Empirical investigation of resource allocation choices in asset-intensive industries

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Abstract

The purpose of this study is to examine the determinants of tangible and intangible resources allocation in asset-intensive organizations, by employing a qualitative and a quantitative study in the setting of maritime shipping industry. First, seven in-depth interviews were employed to identify the firm-specific factors that shape resource allocation decision making. Second, a unique panel dataset of public maritime shipping companies for the period 2010-2020 is utilized to empirically investigate the identified determinants of resource allocation choices. The results indicate that factors, such as firm's risk seeking profile, smaller size, limited cash liquidity, capability to access capital, lower cost of equity capital, higher cost of debt capital, lower level of insiders' ownership, younger CEO, and limited environmental-related disclosures are positively affecting the number of tangible resources allocated. The findings, apart from enriching the body of literature, have some managerial implications that are discussed herein.

1. Introduction

Strategy can be conceptualized as a firm's forward-looking plan that allocates firm's limited resources to specific value-creating projects from a pool of unlimited projects (Levinthal, 2017). Resource allocation is one of the cornerstone processes of strategic management, since strategic management centers on firm's forward-looking plans, or strategies, to achieve superior performance amid the interplay between firm's internal and external environment and by rational allocation of firm's resources (Ronda-Pupo and Guerras-Martin, 2012). Firm's function of the internal capital market, which consists of senior executives that are heavily involved in the strategic management decision making, is responsible for the allocation of firm's resources (Strauch et al., 2019). Despite the importance of resource allocation, the body of literature related to allocation of tangible and intangible resources that support business strategies is underdeveloped (Maritan and Lee, 2017a). In particular, most studies seem to treat resource allocation, which is a management process, the same with capital budgeting, which is a corporate finance process (Bower, 2017). Scholars seem to agree that theory and empirical research concerning resource allocation has departed from its early management-related incarnation carried out in the 1970s (see Bower, 1970) and become wedded to finance-related investment appraisal and capital budgeting tools and techniques (Lovallo et al., 2020), such as calculation of net present value, internal rate of return and payback period (see Alpenberg and Karlsson, 2019). Due to this trend, most relevant studies have focused solely on examining the allocation of financial capital, neglecting other types of nonfinancial tangible resources. In view of literature's shortcomings, the purpose of this study is to investigate the firm-specific factors that shape managerial choices regarding allocation of nonfinancial tangible resources. The paper employs both a qualitative and a quantitative study in the setting of maritime shipping industry. Seven in-depth interviews were employed to identify the firm-specific factors that shape resource allocation choices and to form the research hypotheses. Then, employing a unique panel dataset of public maritime shipping firms for the period 2010-2020, I empirically investigate the determinants of resource allocation decisions that were identified from the qualitative interviews to test a set of research hypotheses in the public sample.

Maritime shipping was selected as the setting of the study because the main business model of maritime shipping firms is to offer global seaborne transportation services via ownership and operation of vessels, which are tangible and capital-intensive resources (Andrikopoulos et al., 2022). Each vessel is owned by a special purpose company (SPC) and all SPCs are consolidated at maritime shipping firm's level. Thus, a maritime shipping firm can be viewed as a portfolio of projects or allocated tangible resources. Moreover, maritime shipping is one of the most internationalized industries of the global economy, since the SPCs are incorporated in jurisdictions such as Marshall Islands, or Liberia, the ship management company that operates the vessels and the ship brokerage company that charters the vessels maybe be located in European countries, such as Greece, the holding company that consolidates the SPVs, the ship management company, and the ship brokerage company may be listed in U.S. Stock Exchange, such as Nasdaq or NYSE. In addition, the transportation service in most shipping segments uses ports for loading and discharging cargoes across many and different countries with diverse regulatory frameworks. This is why maritime shipping is covered by the requirements of supra-regional international conventions imposed by the International Maritime Organization, which is a branch of the United Nations. Therefore, maritime shipping is an appropriate setting to empirically test resource allocation of resource-based theory through an "open systems" lens, responding to the relevant literature call (see Filatotchev et al., 2022). Lastly, the setting of maritime shipping has been used in prior strategic management studies (see Glyptis et al., 2021; Greve, 2009; Greve, 2010).

The paper is organized as follows. The second section reviews the subdued recent literature on resource allocation. The third section presents the qualitative study, which is conducted to develop the research hypotheses. The fourth section provides the quantitative study, which is conducted to test the research hypotheses. The fifth section discusses the results of the quantitative study in conjunction with insights from the qualitative study and theorical propositions from strategic management and transportation literature. The sixth section summarizes the key findings of the study and concludes the paper.

2. Literature review

There is a consensus among academics that resource allocation is a topic overlooked, significantly understudied, and thus, underdeveloped (Bower, 2017; Lovallo et al., 2020; Maritan & Lee, 2017a). Nevertheless, there are some empirical studies that investigate resource allocation choices. The purpose of this section is to review recent and relevant empirical studies on resource allocation to assess whether there is a gap in theory that requires further investigation.

There is a stream in literature that has investigated the impact of resource allocation on firm performance. For instance, Agarwal et al. (2012) explored the spillovers between the pre-acquisition resource allocation activities and post-acquisition performance. By employing a randomized experimental design, they revealed that prior resource allocation decisions in the absence of prior coordination between the acquiring and acquired firm regarding the development of shared culture, reduces post-acquisition performance. Moreover, Busenbark et al. (2017) reviewed the relationship between capital allocation, i.e., allocation of internal financial capital into the business units of a firm, and firm performance. As a result of a systematic literature review, they developed a framework with the key resource allocation strategies (i.e., winner-picking, diversification, and synergies) and the main impediments (i.e., agency problems, behavioral biases, and sociopolitical forces) to capital allocation efficiency, i.e., improved firm performance. Apart from firm performance, there is a study that has investigated the effect of resource allocation on innovation performance. In particular, Klingebiel and Rammer (2014) studied whether resource allocation choices have any impact on innovation performance. By running regression analyses on the secondary data from Mannheim Innovation Panel 2009, i.e., the German part of the European Community Innovation Survey, they found that resource allocation breadth is positively related to innovation performance. They concluded that resource allocation to a broad range of innovation projects, especially by allocating resources at the later stages of the innovation process, leads to increased sales from the new products derived from some innovation projects.

However, the majority of prior studies in literature examine resource reallocation among internal business units of multiunit firms. For example, Bardolet et al. (2017) explored resource allocation

decision making among internal business units of the same firm. By utilizing cross-sectional data, they provided empirical evidence that senior executives show preference towards over-allocation of resources in both the largest and the smallest business units within a multiunit firm. In addition, Vieregger et al. (2017) studied the influence of business unit managers on the capital allocation decisions of multiunit firms. By employing a panel dataset of 544 firms across diverse industries during the period 1998-2013, they demonstrated that there is a positive relationship between the influence business unit executives can exercise on multiunit firm's top management team and active reallocation of capital resources within the multiunit firm. Nevertheless, the strategy of unrelated diversification weakens the relationship between the influence of business unit executives on the decision making of the multiunit firm and resource reallocation.

There is another stream in literature that combines the first two streams, by investigating the impact of resource reallocation on business units' and firms' performance. To begin with, Sengul and Obloj (2017) examined the association between performance feedback, i.e., comparison of performance against an aspiration level, and internal governance mechanisms, since resource allocation decisions are affected by performance feedback. By using regression analysis based on a sample of multiunit firms in France between 1998 and 2004, they discovered that when a subsidiary is performing below aspirations, then it is less likely to be granted with discretion in its resource allocation decisions as well as to be provided with incentive schemes such as cash bonuses by the parent firm. Additionally, Lovallo et al. (2020) examined the relationship between resource allocation flow and firm performance. By using panel data analysis on a sample of 1,917 firms for period 1990-2007 drawn from Compustat, they found an inverted U-shape relationship between the level of reallocation of financial resources across the firm's segments flow and overall firm performance. In other words, although there is a positive association between reallocation of financial resources and firm performance, they found that extreme reallocation is negatively related to firm performance. Lastly, Busenbark et al. (2021) tried to explain why corporate managers, contrary to theory, are not allocating internal resources to the best performing divisions. By studying equity analysts' firm performance projections of U.S. public multidivisional firms for the period

2000-2012, they theorize that extant studies in literature tend to view divisions within a firm as separate entities competing for internal resources rather than sum-of-parts contributing to overall corporate performance.

A notable sub stream of resource reallocation is the study of resource reallocation among geographical regions. Bai and Liesch (2022) investigated the effect of organizational goals on slack resource allocation between domestic and foreign markets. By using a sample of Chinese public manufacturing firms between 2010 and 2016, they found that managers tend to invest slack resources in their domestic market when there is a minor discrepancy between the anticipated and actual level of revenue, whereas they tend to invest slack resources in foreign markets when there is a major discrepancy between the targeted and actual level of revenue.

An interesting academic stream in literature is the investigation of resource allocation in conjunction with the factor markets, i.e., the markets that firms can tap to purchase or rent the required resources to proceed with the manufacturing of their products or the offering of their services. Specifically, Leiblein et al. (2017) discussed the resource allocation decision through the lens of failures in factor markets that allow firms to acquire resources at a discount to their value. Building on real option theory, they proposed that firm competitive heterogeneity results from organizational, structural, and behavioral differences in the resource allocation process, e.g., learning ability, and ability to manage uncertainty.

Another stream in literature has studied the relationship between resource allocation and management remuneration. Predominantly, Souder and Bromiley (2017) investigated the effect of stock options on managers' resource allocation choices. By utilizing a panel dataset of 1,012 manufacturing firms based in U.S. spanning the period 1992-2011, they showed that there is a positive relationship between unexercisable stock options and capital expenditures, as well as between exercisable stock options and research & development expenditures. In addition, they found a negative relationship between underwater options and capital expenditures. Lastly, they provided some support to the proposition that allocations to capital expenditures and research & development expenditures are sensitive

to value changes of stock options. Moreover, Natarajan et al. (2019) investigated whether employee rewards and controls influence resource allocation decisions made by middle-level managers, since most resource allocation-related studies focus on senior-level managers rather than middle-level managers. By using a panel data analysis in the setting of Indian banking industry, they found that higher rewards, measured by employee income growth, and lower controls, measured by degree of employee monitoring, are positively related to resource allocation decision making by middle-level managers.

On a different note, there is one study that investigated the impact of macroenvironmental factors on resource allocation choices. Particularly, Pratap and Saha (2018) examined firm adaptation process in response to radical social, political, and economic changes in their macroenvironment. By employing a longitudinal case study of an individual Indian steel firm over 25 years, they discovered that during microenvironmental disruptive events, senior management's resource allocation decision making is driven by their early age socialization influences, such as family upbringing and schooling.

Corporate social responsibility forms another stream in resource allocation literature. Jia et al. (2020), by using the quasi-experimental approach of difference-in-differences analysis, discovered that allocating resources in corporate social responsibility activities acts as a protection mechanism against the threat of short-selling.

Lastly, employee self-selection represents another stream in resource allocation literature. Ketkar and Workiewic (2021) explored the possibility of an employee to freely launch new projects or join existing projects, in conjunction with project selection and employee allocation processes. By utilizing a computational model, they unraveled that employee self-selection is a best practice in the case of understaffed firms, i.e., in firms where human capital is scarce, considering the project opportunities the firm can pursue.

Based on the above, it is evident that recent empirical research on resource allocation has diverged in several and multiple directions or streams, i.e., relationship between resource allocation and performance; resource reallocation among internal business units; relationship between resource reallocation and performance; resource reallocation among geographical regions; impact of factor markets

on resource allocation; relationship between management remuneration and resource reallocation; impact of macroenvironmental factors on resource allocation; resource allocation in corporate social responsibility activities; and employee self-selection of resource allocation. However, the field continues to lack a broadly accepted theory and evidence regarding the firm-specific factors that shape resource allocation decision making. Some potential insight into how factors affect resource allocation may be found in the transportation literature. Transportation literature studies the business and economic aspects of worldwide cargo and commodity transportation activities. A relevant paper in this literature examined how firm's external environment factors, i.e., market upturns and downturns, affect the timing of resource allocation (Axarloglou et al., 2013). Unfortunately, there has been little work since.

Thus, literature in both academic fields of strategic management and transportation are lacking empirical studies on firm's internal environment factors that shape resource allocation decision making. Therefore, literature review supports the argument that "the manner in which firms deploy internally generated and externally sourced capital deserves much more attention" (Lovallo et al., 2020: 1,377). In doing so, scholars are encouraged to "go into the black box rather than test models built on assumptions about what is occurring in that box we call an organization" (Busenbark et al., 2017: 2,452). This endeavor can be "accomplished through continuing the tradition of qualitative field research but with a more multidisciplinary approach" (Maritan and Lee, 2017a: 2,417). For that reason, the first step in this study is to employ in-depth interviews to conduct qualitative research in the interdisciplinary field of strategic management and transportation research by focusing on maritime transportation industry.

3. Development of research hypotheses

3.1. Methods

Given the paucity of theoretical guidance regarding the firm-specific factors that influence resource allocation decision making, I conducted in-depth semi-structured interviews with elite informants of maritime shipping firms to develop the research hypotheses. Qualitative research methods are most appropriate for researchers to "delve into the black box of organizations to truly understand capital allocation" (Busenbark et al., 2017: 2,431). Among others, the method of in-depth interviews in

theory building when there is lack of pertinent theory and/or there are limited relevant empirical studies, is highly recommended and also in-depth interviews with informants is a commonly used method in management for theory building (Boivie et al., 2021; Gai et al., 2021; Mathias et al., 2018; Ozcan, 2018). Elite informants are high-ranking executives who "have extensive and exclusive information and the ability to influence important firm outcomes, either alone or jointly with others" (Aguinis and Solarino, 2017: 1293). Similar to other studies in the field of management (see Mathias et al., 2017), elite informants, who are either principals or agents in maritime shipping companies, were identified. Maritime shipping industry includes the dry bulk, tanker, containership, and diversified shipping segments (Andrikopoulos et al., 2022). To maximize diversity within the maritime shipping industry, informants representing firms across the multiple shipping segments as well as both private and public maritime shipping firms were selected (see Table 1). As per Bowen's (2008) guidelines, the in-depth interviews were carried out until theoretical saturation was reached, i.e., no additional insights about the factors that shape resource allocation choices from additional informants could be drawn. Overall, I conducted seven in-depth interviews from January 2022 to May 2022. The interviews, which aimed to extract information about the firm-idiosyncratic factors that influence the allocation of capital resources (i.e., cash) to tangible resources (i.e., vessels), lasted between forty minutes and one hour and a half. Pursuant to literature guidance (see Patton, 2002), the firm-specific factors that influence resource allocation decision making were summarized in transcripts. The average transcript for each in-depth interview ranges from two to three pages.

INSERT TABLE 1 HERE

After transcribing the interviews' themes, the informants' quotes about the firm-specific factors that determine resource allocation choices were grouped per firm-specific factors to develop the research hypothesis. In addition, insights about how and why each of the identified factors impact resource allocation choices are also mentioned in the discussion section, elaborating on the empirical findings.

3.2. Analysis

"Allocate your [capital] resources to new [projects, i.e.,] vessels or perish". According to Inf.1 this is a famous quote by George M. Foustanos, who is a famous Greek maritime historian and former ship-owner. Thus, resource allocation decision making is a very important process for the viability and success of profit-seeking organizations.

However, resource allocation choices are inherently complicated (Bettis, 2017; Bower, 2017; Maritan and Lee, 2017b). Both Inf.1 and Inf.4 seem to concur that resource allocation is quite a complex process. It seems that there are many factors from the external and the internal environment of the firm that shape resource allocation decision making. As per Inf.1, Inf.3, Inf.4, Inf.5 and Inf.6, apart from momentum, timing, stage of shipping cycle and market-related factors, there are also firm-specific factors that influence the decision to allocate scarce capital resources to tangible resources, such as vessels.

Risk-taking profile seems to be one of the factors that determine the allocation of resources to tangible resources. In particular,

high risk-taking profile of a company is a positive factor on accumulation of tangible resources, such as secondhand vessels. (Inf.1)

companies with higher risk/return profile are expected to proceed with more vessel acquisitions. (Inf.6)

the risk-taking profile of a shipping company is expected to be positively related to the allocation of resources to tangible assets, i.e., vessels. Thus, companies that buy more vessels are expected to experience higher volatility in their stock price, and vice versa. (Inf.7)

I posit that risk-seeking firms will allocate more capital resources to tangible resources. I hypothesize

Hypothesis 1. (H1) Firm risk-taking profile positively affects intensity of resource allocation.

In addition to firm risk-taking profile, firm size may be also a determinant of resource allocation choices. Two informants argue that firm size is positively related to the decision to allocate more capital resources to vessels.

Company size is an important and positive factor on accumulation of tangible resources, such as secondhand vessels. (Inf.1)

The larger company's size …, the higher its ability to acquire additional vessels and different type of vessels. (Inf.3)

Just one informant claims that firm size is unrelated to resource allocation choices.

The size of the maritime shipping company is not an important factor in accumulation of tangible resources, such as secondhand vessels. (Inf.2)

However, most of the informants assert that firm size is negatively related to resource allocation decision making.

The size of the company is not a positive antecedent of resource allocation choices, i.e., number of vessel acquisitions. (Inf.5)

Inf.4, Inf.6 and Inf.7 provide further insights regarding the causal relationship between firm size and resource allocation process.

Although larger shipping companies may have the ability to acquire more vessels, smaller shipping companies may embark on more vessel acquisitions to grow their size with a view of obtaining critical mass. (Inf.4)

Smaller shipping companies are more inclined to grow their fleets and reach a critical mass that will allow them to be significant "players" in the market. In order to achieve their goal, they may acquire older vessels that are cheaper. In addition, larger companies are less prone to acquire more vessels, since they use the past vessel acquisitions (last-done-deals) as a point of

reference for new vessel acquisitions (for example they are less receptive to pay more for a similar vessel that was acquired at a less price over the past). (Inf.6)

Small-sized companies are more likely to buy more vessels to grow their fleets, compared to large-sized companies, which are in the maturity stage of their life cycle. (Inf.7)

Based on the above, the below hypothesis can be formulated.

Hypothesis 2. (H2) Firm size affects intensity of resource allocation.

Apart from firm risk-taking profile and firm size, cash liquidity is expected to be associated with the resource allocation process since resource allocation is basically the allocation of capital resources to tangible resources. Most informants support this statement.

Cash liquidity is positively associated with accumulation of tangible resources, such as secondhand vessels. (Inf.1)

Cash liquidity is the most important factor that drives the resource allocation decision making in shipping, especially for traditional ship-owners who are also the principals and managers of private maritime shipping companies (Inf.2)

… as well as its cash liquidity are important asset allocation factors, … and the higher company's cash reserves, the higher its ability to acquire additional vessels and different type of vessels. (Inf.3)

… and cash liquidity reserves are very important factors determining the strategic decision-making regarding the number of vessel acquisitions, i.e., resource intensity. (Inf.5)

However, Inf.6 and Inf.7 provide a different perspective.

Access to capital and not cash liquidity is an important factor to the allocation of financial resources in vessel acquisitions. Companies have an incentive to distribute the excess cash liquidity to their shareholders in the form of dividends that will improve the ability to access capital markets in the future. (Inf.6)

Public companies tend to have a higher leverage and less cash liquidity than private companies. Public companies cannot "sit" on their cash. Shipping companies, especially the public ones, are keeping less cash on their balance sheets since they reallocate their capital resources to tangible resources, or vessels. (Inf.7)

Furthermore, Inf.4 argues that cash liquidity is also related to the age of the resource allocated. High cash liquid companies are expected to acquire younger and more modern vessels, which are more expensive, and vice versa. (Inf.4)

Cash liquidity, i.e., level of cash reserves that a firm hold is expected to be an important antecedent of resource allocation choices. I hypothesize

Hypothesis 3a. (H3a) Cash liquidity affects intensity of resource allocation.

Hypothesis 3b. (H3b) Cash liquidity affects oldness of resource allocation.

Other than 'cash liquidity', Inf.6 brings 'access to capital' to the table. With the exception of Inf.3, all informants point out that the capacity to access both equity and debt capital is an important factor of the resource allocation process.

Capacity to access capital (both raise equity and issue debt) is an important and positive factor on accumulation of tangible resources, such as secondhand vessels. (Inf.1)

Access to equity and debt capital is positively related to accumulation of tangible resources in shipping, i.e., acquisition of secondhand vessels, but it is not a very important factor. (Inf.2)

Both access to capital and … are important factors of resource allocation strategic decision making. (Inf.4)

Access to capital and … are very important factors determining the strategic decision-making regarding the number of vessel acquisitions, i.e., resource intensity. (Inf.5)

Access to capital … is an important factor to the allocation of financial resources in vessel acquisitions. (Inf.6)

… the public shipping companies resort to capital markets, both debt and equity, to grow their size by acquiring more vessels. (Inf.7)

Inf.3 does not share the view that the capacity to access equity and debt capital is an important factor of the resource allocation process, since firm size, which affects resource allocation, is most important factor of the resource allocation process.

Access to capital and … are not that important in resource allocation decision making, since the size of the company, among others, determines the access to capital ... (Inf.3)

Despite Inf.3's discord, the capacity to access both equity and debt capital is expected to be an important factor of resource allocation process. Thus:

Hypothesis 4a. (H4a) Capacity to access equity capital affects intensity of resource allocation.

Hypothesis 4b. (H4b) Capacity to access debt capital affects intensity of resource allocation.

Cost of capital goes hand-in-hand with access to capital. Some informants support the statement that there is a causal relationship between cost of capital and resource allocation choices.

Both … and cost of capital are important factors of resource allocation strategic decision making. (Inf.4)

Cost of debt should be a positive factor for the allocation of financial resources in vessel acquisitions because debt capital providers that charge higher interests and coupons are more prompt/and more flexible to provide debt for vessels acquisitions compared to their low-cost peers. On the other hand, higher cost of equity should result to less vessel acquisitions since the additional vessels may not be able to generate actual returns above the hurdle rate of return. (Inf.6)

However, some informants do not share this view.

The cost of capital of maritime shipping companies is irrelevant to the strategic resource allocation decisions in maritime shipping. (Inf.2)

… and cost of capital are not that important in resource allocation decision making, since the size of the company, among others, determines … the cost of capital. (Inf.3)

Cost of capital is not a significant idiosyncratic factor of resource allocation decisions. (Inf.5)

To shed some light on this dissidence, I aim to test the effect of cost of capital on resource allocation.

Hypothesis 5a. (H5a) Cost of equity affects intensity of resource allocation.

Hypothesis 5b. (H5b) Cost of debt affects intensity of resource allocation.

Moving on, insiders' ownership, which is used as a proxy of corporate governance, is expected to be associated with resource allocation decision making.

Strong corporate governance is positively associated with accumulation of tangible resources, such as secondhand vessels. (Inf.1)

Higher insider ownership … is often associated with high speed in decision making but is not related either positively or negatively to the number or type of vessel acquisitions. (Inf.3)

In private companies, the equity ownership by company's officers and directors is expected to be positively associated with the allocation of capital to vessel. In public companies, which have access in equity capital markets, this relationship may not hold true. (Inf.6)

Hypothesis 6. (H6) Insiders' ownership affects intensity of resource.

In literature CEO duality is frequently associated with weak corporate governance. However, CEO duality is also related to centralization in decision making. Informants report mixed insights about CEO duality and resource allocation.

Corporate governance, i.e., size of board, number of independent board members and CEO duality, does not seem to be an idiosyncratic factor that influences the vessel acquisition decision making. However, management control seems to be related to speed in decision

making and speed, i.e., ability to make prompt decisions, is an important element in resource allocation. (Inf. 4)

The type of organizational approach to decision making, i.e., centralized versus decentralized decision making is an important factor in resource allocation decisions. (Inf.2)

CEO duality is often associated with high speed in decision making but is not related either positively or negatively to the number or type of vessel acquisitions. (Inf.3)

Inf.6 gives more color on the causal relationship between CEO duality and resource allocation decision making.

Chief decision makers, such as the CEO, who have multiple senior roles within a company, they are more likely to acquire more vessels, because vessel acquisitions require prompt decision making and prompt decision making is related to the centralization of decision making. A powerful CEO does not need committee approvals and other bureaucratic procedures that are impediments to swift business decisions. (Inf.6)

Along the same lines, Inf.7 argue that

Powerful shipping executives that hold both the position of the CEO and the Chairman of the board, are more likely to build larger fleets by accumulating tangible shipping resources, i.e., vessels, because their overall remuneration will be higher if they control larger fleets. (Inf.7)

Thus:

Hypothesis 7. (H7) CEO duality affects intensity of resource allocation.

Prior studies have investigated firm age as a determinant of resource allocation (see Lee and Lévesque, 2023). CEO age, though, has not received much attention in resource allocation literature. Sengul and Obloj (2017) called for further research on the effect of top management's personal characteristics on resource allocation choices. The informants reveal that CEO age is an important determinant of resource allocation decision making.

Ship-owner's age is a very important factor that influences the managerial choices related to allocation of tangible resources, i.e., vessels. The age of the ship-owner drives her/his agenda or intentions (e.g., succession, wealth management). In addition, the age of the ship-owner shapes her/his profile (e.g., risk taking propensity). (Inf.2)

CEO age determines the number of vessels acquisitions. Younger chief decision makers are likely to acquire more vessels because they are usually more ambitious, and because they can wait for more years to see their decisions to flourish (their young age allow them for more long-term view). Apart from the number of vessels, younger CEOs are more likely to acquire older and less expensive vessels in order to promptly grow their fleets. (Inf.6)

The factors that influence the resource allocation in shipping are mostly associated with the intuition and cumulative experience of the principal, since most shipping companies are family-owned businesses. (Inf.1)

The shipping business growth comes from younger shipping entrepreneur companies whether they are public or private. Younger CEOs, who are usually more ambitious and risk takers, are keen to build big-sized companies, thus, they usually direct their decision making towards more vessel acquisitions. On the contrary, elder, and more established ship-owners, who are usually more risk averse, are less likely to embark on an aggressive accumulation of vessels. However, there are cases of ship-owners, who enlarged their fleets at an advanced age. (Inf.7)

CEO age is also expected to be related to the oldness of the resources allocated, since old tangible assets require certain management capability that management capability is being built with the passage of time, i.e., as the CEO is getting older is also becoming more experienced and, thus, more capable manager.

Acquisition of older vessels requires better ship technical management capability that is being built by accumulated know-how and prior experience. (Inf.4)

Thus, I hypothesize:

Hypothesis 8a. (H8a) CEO age affects intensity of resource allocation.

Hypothesis 8b. (H8b) CEO age affects oldness of resource allocation.

Another interesting and important firm-specify factor affecting resource allocation that emerged from informants' remarks, is the Environmental, Social, and Governance (ESG) scores, especially firm environmental scores.

Environmental, Social, and Governance (ESG) is a trend that is not expected to have a significant impact on accumulation of tangible resources, such as secondhand vessels. (Inf.1)

Environmental regulations also shape the asset allocation choices, i.e., preference for modern, more efficient in terms of consumption, and less polluting vessels. (Inf.3)

Compliance with ESG may lead to better access to capital that in turn will lead to more vessel acquisitions. (Inf.3)

All public companies will be forced to prepare an ESG report sooner or later. ESG is a factor positively affecting the resource allocation decisions. However, ESG is overplayed trend. We are focusing on the "E" to the detriment of the "S". (Inf.4)

Environmental regulations have a major impact on the age of vessels to be acquired, i.e., environmental regulations lead to acquisition of younger, more energy efficient, and less polluting vessels from quality yards. (Inf.5)

Existing vessels have certain technical specs that can't comply with the strict upcoming environmental regulations. Therefore, a company that acquires many vessels is expected to have lower environmental scores. (Inf.6)

The upcoming greenhouse gas regulations are expected to have a significant impact on the resource allocation choices. Currently, most vessels at sea, which were built on past technologies, do not comply with the strict forthcoming environmental thresholds. Uncertainty about the future type of fuel, propulsion system, and design of vessel to comply with these

regulations, makes ship-owners and shipping decision makers reluctant to allocate capital resources to acquire more vessels. Thus, the environmental scores of shipping companies are expected to be negatively related to the decision to acquire more vessels. (Inf.7)

Based on the above, firms that allocate more capital resource to vessels are expected to make less environmental-related disclosures, because existing vessel designs do not comply with forthcoming environmental regulations. I hypothesize

Hypothesis 9. (H9) Environmental disclosure score negatively affects intensity of resource allocation.

4. Testing of research hypotheses

4.1. Methods

4.1.1. Data and sample

The population of this study includes the publicly traded maritime shipping firms, because their business model is to offer seaborne transportation service through the ownership of tangible resources, namely vessels (Andrikopoulos et al., 2022). To compile the sample, I used as sampling frame the TradeWinds list with the maritime shipping firms, whose common shares are listed in all stock exchanges globally (see TradeWinds, 2022). By assembling data from VesselsValue database, i.e., a maritime shipping related database that is also used in academic studies (see Andrikopoulos et al., 2022), and from Bloomberg database, I diligently compiled a unique panel dataset for 109 public maritime shipping firms and for the period 2010 to 2020. However, 366 firm-years for the variables of intensity of resource allocation and oldness of resource allocated from total 1,199 firm-years were available due to inactivity of vessel acquisitions in the remaining 833 firm-years. Moreover, missing values for the some of the explanatory variables resulted to an unbalanced panel dataset.

4.1.2. Dependent variables

Intensity of resource allocation is used as dependent variable for H1, H2, H3a, H4a, H4b, H5a, H5b, H6, H7, H8a and H9. Resource allocation intensity is conceptualized as the allocation magnitude of

existing financial resources to non-financial tangible resources. Natarajan et al. (2019), who conducted empirical research on banking industry in India, operationalize resource allocation as the number of new automated teller machines deployed per year. Lovallo et al. (2020) operationalize reallocation of financial resources as the increase of capital expenditures, i.e., investment in resources, from one year to another. Klingebiel and Rammer (2014) operationalize resource allocation breadth as the number of innovation projects pursued during a period. In maritime shipping industry, each vessel is owned by a SPC and each SPC owns only one vessel. All SPCs are consolidated at maritime shipping firm's level that is a holding company. Thus, a new vessel acquisition is essentially the allocation of firm's capital resources to a new project. Hence, I operationalize the intensity of tangible resource allocation as the number of vessels acquired by a firm in a year. Similar to prior empirical studies in resource allocation, I scale the total number of vessels acquired per firm per year over total assets per firm-year to factor in the different-sized firms in the sample (see Lovallo et al., 2020).

Oldness of tangible resource allocated is used as dependent variable for H3b and H8b. Tangible resource oldness, which is conceptualized as the age of tangible resources allocated, is operationalized as the average age of vessels acquired per firm per year.

I supplemented the exploratory empirical study with the intensity of intangible resource allocation as an additional dependent variable. I operationalize the intensity of intangible resource allocation as the number of new employees hired by a firm in a year. Similar to the intensity of tangible resource allocation variable, I scale the total number of employees hired per firm per year over total assets per firm-year to factor in the different-sized firms in the sample.

4.1.3. Explanatory variables

Firm risk-taking is conceptualized as the degree of risk assumed in the decision making for corporate matters. Risk taking profile is an important factor affecting resource allocation decision making according to the findings of in-depth interviews. Therefore, I use firm risk-taking as one of the explanatory variables for intensity of resource allocation. I operationalize firm risk-taking as the annualized standard deviation of daily stock returns, since managers' risk appetite to exploit market opportunities that in turn will lead to superior firm performance will be reflected to the volatility of firm's stock price (Yung and Chen, 2017).

Firm size has been frequently used by literature in management as a factor that influences firm resource allocation decisions (see Jia et al., 2020; Lovallo et al., 2020). On top of that, the insights from in-depth interviews indicate that firm size is a determinant of resource allocation decision making. Lastly, firm size is frequently used as control variable in similar empirical studies (Klingebiel & Rammer, 2014). Thus, I employ firm size as an explanatory variable in the models. Pursuant to similar studies, I measure firm size with the natural logarithm of total revenue (see Klingebiel & Rammer, 2014).

On one hand, cash liquidity is an important antecedent of firm performance (Deb et al., 2015). On the other hand, resource allocation choices are related to firm performance (Busenbark et al. 2017; Klingebiel & Rammer, 2014; Lovallo et al., 2020). Hence, cash liquidity is used as an explanatory variable in the models of this study. Contrary to recent studies that exclude restricted cash, I operationalize cash liquidity as the natural logarithm of average year-end and beginning-of-the-year total cash, cash equivalent, and restricted cash to take into consideration firm's total financial capital reallocation capacity.

In addition to cash liquidity, I include four financial firm-specific factors that may influence intensity of resource allocation. (1) *Capacity to access equity capital* is conceptualized as a firm's capability to raise equity capital from equity capital markets to finance its projects, including the acquisition of vessels. This variable is computed as the year-on-year increase of a firm's additional paid-in capital. (2) *Capacity to access debt capital* is conceptualized as a firm's capability to issue debt in debt capital markets or obtain interest-bearing debt from financial institutions. This variable is computed as the

year-on year increase of firm's total debt outstanding. (3) *Cost of equity*, as reported by Bloomberg, is the required hurdle rate of return by shareholders for committing their equity capital to a firm. (4) *Cost of debt* is measured as a firm's annual interest and finance expenses over its average year-end and beginning-of-the-year current portion of debt and long-term debt.

The informants from the in-depth interviews suggested that stock ownership by firm's officers and senior executives is a factor affecting the resource allocation choices. In addition, in literature, high insiders' ownership is considered to be a factor of high quality of corporate governance and a mechanism that safeguards the alignment of interest between the agents and principals (Mackey et al., 2017). Moreover, many studies use insiders' ownership also as a control variable. Lastly, prior studies encourage the incorporation of internal governance variables in future empirical studies on resource allocation (see Sengul and Obloj, 2017). For all these reasons, I include insiders' ownership in the regression models. I measure insiders' ownership by the percentage of common shares owned by insiders, i.e., firm's officers, directors, relatives, or anyone else who can influence firm's decision making.

Top management plays pivotal role in allocating firm's scarce resources across a diverse set of opportunities (Maritan, 2001). CEO duality is a commonly used proxy variable of CEO power within the organization (Recendes et al., 2022) and it is used to test hypotheses regarding centralization decision making and CEO risk-taking (see Lim & McCann, 2013). CEO duality was also investigated as a determinant of internal capital allocation efficiency (Aktas et al., 2019). Furthermore, according to the in-depth interviews, CEO duality is also an important factor affecting resource allocation decision making. Thus, CEO duality is added to the explanatory variables of the study. Similar to other empirical studies, CEO duality is operationalized as a dummy dichotomous variable, taking one value if the CEO holds also the position of the Chairwoman/Chairman of the Board and the other value if the CEO does not hold the position of the Chairwoman/Chairman of the Board.

Prior studies have identified that CEO age is associated with reallocation of assets and level of investments (Belenzon et al., 2019). Moreover, the in-depth interviews revealed that CEO age is associated with the resource allocation of tangible assets. Lastly, prior studies encourage the inclusion of

top management's personal characteristics in future studies investigating resource allocation choices (see Sengul and Obloj, 2017). Therefore, the regression models were supplemented with CEO age as an additional explanatory variable.

Empirical studies focusing on environmental, social, and governance (ESG) performance have increased in the past ten years. There is empirical evidence that firms with higher ESG scores are more likely to attract scarce capital resources (Cheng et al., 2014). Among others, the findings of the in-depth interviews suggest that ESG scores, and particularly environmental scores, are associated with resource allocation decision choices. For that reason, the variable of environmental disclosure score is included in the regression models. I operationalize environmental disclosure score as the amount of environmental data a firm report publicly. I measure environmental disclosure score from Bloomberg' proprietary environmental disclosure score, which is based on the extent of a firm's environmental disclosure as part of ESG data. The score ranges from 0.1 for firms that disclose a minimum amount of ESG data to 100 for those that disclose every data point.

INSERT TABLE 2 HERE

4.2. Analysis

I explore the determinants of intensity of resource allocation and oldness of resource allocated through unbalanced panel data analyses. Table 3 presents the descriptive statistics and the pairwise correlations of the dependent and independent variables used in the panel data analyses.

INSERT TABLE 3 HERE

The panel dataset of this study consists of observations for each firm, allowing to explore heterogeneity in resource allocation decision making from both cross-sectional differences and longitudinal changes. However, panel datasets are expected to be impaired from autocorrelation, heteroscedasticity, and endogeneity issues. To control autocorrelation, heteroscedasticity and to address endogeneity concerns, I employ the Arellano-Bond dynamic panel estimator. The Arellano-Bond

dynamic panel estimator accounts for autocorrelation by including lagged dependent variable as a control variable, and thus, controlling for the influence of prior resource allocation behavior on subsequent resource allocation behaviors. It also addresses heteroscedasticity by weighting the generalized methods of sample moments (GMM) and autoregression associated with firm resource allocation decisions over the firm-years. Lastly, by using instruments it also addresses endogeneity concerns (Arellano and Bond, 1991). Unlike other estimation methods with instrumental variables, the Arellano-Bond dynamic panel estimator relies on a set of internal instruments. This is an important advantage of the Arellano-Bond dynamic panel estimator because it is quite difficult to find external instruments that are highly correlated with the endogenous variables, which are present on the right-hand side of a regression model, and uncorrelated with the error term or the part of the dependent variables that are not explained by the included regressors in exploratory empirical studies (Bettis et al., 2014). Lastly, the Arellano-Bond dynamic panel estimator is commonly used in both strategic management (see Lim and Mccann, 2013; Deb et al., 2017) and transportation (see Drobetz et al., 2019) research studies.

To test the hypotheses related to intensity of tangible resource allocation and oldness of tangible resource allocated, I specify the models as follows:

$$TRINT_{it} = f(RISK_{it}, SIZE_{it}, LIQ_{it}, ACEQ_{it}, ACDEBT_{it}, KE_{it}, KD_{it}, OWN_{it}) \qquad (1)$$

$$TROLD_{it} = f(RISK_{it}, SIZE_{it}, LIQ_{it}, ACEQ_{it}, ACDEBT_{it}, KE_{it}, KD_{it}, OWN_{it}) \qquad (2)$$

i = number of firms, i.e., 109 firms, and

t = number of years, i.e., 11 years.

Furthermore, I included a model to explore the determinants of intangible resource allocation intensity. The additional model specification is as follows:

$$IRINT_{it} = f(RISK_{it}, SIZE_{it}, LIQ_{it}, ACEQ_{it}, ACDEBT_{it}, KE_{it}, KD_{it}, OWN_{it}) \qquad (3)$$

i = number of firms, i.e., 109 firms, and

t = number of years, i.e., 11 years.

I present the results for models (1), (2), and (3) in Columns 1, 2, and 3, respectively, of Table 4. The results indicate that the estimates for all the determinants of intensity of tangible resource allocation are statistically significant. In addition, the estimates for all the determinants of oldness of tangible resource allocation are statistically significant, except for capacity to access equity capital, capacity to access debt capital and cost of debt. Lastly, the estimates for all the determinants of intensity of intangible resource allocation are statistically significant, apart from capacity to access equity capital and cost of debt.

INSERT TABLE 4 HERE

In addition to the exploratory variables in models (1), (2), and (3), CEO duality, CEO Age, and environmental disclosure score were also mentioned by the informants of the in-depth interviews as important factors that shape resource allocation decision making. However, the inclusion of the respective variables (i.e., CEOD, CEOAG, and ESG) in the initial models would have reduced panel observations substantially. For that reason, I run three more models with CEOD, CEOAG, and ESG as explanatory variables, by using the below models' specification.

$$TRINT_{it} = f(CEOD_{it}, CEOAG_{it}, ESG_{it},) \tag{4}$$

$$TROLD_{it} = f(CEOD_{it}, CEOAG_{it}, ESG_{it},) \tag{5}$$

$$IRINT_{it} = f(CEOD_{it}, CEOAG_{it}, ESG_{it},) \tag{6}$$

i = number of firms, i.e., 109 firms, and

t = number of years, i.e., 11 years.

Due to the small number of panel observations for model (4) and (5), i.e., 71 panel observations, I employ two-stage least-squares (2SLS) estimation, because 2SLS estimators are found to be more robust for small samples (Pacini and Windmeijer, 2016). For model (6), with 159 panel observations, I employ the Arellano-Bond dynamic panel estimator.

INSERT TABLE 5 HERE

The results for models (4), (5), and (6) are presented in Columns 1, 2, and 3, respectively, of Table 5. The results indicate that the estimates for all the additional determinants of intensity of tangible resource allocation are statistically significant. In addition, only the estimate of CEO age as an additional determinant of oldness of tangible resource allocated is statistically significant. Lastly, the estimates for all the additional determinants of intensity of intangible resource allocation are statistically significant.

Finally, I tested the goodness-of-fit of all models by running the Wald test of the joint significance of the explanatory variables. In all models, the regressors are jointly significant, underpinning the explanatory power of the suggested models. For the Arelano-Bond GMM models (3) and (6), I tested for the absence of serial correlation in the error structure with the AR(1) and AR(2) statistic of Arellano and Bond (1991). The results indicate that there is no serial correlation in the dynamic intangible resource allocation equations, as the null hypothesis of no second-order autocorrelation is not rejected. However, I was not able to run this test to the other Arelano-Bond GMM dynamic models, i.e., (1) and (2), due to small number of panel observations.

INSERT TABLE 6 HERE

The summary with the results of hypotheses testing (see Table 6) provides empirical support to all research hypotheses. In addition, the findings confirm the direction of relationship of Hypothesis 1 and Hypothesis 9.

5. Discussion

The results of the empirical investigation indicate that firm risk-taking profile is positively related to intensity of tangible resource allocation, confirming the Hypothesis 1. This came as no surprise since three informants from the in-depth interviews concur that firms with high risk-taking profile are expected to allocate their capital resources to tangible resources, such as vessels. Literature in transportation research seems to assent that more risk averse firms avoid new risky projects and, conversely, risk seeking firms indulge in new risky projects (Drobetz et al., 2019). In addition, the results coincide with

Souder and Bromiley's (2017) empirical findings that there is a positive relationship between yearly change in capital expenditures and stock volatility, as well as between yearly change in research and development projects and stock volatility.

Furthermore, the empirical study found a negative relationship between firm size and intensity of tangible resource allocation. Informants of the in-depth interviews provided mixed views regarding the nature and the direction of relationship between firm size and the magnitude of resources allocated to tangible assets. Two informants suggested that there is a positive relationship, four informants claimed that there is a negative relationship, whereas one informant stated that there is no relationship whatsoever. The Hypothesis 2 testing seems to verify that there is indeed a relationship between the size of a firm and its allocation activities in tangible resources. Three of the informants shed some light on the causal relationship between intensity of tangible resource allocation and firm size, by mentioning that smaller sized firms are keener to allocate their capital resources to tangible assets to grow and reach a critical mass in terms of size that will allow them to be considered as equals among their larger peers. Lastly, these results add to the body of prior empirical findings, e.g., Klingebiel et al. (2014) have found a negative association between resource allocation breadth and firm size. Hence, apart from resource allocation breadth, resource allocation intensity is also negatively related to firm size.

Moreover, the results provide empirical indication that cash liquidity is negatively associated with both intensity of tangible resource allocation and oldness of tangible resource allocated, offering support for Hypotheses 3a and 3b, respectively. Regarding the relationship between cash liquidity and level of tangible resource allocation, the findings validate the Informant 6's perspective. In particular, it seems that contrary to common belief that cash rich firms are able to allocate more capital resources to tangible assets, firms are reluctant to keep excess liquidity in their balance sheets. They prefer to distribute their excess liquidity to their shareholders, in the form of dividends, because by doing so their firms will become more investable, and thus, they will enhance their access to equity capital markets when needed to raise capital to fund their new projects. Turning to the relationship between cash liquidity and oldness of tangible resource allocated, the findings support the Informant 6's insight that cash weak firms are

expected to allocate their scarce capital resources to older tangible assets, because these assets are less expensive to acquire in factor markets.

On the one hand, the empirical results reveal a positive association between capacity to access capital and intensity of tangible resource allocation, corroborating Hypotheses 4a and 4b. Some of the informants agree that access to both equity and debt capital markets is an important firm-specify factor that shapes strategic decision-making regarding the number of new tangible resources allocated. On the other hand, this study provides evidence that cost of equity capital and cost of debt capital are two additional determinants of tangible resource allocation choices, confirming Hypotheses 5a and 5b. Regarding the direction of the relationships, cost of equity is negatively, and cost of debt is positively related to intensity of tangible resource allocation, respectively. The justification provided by one of the informants is that higher cost of firm's equity should result to less new tangible resources, since the additional tangible resources acquired from factor markets may not generate actual returns above the hurdle rate of return. In addition, according to the Informant 6, cost of debt seems to be a positive factor for the allocation of capital resources in tangible resources, because debt capital providers are more receptive in providing debt for acquisition of new tangible resources by charging higher interest rates, compared to their low-cost competitors. The results regarding the capacity to access capital and intensity of tangible resource allocation, are in line with institutional theory, which propose that companies by allocating their resources to projects justify their corporate purpose, and in turn, enhance their legitimacy, to ensure that they will continue to have access to financial resources to accommodate their future resources allocation plans (Filatotchev et al., 2022).

Furthermore, the results of the study suggest that insiders' ownership is related to the number of new tangible resources allocated, providing support to the Hypothesis 6. However, the direction of relationship denotes a negative versus the positive association suggested by some of the informants. Since insiders' ownership is considered to be a proxy of strong corporate governance (Connelly et al., 2010), the negative relationship implies that weak corporate governance emboldens senior managers to allocate firm's capital resources to new projects. A probable explanation, as stated by the Informant 6, is that

insiders, who don't have material vested interest in their public firms, are more likely to direct firm's decision making towards more allocation of resources to new projects. This finding coincides with Ozbas and Scharfstein's (2010) and Bardolet et al.'s (2017) argument that small insiders' ownership is more prone to "corporate socialism" in terms of resource allocation. This finding also adds to prior academic discussion about the association between resource allocation decision making and embedded value of insider's equity derivatives, or vested interest in general (Lim and McCann, 2013; Souder and Bromiley (2017).

In addition, the findings of the empirical investigation provide support that CEO duality is not an important antecedent of resource allocation, disconfirming the Hypothesis 7. The results of the empirical investigation coincide with Vieregger et al.'s (2017) finding that there is not a statistically significant relationship between corporate governance, measured by CEO duality, and capital reallocation.

Moving on to other CEO personal characteristics, the study provides empirical evidence that CEO age is an important factor affecting intensity of tangible resource allocation and oldness of tangible resource allocated, corroborating the Hypotheses 8a and 8b, respectively. Concerning the causal relationship between CEO age and intensity of resource allocation, the Informant 6 and the Informant 7 argue that younger CEOs are keener to allocate more firm resources to new projects and tangible assets, because they are usually more ambitious to grow professionally together with their firms. Pertaining to the causal relationship between CEO age and oldness of resource allocated, the Informant 4 claims that older tangible resources and investment in projects with older assets require cumulative prior experience and know-how, and cumulative prior experience comes with the passage of time. Consequently, when CEO is getting older is also becoming more experienced and, thus, more competent manager.

Lastly, the study provides evidence that firm's ESG disclosure score, and in particular, environmental disclosure score is negatively related to resource allocation intensity in polluting assets, confirming the Hypothesis 9. As indicated by the informants, ESG initiatives are positive determinants of resource allocation decisions, since better ESG scores can lead to better access to capital that in sequence will lead to more available capital, which can be allocated to new projects. Firms that allocate more

capital resources to tangible assets, which do not comply with forthcoming environmental regulations, are expected to disclose less environmental-related information. This finding may be of some interest to senior managers and policy makers, since firms with low information transparency are facing higher short-selling threat (Jia et al., 2020).

In addition to the factors that shape intensity and oldness of resource allocation choices, as identified by informants of the in-depth interviews, this study provides insights about the factors affecting other aspects of resource allocation decision making. For example, there is empirical evidence that the firm-specific factors of risk-taking and size are positively associated with oldness of tangible resource allocated. Regarding the relationship between risk-taking profile and oldness of tangible resource allocated, Informant 7 argues that high risk-taking firms will usually acquire older vessels because with proper technical management can generate higher returns. In addition, the firm-idiosyncratic factors of cost of equity and insiders' ownership are negatively associated with oldness of tangible resource allocated. Moreover, some of the factors that were found by this study to influence the intensity of tangible resource allocation also affect the intensity of intangible resource allocation. In particular, the firm-specific factor of risk-taking, size, cash liquidity, capacity to access equity and debt capital, cost of equity, and CEO age are positively related to number of new employees hired. Additionally, the firm-idiosyncratic factors of cost of debt, insiders' ownership, CEO duality, and environmental disclosure scores are negatively related to new intangible resources, such as human capital, allocated.

6. Conclusion

There is consensus among scholars that literature is lacking empirical studies on firm-specific factors that shape resource allocation decision making (Lovallo et al., 2020). The purpose of this study is to fill this gap by employing both a qualitative and a quantitative study in the international and "open system" setting of maritime shipping industry.

The results of the study indicate that firm's risk seeking profile, smaller size, limited cash liquidity, capability to access capital, lower cost of equity capital, higher cost of debt capital, lower level of insiders' ownership, younger CEO, and limited environmental-related disclosures are positively

affecting the magnitude of tangible resources allocation. In addition, firm's risk seeking profile, larger size, limited cash liquidity, lower cost of equity capital, lower level of insiders' ownership, and older CEO foster the allocation of capital resources to more old tangible resources. On top of that, this study points out that firm's risk seeking profile, larger size, abundant cash liquidity, capability to access debt capital, higher cost of equity capital, lower level of insiders' ownership, lack of CEO duality, older CEO, and limited environmental-related disclosures are positively affecting the level of intangible resources allocation. These findings, apart from enriching the body of literature regarding resource-based view, and corporate governance, provide some important insights about resource allocation through the lens of institutional theory. In particular, companies are inclined to allocate their scarce resources to projects, regardless of the underlying economics and expected returns, to gain their legitimacy in the eyes of their stakeholders. By doing so, they ensure that they will continue to have access to financial resources to accommodate their future resources allocation plans.

The results of the study also have some important managerial implications. Insiders without any material vested interest in their firms are more prone to adopt "corporate socialism" by allocating more corporate assets to tangible and intangible resources. Additionally, it seems that powerful CEOs, who also hold the position of Chairwoman/Chairman of the Board, tend to allocate more firm resources to new tangible assets. Moreover, younger CEOs, who are more ambitious to grow professionally together with their firms, are eager to allocate more firm resources to tangible assets. Likewise, smaller firms are inclined to allocate their capital resources to more tangible assets to grow and reach a critical mass in terms of size. Furthermore, firms do not allocate their cash liquidity to new projects, since they prefer to distribute their excess cash liquidity to their shareholders, enhancing their capacity to access capital markets to fund their new projects. Lastly, firms that allocate more capital resources to tangible assets seem to disclose less environmental-related information, prompting short-selling pressures to their stock.

Due to the lack of prior empirical studies in this field, the results presented herein beckon replication. Even though the findings of this study offer empirical indication of several firm-specific factors that affect the intensity of tangible and intangible resource allocation and oldness of tangible

resources allocated, future researchers are encouraged to further investigate empirically these factors by using unique datasets in other asset-intensive industries with more observations. Moreover, future studies may explore additional firm-specific factors that influence resource allocation decision making. Lastly, future scholars may want to employ qualitative studies to explore the underpinning of the causal relationships between the factors identified in this study and resource allocation choices. Doing so, strategic management literature will have more rigorous evidence not only about the determinants of resource allocation choices, but also on how firm-idiosyncratic factors are driving resource allocation decisions, or how the internal capital market functions.

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Table 1

Descriptive information for the informants and their firms

Informant	Position	Firm type	Shipping Segment
Inf.1	Managing Director of dry bulk business unit	Public (NYSE)	Diversified (Containerships & dry bulk vessels)
Inf.2	Principal/CEO	Private	Dry bulk vessels
Inf.3	Principal/CEO	Public (NASDAQ)	Product tankers
Inf.4	Principal/CEO in two firms	Firm 1: Public (NASDAQ) Firm 2: Public (NASDAQ)	Firm 1: Dry bulk vessels Firm 2: Containerships
Inf.5	Chairman & CEO	Public (NASDAQ)	Dry bulk vessels
Inf.6	Principal/CEO	Private	Dry bulk vessels
Inf.7	Principal/CEO	Private	Diversified (dry bulk vessels, tankers & containerships)

Table 2

Variables description

Variables	Code	Operationalization
Intensity of tangible resource allocation	*TRINT*	Number of vessels acquired over total assets per firm-year, times 1,000
Oldness of tangible resource allocated	*TROLD*	Average age of vessels acquired per firm-year
Intensity of intangible resource allocation	*IRINT*	Number of new employees hired over total assets per firm-year, times 1,000
Firm risk-taking	*RISK*	Annualized standard deviation of daily stock returns per firm-year
Firm size	*SIZE*	Natural logarithm of total revenue per firm-year
Cash liquidity	*LIQ*	Natural logarithm of average year-end and beginning-of-the-year total cash, cash equivalent, and restricted cash per firm-year
Capacity to access equity capital	*ACEQ*	Year-on year increase of a firm's additional paid-in capital
Capacity to access debt capital	*ACDEBT*	Year-on year increase of firm's total debt outstanding
Cost of equity	*KE*	Cost of equity per firm-year as reported by Bloomberg, which calculates cost of equity via the Capital Asset Pricing Model (i.e., Cost of equity = Risk-free rate + [Beta x Country risk premium])
Cost of debt	*KD*	Annual interest and finance expenses over average year-end and beginning-of-the-year current portion of debt and long-term debt per firm-year
Insiders' ownership	*OWN*	Percentage of common shares held by insiders per firm-year
CEO duality	*CEOD*	Dummy variable: takes value of 1 in firm-years the CEO is also Chairwoman/Chairman of the Board, or 0 otherwise
CEO Age	*CEOAG*	Age of CEO in years per firm year
Environmental Disclosure Score	*ESG*	The score ranges from 0.1 for firms that disclose minimum environmental-related data to 100 for firms that disclose all relevant environmental-related data, as collected by Bloomberg

Table 3

Descriptive statistics and pairwise correlations

	Variables	N	M	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	TRINT	346	4.25	7.89	1													
(2)	TROLD	366	8.04	7.03	0.08 [0.162]	1												
(3)	IRINT	761	-17.80	481.30	0.19 [0.006]	0.06 [0.350]	1											
(4)	RISK	1,019	49.78	30.86	0.41 [0.000]	0.06 [0.296]	0.00 [0.949]	1										
(5)	SIZE	1,103	5.88	1.88	-0.44 [0.000]	0.03 [0.583]	0.02 [0.662]	-0.31 [0.000]	1									
(6)	LIQ	1,078	4.59	1.67	-0.44 [0.000]	-0.07 [0.225]	0.00 [0.927]	-0.36 [0.000]	0.79 [0.000]	1								
(7)	ACEQ	1,080	34.72	858.64	-0.01 [0.900]	-0.02 [0.694]	0.00 [0.964]	-0.01 [0.778]	0.01 [0.675]	-0.01 [0.851]	1							
(8)	ACDEBT	1,065	0.31	5.80	0.06 [0.314]	-0.02 [0.712]	0.01 [0.881]	0.01 [0.828]	-0.05 [0.076]	-0.05 [0.131]	0.01 [0.794]	1						
(9)	KE	1,089	11.15	4.73	-0.06 [0.233]	-0.03 [0.626]	0.00 [0.970]	-0.16 [0.000]	0.18 [0.000]	0.22 [0.000]	-0.06 [0.052]	-0.02 [0.472]	1					
(10)	KD	1,044	4.06	2.35	0.18 [0.001]	0.05 [0.330]	-0.05 [0.150]	0.32 [0.000]	-0.13 [0.000]	-0.31 [0.000]	-0.02 [0.448]	-0.01 [0.631]	-0.05 [0.097]	1				
(11)	OWN	1,034	5.11	11.96	-0.08 [0.167]	0.05 [0.407]	-0.01 [0.753]	0.01 [0.711]	-0.09 [0.007]	-0.07 [0.028]	-0.01 [0.826]	-0.01 [0.725]	-0.10 [0.002]	-0.02 [0.579]	1			
(12)	CEOD	579	0.34	0.47	0.09 [0.252]	-0.09 [0.236]	-0.04 [0.420]	0.08 [0.056]	-0.27 [0.000]	-0.27 [0.000]	-0.03 [0.472]	0.04 [0.305]	0.11 [0.011]	-0.19 [0.000]	0.13 [0.002]	1		
(13)	CEOAG	392	55.70	9.25	-0.14 [0.111]	0.29 [0.001]	0.01 [0.916]	-0.16 [0.002]	0.09 [0.091]	0.09 [0.082]	0.01 [0.803]	-0.11 [0.037]	0.08 [0.110]	-0.17 [0.001]	0.09 [0.077]	0.25 [0.000]	1	
(14)	ESG	432	20.27	14.87	-0.37 [0.000]	0.05 [0.579]	0.08 [0.120]	-0.12 [0.012]	0.49 [0.000]	0.38 [0.000]	-0.04 [0.462]	-0.02 [0.629]	0.09 [0.064]	-0.18 [0.000]	-0.22 [0.000]	-0.10 [0.040]	0.12 [0.035]	1

p-values reported in brackets.

Table 4

Determinants of resource allocation

	TRINT	TROLD	IRINT
	(1)	(2)	(3)
TRINT(-1)	-0.552		
	(0.01)		
	[0.000]		
TROLD(-1)		-0.09	
		(0.06)	
		[0.148]	
IRINT(-1)			-0.33
			(0.01)
			[0.000]
RISK	0.05	0.04	17.02
	(0.01)	(0.02)	(2.68)
	[0.000]	[0.041]	[0.000]
SIZE	-2.73	2.33	1570.41
	(0.64)	(0.89)	(113.65)
	[0.000]	[0.013]	[0.000]
LIQ	-0.93	-4.15	423.83
	(0.38)	(0.69)	(63.50)
	[0.021]	[0.000]	[0.000]
ACEQ	6.28	2.35	0.88
	(0.76)	(1.45)	(2.97)
	[0.000]	[0.116]	[0.768]
ACDEBT	0.23	-0.24	780.41
	(0.09)	(0.31)	(89.34)
	[0.011]	[0.441]	[0.000]
KE	-0.20	-0.38	72.44
	(0.04)	(0.04)	(8.43)
	[0.000]	[0.000]	[0.000]
KD	0.68	0.05	-7.73
	(0.08)	(0.11)	(39.32)
	[0.000]	[0.695]	[0.845]
OWN	-0.22	-0.16	-37.33
	(0.03)	(0.03)	(7.09)
	[0.000]	[0.000]	[0.000]
Prob.(J-statistic)	0.39	0.34	0.51
Panel Observations	88	88	517

Standard errors reported in parentheses; p-values reported in brackets. The method of estimation is the Arelano-Bond GMM.

Table 5

Additional determinants of resource allocation

	TRINT	TROLD	IRINT
	(4)	(5)	(6)
C	7.290	-3.10	
	(1.58)	(5.53)	
	[0.000]	[0.578]	
IRINT(-1)			-0.35
			(0.00)
			[0.000]
CEOD	-0.01	-0.60	-199.09
	(0.49)	(1.94)	(0.20)
	[0.978]	[0.758]	[0.000]
CEOAG	-0.09	0.21	9.20
	(0.03)	(0.11)	(0.06)
	[0.002]	[0.046]	[0.000]
ESG	-0.04	-0.04	-0.16
	(0.02)	(0.06)	(0.01)
	[0.015]	[0.537]	[0.000]
Prob.(J-statistic)			0.48
Panel Observations	71	71	159

Standard errors reported in parentheses; p-values reported in brackets. The method of estimation for models (4) and (5) is the 2SLS and for model (6) is the Arelano-Bond GMM.

Table 6

Summary of hypotheses testing

| | TRINT | | TROLD | |
	Hypothesis	*Relationship*	*Hypothesis*	*Relationship*
RISK	*H1*	*positive*		
SIZE	*H2*	*negative*		
LIQ	*H3a*	*negative*	*H3b*	*negative*
ACEQ	*H4a*	*positive*		
ACDEBT	*H4b*	*positive*		
KE	*H5a*	*negative*		
KD	*H5b*	*positive*		
OWN	*H6*	*negative*		
CEOD	*H7*	*not statistically significant*		
CEOAG	*H8a*	*negative*	*H8b*	*positive*
ESG	*H9*	*negative*		