the corporate manager to increase the efficiency of internal capital allocations.

The E-Index we have used aggregates six individual corporate governance provisions, each of which has been shown by Bebchuk et al. (2009) to have a significant impact on the firm valuation, into one measurement. Unfortunately Bebchuk et al. (2009) publishes only the aggregated E-index and not the data on each of the six different provisions. Thus, we could not test the extent to which each individual provision affects the internal capital allocation efficiency and how the different provisions interact with one another. For instances, Bebchuk et al. (2002) show that the concurrent presence of staggered board and poison pill mutually reinforce each other and so weaken shareholder rights even more.

Led by the findings of our study, we have identified three promising directions for future research. First, there might be further contextual factors at different aggregation levels (industry, firm, and segment levels) beyond market competition and external financing needs that moderate the direct effect of strong shareholder rights on the internal capital allocation efficiency. We encourage researchers to develop arguments and empirically test further contingencies that are likely to influence the effectiveness of strong shareholder rights as a disciplining mechanism for the corporate manager's internal investment decisions.

Second, our findings are based on a North American data set. We encourage future studies to test the generalizability of our results in other countries with other institutional settings.

Third, we assumed in our study that the corporate management is the only entity determining the internal capital allocation process. In fact, it is a more complex interplay among the CEO, CFO, and business unit managers. Thus, it might be a fruitful direction for further examinations to test how strong shareholder rights affect the interplay of entities involved in internal capital allocations.

6 Conclusion

This study examines the association between strong shareholder rights and the corporate manager's internal capital allocation efficiency and how market competition and external financing needs moderates this association. For this

purpose, we conducted dynamic panel GMM regressions of first-differenced variables using data on North American multi-segment firms covering the years 1998 through 2006. Unlike Chen and Chen (2012), this panel approach allows us to control for unobserved and time-invariant firm heterogeneity and to take into account the dynamic nature of internal capital allocations. We confirm the findings of Chen and Chen (2012) and show that strong shareholder rights significantly increase the internal capital allocation efficiency. Further, we show that high market competition moderates this association by weakening the beneficial effect of strong shareholder rights on the internal capital allocation efficiency. The moderating effect of external financing needs, however, is not statistically significant. Hence, strong shareholder rights increase the internal capital allocation efficiency of multi-segment firms especially when market competition is low and, thus, the corporate manager's discretionary power high.

Appendix

See Table 3.

Table 3 Results of OLS estimation with firm-clustered robust standard errors and internal capital allocation efficiency as dependent variable with a 1-year time lagging structure of the right-hand variables and up to five time lags of past internal capital allocation efficiency

Model	1	2	3	4
Strong shareholder rights	0.070 [^] (0.040)	0.071 (0.041)	0.079 [^] (0.041)	0.068 [^] (0.039)
Internal capital allocation efficiency (lag 1)	0.085 [^] (0.044)	0.086 [^] (0.047)	0.086 [^] (0.049)	0.091 [^] (0.050)
Internal capital allocation efficiency (lag 2)	0.073 [^] (0.042)	0.067 [^] (0.038)	0.072 [^] (0.040)	0.071 [^] (0.041)
Internal capital allocation efficiency (lag 3)		0.201* (0.093)	0.199 [^] (0.096)	0.198 [^] (0.098)
Internal capital allocation efficiency (lag 4)			0.079 (0.089)	0.070 (0.094)
Internal capital allocation efficiency (lag 5)				0.003 (0.100)
Controls	YES	YES	YES	YES
Industry dummies	YES	YES	YES	YES
Year dummies	YES	YES	YES	YES
R ²	0.62	0.67	0.67	0.70

Controls were the same as in the regression models of Table 2. In parentheses are corrected standard errors clustered for firms

[^] $p < 0.10$; * $p < 0.05$; ** $p < 0.01$

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