The Economics of Capital Allocation in Firms: Evidence from Internal Capital Markets[*]

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Abstract

We analyze a unique survey dataset to examine the (micro)foundations of capital allocation in firms. Firms employ systems of interconnected measures to counteract agency problems, including layers of approval, divisional budgets, reporting requirements, and compensation schemes. When making funding decisions, top management relies heavily on top-level, non-financial information. However, substantial parts of the capital budget do not require top management approval as firms trade off the benefits and costs of decentralization. Even firms with active internal capital markets tilt capital allocation toward relatively even distributions. Within-firm agency problems may result in divisions' restricted access to internal capital.

JEL Classification: G31, G32

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1 Introduction

A central goal in corporate finance is to understand how capital is allocated in the economy – both *across* and *within firms*. Most research focuses on across-firm allocation, i.e., the process through which external capital is allocated to individual firms via financial markets and financial institutions. However, a critical part of the capital allocation process in the economy occurs within the organization itself: firms allocate (internally and externally raised) capital within and across different lines of business. Despite its relevance, the level of direct knowledge of the workings of internal capital allocation and how it relates to the organization of the firm is rather limited. Relevant data are typically unobservable, as they remain largely undisclosed to outsiders. Therefore, research has focused primarily on the derivation of theoretical results – with a focus on investment outcomes and sometimes the optimal processes themselves. This paper provides new empirical evidence on internal capital allocation and its process, overcoming some of the typical data limitations by using a unique survey data set of CFOs.

With our survey, we get inside the 'black box' and analyze the structure and organization of capital allocation of a broad set of 115 firms. Our objective is to seek answers to central but to date insufficiently understood questions of internal capital allocation. The first is to seek evidence for central frictions influencing the efficiency of corporate investment. Although theory postulates that agency and information issues inside firms are responsible for distortions of corporate investment, there is little direct evidence about the extent to which they are perceived inside firms. Our survey directly asks CFOs about these frictions, and we use the survey data to construct a novel measure of within-firm agency problems. Second, we aim to uncover the mechanisms firms apply to curtail the consequences of those frictions in the capital allocation process. The finance and accounting literature suggests many curative mechanisms, yet we lack detailed knowledge about both their importance and their prevalence. Third, we examine deviations from the traditional paradigm of capital allocation, which is characterized by decentralized bottom-up project initiation of lower-level management but centralized project selection at the level of headquarters. More specifically, we study aspects of the delegation of investment authority from higher levels in the organization to lower levels and the involvement of divisions in the capital allocation process.

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We also reveal how top management uses its own expertise and other soft, non-financial information in the decision to allocate capital. These aspects have been largely ignored in the literature but have recently been recognized as important facets of capital allocation. Fourth, we examine within-firm capital reallocations, a key feature of internal capital markets. Top management's ownership rights allow the reallocation of resources at will within the firm. Still, top management's hands may (effectively) be tied because the implied stripping of resources of some divisions may have high costs. Finally, we look at the interaction of capital allocation and financing. A growing literature suggests several ways how replacing the external capital market with an internal one may affect corporate financing. However, it has remained largely unexplored which of these effects are considered most important by financial executives.

The following key findings emerge from our analysis: First, when asked directly, financial executives acknowledge the prevalence of within-firm agency problems and confirm their effect on capital budgeting. Empire-building tendencies at the divisional level and wasteful influencing activities to attract more capital are particularly common manifestations of agency problems. To mitigate the effects of agency problems on investment outcomes, headquarters implements a variety of mechanisms: layers of approval, division budgets and mechanisms for mitigating information biases. Each of these organizational measures represents one part of a larger corporate system to counteract agency problems when allocating capital. For instance, headquarters requires central approval for major investments in nearly all firms. However, many CFOs report that investment plans and financial projections that divisional managers provide are biased toward attracting a larger share of the overall capital budget. Therefore, headquarters implements certain budgeting procedures that elicit the revelation of managers' private information when divisional managers submit proposals. Firms report the use of many instruments that previous works in finance and accounting suggest. Among the most important instruments are inflated hurdle rates that correct for misrepresentation of private information, compensation schemes that tie division managers' pay to overall firm performance, and reliance on hard, easy-to-verify information. Despite the distortions that lower-level agency problems can cause, and perhaps surprisingly, top management gives divisions considerable discretion over capital expenditures. On average, approximately 40% of overall capital expenditures do not require explicit investment approval by headquarters. This number is surprisingly high. When we

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examine the factors that influence this fraction of overall capital expenditures, we find evidence consistent with a tradeoff: when establishing divisional budgets, headquarters balances the benefits of the efficient use of local information (e.g., lower information acquisition and processing cost) and its costs of agency (e.g., loss of control/empire-building, monitoring cost). These findings tie our results to the larger agenda of the delegation of authority and decentralization in organizations in the literature.

Second, when we turn to the analysis of budgeting methods for individual projects, we find several deviations from the assumptions of most of the theoretical literature. The capital allocation process contains not only bottom-up but also top-down components. Although firms' headquarters must somehow rely on financial projections and other hard information provided by divisions when allocating capital, they extensively use their own (mostly soft) information that resides exclusively at headquarters: Strategic information held by headquarters influences capital allocation as much as the assessment of divisional managers' abilities does. These factors turn out to be particularly relevant in the presence of severe agency issues. CFOs also point out the importance of the availability of non-financial (implementation) resources, which implies that such non-capital constraints, such as manpower, are overlooked in the literature but are highly important from the perspective of financial executives.

The third set of findings relates to the workings of internal markets for capital and their effects on financing. Our evidence confirms that divisions typically have no access to external capital. Instead, they seek funds in the internal capital market through the capital allocation process. CFOs indicate that they frequently move capital from divisions that generate strong cash flow to divisions with little cash flow but favorable investment opportunities to achieve the highest capital productivity. However, our evidence also suggests that firms even restrict divisions' access to internal capital markets under some circumstances: if agency problems are perceived to be large, firms tend to quantity-ration a division's investment by limiting capital allocation to the division's cash flow. Many executives also recognize that capital allocation decisions frequently lead to a more evenly distributed allocation than financial criteria suggest. This irregularity has stimulated previous theoretical work on the motives for cross-subsidies (or socialism) in internal markets. When we examine the relative importance of these motives, one reason stands out: headquarters strategically distorts investment because capital allocation conveys information to internal

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and external stakeholders. The finding confirms the role of capital allocation as an important device for credible communication. Finally, CFOs have strong opinions about the financial benefits of internal capital markets. They perceive such benefits predominantly in higher debt capacities and lower costs of capital. These findings support coinsurance arguments suggesting that internal capital markets may improve access to external financing, but challenge the conventional portfolio view of the firm.

A number of other papers present survey evidence on capital investment (e.g., Gitman and Forrester, 1977; Stanley and Block, 1984; Ross, 1986; Graham and Harvey, 2001). The work closest to ours is parallel work by Graham, Harvey, and Puri (2015), who examine aspects of the delegation of financial decision-making authority within firms (e.g., concerning capital structure, payout, investment or M&A decisions) and budgeting rules associated with capital allocation. They conclude that the degree to which headquarters retains authority varies both across financial policies and with CEOs' personal characteristics. In contrast to their work, we focus attention on the delegation of investment authority and link our results to the trade-off between the benefits and cost of decentralization. Graham, Harvey, and Puri (2015) also study intuitive (but somewhat ad hoc) decision rules associated with capital allocation. In contrast, our choice of decision rules is guided by previous theoretical work, and we investigate the cross-sectional variation induced by firm-specific factors rather than international differences or differences between CEO vs. CFO responses. Most other surveys of capital allocation focus on the techniques how firms evaluate individual investment projects. None of the aforementioned studies examines the mechanisms for truthful reporting and the aspects of capital reallocation in internal capital markets that we cover, and none of them directs attention to the fundamental question how capital allocation is influenced by the agency relationship between top management and division managers (see Stein, 2003). Finally, our objective is to understand the (micro)foundations of capital allocation within firms—this is why we put emphasis on a survey instrument that is closely guided by economic theory and previous empirical evidence. Wherever appropriate, we relate or contrast our findings to the results of these studies and other related work.

The paper is organized as follows. In Section 2, we explain the methodology, describe the dataset, and provide summary statistics. Section 3 analyzes the organization of internal capital allocation. Section 4 focuses on corporate investment in internal capital markets. Section 5 concludes.

2 Methodology

2.1 Survey Development and Sample Selection

In preparing the questionnaire, we reviewed the economics, finance, and accounting literature on capital allocation and extracted predictions and arguments to develop a draft survey.[1] We mailed the draft survey to a group of academic researchers and survey experts for review and feedback. We also pre-tested the questionnaire with a group of CEOs and CFOs through personal interviews. These interviews took 60-90 minutes. We designed these pre-tests to ensure the consistent meaning of survey questions and minimize potential biases caused by measurement error (Bertrand and Mullainathan, 2001). The final four-page questionnaire was structured into five sections that contained 88 questions. One of these sections also collected demographic characteristics of the surveyed firms and their CFOs. The final questionnaire took an average of 25 minutes to answer in our beta testing group.

The focus of our research is on Western European companies from 11 major economies: the United Kingdom, Germany, France, Belgium, the Netherlands, Switzerland, Austria, Sweden, Finland, Norway, and Denmark. For sample selection, we obtain data from Thomson Reuters Worldscope for the 2008 fiscal year, and we restrict the sample to firms with sales of €10 million or more. Smaller firms are unlikely to meet the requirements for the types of firms we have in mind for large parts of the questionnaire: firms that organize business activities in distinct operating segments overseen by a corporate headquarters. Since one major interest of our study is how divisions obtain funds for capital investment through internal capital markets, we focus on diversified firms. Diversified firms operate internal capital markets, in which corporate headquarters pools cash flows from diverse sources and divisions seek funds through the capital

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[1] The final questionnaire and a comprehensive overview of the theories that guided its design are in the Internet Appendix. Therein, we provide brief summaries of theories and link these to the corresponding questions.

allocation process (versus through financial markets).[2] Following standard practice, we define diversified firms as those firms that report segments in at least two different 3-digit SIC codes and generate less than 90% of sales in one 3-digit SIC code industry (Maksimovic and Phillips, 2007; Rajan, Servaes, and Zingales, 2000; Lang and Stulz, 1994; Berger and Ofek, 1995). This relatively narrow industry definition allows for distinguishing between firms with related and unrelated lines of business in subsequent chapters. Additionally, we exclude companies if the sum of reported segment revenues differs from total revenue. Because many of the hypotheses are not applicable to pure financial firms, we exclude firms that generate the majority (more than 50%) of their revenues in SIC codes starting with 6.

2.2 Delivery and Response

We identified 992 firms that matched the selection criteria and mailed the questionnaire along with a personalized and signed cover letter. We obtained firm and CFO contact information from several sources, primarily Thomson Reuters Worldscope, but also Bloomberg, Compustat, and Capital IQ. The questionnaire was sent on April 26, 2010. To increase the response rate, we offered participating financial executives an advanced report of the results. Additionally, we employed a team of graduate students to make follow-up calls and re-mail a second copy of the questionnaire if requested. The survey design followed the principles proposed by Dillman (1978), Bradburn, Sudman, and Wansink (2004), Bednar and Westphal (2006), and Baruch and Holtom (2008). We requested that the survey be returned via fax, mail, or e-mail by May 7, 2010.

Overall, 115 CFOs returned fully completed surveys, for a response rate of 11.6%. Given the length of the survey, the response rate compares favorably to those of most similar studies, such as Graham and Harvey (2001) with 8.9%, Brounen, de Jong, and Koedijk (2004) with 4.8%, Graham, Harvey, and Rajgopal (2005) with 10.4%, Lins, Servaes, and Tufano (2010) with 8.9%, Graham, Harvey, and Puri (2015) with 8.7%, Dichev et al. (2013) with 5.4%, or McCahery, Sautner, and Starks (2016) with 4.3%.

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[2] Standalone firms may or may not employ an internal capital market (see Gertner and Scharfstein, 2013; Maksimovic and Phillips, 2013).

2.3 Respondent Characteristics

Table A presents self-reported summary statistics of both the firms in our sample and the CFOs who returned useable surveys. The sample is balanced between small firms (42%, firms with €1 billion in sales or less) and large firms (58%, firms with more than €1 billion in sales). All the firms in our sample operate at least two divisions. These divisions are active in several industries, including manufacturing (26%), construction (11%), retail and wholesale (9%), high-tech (9%), energy (8%), and transportation (7%), among others. We also asked for personal characteristics of the financial executives. Nearly all the financial executives are male (98%), more than half (55%) are 50 or younger, and 67% have an MBA or a doctoral degree. Consistent with previous studies (for instance, Graham and Harvey, 2001), our sample indicates that financial executives change jobs frequently: nearly 60% have been in their job for a maximum of five years.

We use several control variables to analyze survey responses conditional on firm characteristics that may affect internal capital allocation. We selected these variables based on the review of the literature to exploit heterogeneity across certain subsamples of the responding firms. Except for nominal variables, we use medians as the cutoff points to categorize firms (see Table B for the full set of variable definitions and their categories). For instance, the median firm in our sample operates three lines of business. Therefore, we define firms as having "few" lines of business (55%) when they report two or three different lines of business and as having "many" lines of business (45%) if they run four or more different lines of business. We also investigate whether the degree of relatedness in diversification has an impact on survey results. As a proxy for relatedness, we asked CFOs to indicate the major industries in which their firm operates (retail and wholesale, mining, manufacturing, construction, transportation, energy, communication and media, banking and insurance, high-tech, healthcare and pharmaceuticals, and services/consulting).[3] We define firms as "unrelated diversified" firms (43%) if they operate in more than one major industry and as "related diversified" firms (57%) if they run business lines within one industry only. Because the firm's ability to secure external financing has a direct impact on corporate investment, we asked CFOs if they

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[3] The industry classification is from Graham and Harvey (2001) and their subsequent CFO surveys.

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perceive their companies as facing capital constraints when capital markets are operating normally. We thus can build subsamples of "capital-constrained" (30%) and "capital-unconstrained" firms (70%). Furthermore, we refer to firms as "high leverage" firms if their debt-to-asset ratio is larger than the sample median (44%) and as "low leverage" firms if their debt ratio is below (56%). Moreover, we consider the effect of long-term credit ratings. We classify firms into "high rating" firms (41%; ratings of A- and better) and "low rating" firms (59%; BBB+ and worse). Finally, we build subsamples for CFO characteristics distinguishing between "young" (55%; age ≤ 50) and "mature" CFOs (45%; age > 50) as well as between "short" tenure (50%; four years and less in the CFO position) and "long" tenure CFOs (50%; five and more years). Throughout our study, we perform univariate analyses on survey questions conditional on each of these variables. Because some firm characteristics are correlated (see Table C), we also run multivariate (mostly logistic) regressions using these characteristics as independent variables. To simplify exposition and for brevity, we present the full set of univariate results in subsequent tables (see, e.g., Graham and Harvey, 2001, or Brau and Fawcett, 2006), but relegate multivariate regressions and alternative statistical tests to the Internet Appendix. We generally only report conclusions if they are robust to the full set of specifications and tests (that we also describe at the appropriate places below).

One of the concerns that can threaten the validity of the survey method is that respondents may systematically differ from non-respondents (see, e.g., Armstrong and Overton, 1977; Wallace and Mellor, 1988). In Table D, as suggested by Moore and Reichert (1983), we compare the characteristics of "surveyed" firms and "invited" firms. Of our 115 responses, more than half (55%) were from German-speaking countries (Germany, Austria, and Switzerland), which is relatively more than the proportion of firms from German-speaking countries among the overall selected sample (31%). Compared to the invited companies from Worldscope, the firms in our sample also have somewhat higher sales. This size disparity is not surprising given that survey response rates from large firms are frequently higher than those from small firms (Dennis, 2003).[4] Although our sample may not fully represent the distribution of firms with respect to size, it may do well in capturing the behavior of the major firms in the economy. We also check

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[4] This tendency is also present in comparable surveys targeting financial executives (Graham, Harvey, and Rajgopal, 2005; Dichev et al., 2013).

variables with metric scales other than size (operating segments, debt ratio) and find no significant difference between sample and population averages. Finally, we compare responses from early (the first 50 percent) and late respondents (the last 50 percent) and find no meaningful differences in responses across these groups.[5]

[Insert Table A, B, C, D here]

3   The Organization of Internal Capital Allocation

Most of the firm's financial policy decisions—such as capital structure or payout decisions—are centralized at the level of headquarters with limited involvement of lower-level divisional management (Jennergren, 1981; Graham, Harvey, and Puri, 2015). Capital allocation and investment decisions are very different, however. Divisional managers possess private information that is not readily available to top management but that is crucial to the efficient allocation of capital. The importance of local information at the level of divisions favors the delegation of investment authority from higher levels to lower ones and the involvement of divisions in the capital allocation process. But the benefits of the use of local information come with agency costs. Divisional managers may have preferences different from those of top management, which likely results in opportunistic behavior and the distortion of capital allocation at the divisional level.

Firms have substantial flexibility in how to organize the process of capital allocation and the careful design of the allocation process can potentially mitigate the consequences of these frictions while largely incorporating divisional management's private information (see also Stein, 2003): firms typically balance between centralization and decentralization of investment decisions, frequently assign budget limits, establish different layers of approval, and implement mechanisms to mitigate information biases. We examine these mechanisms in the following sections, but begin with the analysis of problems of agency and information inside firms. Although these frictions are fundamental problems of corporate investment

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[5] We perform chi-square tests of differences in responses for both groups and each of the sixty-eight questions not related to demographics. Three of them are statistically different across the two groups of firms at the 5% level.

(and the central postulate of most capital allocation theories), little is known about the extent to which they are perceived inside firms. We provide evidence by posing direct questions to CFOs.

3.1 Asymmetric Information and Agency Problems Inside the Firm

Capital allocation theories typically suggest that divisional management has private information about their businesses (e.g., Harris, Kriebel and Raviv, 1982; Antle and Eppen, 1985). Indeed, 71% of CFOs agree or strongly agree that divisional management is better informed about their divisions' businesses than headquarters (Table 1) confirming the need for a bottom-up component in the capital allocation process. Interestingly, the informational disadvantage of headquarters relative to divisional management is significantly larger if diversification is unrelated (80.0% of unrelated diversified firms agree or strongly agree vs. 63.9% of related diversified firms), which supports the view that informational asymmetries inside the firm increase as the firm grows in scope (Chandler, 1962; Aghion and Tirole, 1997).

Divisional management's superior information alone is not sufficient for inefficiencies. If incentives between headquarters and divisional management were aligned, divisional managers would act in the best interests of headquarters. Personal objectives of divisional management frequently lead to weak incentives to maximize firm value, manifesting themselves in, e.g., empire building, influencing activities and lobbying, lack of effort, entrenchment, or perk consumption. Our survey examines the types of within-firm conflicts of interest frequently associated with affecting capital allocation and directly asks how CFOs assess the divergence of objectives between headquarters and divisional management. CFOs were asked to score on a scale from 1 ("strongly disagree") to 5 ("strongly agree") how strongly they concur with a set of statements about moral hazard at the divisional level. Understanding the types of moral hazard inside firms is important for researchers trying to model capital allocation in firms and offer solutions for minimizing agency costs. Fig. 1 and Table 1 summarize the results.
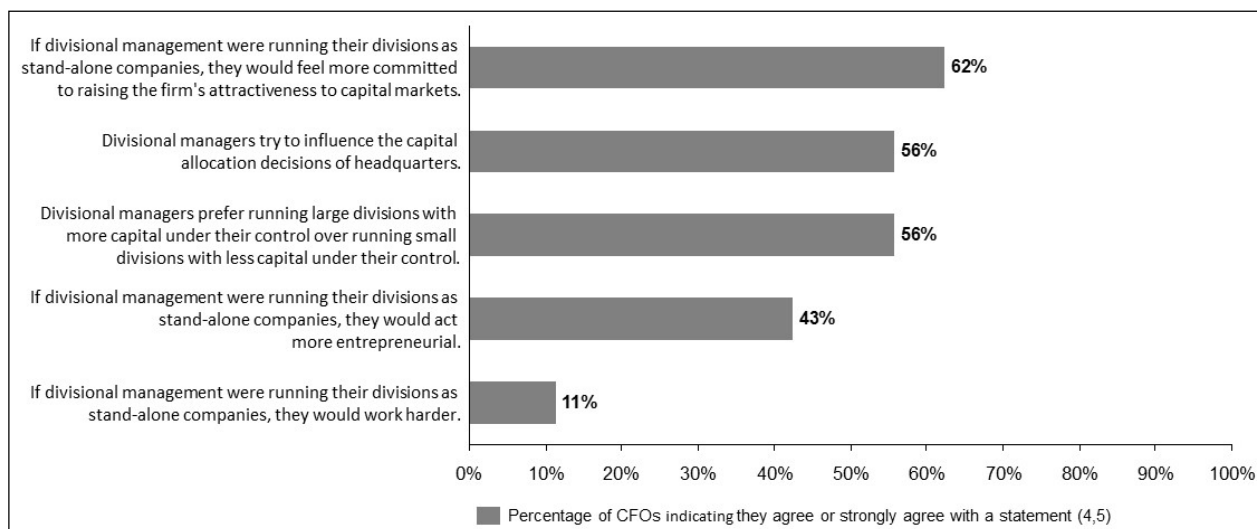
Fig. 1: Survey evidence on the question (n=106): "If another corporate manager made the following statements, how strongly would you agree or disagree with each of them when you think about the divisional management in your company?" We ask executives to indicate their level of agreement with these arguments on a scale from 1 to 5, with 1 denoting "strongly disagree" and 5 denoting "strongly agree."

Overall, our results imply (and confirm) that different forms of agency problems have a legitimate role in theoretical models of internal capital allocation. There is no single, dominant moral hazard problem at the level of divisions that executives perceive as more relevant than all others.[6] For instance, we ask CFOs whether divisional management would feel more committed to raising the firm's attractiveness to capital markets if they were running a standalone firm (de Motta, 2003). Almost two-thirds of CFOs (62%) agree or strongly agree, which supports the view of misaligned preferences between top management and divisional management with respect to increasing firm value. Divisional managers may also have preferences for building large empires (Jensen 1986, 1993; Hart and Moore, 1995) or may engage in wasteful influencing activities and lobbying as a result of intra-firm bargaining for resources (Milgrom, 1988; Milgrom and Roberts, 1988; Meyer, Milgrom, and Roberts, 1992; Scharfstein and Stein, 2000). A majority of financial executives confirm the empire-building tendencies of divisional managers and their attempts to influence headquarters' decisions in their favor (56% each). Interestingly, influencing

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[6] We perform McNemar's test for the analysis of paired dichotomous variables to examine whether ratings of sub-questions are statistically different or whether differences arise by chance (see, e.g., Table 1, Panel A, last column). For instance, the ratings of the three most common types of moral hazard (see Fig. 1) are not statistically different, but each of the ratings differs statistically from the least common rating (11%, "work harder"). We conduct these pairwise tests throughout for all survey questions with answers that allow a rank-order interpretation (see the survey questions in Tables 1, 8, 9, 10, 11, 13 and 14) to avoid misinterpretation of their relative importance if ratings are statistically similar. See McCahery, Sautner, and Starks (2016) and Dichev et al. (2013) for related tests.

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activities by divisional management are more severe if empire-building tendencies are high (67.8% vs. 40.4%). This complementarity result supports the theoretical foundations of influencing models of capital allocation. For instance, in Scharfstein and Stein's (2000) model, empire-building preferences lead to influencing activities of divisional management to attract more capital to the own division.

Capital allocation models also hypothesize that the capital allocation process diminishes entrepreneurial incentives (Gertner, Scharfstein, and Stein, 1994; Aghion and Tirole, 1997; Brusco and Panunzi, 2005; Seru, 2014) because headquarters can reallocate funds across divisions, which may decrease incentives to generate these funds ex-ante. Forty-three percent of financial executives agree or strongly agree that divisions would behave more entrepreneurial if divisional management were running their divisions as standalone companies. Surprisingly, only 11% of CFOs believe that insufficient provision of effort at the divisional level is prevalent in their firm. Thus, withholding effort, e.g., in the form of working hours, seems to be of second-order importance relative to other forms of moral hazard at the level of divisional management.

When further examining the interrelation between agency problems and capital budgeting below, we employ a composite measure of the perceived level of within-firm agency problems. We average the score of the above five ratings and use the median score as the cutoff point to classify firms into high- and low-agency cost firms. Details on the construction of the agency measure are set forth in Table 2. As we document below, agency problems have a profound influence on the organization of capital allocation.

[Insert Table 1 here]

3.2 Project Authorization and the Delegation of Authority

We begin our analysis of capital allocation by examining the allocation of investment authority between headquarters and divisions. The allocation of investment authority consists of a set of instruments and corporate policies that abstract from the individual investment project but hold for investment in general. Specifically, we examine the allocation of investment authority to lower levels of the organization (or delegation) via budget limits and layers of approval. Subsequently, we study whether and how firms

implement curative mechanisms proposed by the theoretical literature to mitigate information biases or to reduce informational asymmetry.

3.2.1   Major Investments: Decision-Making Authority and Approval Thresholds

Investments typically require top management approval if they materially affect the business as a whole, which may be determined by the size (Gitman and Forrester, 1977) or nature (Marshuetz, 1985) of a single project. We ask CFOs whether decision-making authority for major investments resides at headquarters (Table 2, row 1). CFOs consistently report that major investment decisions are *not* delegated to lower level management. Headquarters retains decision-making authority over major investments in nearly all firms (97%), which also confirms the role of headquarters as the centralized provider of finance (see also Bower, 1970; Myers, 1984; Stanley and Block, 1984; Harris and Raviv, 1996).

Previous literature also documents that firms often use approval procedures that include *formal* investment thresholds (see also Bower, 1970; Ross, 1986; Brealey and Myers, 2003, p. 312): divisions are authorized to make investment decisions within budget limits without headquarters' consent if capital expenditures for a project are below a certain level, but headquarters' approval is required for large investments. From a theoretical standpoint, these thresholds are an efficient way to solve agency and information problems between headquarters and divisional managers either by reducing auditing costs if the information is verifiable (Harris and Raviv, 1996 and 1998; Malenko, 2016) or by facilitating the separation of good and bad proposals if it is not (Marino and Matsusaka, 2005). Indeed, there is a widespread use of approval thresholds. Nearly all firms (97%) indicate they use such threshold levels.

[Insert Table 2 and 3 here]

We also ask CFOs to report the threshold levels that trigger central approval. We summarize these facts in Fig. 2 and Table 3.[7] The mean (median) threshold level is €5 million (€0.5 million); threshold levels range from €0.001 million to €65 million. From the boxplot in Fig. 2, we can discern that there is a clear

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[7] Only 80 of 115 firms provided data on threshold levels, perhaps because of confidentiality concerns.

tendency for threshold levels to increase with the size of capital expenditures.[8] Median threshold levels rise from €100,000 to €5 million as we move from the bottom to the top group of firms. A similar tendency is also given with respect to firm size (shown in the Internet Appendix, Fig. C.1). The median threshold level in the group of small firms is €100,000, whereas it is €2 million in the group of large firms.
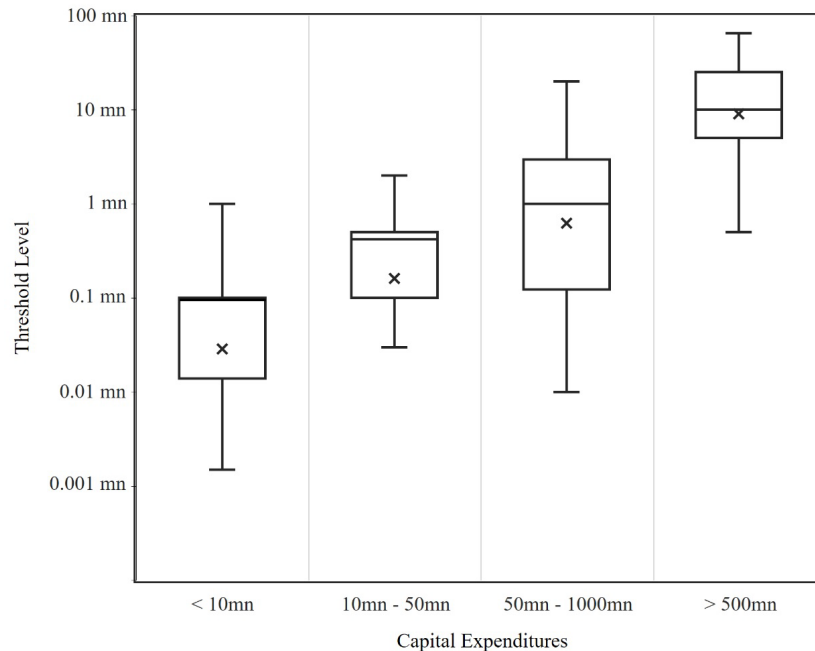
Fig. 2: Investment Thresholds and Capital Expenditures: Figure 2 displays boxplots of investment threshold levels for different size categories of capital expenditures (in Euro). The solid line (the cross symbol) within each box represents the median (mean), whereas the box gives the interquartile range (i.e., the middle half of the distribution between the first and third quartile). Threshold levels on the vertical axis are measured on a logarithmic scale.

3.2.2 Division Budgets

Despite the importance of headquarters for major corporate investment decisions, firms partially delegate investment authority to their divisional managers in the capital budgeting process. For instance, Graham, Harvey, and Puri (2015) recently show that the delegation of authority varies across the five major financial policies of the firm (M&A, capital structure, payout, capital allocation, investment), with capital allocation and investment decisions being delegated most frequently to lower levels in the hierarchy. While their study provides novel insights about financial policies, it is not concerned with the main

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[8] In the figure, we display boxplots of investment threshold levels for different size categories of capital expenditures. The solid line within each box represents the median, whereas the box gives the interquartile range (i.e., the middle half of the distribution between the first and third quartile).

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instrument of investment autonomy: the size of divisions' budgets for capital investments. Headquarters typically assigns budgets for its divisions; within budget limits division managers have capital investment autonomy. We are also able to exploit the cross-sectional variation in our survey data to test predictions suggested by theories of delegation. As described in Chapter 2.3, we perform univariate tests in subsequent tables, but only report findings in the paper if they are robust to the multivariate specifications and tests. To simplify exposition, we provide all additional checks in the Internet Appendix.

CFOs report that a noteworthy average of 39% of annual capital expenditures do not require higher-level investment approval by headquarters (see Table 4, row 1). This result is surprisingly high, indicating that firms provide divisions with considerable discretion about how to spend the firm's capital; firms delegate a large portion of their overall investments to divisional management.[9] This finding also demonstrates that capital allocation involves more than bottom-up project initiation and top-down capital allocation, as many finance textbooks suggest (see Brealey and Myers, 2003): substantial investment authority resides decentralized at lower levels of the organization.[10]

When we examine firm characteristics that are associated with the fraction of overall capital expenditures that divisions can make without explicit signoff (i.e., the degree or extent of delegation/decentralization), we find this number is significantly higher for large firms than for small firms (45.7% vs. 28.9%). Theories of firm size and scope can explain this result. As firm size expands, local information becomes more costly to aggregate and transmit through the hierarchy (Bloom, Sadun and van Reenen, 2010; Garicano, 2000). Top management is also time constrained over the investment decisions they can make (Penrose, 1959; Chandler, 1962), which favors the decentralization of the investment decision to divisional management if firms are large. We also find that divisional budgets are significantly smaller for firms whose CFOs report substantial agency conflicts between headquarters and divisional management (31.6% vs. 44.2%). This difference between the two groups is economically significant and supports the central prediction of theories of decentralization: agency problems reduce the level of delegation, and hence headquarters seeks

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[9] A back-of-the-envelope calculation suggests that for S&P 500 firms (2000-2015), 39% of annual capital expenditures imply an interquartile range from $25mn to $250mn in absolute terms.

[10] See also Seru (2014), who examines the relationship between decentralized R&D budgets and innovation using survey data.

to retain decision-making control (see, e.g., Dessein, 2002). Finally, the CFOs of high debt-ratio firms report significantly lower levels of decentralization than CFOs of low debt-ratio firms do (31.3% vs. 44.5%). To the extent that debt disciplines top management (Jensen, 1986), this result supports the view of a negative relation between high-powered incentives at the level of headquarters and the level of decentralization inside the firm (Hart and Holmström, 2010).[11]

Overall, our results support inferences made by theories of decentralization (see, e.g., Bloom, Sadun and van Reenen, 2012) that suggest a tradeoff between the benefits of the efficient use of local information (e.g., lower information acquisition and processing cost) and its costs of agency (e.g., loss of control/empire-building, monitoring cost). Our conditioning analysis provides evidence that firms balance these benefits and costs of decentralization (or delegation) when allocating capital. The on-average results also demonstrate that the extent to which firms delegate investment authority via divisional budgets is relatively high: a large fraction of overall capital investments does not require explicit investment approval by headquarters.

[Insert Table 4 here]

3.3 Information Aggregation and Information Production

To reach high-quality investment decisions for major investments, firms use local private information provided via investments proposals and aggregate this information at the level of corporate headquarters (e.g., Radner, 1992 and 1993; Bolton and Dewatripont, 1994). Investment proposals typically contain cash flow projections, financial analyses, and backup information; they are frequently initiated bottom-up by the divisions. We are interested in examining the extent to which headquarters relies on these reports of divisions' private information or whether headquarters relies instead, at least in part, on other methods to elicit private information from divisional managers. Before examining such organizational responses, we provide some basic facts about the information aggregation process through investment proposals.

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[11] As previously noted, we also perform multivariate regression models with the percentage of expenditures that managers spend without approval as the dependent variable and the conditioning variables as controls. These regression models confirm the results from the univariate tests in terms of both their statistical and their economic significance. The Internet Appendix reports the full results.

3.3.1 Information Aggregation via Investment Proposals

Table 3 displays the number of investment proposals that operating divisions submit to headquarters in an average year. The number of proposals ranges between 2 and 300 projects,[12] with 20 proposals per year for the median firm and 36 proposals on average. Small firms have a median of 18 investment proposals, compared to 25 proposals in large firms. This seemingly low number of proposals for the median firms is intuitive considering arguments of management time constraints and CEO overload. When headquarters insists on reviewing and approving major projects, it limits the number of capital projects that can be reviewed (see Levy and Sarnat, 1994, p. 96 and the literature on information processing under management time constraints, e.g., Crémer, 1980; Geanakoplos and Milgrom, 1991). Table 3 also displays the number of proposals divided by the number of operating segments; the mean (median) number of proposals is 11 (5) per division and year. We also examine project acceptance rates and ask executives which percentage of these proposals receives final approval (see Table 4, row 2). Our results indicate that project screening is not a "formality" with top management merely rubber-stamping the proposals presented. The average acceptance rate for investment proposals is 78%, which does not vary conditional on different firm characteristics.

However, constraints on management time are not the only frictions that top management face when processing information provided by divisional management. It is well known that managers have incentives to manipulate financial projections to achieve larger-than-efficient resource allocations or more favorable evaluation benchmarks (Stein, 1997; Antle and Fellingham, 1997; Bernardo, Cai, and Luo, 2001). Managerial overconfidence may also lead divisional management to systematically overestimate the returns on their investment projects (Malmendier and Tate, 2006). The financial executives in our study are aware of these distortions and know that information from divisional management is likely to be biased. Nearly all executives (98.2%) report that divisions provide detailed financial information (such as cash flow forecasts or NPV calculations) as part of their investment proposals (see Table 5). However, only approximately one-third of these executives consider forecasts to be relatively reliable (see Table 6).

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[12] We omit one outlier firm that reported an average of 4,500 investment proposals per year.

More than half the executives (50.9%) indicate that cash flow and net present value (NPV) forecasts are biased upwards—i.e., higher or substantially higher—than actual outcomes.

Because investment distortions from misrepresentation of information can be significant, potential remedies for such distortions have been a matter of long-standing interest in the literature.[13] In the following section, we examine the practices that firms use to alleviate this problem of control.

[Insert Tables 5 and 6 here]

3.3.2 Capital Budgeting Mechanisms for Eliciting Truthful Reporting of Private Information

Scholars in management accounting and finance have proposed a variety of curative mechanisms that can ensure that divisional managers provide truthful information (see Stein, 2003, p. 143 or Haka, 2006 for an overview). Yet it has remained largely unclear whether and to what extent these schemes are employed in practice; and, to the best of our knowledge, these questions have not been studied elsewhere. We examine the relative importance of various mechanisms proposed by previous research and ask CFOs to rate them on a scale from 1 (not important) to 5 (highly important).[14] Fig. 3 and Table 7 summarize the results.

[Insert Table 7 here]

The financial executives in our sample state that the most important control mechanism for motivating truthful representation in the budgeting process is making divisional managers' compensation a function of overall firm performance. Seventy-three percent of CFOs find this mechanism very or highly important. For instance, Loeb and Magat (1978), Groves and Loeb (1979), Cohen and Loeb (1984), Antle and Fellingham (1997), or Bernardo, Cai, and Luo (2004) posit that sharing the entire firm's profit with divisional management provides the appropriate incentives to achieve truthful forecasts. Such

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[13] Compared to the problem of misrepresentation of private information, managerial overconfidence is relatively impervious to potential measures that mitigate its consequences (see Stein, 2003, p. 123).

[14] The survey questions isolate from the possibility that firms employ a particular design scheme for reasons other than for truthful reporting. For instance, firms use hurdle rates in excess of the firm's real cost of capital to induce divisional managers to report truthfully (e.g., Antle and Eppen, 1985), but they impose them also, e.g., to account for real-option-like characteristics of investments (Dixit and Pindyck, 1994, p. 7; Jagannathan et al., 2016 for other motives). The survey question requests: "If you use these practices for other reasons and not for truthful reporting, please check 'Not important'."

compensation tied to the firm's overall performance puts the divisional manager in an owner-like position. Interestingly, the scheme is relatively less important for firms with many lines of business (66.0% vs. 78.0%, see also Internet Appendix C.4, column 1), which is consistent with the argument that free-rider problems make profit sharing less effective with an increasing number of projects (see, e.g., Baker, Jensen, and Murphy, 1988).
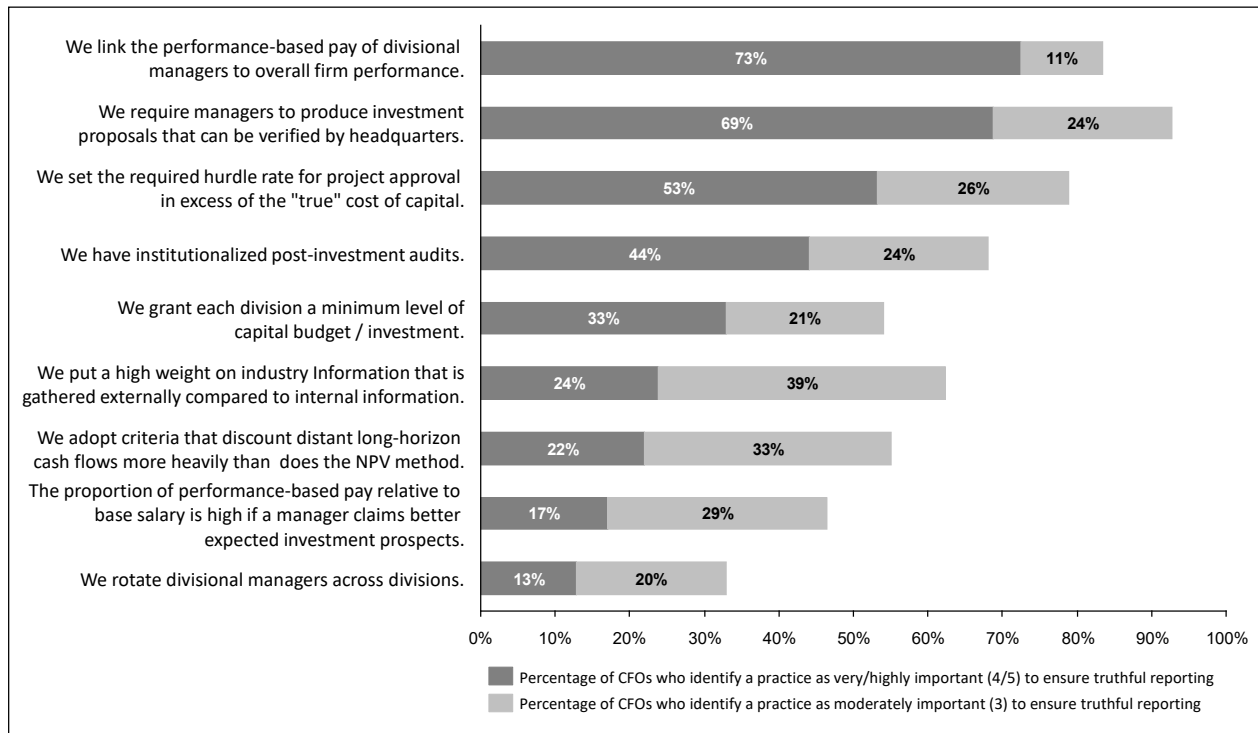
Fig. 3: Survey evidence on the question (n=109): "How important are the following business practices in your company to ensure that divisional managers provide truthful forecasts and do not overstate the attractiveness of investment projects? If you use these practices for other reasons and not for truthful reporting, please check 'Not Important'."

Another highly rated measure to curb misrepresentation is to require investment proposals with information that is verifiable by headquarters (68.8%) (see Stein, 2002). Such hard, easy-to-verify information is important because headquarters can then audit investment proposals to discover the true productivities of capital (Harris and Raviv, 1996 and 1998). Interestingly, firms find this measure relatively more important if they report high agency problems (76.7% vs. 63.8%).

We also examine whether firms use inflated hurdle rates to correct for the misrepresentation of private information. This argument is related to the literature on capital rationing. Firms trade off foregone profits

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of marginally profitable projects with the costs of eliciting private information (informational rents) that must be paid to divisional managers (Antle and Eppen, 1985; Antle and Fellingham, 1997). More than half (53.2%) of executives use inflated hurdle rates in excess of the "true" cost of capital to avoid misrepresentation of private information. Large firms find this measure relatively more important (64.6% vs. 36.4%).

Other methods of eliminating managers' misrepresentation of private information include *ex post* control mechanisms such as institutionalized post-investment audits. *Ex post* information production may be less costly than capital rationing to mitigate *ex ante* information problems (Antle and Eppen, 1985). Our results indicate that post-audits of investment projects are less common than intuition may suggest. Only 44% of firms report using post-audits to motivate truthful representations. The result is interesting because previous research indicates that post-audits can outperform other mechanisms at inducing truth-telling (Magee, 1980 for an analytical approach; Chow, Hwang, and Liao, 2000 in an experimental setting). One possible explanation for this reluctance to employ post-audits is that firms are frequently unwilling to abandon capital projects (Jensen, 1993), for instance, because of top managers' career concerns (Kanodia, Bushman, and Dickhaut, 1989; Staw, 1976). Interestingly, the auditing of capital projects is significantly more important for firms with many lines of business (62.0% vs. 28.8%).

Other practices that may help firms address information problems are less frequently important. For instance, Ozbas (2005) argues that rigid divisional capital budgets and job rotation programs can improve divisional managers' incentives for truthful communication with headquarters. Indeed, 33.0% and 12.8% of firms find these arguments very or highly important. Bernardo, Cai, and Luo (2001, 2004) propose explicit incentives for divisional managers. In the authors' optimal compensation contract, the proportion of performance-based pay relative to base salary is high if divisional managers claim better expected investment prospects. Such flexible and information-sensitive contract designs at the divisional level are important for approximately one-sixth (17.4%) of firms.

4 Capital Investment in Internal Capital Markets

4.1 Decision Rules of Capital Allocation

In the next section, we examine capital budgeting methods and decision rules, both formal and informal ones. Unlike previous studies that investigate formal decision rules to evaluate projects (Graham and Harvey, 2001; Trahan and Gitman, 1995; Bierman, 1993), our focus is on cross-sectional dimensions that are specific to firms whose divisions seek funds through internal capital markets. Subsequently, we examine the importance of informal budgeting measures that have been proposed by previous research. Among these measures are the assessment of managerial abilities and strategic information of top management when allocating capital to certain businesses, and there is considerable anecdotal evidence that the use of these rules is common. As we show, their relative importance is strongly associated with our measure of agency problems between top management and divisional management and other firm characteristics.

4.1.1 Financial Analysis, Formal Decision Rules, and Bottom-up Measures

We first asked CFOs to indicate the relative importance of the standard capital budgeting decision rules recommended by finance textbooks, including NPV, IRR, hurdle rate, payback period, sensitivity analysis, and real-option valuation methods. CFOs were asked to score the importance that they attribute to the different budgeting techniques on a scale of 1 to 5, with 1 denoting "not important" and 5 denoting "very important." Our sample results are summarized in Fig. 4 and Table 8.

IRR, NPV, payback period, and sensitivity analyses are the CFOs' most widely used techniques to allocate funds. Approximately two-thirds of our respondents rate this cluster of factors as very or highly important in their decisions to provide divisions with capital. Only 37% of firms find hurdle rates very or highly important. Interestingly, very few firms—only seven in the sample (6%)—find real-option methods very or highly important in evaluating investment projects. The overall results about the budgeting techniques employed are in line with Graham and Harvey's (2001) survey of US firms. Our study also confirms the authors' findings on the importance of the payback period despite its shortcomings (e.g., no discounting of cash flows, bias toward short-lived projects).

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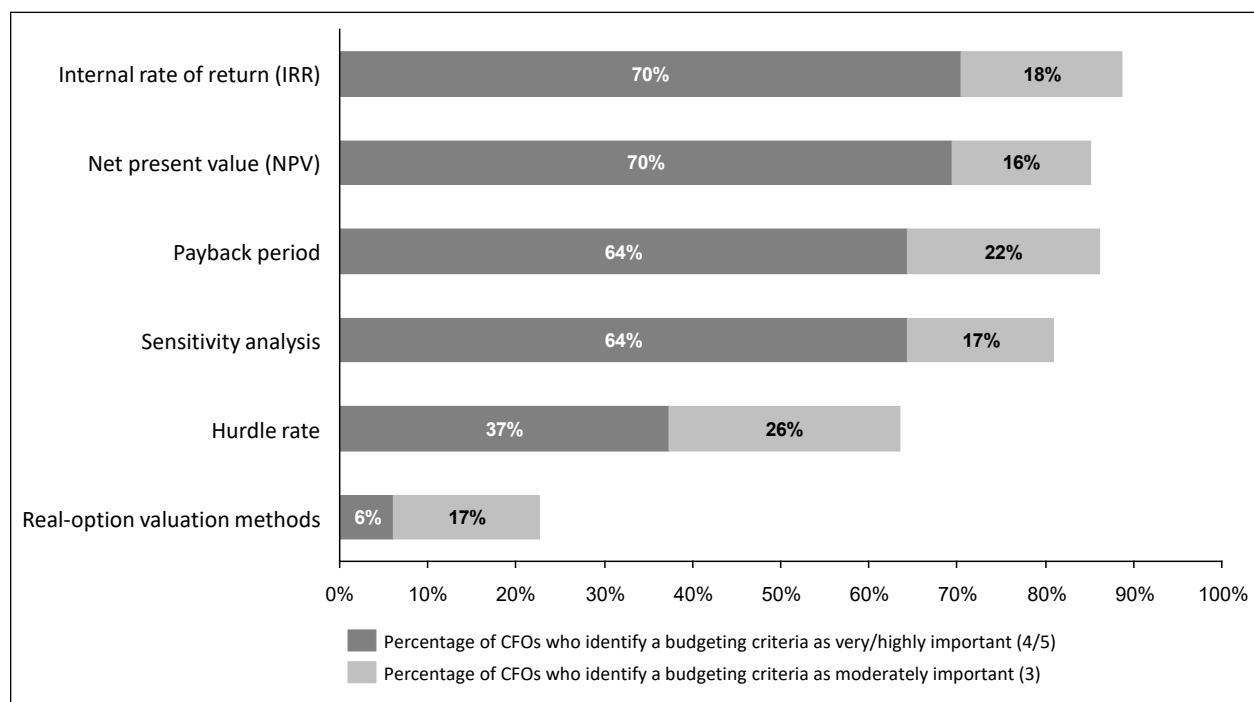
Fig. 4: Survey evidence on the question (n=115): "How important are the following financial criteria for your capital allocation decision?"

[Insert Table 8 here]

However, the relative importance of individual budgeting techniques is different in the cross-section of firms. The analysis puts forth a set of novel results, particularly with respect to firms that operate unrelated businesses. Unrelated diversifiers rank payback period as the most important budgeting technique (80.0%), with NPV as the next closest at 66.0%. IRR is relatively less important (60.0%) for these firms. One possible explanation for the prominence of the payback technique for firms with unrelated businesses is related to the degree of information problems between the corporate center and its business divisions. If divisions operate in unrelated businesses, informational asymmetries are likely more pronounced because headquarters is frequently less knowledgeable about the foundations of divisional investment proposals. Therefore, headquarters may want to adopt payback rules to place more weight on near-term cash flows that can signal the true project quality in the short run and thus contradict a divisional manager's *ex ante* evaluation of a capital project at an early stage (see also Bernardo, Cai, and Luo, 2001). If cash flows are below forecasts, the firm can force corrective actions, such as abandoning poorly performing investments. Thus, our findings may suggest that the payback criterion can protect especially firms with

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unrelated businesses against problems of informational asymmetry. We find further evidence for this postulate in unreported analysis. The payback period is rated as the most important technique among firms that indicate a strong informational advantage in favor of divisional managers (68.0% vs. 48.4%).

We also look at the importance of IRR and control for the relatedness of divisions. The relatively low prominence of IRR for unrelated diversified firms relative to related diversified firms (60.0% vs. 78.5%) may stem from the incompleteness of the criterion when comparing unrelated businesses whose systematic risks differ significantly. Whereas the use of IRR can be acceptable if systematic risks of competing projects are similar, its application may be particularly costly if businesses differ significantly, which is likely in the case of diversified firms with unrelated businesses.[15]

Furthermore, our survey reveals that firms with low credit ratings are significantly more likely to find payback periods important (74.2% vs. 31.8%). To the extent that ratings proxy for financial capacity, our result suggests that capital-constrained firms may emphasize liquidity in their budgeting decision and rank projects according to their ability to generate cash quickly (see Pike, 1983; Weston and Brigham 1993, p. 69).

Conditional analysis further reveals that hurdle rates are relatively less important for firms that report capital constraints (45.0% vs. 20.0%).[16] This result is intuitive. When resources are limited, projects compete for their share of a fixed amount of capital. Therefore, firms are not able to undertake all NPV-positive projects, and the approval decision should be based on the relative profitability of the projects. However, because a firm commits itself to fund projects that meet or exceed its hurdle rate, it may be less useful for capital-constrained firms; the firm would have to employ an iterative process of determining the hurdle rate that matches capital supply and demand. Finally, CFO characteristics are important for the budgeting measure of choice. CFOs with short tenures find NPV (79.3% vs. 59.6%) and sensitivity analyses (74.1% vs. 54.4%) relatively more important than their peers with long tenures.

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[15] See Gup and Norwood III. (1982), Fuller and Kerr (1981), or Weston (1973) for the use of divisional costs of capital in multi-division firms.

[16] IRR and hurdle rate are related, both rules do not quantify absolute dollar contributions to firm value. The IRR is the discount rate at which the project NPV is equal to zero. The hurdle rate, on the other hand, is the minimum rate (communicated ex-ante) that the firm mandates to earn when investing in a project.

4.1.2 Informal Decision Rules and Top-Down Measures

We also asked CFOs explicitly about the informal decision rules that they apply in their capital allocation decisions and find surprising results (see Fig. 5 and Table 9). Remarkably, CFOs rate the three most important "soft" measures affecting capital allocation *larger* in absolute magnitude than all the financial measures mentioned above. Overall, these three rules are perceived as nearly similar in relevance, namely, "strategic information of headquarters" (82.6%), the "assessment of divisional managers' abilities" (79.1%), and the firm's "ability to execute projects" (79.1%). When including these soft factors, IRR (70.4%) and NPV (69.6%), the most prominent financial measures, rank only fourth and fifth.
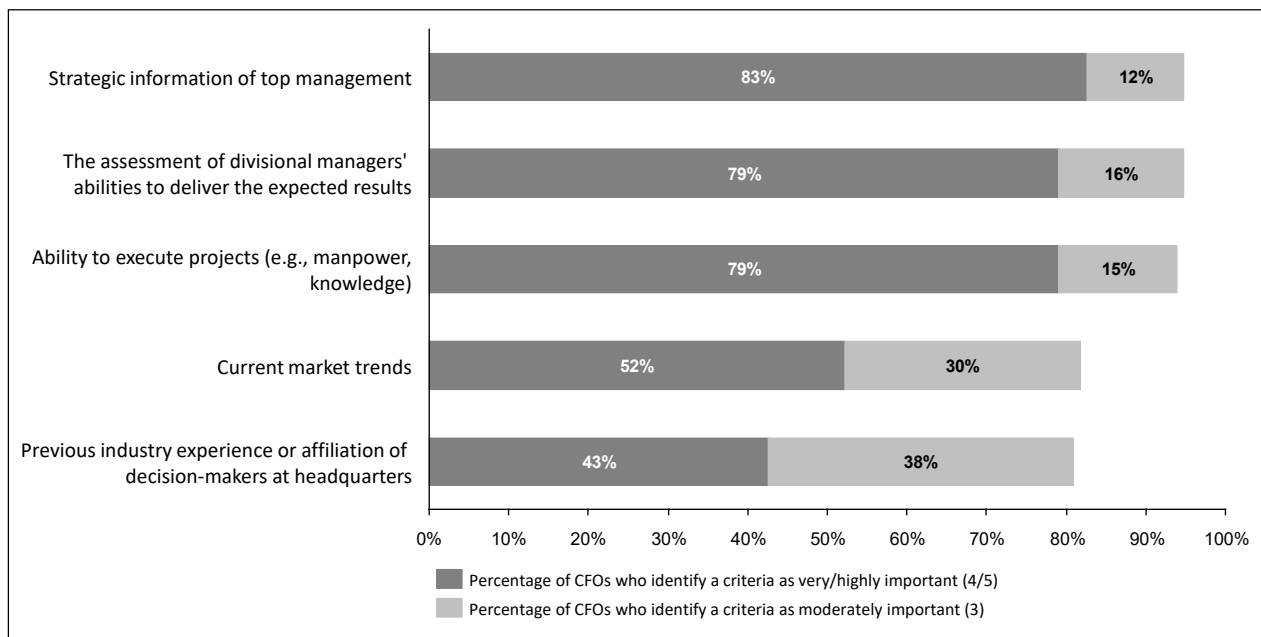
Fig. 5: Survey evidence on the question (n=115): "How important are the following factors that go beyond pure financial criteria for your capital allocation decision?"

Whereas the absolute magnitude of these scores may seem surprising at first sight, it likely captures the notion that the capital investment process reflects not only the *bottom-up* view of divisional management (through investment proposals) but also the *top-down* perspective of a firm's corporate center (see also Brealey and Myers, 2003, p. 314).[17] The finance literature has focused on this notion only recently. There

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[17] As Brealey and Myers (2003, p. 314) note, "A firm's capital investment choices should reflect both bottom-up and top-down processes. (...) Plant and division managers, who do most of the work in bottom-up capital budgeting, may not see the forest for the trees. Strategic planners may have a mistaken view of the forest because they do not look at the trees one by one" (see also Bower, 1970, p. 334-338 and Roberts, 2005, p. 397).

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is extensive literature on how information and agency problems influence the bottom-up budgeting process because division managers have better information about their businesses than their superiors, but it is also headquarters that uses its own "strategic information" in the investment process (Hoang and Ruckes, 2015; Almazan, Chen, and Titman, 2017). Such informational advantages of headquarters may result from top management's activities beyond the realm of the firm (Mintzberg, 1975) and/or from its ability to see the "big picture" across all its divisions. This ability implies better information on such issues as potential spillovers, strategic intentions, or implications on the corporation as a whole. Regardless of the source of strategic information, top management uses this information extensively in the budgeting process. Our analysis further reveals that relying on headquarters' strategic information in the budgeting process is more important if agency problems at the level of divisional management are high (88.6% vs. 75.8%). This result suggests that the informational input provided by divisions may be less relevant for allocation decisions if incentives between top management and division management are misaligned.

Another important factor is the firm's "assessment of divisional managers' abilities" to deliver expected results. Seventy-nine percent of CFOs find this argument very or highly important. This finding is interesting. Although there is anecdotal evidence that headquarters' opinion of divisional managers' ability (to successfully implement an approved project or to cautiously compile proposals) is crucial in the investment process (Ross, 1986; Bower, 2005),[18] relatively little is known about its role in the budgeting process.[19] Additionally, Hoang and Ruckes (2015) suggest that top management holds a private assessment of its divisional managers' level of ability to successfully implement new projects. We further find that in diversified firms with unrelated divisions, the proportion of CFOs perceiving such assessments as very or highly important is significantly higher than in firms with related divisions (88.0% vs. 72.3%).

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[18] Bower (2005, p. 31) writes, "It is the track record of the general manager in the middle who signs the proposal that determines the way the projections and calculations it contains are regarded. In fact, when they pick up a proposal, top managers usually look first for the name on the signature line before reading anything else. […]." Bower (2005, p. 31-32) further notes that "particularly in multi-business or high-technology companies, […] top management may have little basis […] of the detailed foundations of the proposal. […] Top corporate officers behave like bankers who provide funds based on the reliability of the borrowers." See also Carter (1971, p. 426).

[19] The role of divisional managers' characteristics in the budgeting process was studied only recently. Duchin and Sosyura (2013) and Gaspar and Massa (2011) examine the effect of divisional managers' (social) connections to the CEO on capital allocations. See also Glaser, Lopez-De-Silanes, and Sautner (2013) who show that the political power of divisional managers influences the distribution of cash windfalls across divisions.

Therefore, headquarters appears to rely strongly on additional human-capital-related signals if lines of business are relatively diverse and therefore informational asymmetries between divisions and the corporate center can be high. Finally, the assessment of divisional managers' abilities is relatively more important if within-firm agency problems are perceived to be large (86.4% vs. 74.1%). Hence, analogous to the conditional use of its strategic information (see previous paragraph), headquarters puts more weight on its own high-level judgment the more severe agency problems are.

Another 79% of survey participants state that the "ability to execute projects" is very or highly important, indicating that operative and non-capital constraints are equally relevant to corporate investment. This result is consistent with both the arguments made by Levy and Sarnat (1994, p. 96) and Pike (1983) and the field evidence of Bromiley (1986, p. 129). These studies argue that the supply of profitable investments can exceed a company's ability to implement them due to, for instance, the limited supply of skilled labor or senior management's capacity to approve and review projects. Therefore, both capital access and the availability of implementation resources can significantly influence investment. In this respect, (good) projects compete not only for their share of a potentially limited capital budget but also for scarce non-capital resources that are potentially devoted to other projects.

Furthermore, more than half (52%) of the respondents consider following "current market trends" as very or highly important. This evidence is moderately strong, and the finding is consistent with "herding" arguments. Decision makers look at the decisions previously made by other decision makers either because of reputational concerns (Scharfstein and Stein, 1990) or because previous movers have relevant information (Banerjee, 1992; Bikhchandani, Hirshleifer and Welch, 1992).[20] Following market trends is significantly less important for pure conglomerates, i.e., firms with unrelated diversification (40.0% vs. 61.5%). This result may reflect that ignoring market trends is relatively more costly for related diversified firms (whose market opportunities are positively correlated across divisions) if market opportunities realize positively and competitors succeed.

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[20] Several financial executives in our pre-testing group stress the importance of following long-term industry trends.

Finally, 43% of CFOs indicate that "previous industry experience or affiliation of decision makers at headquarters" plays an important role in capital allocation. Even though we cannot pinpoint its directional effect (i.e., favoritism vs. reverse favoritism), this finding is consistent with the discussion in Xuan (2009) in the sense that decision makers' job histories are important determinants of internal capital allocation. The result is particularly interesting given that executives confess potentially *undesirable behavior* during the budgeting process.

[Insert Table 9 here]

4.2 Capital Reallocation Policies in Internal Capital Markets and the Interaction with Corporate Financing

We devote the final part of our paper to within-firm capital reallocation, a key feature of internal capital markets. A considerable body of research points out that internal capital markets can be more or less efficient in allocating capital than external capital markets (see the literature surveys Stein, 2003 and Gertner and Scharfstein, 2013), but the measurement of capital reallocation activities with accounting data generally represents an empirical challenge (see Maksimovic and Philips, 2007 and 2013). Our survey aims to circumvent some of the obstacles encountered in previous studies by providing direct evidence of the reallocation of capital in internal capital markets. Our main area of interest is the study of "corporate socialism," the much-discussed hypothesis of a potential bias in capital allocation in internal capital markets (Scharfstein and Stein, 2000; Rajan, Servaes and Zingales, 2000; Matvos and Seru, 2014). We analyze the prevalence of possible distortions in capital allocation and the importance of several alternative hypotheses that aim to explain such firm policies.

We conclude with examining the interaction between internal capital allocation and financing. A growing empirical literature suggests several channels through which replacing the external capital market by an internal capital market may affect corporate financing. However, it has remained largely unexplored, which of these factors are considered most important by financial executives.

4.2.1 Winner-Picking and Corporate Socialism

To examine the (re)allocative efficiency of internal capital markets, we directly ask how frequently firms engage in so-called "winner-picking" (Gertner, Scharfstein and Stein, 1994; Stein, 1997) by moving financial resources from divisions that are generating strong cash flow to divisions with less cash flow but strong investment opportunities to achieve the highest capital productivity (Table 10, row 1; 1=never, 2=rarely, 3=sometimes, 4=often, 5=always). The survey evidence provides strong support for such "winner-picking" (Stein, 1997) across divisions. Indeed, 84% of CFOs report that they sometimes, often, or always use the ability to redeploy cash flows toward divisions with relatively favorable investment opportunities. Furthermore, 52% of firms always or often "winner-pick," and only 1.7% of firms say they never do so. Thus, our evidence indicates that top management utilizes its decision authority to pursue value-enhancing reallocations across divisions (Guedj and Scharfstein, 2004; Khanna and Tice, 2001). Firms that frequently (i.e., sometimes, often, or always) engage in winner-picking also generate a higher number of investment proposals in the investment process (see Section 3.3.1). In the group of firms that generate many proposals, 94% engage in winner-picking, compared to 75% in the group of firms that generate few (untabulated). In addition, large firms (89.6% vs. 77.1% for small firms), financially constrained firms (91.4% vs. 81.3% for unconstrained firms, see also Internet Appendix C.8), and firms with low levels of agency problems (90.3% vs. 79.5% for firms with high levels of agency problems, see also Internet Appendix C.8) tend to engage in winner-picking more frequently.

Despite these apparent benefits of internal capital markets, some studies posit that multi-divisional firms allocate capital inefficiently among business units. For instance, Rajan, Servaes, and Zingales (2000), Ozbas and Scharfstein (2010), and Matvos and Seru (2014) argue that firms frequently favor divisions with poor growth opportunities at the expense of those with good opportunities and therefore seem to knowingly move capital allocation toward an even distribution across divisions ("corporate socialism"). However, because these empirical studies are not free of measurement and endogeneity issues[21], the

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[21] See Maksimovic and Phillips (2007) and Maksimovic and Phillips (2013) for a comprehensive discussion of these issues in the literature on internal capital markets.

debate about *whether* and *why* firms potentially engage in such investment behavior has not been resolved. With our survey instrument, we are able to bypass some of these issues.

We first examine the *existence (and prevalence)* of socialism in internal capital markets. We ask CFOs on a scale of 1 to 5 about how frequently they allocate financial resources more evenly than pure financial criteria suggest (1=never, 2=rarely, 3=sometimes, 4=often, 5=always). According to our study, a large proportion of firms acknowledges and practices corporate socialism. Nearly half (47%) of the financial executives surveyed sometimes, often, or always cross-subsidize with a balanced capital allocation across divisions. Furthermore, 24% of the respondents indicate that they never engage in corporate socialism.[22] Therefore, our findings suggest that socialism not a mere statistical artifact, but relatively common in practice. Additionally, our results are relatively homogeneous across firms, and there is no difference in the prevalence of socialism conditional on firm or executive characteristics.

We further examine the pervasiveness of socialism conditional on firms engaging frequently in winner-picking. We distinguish between "infrequent" winner-pickers (Table 10, row 1; 1=never, 2=rarely) and "frequent" winner-pickers (3=sometimes, 4=often, 5=always) as well as between "light" balancers (Table 10, row 2; 1=never, 2=rarely) and "strong" balancers (3=sometimes, 4=often, 5=always). Whereas 47% of firms in the overall sample engage in "strong" balancing, "frequent" winner-pickers are more likely to do so relative to "infrequent" winner-pickers (52% vs. 22%). This result is interesting because it sheds light on the deeper connection of both investments policies. Instead of viewing reallocations and cross-subsidization as mutually exclusive, they may better be seen as interconnected. Firms that frequently transfer funds to more productive divisions are also more likely to engage in cross-subsidization. Overall, our results suggest that firms operate active internal capital markets to improve investment productivity of the firm. However, there may be less capital reallocation than would be optimal for investors.

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[22] At first glance, these numbers may appear larger than those in Graham, Harvey, and Puri (2015), who find that 6-18% of CFOs consider "a balanced capital allocation" an important/very important capital allocation principle. However, their findings cannot be compared to those presented here. Unlike our study, they do not examine the prevalence/frequency of socialism and do not study capital reallocation and their motives. They investigate the relative importance of explicit or understood *capital budgeting principles that generally govern capital allocation*. In their study (and perhaps not surprisingly), only 7% (6%) of U.S. CEOs (CFOs) and 14% (18%) of non-U.S. CEOs (CFOs) say that a "moving (capital) towards an even balance" is an important or very important general allocation principle.

Second, to further investigate the *causes* of cross-subsidization, we examine the previously discussed subsample of "strong" balancers and inquire about the intentions for their investment behavior.

Several studies have attempted to explain biases in capital allocation. Most of them view these biases as evidence of agency problems or rent-seeking at the level of divisional or corporate managers. Some of these studies argue that managers of divisions with weak investment opportunities have power over headquarters to achieve larger-than-efficient capital allocations because of either lower opportunity costs to improve their outside options (Scharfstein and Stein, 2000) or their ability to act opportunistically by investing in inefficient projects that protect the division from subsequent expropriation (Rajan, Servaes, and Zingales, 2000). Bernardo, Luo, and Wang (2006) offer the alternative theoretical explanation that capital misallocation can be part of an incentive mechanism to elicit private information from divisional managers about investment proposals in the budgeting process. Other studies find that capital misallocation can result from factors related to agency considerations at the CEO level. Goel, Nanda, and Naranayan (2004) argue that because of career concerns, CEOs have incentives to invest in divisions in mature industries whose cash flows are likely more precise and thus better signals of the CEO's abilities. To the extent that informativeness and divisional productivity are negatively correlated, the theory predicts a capital allocation bias in favor of lower-productivity divisions. Finally, Hoang and Ruckes (2015) posit a more optimistic (and potentially value-enhancing) story of socialism in the sense that "informational effects" of capital allocation cause firms to allocate capital more evenly than pure financial criteria would suggest. The authors argue that capital allocation conveys headquarters' private information about long-term capital productivity to managers of a multi-divisional firm. If such information weakens incentives of managers, headquarters has a strong interest in limiting its information transmission with a relatively even capital allocation. Almazan, Chen, and Titman (2017) provide a related model in which corporate socialism may arise due to the informational effect of capital allocation on division managers' incentives. They also extend the general argument to other firm stakeholders such as customers and suppliers. We ask the subsample of "strong" balancers how important these motives are in their decisions to cross-subsidize. Fig. 6 and Table 12 summarize the results.
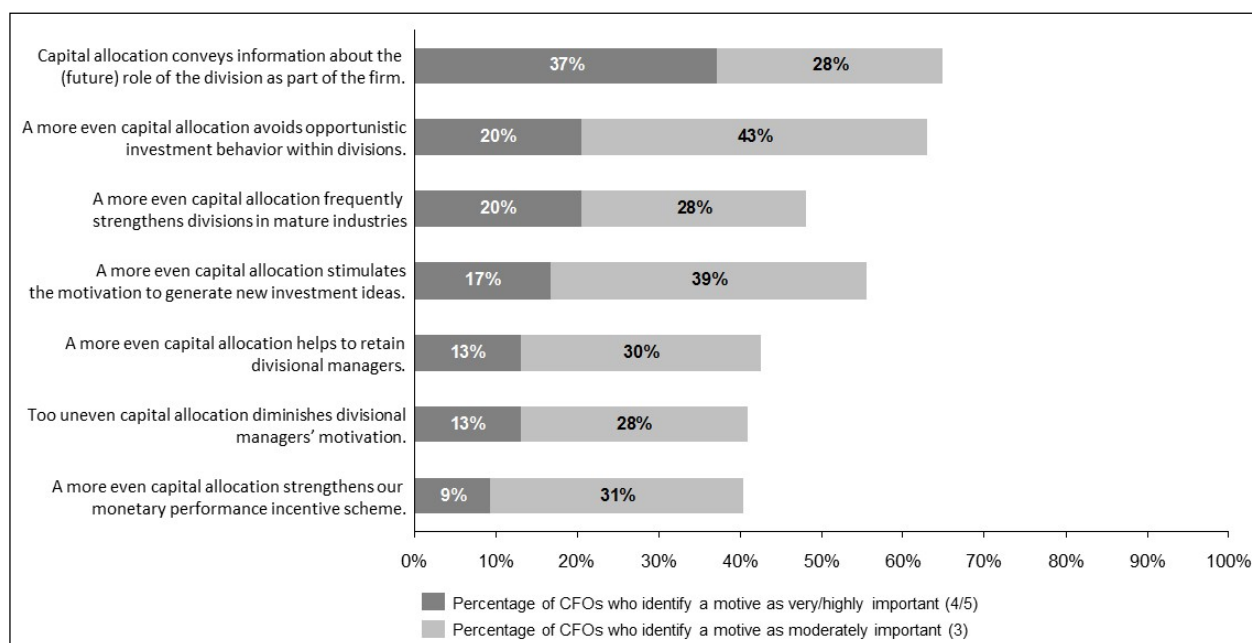
Fig. 6: Survey evidence on the question (n=54): "Please think about situations where you have decided to allocate capital more evenly than pure financial criteria suggested. How important were the following factors for your allocation?"

Overall, our findings suggest that *for the average firm,* the explanatory power of the existing theories is moderate to low. In unreported analyses, we find that 30% (n=16) of the firms in the subsample do not find any of the current theories very or highly important in explaining their investment behavior. Thirty-two percent of firms indicate the importance of one explanation, and 26% of firms indicate the importance of two explanations. These results also suggest a broad heterogeneity of causes for socialism; therefore, multiple and different theories must be considered to understand socialism.

Of the 47% of firms that engage in cross-subsidization across divisions, more than one-third state that "capital allocation conveys information about the (future) role of the division as part of the firm" (37.0%), suggesting that financial executives acknowledge the communication aspect of capital budgets. Relatively even or avoiding too extreme capital allocations disclose the least about the relative prospects of divisions and improve stakeholders' incentives (Hoang and Ruckes, 2015; Almazan, Chen and Titman, 2017). All other arguments follow in their relative importance. We do emphasize that their ratings cluster, and ratings are not statistically different from each other. Rajan, Servaes, and Zingales' (2000) argument that an even capital allocation can prevent opportunistic investment behavior is important for 20% of executives, and

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this argument is relatively more important for firms with many business lines (30.8% vs. 10.7%). Interestingly, firms with high discretionary budgets at the division level are more likely to find this argument important (42.9% vs. 3.7%). In fact, it is the most important rationale for socialism at these firms.[23] Because they ensure a high minimum level of funds to divisions, high divisional budgets are complementary to socialistic capital allocation and may protect firms against the implementation of inefficient projects that protect divisions from the redistribution of surplus to other divisions (Rajan, Servaes, and Zingales, 2000). A similar proportion of 20% of CFOs state that a relatively even capital allocation strengthens divisions in mature industries, as suggested by Goel, Nanda, and Naranayan (2004). In addition, 13% of firms use a more even capital allocation to "retain divisional managers" (one of several implications of Scharfstein and Stein, 2000). Finally, at 9% of firms, Bernardo, Luo, and Wang's (2006) notion that "a more even capital allocation strengthens a firm's monetary performance incentive scheme" causes corporate socialism.

[Insert Table 11 and 12 here]

Finally, we examine if firms restrict access of divisions to internal capital markets under some circumstances. The rationing of divisional capital for investments may limit internal capital market activity but has been proposed as a mechanism to counter misaligned incentives (see Holmström and Ricart i Costa, 1986; Shleifer and Vishny, 1989). Specifically, we ask whether firms limit capital allocation to the division's own generated cash flow. On average, 26% of executives report the use of such a rationing policy at the division level, indicating that firms apply this instrument selectively. Consistent with theoretical predictions, firms are relatively more likely to impose such divisional spending limits if agency problems at the divisional level are perceived to be large (40.9% vs. 17.7%; Table 11, row 3).

4.2.2 The Financing Effects of Internal Capital Markets

One important characteristic of internal capital markets is that corporate headquarters centrally raises external financing and pools capital that individual projects generate. This "single-lender property" of

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[23] In unreported analysis, we find that a large fraction of 58% of total capital expenditures is part of an initial divisional budget at these firms (compared to 32% in firms with low discretionary budgets).

headquarters coupled with ownership rights over the use of project assets affects not only investments but also the firm's environment for financing. In particular, the internal capital market insulates individual projects from costs associated with relying on external capital markets that would otherwise occur if divisions were standalone firms.[24] The arguments underlying these "financing benefits" typically rely on the internal capital market's ability to transfer funds between projects and the less-than-perfect correlation of divisions with respect to cash generation or cash requirements to finance capital investments. In the final section of our paper, we focus on these financing implications of internal capital markets. We exploit the multi-segment nature of our sample of diversified firms and ask how executives rate the relative importance of different financing benefits of integrating multiple businesses into an internal capital market compared to a situation in which their divisions were standalone firms.

[Insert Table 13 here]

Our findings support recent literature that suggests how replacing the external capital market with an internal one may affect corporate financing. Fig. 7 and Table 13 display the results. First, more than two-thirds (70%) of CFOs believe that the most important financial benefit of integrating multiple businesses under the roof of the internal capital market is "lower cost of capital" (Hann, Ogneva, and Ozbas, 2013). They argue that the internal capital markets' ability to transfer resources to cash-poor divisions may reduce a firm's systematic risk by avoiding countercyclical costs of financial distress.[25] Our result provides confirming evidence of this argument that explicitly rejects the conventional textbook view that diversification cannot affect the firm's cost of capital (see Ross, Westerfield, and Jaffe, 2006). Coinsurance may enable the diversified firm to reduce distress risks that standalone firms cannot avoid on their own. Second, coinsurance can increase debt capacity, as first noted by Lewellen (1971). This argument is important to a large proportion of the respondents (60%).[26] Therefore, our result supports recent empirical evidence in favor of the "more-money" hypothesis (Benz and Hoang, 2019; Kuppuswamy and Villalonga, 2015), even though Berger and Ofek (1995) and Comment and Jarrell (1995) find either

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[24] In the long term, firms may respond to financing constraints by expanding the scope of internal capital market activity (Matvos, Seru, and Silva, 2017).

[25] In general, financial distress tends to occur during downturns (see, for example, Almeida and Philippon, 2007).

[26] In addition, all the CFOs in our pre-testing group emphasized the importance of this potential benefit of coinsurance.

no or weak associations between diversification and actual leverage. Firms with higher debt ratios (71.7% vs. 51.7%) and firms with many lines of business (68.8% vs. 53.4%, see also Internet Appendix C.1, column 2) find this effect significantly more important.

Lower cost of capital — 70% / 20%
Ability to borrow more / Higher debt capacity — 60% / 19%
Better conditions for raising equity — 46% / 26%
Less need to hold (precautionary) cash — 40% / 36%
Ability to avoid external financing — 27% / 41%
Lower personal taxes for investors — 5% / 20%

Percentage of CFOs who identify an effect as very/highly important (4/5)
Percentage of CFOs who identify an effect as moderately important (3)

Fig. 7: Survey evidence on the question (n=106): "How important are the following effects of diversification for your company? Please answer compared to the situation where your divisions were standalone companies and had to raise funds by themselves."

Third, previous research also argues that similar risk-pooling mechanisms can affect the conditions for raising equity (e.g., Hadlock, Ryngaert, and Thomas, 2001).[27] Forty-six percent of the surveyed CFOs believe that operating a division as part of a diversified firm provides better conditions for raising equity compared to a situation in which the divisions were standalones. Interestingly, firms with less access to debt place greater value on this benefit for equity issuers (very or highly important for 51.9% of firms with a low rating and 20.0% of firms with a high debt rating). Fourth, 40% of the CFOs find the effect that diversified firms have "less need to hold (precautionary) cash" very or highly important for their firm. This cash-holding argument is consistent with precautionary savings arguments and has recently gained attention in the context of corporate liquidity and diversification. Duchin (2010) finds that diversified firms carry significantly less cash than their standalone peers because of their ability to smooth investment

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[27] The mechanism in Hadlock, Ryngaert, and Thomas (2001) is somewhat subtler than the coinsurance argument in Lewellen (1971) and others. In their theoretical model, pooling risks of imperfectly correlated divisions helps reduce adverse selection cost when issuing equity, resulting in a less negative market reaction to an equity issue.

opportunities and cash flows. Although statistically insignificant, unrelated diversified firms (44.4%) find this effect more important than related diversified firms (36.1%). Fifth and perhaps somewhat surprisingly, CFOs rate the relative importance of diversified firms' "ability to avoid external financing" relatively low, on average. The argument, which relates to the reliability of capital supply in internal capital markets (Liebeskind, 2000; Henderson 1970) and the propensity to raise external financing, is more important for firms that find "less need to hold (precautionary) cash" an important benefit (40.5% vs. 18.9%, untabulated), consistent with Duchin's (2010) argument that internal capital markets insulate firms from the rationing and costs of external capital markets. Finally, tax benefits of investors, as suggested by Bhide (1990), do not appear to be a significant benefit of operating multiple lines of business.

Our survey results document that financial executives have strong opinions about the financing benefits of internal capital markets and reject the widely-held notion that combining multiple lines of business does not have positive effects on a firm's financing environment. Our findings particularly support arguments suggesting that internal capital markets may decrease cost of capital and improve access to external financing.

5 Conclusion

Despite an unabated interest in better understanding corporate investment, empirical research in corporate finance has usually stopped half-way. Although there is considerable evidence about how capital is allocated from investors to firms, our knowledge about how firms allocate financial resources to projects has not kept pace with theories of allocation processes and internal capital markets. We attempt to fill part of this gap by presenting an analysis of unique data from a CFO survey. Our emphasis is on the most relevant aspects of the internal capital allocation process and the capital markets within firms. The survey questions were designed to exploit the in-depth knowledge of top financial executives about this process (e.g., importance of agency problems inside firms, biases in proposals, choosing "socialistic" capital allocations, or implications for corporate financing). Our survey instrument itself is closely guided by economic theory and previous empirical evidence, allowing it to match theoretical predictions with practice.

The results of our analysis allow us to corroborate some theories and question others. Reassuringly, our analysis confirms that agency issues are crucial for understanding capital allocation within firms and ultimately, corporate investment in the economy. Firms employ instruments to limit agency costs that are both organizational (e.g., layers of approval) and personal (e.g., compensation schemes) in nature, and their use is largely consistent with theoretical models of capital budgeting. Our findings confirm that firms actively reallocate financial resources across divisions via internal capital markets to take advantage of more profitable investment opportunities. The tendency to distribute capital relatively evenly exists even though CFOs by and large reject explanations offered by existing work, leaving open questions regarding the causes and value effects of such "socialistic" allocations. Despite the success of existing theories of capital allocation, the findings call for a renewed investigation of the central elements of internal capital markets. The strong emphasis given to bottom-up components in the allocation process—while undoubtedly important—may be overstated. Top management's role is only partly to evaluate project proposals. Our results show that using private knowledge and expertise, top management actively shapes the firm's investment policy, often beyond financial projections and other hard information provided by division management—especially if agency problems are severe. This suggests that its private information may lead top management to extend its involvement even further than identified in our study. Investigating these issues may be a fruitful area for future research. Finally, we hope that our findings will motivate future theories and help guide the design of large-sample archival work on corporate investment. Practitioners also may find our study valuable because the findings allow executives to convert conjectures and anecdotal evidence into stylized or even hard facts.

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Table A
Summary statistics based on the survey responses

	Percent	Count		Percent	Count
Annual sales revenue (€ millions)			*CAPEX (€ millions)*		
10-25	3.5%	4	< 1	1.7%	2
25-100	7.8%	9	1-10	18.3%	21
100-500	16.5%	19	10-50	26.1%	30
500-1,000	13.9%	16	50-100	14.8%	17
1,000-5,000	29.6%	34	100-500	14.8%	17
5,000-10,000	7.0%	8	500-1,000	10.4%	12
> 10,000	21.7%	25	>1,000	13.9%	16
	100.0%	**115**		**100.0%**	**115**
No. lines of business			*Debt-to-asset ratio (%)*		
2	26.1%	30	≤ 15	21.7%	25
3	28.7%	33	> 15 to 30	34.8%	40
4	23.5%	27	> 30 to 50	24.3%	28
> 4	21.7%	25	> 50	19.1%	22
	100.0%	**115**		**100.0%**	**115**
Industry			*Country*		
Manufacturing	25.9%	51	Germany	35.7%	41
Construction	11.2%	22	United Kingdom	10.4%	12
Retail and Wholesale	9.1%	18	Switzerland	10.4%	12
Tech (Software, Biotech)	9.1%	18	France	8.7%	10
Energy	7.6%	15	Austria	8.7%	10
Transport	6.6%	13	Sweden	8.7%	10
Consulting, Service	6.6%	13	Netherlands	5.2%	6
Pharma, Healthcare	5.6%	11	Norway	4.3%	5
Communication, Media	3.6%	7	Belgium	3.5%	4
Mining	1.0%	2	Denmark	2.6%	3
Bank, Finance, Insurance	1.0%	2	Finland	1.7%	2
Other	12.7%	25		**100.0%**	**115**
Credit rating			*CFO tenure (years)*		
AAA, AA	7.8%	9	≤ 2	25.2%	29
A	11.3%	13	3 to 4	25.2%	29
BBB	18.3%	21	5 to 6	15.7%	18
BB, B	8.7%	10	7 to 8	11.3%	13
No Rating	53.9%	62	≥ 9	22.6%	26
	100.0%	**115**		**100.0%**	**115**
Ownership			*CFO age (years)*		
public	82.6%	95	< 40	8.7%	10
private	17.4%	20	40 to 50	46.1%	53
	100.0%	**115**	51 to 59	34.8%	40
			> 59	10.4%	12
Managerial ownership (%)				**100.0%**	**115**
0 to 1	67.8%	78			
> 1	32.2%	37	*Gender of CFO*		
	100.0%	**115**	male	98.3%	113
			female	1.7%	2
Single investor owns more than				**100.0%**	**115**
10% of companys equity					
Yes	74.8%	86	*CFO education*		
No	25.2%	29	College degree	4.3%	5
	100.0%	**115**	Non-MBA Master's	28.7%	33
			MBA	49.6%	57
			Dr. / PhD	17.4%	20
				100.0%	**115**

Table A reports summary statistics of responding firms and their CFOs. The data is drawn from 115 completed questionnaires. Variables and their categories are defined in Table D. Because firms can operate in several industries, observations for Industry sum up to more than 115.

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Table B

Definitions and data sources for variables used in cross-sectional analysis

Control variable	Subsample 1	Definition 1	Subsample 2	Definition 2	Source
Size	small	≤ EUR 1bn revenue	large	> EUR 1bn revenue	Annual sales revenue at my company is in the range of? (Question 1, Closing Section)
Lines of business	few	≤ 3	many	> 3	How many lines of business is your company running? (Question 2, Closing Section)
Diversification	related	1 primary industry	unrelated	≥ 2 primary industries	What broad industries are you working in? (Question 3, Closing Section)
Capital constraints	no	unconstrained	yes	constrained	When capital markets are operating normally, is your company capital constrained? (Question 1, Section D)
Debt ratio	low	≤ 30%	high	> 30%	What is your debt-to-asset ratio (e.g., 0.2, 0.3)? (Question 7, Closing Section)
Agency Cost	low	≤ 0.4	high	> 0.4	Average value of the five ratings of within-firm agency problems (4 or 5 recoded as 1, and 1, 2, or 3 recoded as 0) (Question 5a-c, e-f, Section B)
Equity	public	public firms	private	private firms	Ownership? (Question 5a, Closing Section)
Managerial ownership	low	≤ 1%	high	> 1%	If all options were exercised, what percentage of your company's equity would be owned by the top 3 managers (e.g., 5%)? (Question 5b, Closing Section)
Rating	low	A- or better	high	BBB+ or worse	What is your credit issuer rating (e.g., AA-, B+)? Write NONE if debt is not rated. (Question 6, Closing Section)
Age (year)	young	≤ 50 years	mature	> 50 years	Age of CFO? (Question 2, CFO Demographics)
Tenure (year)	short	≤ 4 years	long	> 4 years	Tenure (time in current job) of CFO (Question 3, CFO Demographics)
Education	MBA, PhD.	MBA, PhD.	others	Undergraduate, Non-MBA Master's	Highest educational background? (Question 4, CFO Demographics)

This table defines the variables used in the cross-sectional analyses. We divide the total sample into two groups using the medians as cut-off points for all variables except for Diversification (one/many major industries), Capital constraints (yes/no), Equity (public/private), and Education (MBA and PhD/other). The industry definition follows Graham, Harvey, and Rajgopal (2005). The last column shows from which survey sections the variables are drawn.

Table C

Correlations of control variables of the survey

	Size	Lines of business	Diversification	Capital constrained	Debt ratio	Equity	Managerial ownership	Rating	Age	Tenure
	(small to large)	(few to many)	(related to unrelated)	(no to yes)	(low to high)	(public to private)	(low to high)	(high to low)	(young to mature)	(short to long)
Lines of business (few to many)	0.202**									
Diversification (related to unrelated)	- 0.005	0.155*								
Capital constrained (no to yes)	- 0.322***	0.007	- 0.046							
Debt ratio (low to high)	- 0.182**	0.014	- 0.026	0.144						
Equity (public to private)	0.109	0.136	0.060	0.095	0.125					
Managerial ownership (low to high)	- 0.196*	0.034	0.162	0.152	0.035	- 0.051				
Rating (high to low)	0.054	- 0.003	0.336**	- 0.103	0.074	- 0.041	- 0.118			
Age (young to mature)	0.131	- 0.018	0.049	0.007	0.127	0.090	- 0.014	- 0.197		
Tenure (short to long)	0.063	0.008	0.113	0.025	0.043	0.004	0.175	- 0.029	0.392***	
Educ. MBA Dr. (MBA, Dr. to others)	- 0.118	0.105	- 0.057	0.017	0.092	0.019	0.165	- 0.089	- 0.081	- 0.031

Table C reports the correlations (φ/mean square contingency) for Size, Lines of business, Diversification, Diversity in investment prospects, Debt ratio, Equity, Managerial ownership, Rating, Age, Tenure, Education (firm and CFO) characteristics. Variables and their categories are defined in Table D.

***, **, * denotes a significant difference at the 1 %, 5 % and 10 % level, respectively.

Table D

Responding and non-responding firms: Firm characteristics

Characteristics	Invitations	Invitations (%)	Received	Received (%)	p-value	Significance level
	n	*p*	*n*	*p*		
Country						
Germany	212	21.4%	41	35.7%	*0.00*	***
Austria	30	3.0%	10	8.7%	*0.00*	***
Switzerland	66	6.7%	12	10.4%	*0.10*	
United Kingdom	243	24.5%	12	10.4%	*0.00*	***
Sweden	79	8.0%	10	8.7%	*0.77*	
Netherlands	37	3.7%	6	5.2%	*0.40*	
Belgium	29	2.9%	4	3.5%	*0.72*	
Norway	44	4.4%	5	4.3%	*0.96*	
France	175	17.6%	10	8.7%	*0.01*	**
Denmark	33	3.3%	3	2.6%	*0.67*	
Finland	44	4.4%	2	1.7%	*0.16*	
Total	**992**	**100.0%**	**115**	**100.0%**	**0.00**	***
Number of operating Segments						
2 segments	200	20.2%	30	26.1%	*0.11*	
3-4 segments	529	53.3%	60	52.2%	*0.80*	
≥ 5 segments	263	26.5%	25	21.7%	*0.25*	
Total	**992**	**100.0%**	**115**	**100.0%**	**0.22**	
Annual revenue						
< 25 million €	72	7.3%	4	3.5%	*0.10*	
25-100 million €	174	17.5%	9	7.8%	*0.00*	***
100-500 million €	284	28.6%	19	16.5%	*0.01*	**
0.5-1 billion €	115	11.6%	16	13.9%	*0.07*	*
1-5 billion €	200	20.2%	34	29.6%	*0.11*	
5-10 billion €	53	5.3%	8	7.0%	*0.23*	
> 10 billion €	94	9.5%	25	21.7%	*0.00*	***
Total	**992**	**100.0%**	**115**	**100.0%**	**0.00**	***
Debt ratio						
Low (≤ 0.3)	466	52.1%	65	56.5%	*0.34*	
High (> 0.3)	429	47.9%	50	43.5%	*0.34*	
missing	97		0			
Total	**992**	**100.0%**	**115**	**100.0%**	**0.34**	

***, **, * denotes a significant difference at the 1 %, 5 % and 10 % level, respectively.
This table reports statistics of the 115 "surveyed" firms and the 992 "invited" firms that we selected from Worldscope. The analysis is based on the variables Country, Number of operating segments, Annual revenue, Equity, Capex-to-asset ratio, and Debt ratio. Demographic characteristics of the "invited" firms are obtained from Worldscope. Demographic characteristics for the "surveyed firms" are obtained from the questionnaire. Variables and their categories are defined in Table D. Chi-square tests for goodness of fit across all categories of the six variables are conducted to test whether the distribution of each variable in the sample of "surveyed" firms follows the patterns in the population of "invited" firms. The six values in the last column and row of each table (in bold) report the p-values. In addition, one-proportion z-tests (here: also equivalent to chi-square tests) are conducted to compare the proportion of "surveyed" firms in a particular category to the proportion of "invited" firms.

Table 1

Asymmetric Information and Agency Problems Inside the Firm

Survey responses to the question: If another corporate manager made the following statements, how strongly would you agree or disagree with each of them when you think about the divisional management in your company?

Panel A

	Questions	Obs.	Mean	% agree or strongly agree	% disagree or strongly disagree	Statistical differences of proportions in rows
-	Divisional managers have superior information / knowledge about their businesses compared to the information that headquarters has.	106	3.72	70.8	11.3	-
(1)	If divisional management were running their divisions as stand-alone companies, they would feel more committed to raising the firm's attractiveness to capital markets.	106	3.58	62.3	15.1	4-5
(2)	Divisional managers try to influence the capital allocation decisions of headquarters.	106	3.52	55.7	14.2	5
(3)	Divisional managers prefer running large divisions with more capital under their control over running small divisions with less capital under their control.	106	3.48	55.7	22.6	5
(4)	If divisional management were running their divisions as stand-alone companies, they would act more entrepreneurial.	106	3.11	42.5	30.2	1, 5
(5)	If divisional management were running their divisions as stand-alone companies, they would work harder.	106	2.27	11.3	63.2	1-4

Panel B

% agree or strongly agree	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Empire Building	
	small	large	few	many	related	unrelated	no	yes	low	high	low	high
-	70.8	65.1	74.6	69.0	72.9	63.9	80.0**	74.3	62.5	68.3	73.9	74.5	67.8
(1)	62.3	58.1	65.1	67.2	56.3	70.5	51.1**	58.1	71.9	61.7	63.0	57.4	66.1
(2)	55.7	58.1	54.0	60.3	50.0	47.5	66.7**	51.4	65.6	55.0	56.5	40.4	67.8***
(3)	55.7	55.8	55.6	48.3	64.6*	54.1	57.8	51.4	65.6	48.3	65.2*	0.0	100.0
(4)	42.5	44.2	41.3	48.3	35.4	39.3	46.7	33.8	62.5***	41.7	43.5	38.3	45.8
(5)	11.3	11.6	11.1	12.1	10.4	11.5	11.1	12.2	9.4	8.3	15.2	12.8	10.1

Panel B (continued)

% agree or strongly agree	Equity		Managerial ownership		Rating		Age		Tenure		Education	
	public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others
-	70.8	69.3	77.8	72.2	67.6	75.0	85.2	69.5	72.3	74.5	66.7	71.8	68.6
(1)	62.3	59.1	77.8	62.5	61.8	60.0	77.8	57.6	68.1	61.8	62.7	57.7	71.4
(2)	55.7	53.4	66.7	54.2	58.8	60.0	74.1	54.2	57.4	63.6	47.1*	53.5	60.0
(3)	55.7	55.7	55.6	54.2	58.8	65.0	70.4	55.9	55.3	56.4	54.9	47.9	71.4**
(4)	42.5	44.3	33.3	37.5	52.9	45.0	37.0	42.4	42.6	52.7	31.4**	39.4	48.6
(5)	11.3	12.5	5.6	12.5	8.8	10.0	7.4	11.9	10.6	16.4	5.9*	14.1	5.7

Ratings are based on a five-point Likert scale from 1 (strongly disagree) to 5 (strongly agree).

Panel A reports summary statistics for the responses from all responding firms. We report the mean score, the percentage of respondents that agree (4) or strongly agree (5) with a statement, and the percentage of respondents that disagree (2) or strongly disagree (1) with a statement. The last column reports results from McNemar tests (for the analysis of multiple proportions drawn from a single sample) to examine whether ratings of each pair of sub-questions are statistically different. For instance, the rating in row 1 ("If divisional management were running their divisions as stand-alone companies, they would feel more committed to raising the firm's attractiveness to capital markets."; % very or highly important) is statistically different from the ratings in rows 4-5.

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered 4 (agree) and 5 (strongly agree) across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 2

The Organization of Internal Capital Allocation: Headquarters and Investment Decisions

Survey responses

Panel A

	Questions	Obs.	% Yes	% No
(1)	Does headquarters have the decision-making authority regarding major investments?	112	97.3	2.7
(2)	Is approval from headquarters required beyond a certain size of investment?	109	97.2	2.8

Panel B

	% Yes	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	97.3	95.7	98.5	96.7	98.0	96.8	98.0	96.2	100.0	95.3	100.0	95.1	100.0
(2)	97.2	95.5	98.5	96.6	98.0	98.4	95.8	97.3	97.1	98.4	97.9	98.2	97.7

Panel B (continued)

	% Yes	Equity		Managerial ownership		Rating		Age		Tenure		Education	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others
(1)	97.3	97.8	94.7	96.1	100.0	100.0	100.0	96.7	98.0	96.4	98.2	96.0	100.0
(2)	97.2	100.0	83.3***	98.6	94.4	95.2	100.0	94.9	100.0	98.1	96.4	100.0	91.9**

Ratings are based on a two-point (yes/no) scale.

Panel A reports summary statistics for the responses from all responding firms. We report the percentage of respondents that answer yes and no.

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered yes across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

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Table 3

The Organization of Internal Capital Allocation: Headquarters and Investment Decisions

Survey responses

Panel A

	Questions	Obs.	Mean	Median	Min/max
(1)	If approval from headquarters is required beyond a certain size of investment, from which project size (threshold amount) on does the authority to make decisions reside with headquarters? (Mio €)	80	5.15	0.5	0.001/65
(2)	In an average year, how many investment proposals are submitted to headquarters for approval? (n)	105	78.8	20.0	2/4500
(2a)	In an average year, how many investment proposals are submitted to headquarters for approval? (outlier-adjusted) (n)	104	36.3	20.0	2/300
(3)	Investment proposals submitted to headquarters per division in average year (calculated: item 2a of Table 3 divided by number of operating segments)	104	11.3	5.0	0.7/125

Panel B

	Median	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	0.50	0.1	2***	0.4	1.0	0.6	0.5	1.0	0.15*	1.0	0.2**	0.6	0.5
(2)	20.0	17.5	25**	18.8	25.0	20.0	20.0	20.0	32.5**	17.5	25**	20.0	25.0
(2a)	20.0	17.5	25**	17.5	25.0	20.0	20.0	18.8	32.5**	17.5	25**	20.0	25.0
(3)	5.0	5.0	6.3	6.7	5.0	6.5	5.0*	5.0	8.1***	4.2	6.7**	5.0	5.0

Panel B (continued)

	Median	Equity		Managerial ownership		Rating		Age		Tenure		Education		Winner-Picking	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others	no	yes
(1)	0.50	0.5	3.8	1.0	0.1***	5.0	1.2	0.5	0.6	1.0	0.5	1.0	0.5	0.20	0.60
(2)	20.0	20.0	20.0	22.5	17.5	25.0	18.8	20.0	20.0	20.0	20.0	20.0	20.0	10.0	25.0***
(2a)	20.0	20.0	20.0	20.0	17.5	22.5	18.8	20.0	20.0	20.0	20.0	20.0	20.0	10.0	25.0***
(3)	5.0	5.0	5.0	5.0	4.4	6.6	5.0	5.0	5.0	6.7	5.0	5.0	5.0	3.3	6.3***

Respondents were asked to enter a threshold amount and the number of investment proposals in an average year.

Panel A reports summary statistics for the responses from all responding firms. We report the mean score, the median, the minimum and the maximum.

Panel B splits the sample by various characteristics and compares the medians across subsamples using Kruskal-Wallis and Mood tests of differences in medians. See Table B for column/variable definitions and data sources.

***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 4

The Organization of Internal Capital Allocation: Headquarters and Investment Decisions

Survey responses

Panel A

	Questions	Obs.	Mean	Median	Min/max
(1)	What percentage of the total amount of capital expenditures of your company in an average year does not require explicit approval by the headquarters (e.g., because it is part of an initial divisional budget)? (%)	105	38.8	40.0	0/95
(2)	On average, how many of these (= investment proposals, see Table 3) obtain approval? (%)	105	77.7	80.0	17/100
(3)	On average, how many proposals receive close scrutiny by headquarters? (%)	92	68.6	72.5	0/100

Panel B2

	Mean	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	38.8	28.9	45.7***	38.8	38.9	40.6	36.5	42.0	32.1*	44.5	31.3**	44.2	31.6**
(2)	77.7	76.3	78.8	77.0	78.7	76.9	78.8	79.1	75.0	78.6	76.6	79.9	73.9*
(3)	68.6	74.5	65.0	69.6	67.5	64.8	73.6	70.0	65.6	70.0	67.0	68.6	66.9

Panel B2 (continued)

	Mean	Equity		Managerial ownership		Rating		Age		Tenure		Education	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others
(1)	38.8	38.2	41.9	42.0	33.0	43.8	40.1	37.7	40.0	38.2	39.3	41.0	34.3
(2)	77.7	76.8	82.1	79.0	76.0	76.8	73.4	77.7	77.8	76.8	78.6	76.2	80.9
(3)	68.6	68.6	68.7	66.0	74.0	65.1	66.3	70.2	66.8	71.1	66.0	66.3	73.5

Respondents were asked to enter percentages.

Panel A reports summary statistics for the responses from all responding firms. We report the mean score, the median, the minimum and the maximum.

Panel B splits the sample by various characteristics and compares the mean score across subsamples using standard differences of means tests. See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 5

The Organization of Internal Capital Allocation: Headquarters and Investment Decisions

Survey responses

Panel A

	Question	Obs.	% Yes	% No
(1)	Does divisional management provide financial information such as cash flow forecasts or NPV calculations as part of their investment proposals?	109	98.2	1.8

Panel B

	% Yes	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	98.2	97.7	98.5	100.0	96.0	98.4	97.9	97.3	100.0	98.4	97.9	100.0	95.3*

Panel B (continued)

	% Yes	Equity		Managerial ownership		Rating		Age		Tenure		Education	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others
(1)	98.2	97.8	100.0	97.3	100.0	95.2	96.7	98.3	98.0	96.3	100.0	98.6	97.3

Ratings are based on a two-point (yes/no) scale.

Panel A reports summary statistics for the responses from all responding firms. We report the percentage of respondents that answer yes and no.

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered yes across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 6

The Organization of Internal Capital Allocation: Headquarters and Investment Decisions

Survey responses

Panel A

	Question	Obs.	Mean	% higher than actual outcomes	% lower than actual outcomes
(1)	On average, the forecasts provided in investment proposals are...	108	2.5	50.9	12.0

Panel B

	% higher than actual outcomes	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	50.9	59.1	45.3	55.9	44.9	50.8	51.1	48.6	55.9	56.7	43.8	50.0	52.4

Panel B (continued)

	% higher than actual outcomes	Equity		Managerial ownership		Rating		Age		Tenure		Education	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others
(1)	50.9	52.2	44.4	51.4	50.0	52.4	48.3	48.3	54.0	60.4	41.8*	48.6	55.6

Ratings are based on a five-point Likert scale from 1 (substantially higher than actual outcomes) to 5 (substantially lower than actual outcomes).
Panel A reports summary statistics for the responses from all responding firms. We report the mean score, the percentage of respondents that answered 1 (substantially higher than actual outcomes) and 2 (higher than actual outcomes), and the percentage of respondents that answered 4 (lower than actual outcomes) and 5 (substantially lower than actual outcomes).

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered 1 (substantially higher than actual outcomes) and 2 (higher than actual outcomes) across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 7

The Organization of Internal Capital Allocation: Headquarters and Investment Decisions

Survey responses to the question: How important are the following business practices in your company to ensure that divisional managers provide truthful forecasts and do not overstate the attractiveness of investment projects? If you use these practices for other reasons and r
reporting, please check "Not Important".

Panel A

	Question	Obs.	Mean	% very or highly important	% somewhat or not important	Statistical differences of proportions in rows
(1)	We link the performance-based pay of divisional managers to overall firm performance.	109	3.70	72.5	16.5	3-9
(2)	We require divisional managers to produce investment proposals with information that can be verified by headquarters.	109	3.83	68.8	7.3	3-9
(3)	We set the required hurdle rate for project approval in excess of the "true" cost of capital.	109	3.27	53.2	21.1	1-2, 5-9
(4)	We have institutionalized post-investment audits.	109	3.11	44.0	32.1	1-2, 6-9
(5)	We grant each division a minimum level of capital budget / investment.	109	2.72	33.0	45.9	1-3, 8-9
(6)	We put a relatively high weight on industry information that is gathered externally compared to internal information.	109	2.67	23.9	37.6	1-4, 9
(7)	We adopt criteria (e.g., payback rules) that discount distant long-horizon cash flows more heavily than does the NPV method.	109	2.51	22.0	45.0	1-4
(8)	The proportion of performance-based pay relative to base salary is high if a divisional manager claims better expected investment prospects.	109	2.33	17.4	53.2	1-5
(9)	We rotate divisional managers across divisions.	109	2.03	12.8	67.0	1-6

Panel B

	% very or highly important	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	72.5	70.5	73.8	78.0	66.0	70.5	75.0	73.3	70.6	70.5	75.0	62.1	83.7**
(2)	68.8	70.5	67.7	64.4	74.0	72.1	64.6	72.0	61.8	67.2	70.8	63.8	76.7
(3)	53.2	36.4	64.6***	49.2	58.0	55.7	50.0	61.3	35.3**	54.1	52.1	62.1	44.1*
(4)	44.0	36.4	49.2	28.8	62.0***	41.0	47.9	48.0	35.3	41.0	47.9	41.4	46.5
(5)	33.0	25.0	38.5	35.6	30.0	36.1	29.2	38.7	20.6*	36.1	29.2	27.6	37.2
(6)	23.9	25.0	23.1	20.3	28.0	24.6	22.9	25.3	20.6	23.0	25.0	22.4	25.6
(7)	22.0	25.0	20.0	18.6	26.0	21.3	22.9	26.7	11.8*	24.6	18.8	24.1	18.6
(8)	17.4	20.5	15.4	15.3	20.0	16.4	18.8	20.0	11.8	18.0	16.7	13.8	23.3
(9)	12.8	13.6	12.3	10.2	16.0	16.4	8.3	12.0	14.7	11.5	14.6	12.1	16.3

Panel B (continued)

	% very or highly important	Equity		Managerial ownership		Rating		Age		Tenure		Education	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others
(1)	72.5	74.7	61.1	71.2	75.0	71.4	70.0	71.2	74.0	83.3	61.8**	72.2	73.0
(2)	68.8	69.2	66.7	64.4	77.8	71.4	50.0	67.8	70.0	77.8	60.0**	70.8	64.9
(3)	53.2	52.7	55.6	56.2	47.2	38.1	63.3*	52.5	54.0	51.9	54.5	55.6	48.6
(4)	44.0	44.0	44.4	47.9	36.1	52.4	43.3	42.4	46.0	46.3	41.8	45.8	40.5
(5)	33.0	31.9	38.9	32.9	33.3	38.1	30.0	37.3	28.0	37.0	29.1	29.2	40.5
(6)	23.9	25.3	16.7	19.2	33.3	23.8	20.0	20.3	28.0	22.2	25.5	29.2	13.5*
(7)	22.0	22.0	22.2	20.5	25.0	14.3	20.0	16.9	28.0	16.7	27.3	22.2	21.6
(8)	17.4	17.6	16.7	15.1	22.2	19.0	6.7	16.9	18.0	16.7	18.2	20.8	10.8
(9)	12.8	13.2	11.1	13.7	11.1	9.5	16.7	15.3	10.0	18.5	7.3*	12.5	13.5

Ratings are based on a five-point Likert scale from 1 (not important) to 5 (highly important).

Panel A reports summary statistics for the responses from all responding firms. We report the mean score, the percentage of respondents that find a business practice very (4) or highly important (5), and the percentage of respondents that find a business practice somewhat (2) or not important (1). The last column reports results from McNemar tests (for the analysis of multiple proportions drawn from a single sample) to examine whether ratings of each pair of sub-questions are statistically different. For instance, the rating in row 1 ("We link the performance-based pay of divisional managers to overall firm performance."; % very or highly important) is statistically different from the ratings in rows 3-9.

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered 4 (very important) and 5 (highly important) across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 8

Headquarters and Allocation of Capital

Survey responses to the question: How important are the following financial criteria for your capital allocation decision?

Panel A

	Question	Obs.	Mean	% very or highly important	% somewhat or not important	Statistical differences of proportions in rows
(1)	Internal rate of return (IRR)	115	3.84	70.4	11.3	5-6
(2)	Net present value (NPV)	115	3.82	69.6	14.8	5-6
(3)	Payback period	115	3.77	64.3	13.9	5-6
(4)	Sensitivity analysis	115	3.60	64.3	19.1	5-6
(5)	Hurdle rate	115	2.93	37.4	36.5	1-4, 6
(6)	Real-option valuation methods	115	1.77	6.1	77.4	1-5

Panel B

	% very or highly important	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	70.4	70.8	70.1	73.0	67.3	78.5	60.0**	71.3	68.6	69.2	72.0	69.4	75.0
(2)	69.6	60.4	76.1*	66.7	73.1	72.3	66.0	70.0	68.6	72.3	66.0	66.1	75.0
(3)	64.3	72.9	58.2	66.7	61.5	52.3	80.0***	65.0	62.9	67.7	60.0	61.3	63.6
(4)	64.3	54.2	71.6*	58.7	71.2	69.2	58.0	66.3	60.0	67.7	60.0	64.5	68.2
(5)	37.4	22.9	47.8***	30.2	46.2*	40.0	34.0	45.0	20.0**	38.5	36.0	40.3	29.5
(6)	6.1	4.2	7.5	4.8	7.7	6.2	6.0	6.2	5.7	6.2	6.0	4.8	9.1

Panel B (continued)

	% very or highly important	Equity		Managerial ownership		Rating		Age		Tenure		Education		Information Asymmetries	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others	low	high
(1)	70.4	68.4	80.0	71.8	67.6	63.6	67.7	74.6	65.4	74.1	66.7	71.4	68.4	80.1	68.0
(2)	69.6	70.5	65.0	73.1	62.2	68.2	67.7	73.0	65.4	79.3	59.6**	70.1	68.4	80.6	65.3
(3)	64.3	64.2	65.0	62.8	67.6	31.8	74.2***	69.8	57.7	65.5	63.2	62.3	68.4	48.4	68.0*
(4)	64.3	65.3	60.0	65.4	66.2	72.7	61.3	61.9	67.3	74.1	54.4**	62.3	68.4	67.7	65.3
(5)	37.4	38.9	30.0	37.2	37.8	59.1	41.9	30.2*	46.2	31.0	43.9	39.0	34.2	29.0	38.7
(6)	6.1	6.3	5.0	7.7	2.7	9.1	9.7	4.8	7.7	5.2	7.0	5.2	7.9	3.2	8.0

Ratings are based on a five-point Likert scale from 1 (not important) to 5 (highly important).

Panel A reports summary statistics for the responses from all responding firms. We report the mean score, the percentage of respondents that find a budgeting method very (4) or highly important (5), and the percentage of respondents that find a budgeting method somewhat (2) or not important (1). The last column reports results from McNemar tests (for the analysis of multiple proportions drawn from a single sample) to examine whether ratings of each pair of sub-questions are statistically different. For instance, the rating in row 1 ("Internal rate of return (IRR)"; % very or highly important) is statistically different from the ratings in rows 5-6.

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered 4 (very important) and 5 (highly important) across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 9

Headquarters and Allocation of Capital

Survey responses to the question: How important are the following factors that go beyond pure financial criteria for your capital allocation decision?

Panel A

	Question	Obs.	Mean	% very or highly important	% somewhat or not important	Statistical differences of proportions in rows
(1)	Strategic information of top management	115	4.0	82.6	5.2	4-5
(2)	The assessment of divisional managers' abilities to deliver the expected results	115	4.0	79.1	5.2	4-5
(3)	Ability to execute projects (e.g., manpower, knowledge)	115	4.1	79.1	6.1	4-5
(4)	Current market trends	115	3.5	52.2	18.3	1-3
(5)	Previous industry experience or affiliation of decision-makers at headquarters	115	3.3	42.6	19.1	1-3

Panel B

	% very or highly important	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	82.6	75.0	88.1*	82.5	82.7	84.6	80.0	85.0	77.1	84.6	80.0	75.8	88.6*
(2)	79.1	83.3	76.1	85.7	71.2*	72.3	88.0**	82.5	71.4	80.0	78.0	74.1	86.4*
(3)	79.1	83.3	76.1	79.4	78.8	81.5	76.0	83.7	68.6*	81.5	76.0	79.0	77.3
(4)	52.2	47.9	55.2	54.0	50.0	61.5	40.0**	53.7	48.6	49.2	56.0	53.2	50.0
(5)	42.6	45.8	40.3	42.9	42.3	47.7	36.0	45.0	37.1	44.6	40.0	32.3	56.8**

Panel B (continued)

	% very or highly important	Equity		Managerial ownership		Rating		Age		Tenure		Education	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others
(1)	82.6	83.2	80.0	84.6	78.4	86.4	87.1	79.4	86.5	84.5	80.7	81.8	84.2
(2)	79.1	80.0	75.0	78.2	81.1	54.5	90.3***	77.8	80.8	81.0	77.2	81.8	73.7
(3)	79.1	82.1	65.0*	76.9	83.8	77.3	83.9	76.2	82.7	77.6	80.7	81.8	73.7
(4)	52.2	54.7	40.0	52.6	51.4	45.5	48.4	58.7	44.2	53.4	50.9	57.1	42.1
(5)	42.6	43.2	40.0	41.0	45.9	36.4	45.2	42.9	42.3	48.3	36.8	42.9	42.1

Ratings are based on a five-point Likert scale from 1 (not important) to 5 (highly important).

Panel A reports summary statistics for the responses from all responding firms. We report the mean score, the percentage of respondents that find a factor very (4) or highly important (5), and the percentage of respondents that find a factor somewhat (2) or not important (1). The last column reports results from McNemar tests (for the analysis of multiple proportions drawn from a single sample) to examine whether ratings of each pair of sub-questions are statistically different. For instance, the rating in row 1 ("Strategic information of top management"; % very or highly important) is statistically different from the ratings in rows 4-5.

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered 4 (very important) and 5 (highly important) across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 10

Headquarters and Allocation of Capital

Survey responses

Panel A

	Question	Obs.	Mean	% often or always	% some-times	% rarely	% never
(1)	Diversified firms may use the ability to move funds from divisions that are generating strong cash flow to divisions with less cash flow but strong investment opportunities. How frequently do you use this ability in order to achieve the highest capital productivity?	115	3.55	52.2	32.2	13.9	1.7
(2)	How frequently do you allocate financial resources more evenly across divisions than pure financial criteria (e.g., NPV) suggest?	115	2.37	12.2	34.8	29.6	23.5

Panel B

	% Sometimes to always	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	84.3	77.1	89.6*	82.5	86.5	81.5	88.0	81.3	91.4	86.2	82.0	90.3	79.5
(2)	47.0	47.9	46.3	44.4	50.0	46.2	48.0	47.5	45.7	40.0	56.0*	45.1	47.7

Panel B (continued)

	% Sometimes to always	Equity		Managerial ownership		Rating		Age		Tenure		Education		Winner-Picking	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others	no	yes
(1)	84.3	81.1	100**	84.6	83.8	81.8	87.1	82.5	86.5	84.5	84.2	83.1	86.8	0.0	100.0
(2)	47.0	44.2	60.0	47.4	45.9	54.5	51.6	47.6	46.2	48.3	45.6	46.8	47.4	22.2	51.5**

Ratings are based on a five-point Likert scale from 1 (never) to 5 (always).

Panel A reports summary statistics for the responses from all responding firms. We report the mean score, the percentage of respondents that engage in winner-picking (Section D, Q4) / corporate socialism (Section D, Q7) often (4) or always (5), sometimes (3), rarely (2), or never (1).

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered 4 (often) and 5 (always) across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 11

Capital Investment in Internal Capital Markets: Headquarters and Allocation of Capital

Survey responses

Panel A

	Question	Obs.	% Yes	% No
(1)	When capital markets are operating normally, is your company capital constrained? In other words: Does your financing capacity limit your ability to pursue attractive investment projects.	115	30.4	69.6
(2)	Does your company's top management impose a limit on total investments of the firm by a predetermined, fixed budget?	115	55.7	44.3
(3)	Is the capital allocation to a division restricted by the division's own generated cash flow?	115	26.1	73.9

Panel B

	% Yes	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	30.4	47.9	17.9***	30.2	30.8	32.3	28.0	0.0	100.0	24.6	38.0	30.0	43.1**
(2)	55.7	50.0	59.7	58.7	51.9	58.5	52.0	50.0	68.6*	49.2	64.0	56.5	54.5
(3)	26.1	25.0	26.9	19.0	34.6*	24.6	28.0	20.0	40.0**	24.6	28.0	17.7	40.9***

Panel B (continued)

	% Yes	Equity		Managerial ownership		Rating		Age		Tenure		Education	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others
(1)	30.4	28.4	40.0	25.6	40.5	31.8	22.6	30.2	30.8	29.3	31.6	29.9	31.6
(2)	55.7	57.9	45.0	50.0	67.6*	59.1	51.6	57.1	53.8	56.9	54.4	53.2	60.5
(3)	26.1	28.4	15.0	23.1	32.4	9.1	38.7**	30.2	21.2	24.1	28.1	27.3	23.7

Ratings are based on a twp-point (yes/no) scale.

Panel A reports summary statistics for the responses from all responding firms. We report the percentage of respondents that answer yes and no.

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered yes across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

Table 12

Headquarters and Allocation of Capital

Survey responses to the question: Please think about situations where you have decided to allocate capital more evenly than pure financial criteria suggested.
How important were the following factors for your allocation?

Panel A - answers filtered by "sometimes to always" of Question "How frequently do you allocate financial resources more evenly across divisions than pure financial criteria (e.g., NPV) suggest?" (see Table 12)

	Question	Obs.	Mean	% very or highly important	% somewhat or not important	Statistical differences of proportions in rows
(1)	Capital allocation conveys information about the (future) role of the division as part of the firm.	54	2.80	37.0	35.2	3-7
(2)	A more even capital allocation avoids opportunistic investment behavior within divisions.	54	2.50	20.4	51.9	-
(3)	A more even capital allocation frequently strengthens divisions in mature industries.	54	2.74	20.4	37.0	1
(4)	A more even capital allocation stimulates divisional managers' motivation to generate new investment ideas.	54	2.50	16.7	46.3	1
(6)	A more even capital allocation helps to retain divisional managers.	54	2.26	13.0	57.4	1
(5)	Too uneven capital allocation diminishes divisional managers' motivation.	54	2.15	13.0	59.3	1
(7)	A more even capital allocation strengthens our monetary performance incentive scheme.	54	2.20	9.3	59.3	1

Panel B

	% very or highly important	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	37.0	34.8	38.7	28.6	46.2	40.0	33.3	28.9	56.3*	42.3	32.1	32.1	42.9
(2)	20.4	13.0	25.8	10.7	30.8*	20.0	20.8	23.7	12.5	23.1	17.9	25.0	14.3
(3)	20.4	21.7	19.4	14.3	26.9	20.0	20.8	23.7	12.5	23.1	17.9	17.9	23.8
(4)	16.7	13.0	19.4	17.9	15.4	10.0	25.0	15.8	18.8	15.4	17.9	10.7	19.0
(6)	13.0	13.0	12.9	10.7	15.4	16.7	8.3	7.9	25.0*	11.5	14.3	7.1	23.8
(5)	13.0	13.0	12.9	10.7	15.4	13.3	12.5	10.5	18.8	7.7	17.9	7.1	19.0
(7)	9.3	13.0	6.5	7.1	11.5	3.3	16.67*	5.3	18.8	15.4	3.6**	7.1	4.8

Panel B (continued)

	% very or highly important	Equity		Managerial ownership		Rating		Age		Tenure		Education		Discretionary Budgets	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others	low	high
(1)	37.0	35.7	41.7	35.1	41.2	50.0	25.0	30.0	45.8	35.7	38.5	41.7	27.8	37.0	33.3
(2)	20.4	19.0	25.0	21.6	17.6	16.7	25.0	20.0	20.8	21.4	19.2	25.0	11.1	3.7	42.9***
(3)	20.4	16.7	33.3	18.9	23.5	8.3	25.0	20.0	20.8	17.9	23.1	16.7	27.8	14.8	19.1
(4)	16.7	14.3	25.0	13.5	23.5	16.7	25.0	20.0	12.5	25.0	7.7*	22.2	5.6	22.2	14.3
(6)	13.0	11.9	16.7	10.8	17.6	25.0	12.5	13.3	12.5	17.9	7.7	11.1	16.7	18.5	9.5
(5)	13.0	16.7	0.0	5.4	29.4**	16.7	18.8	16.7	8.3	7.1	19.2	5.6	27.8**	14.8	9.5
(7)	9.3	4.8	25.0**	5.4	17.6	8.3	18.8	6.7	12.5	3.6	15.4	8.3	11.1	7.4	9.5

Ratings are based on a five-point Likert scale from 1 (not important) to 5 (highly important).

Panel A reports summary statistics for the responses from the firms that indicate that they frequently engage in socialism (Section D, Q4; 3=sometimes, 4= rarely, 5=always) following the definition in Section 4.2.1. We report the mean score, the percentage of respondents that find a factor very (4) or highly important (5), and the percentage of respondents that find a factor somewhat (2) or not important (1). The last column reports results from McNemar tests (for the analysis of multiple proportions drawn from a single sample) to examine whether ratings of each pair of sub-questions are statistically different. For instance, the rating in row 1 ("Capital allocation conveys information about the (future) role of the division as part of the firm."; % very or highly important) is statistically different from the ratings in rows 3-7.

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered 4 (very important) and 5 (highly important) across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.

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Table 13

Financing Effects of Diversification

Survey responses to the question: How important are the following effects of diversification for your company? Please answer compared to the situation where your divisions were stand-alone companies and had to raise funds by themselves.

Panel A

	Section B, Question 3	Obs.	Mean	% very or highly important	% somewhat or not important	Statistical differences of proportions in rows
(1)	Lower cost of capital	106	3.81	69.8	10.4	3-6
(2)	Ability to borrow more / Higher debt capacity	106	3.51	60.4	20.8	3-6
(3)	Better conditions for raising equity	106	3.26	46.2	27.4	1-2, 5-6
(4)	Less need to hold (precautionary) cash	106	3.16	39.6	24.5	1-2, 5-6
(5)	Ability to avoid external financing	106	2.87	27.4	32.1	1-4, 6
(6)	Lower personal taxes for investors	106	1.82	4.7	75.5	1-5

Panel B

	% very or highly important	Size		Lines of business		Diversification		Capital constrained		Debt ratio		Agency Cost	
		small	large	few	many	related	unrelated	no	yes	low	high	low	high
(1)	69.8	65.1	73.0	69.0	70.8	72.1	66.7	73.0	62.5	66.7	73.9	72.6	65.9
(2)	60.4	62.8	58.7	53.4	68.8	57.4	64.4	62.2	56.3	51.7	71.7**	58.1	63.6
(3)	46.2	46.5	46.0	41.4	52.1	47.5	44.4	48.6	40.6	41.7	52.2	46.8	45.5
(4)	39.6	44.2	36.5	39.7	39.6	36.1	44.4	40.5	37.5	38.3	41.3	38.7	40.9
(5)	27.4	16.3	34.9**	19.0	37.5**	21.3	35.6	33.8	12.5**	33.3	19.6	30.6	22.7
(6)	4.7	4.7	4.8	3.4	6.2	6.6	2.2	5.4	3.1	5.0	4.3	6.5	2.3

Panel B (continued)

	% very or highly important	Equity		Managerial ownership		Rating		Age		Tenure		Education	
		public	private	low	high	high	low	young	mature	short	long	MBA, Dr.	others
(1)	69.8	71.6	61.1	68.1	73.5	70.0	66.7	71.2	68.1	74.5	64.7	69.0	71.4
(2)	60.4	63.6	44.4	59.7	61.8	60.0	51.9	61.0	59.6	63.6	56.9	60.6	60.0
(3)	46.2	47.7	38.9	48.6	41.2	20.0	51.9**	52.5	38.3	52.7	39.2	46.5	45.7
(4)	39.6	36.4	55.6	41.7	35.3	50.0	33.3	40.7	38.3	45.5	33.3	39.4	40.0
(5)	27.4	26.1	33.3	26.4	29.4	35.0	25.9	32.2	21.3	29.1	25.5	29.6	22.9
(6)	4.7	5.7	0.0	5.6	2.9	10.0	0.0*	1.7	8.5*	3.6	5.9	7.0	0.0

Ratings are based on a five-point Likert scale from 1 (not important) to 5 (highly important).

Panel A reports summary statistics for the responses from all responding firms. We report the mean score, the percentage of respondents that find a factor very (4) or highly important (5), and the percentage of respondents that find a factor somewhat (2) or not important (1). The last column reports results from McNemar tests (for the analysis of multiple proportions drawn from a single sample) to examine whether ratings of each pair of sub-questions are statistically different. For instance, the rating in row 1 ("lower cost of capital"; % very or highly important) is statistically different from the ratings in rows 3-6.

Panel B splits the sample by various characteristics and compares the proportion of respondents that answered 4 (very important) and 5 (highly important) across subsamples using chi-square tests (and for small expected frequencies Fisher's exact tests). See Table B for column/variable definitions and data sources. ***, **, or * denote statistical significance of differences in proportions across groups at the 1 %, 5 % and 10 % level, respectively.