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Essays on Mergers and Acquisitions

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Essays on Mergers and Acquisitions

PAULO VICTOR GOMES NOVAES

Tese de Doutorado defendida e aprovada, no dia trinta de maio do ano de dois mil e vinte e três, pela Banca Examinadora, designada pelo Colegiado do Programa de Pós-Graduação em Controladoria e Contabilidade da Universidade Federal de Minas Gerais, composta pelos professores doutores: **Wagner Moura Lamounier (Orientador/UFMG), Gabriel Pereira Pundrich (Coorientador/Warrington College of Business - University of Florida), Rodrigo Verdi (MIT Sloan School of Management), Fabio Moraes da Costa (IOWA Tippie College of Business), Wesley Mendes da Silva (FGV) e Robert Aldo Iquiapaza Coaguila (UFMG)**.

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Belo Horizonte, 30 de maio de 2023.

To my beloved, strong, and inspiring family.

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"I'm burning through the sky, yeah.
200 degrees, that's why they call me Mister Fahrenheit
I'm travelling at the speed of light.
I wanna make a supersonic man out of you.
I'm having such a good time.
I'm having a ball.
(Don't stop me now)
If you wanna have a good time
Just give me a call
(Don't stop me now)
'Cause I'm having a good time.
(Don't stop me now)
Yes, I'm having a good time.
I don't want to stop at all."

(Queen, "Don't stop me now")

Resumo

Esta tese está dividida em três artigos relacionados às operações de Fusões e Aquisições (M&A) norte-americanos, compreendendo o período entre 2000 e 2021. O *artigo 1* explora os motivos tradicionais para uma empresa buscar um M&A, como adquirente e como alvo: i) ineficiência da gestão, ii) excesso de fluxo de caixa livre e iii) erros de avaliação (de mercado). Observa-se esses canais teóricos sob a perspectiva da teoria do ciclo de vida da empresa, argumentando que analisar o ciclo de vida da empresa ajuda a desembaraçar as motivações para a firma engajar no M&A. Por um lado, as empresas maduras são mais propensas a adquirir por meio de maior acesso ao capital de crescimento, enquanto as empresas em introdução e declínio são mais propensas a fazer aquisições quando estão supervalorizadas. Por outro lado, as empresas no estágio de crescimento buscam ser compradas quando suas ações estão supervalorizadas. Além disso, mostra-se que a estratégia de "crescimento de compra" é ainda mais arriscada para as empresas na fase de introdução, uma vez que essas empresas têm uma maior probabilidade de mudar para um declínio após o negócio, em média. No *artigo 2*, explora-se um cenário em que empresas em diferentes cenários (estágios do ciclo de vida) se envolvem em fusões e aquisições como adquirentes. Examina-se o efeito da transferência de conhecimento durante o processo de integração gerencial. A previsão é que empresas com maior capacidade de gestão realizem melhor essa integração, o que significa alocar melhor os recursos adquiridos. Devido a diferentes incentivos, espera-se que as empresas em introdução, crescimento e maturidade alcancem resultados melhores no M&A comprando principalmente ativos fixos, enquanto as empresas em estágio de declínio alcancem as sinergias esperadas atraindo novos administradores em uma estratégia para sobreviver. Os resultados são consistentes com as expectativas para empresas em fase de crescimento, maturidade e declínio, mas menos consistentes para empresas em estágio de introdução. *O artigo 3* mostra que os consultores financeiros incorporam a presença de acionistas ativistas ao elaborar seu parecer sobre o evento (*fairness opinion*). Especificamente, espera-se (e encontra-se) que os ativistas examinam a gestão da empresa para melhorar tanto a qualidade dos relatórios financeiros quanto para fazer investimentos mais eficientes. Posteriormente, no contexto de M&A, a presença e o escrutínio de ativistas indiretamente ajudam o consultor do negócio a assegurar a razoabilidade das previsões de investimento da gestão. Em suma, encontram-se diferentes aspectos de implicações na negociação do acordo. Sob esse cenário, o parecer é usado como uma ferramenta de negociação ao invés de um instrumento de justificativa de preços. Portanto, os ativistas representam uma proteção extra aos acionistas minoritários. Em outras palavras, os resultados mostram que os ativistas ajudam a assegurar a razoabilidade das previsões de investimento da administração. Os resultados são submetidos a vários testes de robustez, incluindo os motivos específicos declarados para o ativismo em busca de explicar questões de endogeneidade. Coletivamente, os resultados gerais fortalecem o papel do parecer como uma ferramenta de negociação quando os ativistas exercem seu papel disciplinador.

Palavras-chave*:* Fusões e Aquisições; Estágios do Ciclo de Vida; Sinergia; Acionistas Ativistas; Consultores; Parecer Técnico.

Abstract

This doctoral dissertation is divided into three papers regarding US M&A deals spanning the period between 2000 and 2021. *Paper 1* explores the traditional motivations for a firm to pursue an M&A, both as acquirer as target: inefficient management, excess of free-cash flow, and misvaluation. I observe these theoretical drivers under the firm's life cycle theory, arguing that analyzing the firm's life cycle stage helps to disentangle the motivations for a firm to engage in M&A. On the one hand, mature firms are more likely to acquire via greater access to growth capital, while the introduction and decline firms are more prone to make acquisitions when they are overvalued. On the other hand, growth firms seek to be purchased when their shares are overvalued. In addition, I show that the "buying growth" strategy is even riskier for firms at the introduction stage since these firms have a greater likelihood to switch to a decline after the deal, on average. In *paper 2*, I explore a setting where firms in different scenarios (life cycle stages) engage in M&A as acquirer. I examine the effect of knowledge transfer during the management integration. The prediction is that firms with greater management ability conduct the integration, which means allocate the acquired resources. Due to different incentives, I predict that introduction, growth, and mature firms achieve better M&A outcomes by buying primarily fixed assets while decline-stage firms reach the expected synergies by attracting new management in a strategy to survive. Results are consistent with expectations for grow, mature, and decline stage-firms, but less consistent for firms at the introduction stage. *Paper 3* shows that financial advisors incorporate the presence of activist shareholders while elaborating the fairness opinion. Specifically, I predict and find that activists scrutinize the firm management to enhance the financial reporting quality and to make more efficient investment. Subsequently, in the context of M&A, the presence and scrutiny of activists indirectly help the deal advisor to assure the reasonableness of management investment forecasts. In sum, I find different aspects of implications on the deal negotiation. Under this setting, the fairness opinion is used as a negotiation tool instead of a price justification instrument. Therefore, activists represent an extra protection to minority shareholders. In other words, I show that activists help to assure the reasonableness of management investment forecasts. The results are subjected to several robustness checks, including the particular declared motives for activism to account for endogeneity issues. Collectively, overall results strengthen the role of fairness opinion as a negotiation tool when activists exercise their disciplining role.

Keywords: Mergers and Acquisitions; Life Cycle Stages; Synergy; Activist Shareholders; Deal Advisors; Fairness Opinion.

SUMMARY

Motivation and Thesis

This doctoral dissertation is divided into three papers. In general, I navigate via different theoretical approaches regarding the firm's management, fundamentals, and contracting decisions in asymmetric informational environments to investigate the role of internal and external factors on mergers and acquisitions (M&A) activities. Respectively, the three papers focus on the motivation to engage, the deal outcome, and the target's valuation attributes.

Mergers and Acquisitions deals represent a bundle of activities that mainly includes a merger of two or more firms (merger), a purchase of a firm by another (acquisition) or a tender offer, which means a control takeover (friendly or hostile) through the majority of voting shares acquisition (takeover). In this dissertation, I use all of these concepts interchangeably, with data from US M&A deals spanning the period between 2000 and 2021. Mueller (1970, p. 675) refers to the M&A market as a "veritable sea of synergistic opportunities". Theoretically, there are different reasons to engage in a M&A, i.e., operating efficiency gain, market-share enhancing, production verticalization, bargain power, tax economy, among others (Jensen & Ruback, 2002; Matos, 2001; Mueller, 1969). But these theoretical gains are hard to estimate empirically, due to a flurry of reconstructing that follows the deal completion (Jensen, 1988). However, I claim that before discussing expected results, a proper analysis of a M&A deal may understand the mechanism behind the decision to engage.

In the *paper 1*, I draw the setting where the theoretical drivers of inefficient management, agency cost of free-cash flow, and market misvaluation are moderated by the life cycle stages of acquirer and target. I predict the "buying growth" strategy to be a risky activity, where firms at certain life cycle stage use this strategy sometimes to grow while other firms sometimes engage on such activities to survive. I find results consistent with predictions but also discuss the expected sustainable additional value to shareholders (Penrose, 1959; Renneboog & Vansteenkiste, 2019). Using an exploratory mechanism regarding the firm's life

cycle stage, I offer new insights on the effect of M&A deals on the firm's financial and economic structure.

In the *paper 2*, I further investigate the knowledge transference as a driver of M&A success controlled by the firm's life cycle stage. I argument that firms in certain life cycle stages engage in M&A to grow by acquiring fixed assets, while others reach the expected synergies by attracting new management in order to survive. In the first situation, I draw a setting where the integration process lies on a knowledge transfer that flows from the acquirer to target, while the opposite flow is expected when the deal is motivated by survival. I analyze this setting via both operating and market return perspective. The results are consistent with predictions for accounting performance, but less consistent for alternative proxies of M&A success.

In the *paper 3*, I discuss the participation of activist shareholders on the target firm prior to deal. I explore an institutional setting where these informed investors enhance the managerial ability which results in greater financial quality and greater investment efficiency. As a result, I show a spillover effect of the activist participation on the external financial advisor. I claim that these external analysts incorporate the information of enhanced managerial ability in the valuation attributes, enabling the fairness opinion to be used as a negotiation tool instead of a price justification instrument. Therefore, I show the activists to represent an extra protection to minority shareholders.

Collectively, I offer the following overall thesis:

Conflicting interests related to managers, activist shareholders, and financial advisors affect distinct dimensions of the M&A participation, and the knowledge transfer impact better deal outcomes, sometimes depending on the firms' life cycle stages.

Considering the format of this dissertation, each paper is divided into 5 sections: i) introduction, ii) hypothesis development; iii) research design, iv) results discussion and v)

conclusions with contributions and guidelines for future research. In the end, I present general conclusions of the research.

Chapter I - M&A Drivers and Life Cycle Stages Dynamic

Abstract

This paper examines whether and how firms' life cycle stages dynamic influences the mergers and acquisitions (M&A) activities under both acquirer and target firms' perspectives. Specifically, I investigate three different mechanisms under which firms in different stages engage in M&A activities using US deals from 2000 and 2021. To estimate the likelihood, I use a Multiway fixed effects estimator as a Linear Probability Model. First, consistent with prediction, mature firms use the excess of free cash flow to make acquisitions while introduction and decline-stages firms are less likely to make acquisitions the greater their free cash flow. Second, I show that mature firms are less likely to be purchased, but I find weak results for the target's management ability to drive acquisitions. Third, firms undervalued are more likely to be purchased, regardless of the control for the life cycle dynamic. On the other hand, when overvalued, introducing and growing firms are more likely to be purchased than firms classified in other stages. My results suggest that analyzing the M&A activity via the life cycle approach enables a better comprehension of the mechanisms under which firms in different stages engage in M&A. This paper helps to disentangle the M&A literature with a closer look at the analysis of the life cycle stages dynamic, which may help managers, analysts, financial advisors, and investors to analyze future negotiations.

Keywords: Mergers and acquisitions. Acquirer. Target. Life cycle stages. Transitions.

1. Introduction

This paper examines how firms' life cycle stages dynamic influences mergers and acquisitions (M&A) activities. Theory of firm's growth predicts that economic decisions to grow rely on the desire of long-run profits, where the pursuit of new profitable opportunities must always expect marginal rates of return (Penrose, 1959). Then, the expansion of a firm may primarily be a consequence of two methods: investing in new projects that will organically increase revenue and firm size (Barney, 1991) or purchasing existing plants and markets via M&A transactions. On one hand, the M&A strategy expected to result in fast growth, but on the other hand, the "new firm" requires an expressive improvement in managerial ability, which can change the firm nature depending upon the conditions prior to the acquisition (Mueller, 1986; Penrose, 1959). In spite of the theoretical drivers, the extent empirical literature provides mixed evidence about how the preceding nature of the firm affects the decision of engaging in M&A and what are the consequences of such an engagement.

From the financial perspective, any investment is expected to generate positive net present value of a stream of expected future benefits, which means that the benefits must exceed all the costs, including the opportunity cost of the capital. Under an M&A perspective, the whole cost to the acquisition of another firm must be lower than the investment outlays to grow organically (Penrose, 1959). However, prior studies have been consistently showing value destroying acquisitions (Dutordoir et al., 2014; Fluck & Lynch, 1999; Healy et al., 1992, 1997; M. M. Hossain & Javakhadze, 2020), which gives rises to questions about factors other than the mentioned financial point of view to affect the decision to acquire another firm.

In this study, I draw this setting departing from the following three theoretical perspectives: the excess of free cash-flow (Jensen, 1986a); the target management (in)efficiency (Manne, 1965; Matos, 2001; Palepu, 1986); and the firm misvaluation on capital market, which enables a discussion on valuation differentials and market timing (Rhodes–Kropf et al., 2005).

These approaches reflect firms' characteristics, such as corporate governance, market performance, and financial constraints, which have been consistently demonstrated as different across firms' life cycle stages (Bhattacharya et al., 2020; Black, 1997; Dickinson, 2011; Dickinson et al., 2018; Filatotchev et al., 2006; Jenkins & Kane, 2004). Therefore, I use these interrelated theoretical approaches to offer the firm's life cycle dynamic prior to the acquisition as a disentangling additional informational factor when analyzing firms surrounded by M&A deals.

While the extent literature indicates the mentioned drivers of M&A, it is not clear about the settings that fit the mechanism under which firms engage in such activities. Theoretically, growth and mature firms tend to generate greater cash flow from operating activities since these firms have greater knowledge about the operation, comparatively to firms in other stages. Meanwhile, firms in other life cycle stages (i.e., shake-out and decline) strive to maintain their operations at the expenses of new capital injection. So, comparative to firms in other stages, growth and mature-stage firms would be less financially constrained to engage in M&A (Fischer, 2017). It is also true that, although growth and mature firms are characterized for being more productive, which could be an incentive to grow organically, firms at these stages are not entirely similar. The price for proving capital to growth-stage firm is higher than it is for mature firms, because the capital provider's demand for risk premium varies across the firm's life cycle (Hasan et al., 2015). Then, growth-stage firms have greater demand for external growth capital than mature firms, which usually have more free-cash flow. On the other hand, the law of diminishing marginal return suggests that mature firms may pursue the buying growth strategy the greater is their free-cash flow. Greater cash flow availability does not necessarily imply paying in cash, but it signalizes greater collateral when raising the necessary growth capital (Fischer, 2017).

In addition, although firms at introduction also engage in M&A deals, these firms may be less likely to make acquisitions driven by free-cash flow because initiating firms should focus on growth organically (Jenkins & Kane, 2004) and are comparatively more financially constrained (Dickinson, 2011). On the opposite tail, the classification as a decline stage denotes an undesirable capital and governance structure, on average. So, it would be unlikely to see declining firms making acquisitions, especially driven by cash (Ames et al., 2020).

Moreover, although some deals are motivated by overvaluation (Fu et al., 2013), there is little indication of when to expect such an attitude concerning the life cycle stage of the firm. Owen & Yawson (2010, p.439) state that "incorporating firm life cycle into the analysis of mergers and acquisitions results in a considerably more complete picture of bidder behavior". Also, Ames et al. (2020) recently find that declining acquirers are more likely to engage in diversification deals than non-declining acquirers. Therefore, I strengthen the notion that incorporating both acquirer and target life cycle stages into the analysis is even more informative to market agents.

Hence, I address the question of how firm's life cycle stages dynamic influence the M&A participation both as an acquirer as a target.

Unlike prior studies, I offer a more consistent approach of firm life cycle, which enables an even more complete picture. By life cycle stages dynamic, I mean the analysis of life cycle transitions and persistence patterns in specific stages. I follow the recent literature to use the five-stage model of Dickinson (2011) that enables an investigation on both sides as long as both firms disclose their financial statements, precisely the Cash Flow Statement (Al-Hadi et al., 2016a; Ames et al., 2020; Dickinson et al., 2018; Drake, 2015; Hasan et al., 2015; Jaggi et al., 2022; Shahzad et al., 2022). Moreover, I innovate by proposing the investigation on life cycle stages dynamic, which attempts to track patterns of persistence in a single stage as well as a positive/negative changes in the life cycle stages. Additionally, this paper is also pioneering in

providing the sell-side perspective by further investigating target public firms under the same approach. Recently, Ames et al. (2020) examined the impact of life cycle stages on M&A deals during 1988-2010, and find different acquisition patterns between declining and non-declining firms. I notice that my research is substantially different from theirs due to several reasons. First, my sample period captures a potential different M&A wave. Second, while Ames et al. (2020) provide descriptive results under a broader perspective, I examine three different theoretical motives for engaging in M&A.

Using a US sample spanning the period 2000-2021, I first replicate the approach of Owen & Yawson (2010) by testing the drivers of M&A, and the respective controls. The mentioned authors rely on an outdated measure of life cycle stage, based on retained earnings (the so-called "three-stage model" of Miller & Friesen (1984)), I use the underlying idea to show the mechanism behind some of their control variables, assuming that financial structure, management ability, and market valuation have been noticed as different across the stages. Operationally, I show that prior design is not robust to extract much information from the drivers of M&A. Therefore, I design a model using the life cycle stages indicators and their interactions with the corresponding drivers, one at a time. So, using an alternative probability linear model that capture the probability a firm to engage in a M&A, I interact the mentioned drivers with the firm's life cycle stages indicators to examine the life cycle effects when the driver is more pronounced. I sum the findings into five parts.

First, I validate the expectation that mature-stage firms are less likely to be acquired. However, I find no consistent evidence of management inefficiency on the likelihood to be acquired, even after controlling for life cycle stages. *Second*, I show that mature firm's decision to purchase is significantly driven by their excess of free-cash flow. This result is consistent with the arguments that mature firms are more focused on profit margin since their structures are more solid compared to firms in other stages. Moreover, under the law of diminishing

returns, mature firms with excess of free-cash flow invest in buying growth strategy, while firms at the introduction and decline stages go consistently on the opposite direction. *Third*, I find that acquirer's overvaluation seems to drive acquisitions when targets are overvalued, with an additional shock when the overvalued target firm has a track record of profitability and growth opportunity to show. *Fourth*, I find that the control for life cycle stages reveals the incentives of introduction and decline-stage firms to make acquisitions when their shares are overvalued. *Fifth*, I provide exploratory evidence of the deal's effect on the life cycle transition for acquirers, giving raise to insights to be investigated in future research.

Although one may concern an endogeneity, I address this issue with my research design. Since the decision to purchase or to be purchased usually takes about 9 months (Wangerin, 2019a), I use the prior pattern of life cycle stages (and related transitions that I term "dynamic") and related control variables in the attempt to capture signals of predictability of acquisitions under different settings.

The remainder of the paper proceeds as follows. I develop the testable hypotheses in Section 2. In Section 3, I define the research design, describing the sample selection, the sources of data, and the econometric models. In section 4, I present the main results and perform some robustness tests. I finally offer concluding remarks in Section 5.

2. Hypotheses Development

A M&A is a single moment for a given firm where the acquirer expects to end-up with at least three major benefits. First, M&A activities may enable the firm to penetrate new markets. Second, depending on the strategy, the firm may verticalize the value chain to avoid suppliers dependency (Jensen, 1988). Third and regardless the specific purpose, the M&A should generate sustainable additional value to shareholders (Penrose, 1959; Renneboog & Vansteenkiste, 2019).

Throughout the decades, different incentives and mechanisms have triggered different mergers waves, responding to different technologies, normative rules, competition, and also to technical ability to provide properly examinations of potential targets (Gorton et al., 2009; Healy et al., 1997; Jensen, 1988; Jensen & Ruback, 1983; Rhodes–Kropf et al., 2005). Prior literature shows that in takeovers during the 1980's, old firms were at more risk of takeover, as well as firms with more organization slack. At that time, the presence of CEO (Donaldson & Davis, 1991) and other governance characteristics – typically required from modern firms – increased the risk of takeover (Morck et al., 1988). As Donaldson & Davis (1991) mention, "large corporations that were most successful by the standards of organization theory were most likely to be taken over in the 1980s". Despite large, these firms were regarded as inert under managerial perspective. Conversely, modern literature in capital market show that firms characteristics such as corporate governance are as dynamic as the firm life cycle stage, reflecting different patterns of management and economic results (Dickinson, 2011; Filatotchev et al., 2006; Jenkins & Kane, 2004).

Different firms and industry characteristics have implications on the decision to engage in a M&A. In this paper, I dive into traditional theoretical drivers of M&A to differentiate the mechanism under which firms engage in M&A controlled by prior firms' life cycle stages. First, I analyze the target inefficient management hypothesis. Second, the acquirer agency cost of free cash flow. Third, the market (mis)valuation theory for both acquirers and targets.

2.1. Inefficient Management Hypotheses and Firm's Life Cycle

Part of the literature in M&A relies on efficient market hypothesis (Fama, 1970a), while others claim for alternative explanations, such as management hubris (Roll, 1986), and the inefficient management hypothesis (Healy et al., 1992, 1997; Palepu, 1986). On one hand, the anecdotal and less conclusive hypothesis of hubris posits that managers engage in M&A activities with overconfidence. Also, the manager would select inadequate targets, sometimes

paying high premium to win an auction, which could contribute to the "winner's curse" (Boone & Harold Mulherin, 2008; Hossain, 2021). On the other hand, Healy et al. (1992, 1997) and Palepu (1986) distinguish firm's potential to grow from existing management team.

In other words, while some firms are inefficiently conducted, efficient competitors are constantly evaluating these firms as potential targets. Under this mechanism, when these efficient managers observe signals of effective growth opportunities, they buy those resources aiming to enhance the combined firm value (synergy) (Healy et al., 1992; Palepu, 1986). So, it is plausible to expect greater likelihood for inefficiently managed firms to be acquired. Nonetheless, inefficient management itself may not signalize a good investment for acquirers. There should exist additional signals to attract the acquirer's attention.

Prior literature suggests that some of these potential signals may be interpreted under the firm's life cycle stage (Ames et al., 2020; Bhattacharya et al., 2020; Dickinson, 2011; Owen & Yawson, 2010). Firms' characteristics such as profitability, investment policies, and corporate governance dynamic to be significantly affected by the firm life cycle stage (Ahmed et al., 2021; Bhattacharya et al., 2020). For instance, firms in growth and mature stages are expected to present more quality in corporate governance issues (Al-Hadi et al., 2016a; Zhao & Xiao, 2018) and to have greater operating return, compared to firms in other stages (Dickinson, 2011).

Habib & Hasan (2017) find consistent evidence that the propensity to take managerial risk differs across the firms' life cycle stages, where risk-taking represents the uncertainty related to expected future benefits. On the one hand, firms at the stage of introduction and decline have higher levels of uncertainty, so investors imply greater discount to finance investment projects for these firms. Specifically, while introduction-stage firms require greater amount to expand, declining firms demand new efforts to return to profitability. Then, the authors show that for firms in both situations, the risk-taking is even costly and negatively

associated with future performance. On the other hand, the risk-taking decision for growth and mature firms are positively associated with future performance since firms in these stages have comparatively greater knowledge about the operation, and this expertise along with track records alleviate the overall uncertainty, remaining the intrinsic risk only.

Although one may concern that life cycle stages defines the management ability or vice-versa, I claim that life cycle stages reflect not only internal decision, but also the external environment (Dickinson, 2011). For instance, neither mature necessarily implies firms with good managerial ability nor decline stage necessarily represents a poor management. Then, if the signals are interpreted by potential acquirers, lower risky stages with inefficient management may convey a message of opportunity to acquire and run the business differently.

Intuitively, if growth and mature-stage firms are comparatively less dependent on an existing management team because the business are running at a certain pace, then it is more plausible to expect an inefficient management team to be replaced tha   n   to   expect   the overall firm to be purchased. Therefore, controlling for the target's life cycle stage may clarify the theoretical relation between target management inefficiency and the likelihood to be acquired (Healy et al., 1992, 1997; Palepu, 1986). Formally, I hypothesize that:

H1: Firms with lower management ability are more likely to be targeted when classified as growth and mature.

2.2. Agency Cost of Free Cash-Flow and Firm's Life Cycle Stage

Agency cost of free-cash-flow stems from the traditional agency theory (Jensen & Meckling, 1976) and relies on the trade-off between distributing the excess of money to investors as dividends and improving the amount of resources under management (Jensen, 1986a). More resource under management control denotes greater managers' responsibility for taking economic decision in order to add value to shareholders, including making acquisitions.

Consistent with this view, prior literature shows that firms with more cash-holdings are more likely to engage in M&A activities as bidder (Harford, 1999; Owen & Yawson, 2010).

Meanwhile, the literature in life cycle helps to distinguish the resource allocation and fundraising strategies in different ways. First, firms at the growth stage are more focused on sales growth (Jenkins & Kane, 2004; Mueller, 1972) although they are still investing in properties, plants & equipment (PPEs), R&D projects, and in innovating outputs, especially to deter entry (Dickinson, 2011; Spence, 1977). Second, mature firms generate comparatively greater cash flow from operating activities (Wernerfelt, 1984a), have greater access to long-term debt (Barclay & Smith, 1995), lower cost of capital (Almeida & Novaes, 2020; Hasan et al., 2015), more steadiness in revenue growth, and are more profitable (Dickinson, 2011). In turn, introduction and decline-stage firms are characterized for being comparatively more financially constrained, with lower cash retention, and comparatively lower profitability (Dickinson, 2011). Third, growing via acquisition is easier for firms with more access to growth capital (Barclay & Smith, 1995). Even in cash deals, firms use partial external capital to finance the deal (Fischer, 2017). Then, other things equal, greater access to funding may facilitate the decision to engage in M&A deals.

Therefore, although less financially constrained firms may face lower barriers to become a bidder, the effect of financial constraint on the likelihood to engage in M&A may be consistent with the firm life cycle stage. Then, I formalize my second hypothesis.

H2a: Financial unconstrained firms are more likely to engage in M&A activities as a bidder when classified as mature, compared to firms in other stages of life cycle.

Although growth-stage firms can also have access to growth capital to make acquisitions, I argue that these firms have lower incentives to do so. Myers (1984) explains the cost of financial distress and mentions that growth opportunity firms have more at stake when deciding to raise capital, then these firms would be comparatively less likely to borrow.

Likewise, riskier firms (e.g., introduction and decline-stage firms) face higher risk of default, which could compromise the firm-value. Therefore, under the pecking order theory, I hypothesize:

H2b: Financial unconstrained firms are less likely to engage in M&A activities as a bidder when classified as introduction, growth, and decline, compared to firms at the shake-out stage.

2.3. Market Misvaluation Theory and Life Cycle Stages

Shleifer & Vishny (2003) propose a theory predicting that M&A transactions are potentially driven by stock market misvaluation of merging firms. The main assumption is that market is partially inefficient, but managers are completely rational. Consequently, they observe the opportunities and take advantages of expressive differences between stock market valuation and fundamentals for both bidder and target firms. Empirically, the authors prove that most of the M&A deals are driven by overvaluation in bidder's market value and find negative long-run returns to bidders in stock-based acquisitions, while such returns are positive in cash-based deals.

Likewise, Rhodes–Kropf et al. (2005) agree that valuation errors significantly affect the M&A activity. The authors breakdown the fundaments behind the market-to-book ratio and find that most of the acquirer index behavior is driven by the firm specific deviation from short-run industry pricing. Moreover, the authors evidence that firms with low long-run growth opportunities ratio buy firms with high long-run growth expectation.

In this regard, I advocate that early-stage firms are expected to present more long-run growth opportunities, comparatively to firms in other stages. Furthermore, market reaction seems to be different among firm's life cycle stages. Barth et al. (2017) show that mature firms are valued for earnings, while declining firms are interpreted at liquidation values. Vorst & Yohn (2018) provide arguments and evidence that the life cycle approach improves the forecast

function, but such potentially enhanced information is inefficiently used by market investors. Moreover, prior evidence shows that while stock returns of growth and mature firms respond more significantly to analyst forecasted earnings, an opposite behavior is observed in firms classified in more risky stages (introduction and decline). For firms in the latter situation, the accounting earnings and earnings growth are more pronounced in explaining the stock returns (Dickinson et al., 2018).

Hence, while the prediction is that firms with low long-run growth opportunities buy firms with high level of growth opportunities, the argument under the life cycle approach is that mature firms have comparatively greater knowledge about the operation and make more efficient investment. Therefore, assuming that market is partially inefficient and that there are managers completely rational, firms are constantly compared to their peers. Therefore, there will be an incentive to acquire when a rational manager observes an undervaluation for an allegedly promising firm.

Considering altogether, I claim that if the assumption of market inefficiency holds, firms classified at stages with growth opportunities can be undervalued, and then they will become more vulnerable to be purchased. On the other hand, if market prices fully incorporate the fundamental differences across the life cycle stages, there will be no difference of market prices across the stages. Formally, I hypothesize:

H3a: Undervaluation is not different across firms' life cycle stages.

H3b: Undervalued firms are more likely to become target, with greater likelihood when firms are classified in stages characterized by high long-run growth opportunity.

On average, market draws the same inferences from acquisitions regardless the method of payment. Assuming no long-run profitability after merger, the only reason for a stock-based acquisition would be the undervaluation of the target firm. However, there are arguments to believe on the deal to be driven by the overvaluation of the acquirer firm (Chemmanur et al.,

2009; Shleifer & Vishny, 2003; Wiggenhorn et al., 2007). Prior evidence shows that acquisitions where the acquirer is overvalued end-up not creating but destroying value to shareholder (Fu et al., 2013).

The main concern about overvalued stocks lies on the low chance that existing projects will deliver the expected results. Regardless of whether the stock overvaluation is driven by an average discount rate considerably lower than the fair one or driven by higher expectation of future benefits, managers would have to deliver better financial performance to sustain the price (Jensen, 2005), and an acquisition is a way to postpone this promise. The primary rationale is that the acquirer firm will bust-up the target's management in order to reach the expected synergies after merger (Martin, 2016; Zollo & Singh, 2004). Nonetheless, this motivation is more plausible to be expected when acquirer present low long-run expected growth and greater ability to conduct the management integration, which fit the characteristics of mature firms. Then, under this argument, firms classified at the mature stage may have greater incentives to become bidder when their stock prices are overvalued. Arguably, the use of an overvalued stock as an integral or partial currency could create value to shareholder.

Under this perspective of postponing, introduction and decline-stage firms may also observe benefits in making acquisitions using overvalued stocks, although such an attitude is comparatively riskier (Ames et al., 2020). Firms at these stages are characterized by higher uncertainty (Mueller, 1972), lower access to funding (Blomkvist et al., 2021), and poorer corporate governance (Filatotchev et al., 2006). Then, for these firms, engaging in a M&A is an even more sensible decision with the objective to move to a necessary situation that will potentially meet the market expectation.

Collectively, assuming that bidders tend to know their real fair value, it is plausible to expect that firms at different stages have incentives to use overvalued stock prices to make acquisitions. Formally, I hypothesize:

H3c: Overvalued firms are more likely to become acquirer, with greater likelihood when acquirers are classified at mature, introduction, and decline stages.

At the same time rational acquirers evaluate potential undervalued targets, managers of overvalued firms also go to market not to acquire, but to be acquired. Primarily, this attitude can be motivated by two reasons. On one hand, the owner may be interested in selling assets of a firm in discontinuity, and this would imply a considerable discount. On the other hand, an owner may seek an acquirer for his firm motivated by recent track records, which convey an idea of growth expectation and higher economic value. Consistent with the latter, Fidrmuc & Xia (2019) recently find that CEOs have managerial motivation to sell the firm when the operating performance is at a high level, indicating growth potential. Therefore, I hypothesize:

H3d: Overvalued firms are more likely to become target when classified at growth stage.

3. Data and Variables

3.1. Sample Selection

I obtain M&A data from the SDC Platinum on deals completed between January 2000 and December 2021 involving traded US firms, according to the following criteria. I exclude observations with generic serial acquirers (namely *Creditors*, *Investor Group*, *US Dept of the Treasury*, *Bondholders*, *Shareholders*, *Public Investment Fund*, and *Undisclosed Acquiror*). Moreover, I exclude information from deals where acquirer and target have the exact CUSIP-6 number, and serial acquirers (with 4 or more acquisition in a single year), following Laamanen & Keil (2008). Serial acquisitions respond to a distinct growth strategy, with mutually interrelated acquisition, where the specific drivers are confounded (Fuller et al., 2002). For firms that acquired more than once, I keep the most relevant event, considering the deal value. I collect financial information from Compustat for acquirer and target firms, requiring bidders to hold less than 50% of the target's share before the announcement and more than 50% after the completion.

Table I.1 summarizes the M&A database selection process:

Table I.1
Sample Selection – M&A Dataset

M&A Data Selection Criteria	Number of deals
M&A deals concluded between 2000 and 2021	12,639
Exclude generic and governmental acquirers	-1,380
Exclude deals without deal value information on SDC Platinum	-1,433
Percent of shares sought ≥ 50	-3,629
Exclude deals where acquirer and target have the exact CUSIP number	-57
Exclude deals of serial acquirers (≥4 deals in a single year)	-58
Exclude non-top deals for multiple acquisitions in the same year	-500
Exclude repeated deal information	-2
Final Sample (Gross)	5,580

I merge the database of deals with Compustat overall dataset using CUSIP6, resulting in 2,404 deals and a total sample of 216,707 firm-year observations, excluding firms without SIC industry information and without information required to calculate the interesting variables. Following Owen & Yawson (2010), I also exclude financial (SIC codes 6000-6999) and utility (SIC codes 4900-4999) firms from the sample. Financial services and utilities firms are usually dropped from general accounting research because their business specificity is not equally captured by accounting financial reports. Following the same studies, I also drop firms with negative book value of equity to mitigate the chance to consider a positive return on equity that comes from negative income and negative book value. This screening process results in 1,672 deals and 159,290 firm-year observations.

3.1. Variables

Before implying the main measure of firm's life cycle, I follow the same approach used in Owen & Yawson (2010) by using the retained earnings relative to size, measured at the fiscal year prior to the announcement, as a proxy for life cycle. According to the authors, this is a proxy for "available internal funds that could be used for investment". The quartiles of this variable is used to classify the firms into the following stages: young (q1), mature (q2 and q3) and old (q4) firms, following Miller & Friesen (1984).

Subsequently, I follow recent studies (Bhattacharya et al., 2020; Dickinson et al., 2018; Habib & Hasan, 2017; Shahzad et al., 2020; Vorst & Yohn, 2018) to use the five-stage model supported by Dickinson (2011). I understand that this enables a properly comparison of the results and consequently a more effective contribution to the literature.

Recent literature uses a parsimonious model that exclusively relies on Cash Flows Statement, which is a mandatory financial report for US firms since 1989. According to this model, a firm is classified into five stages (*introduction, growth, mature, shake-out, and decline),* fitting eight possible combinations among cash flow from operating, investing, and financing activities, as presented in Panel I.1.

Panel I.1
Combination of cash flow signals

Cash Flow	Intro	Growth	Mature	Shake-out		Decline	
From **Operating** Activities	-	+	+	-	+	+	-	-
From **Investing** Activities	-	-	-	-	+	+	+	+
From **Financing** Activities	+	+	-	-	+	-	+	-

Source: Dickinson (2010, p. 9)

The Five-stage model outperforms others, i.e., DeAngelo et al. (2006) and Miller & Friesen (1984), due to less discretion imposed by the researcher and is also consistently uncorrelated with the firm age, which is also presented in an outdated models, such as Anthony & Ramesh (1992) and Yan (2006). In addition, a growing stream of research have been using the Five-stage model (Al-Hadi et al., 2016; Ames et al., 2020; Dickinson et al., 2018; Habib & Hasan, 2017; Hasan et al., 2015).

In addition, I propose a step forward by exploring the effects of different patterns of firm life cycle stage dynamic. The five-stage model is characterized by capturing a non-linear progression, which means that a firm can move from introduction to mature or the opposite. Then, I explore the persistence in each stage for two or more periods in order to capture firms that "reside" in a stage for a long period. Moreover, I also explore the following dynamic

transitions: *positive change* means a movement from any stage to growth and/or mature stages, and the *negative change* captures the opposite movement.

Panel I.2 illustrates the 4 changes per stage, totaling 20 possible changes [(5-1) *5].

Panel I.2
Life cycle stage possible transitions

t1→ t2	Introduction	Growth	Mature	Shake-Out	Decline
Introduction	→	↑	↑	↓	↓
Growth	↓	→	↑	↓	↓
Mature	↓	↑	→	↓	↓
Shake-Out	↑	↑	↑	→	↓
Decline	↑	↑	↑	↑	→

The continuous (persistence), up (positive), and down (negative) arrows convey the dynamic year over year, which signalizes changes (or persistence) in structure, focus, and/or corporate environment, since the firms have incentives to attempt to achieve (and stay) around growth and mature stages (Dickinson, 2011; Jenkins & Kane, 2004; Mueller, 1972).

Since this dynamic approach is new in the accounting literature, there are no arguments enough to formulate any hypothesis for positive or negative change. However, I use the notion of persistence as a robust investigation of a firm's life cycle stage. Recently, Bhattacharya et al. (2020) explore the notion of a transition effect of this five-stage model, and find that when the firms transit from growth to mature (and the opposite movement), there are different levels on the propensity to pay dividends compared to other firms at the same stage. Despite the different focus, this study is the first one to document this transition effect on investment decisions such as M&A.

I notice that my research proposes a broader analysis, considering a different corporate decision under three different theoretical perspective. Hence, the analysis of transitions is still a matter of data exploration so I can observe patterns of firms' structure of bidder and targets about to engage in the M&A activity.

4. Research Design and Main Results

4.1. Research Design

To examine the hypotheses of life cycle stages' influence on the likelihood to engage in an M&A deal, I follow the recent literature in accounting (DeHaan, 2021; Donelson et al., 2022; Imperatore et al., 2021), to use a feasible and computationally efficient estimator of a linear model with correction with multiple level of fixed effects (year and industry) and missing control variables. In this estimation, for every level g of every fixed effect f, the mean of the residuals must be zero (Correia, 2016). In this case, the Multiway Fixed Effects (MWFE) ameliorates the traditional Linear Probability Model (LPM), which, in my sample, is superior to the probabilistic models such as *logit* and *probit*, because of the large number of dummies (and interactions) used as regressors. This estimator generates statistics robust to heteroskedasticity, also clustering the errors by firm (Correia, 2016).

Although one can criticize the LPM due to the assumption of constant linear relation, Woodridge, (2002, p.455) implies that the estimation of conditional probabilities ($P(y = 1 \mid X)$) often result in "good partial effects on the response probability near the center of the distribution". He also adds that "If the main purpose is to estimate the partial effect of x_j on the response probability, averaged across the distribution of X, then the fact that some predicted values are outside the unit interval may not be very important" (p. 455).

In the context of linear regression with fixed effects, including interactions between variables can help to address concerns about the constant slope assumption, as it allows for the relationship between the dependent variable and the explanatory variables to vary across different groups defined by multiple fixed effects (Angrist & Pischke, 2008).

Moreover, the interpretation of coefficients is in probability terms. For metric variables, a one-unit increase in X is associated with a "percentage point increase" in the probability that the dependent variable (dummy) equals one. For Bernoulli distribution (dummy), the interpretation is on the difference in the probability of success (y=1) when the dummy equals 1 and when it equals 0, *ceteris paribus* (Woodridge, 2002). In this research, the focus lies on the

interaction effect, where three traditional M&A drivers are segregated into the firm's life cycle stages before the deal, one driver at a time.

In sum, for all models, I use the same dependent variable: an indicator that assumes 1 if the firm engaged in a M&A, and zero otherwise ($P(d_{deal_{it}} = 1)$). However, I capture this information one year prior to the deal announcement.

In order to address some concerns about the life cycle measure, I test a less robust and outdated measure of life cycle to reveal the limitations of this alternative. Then, before proposing the main estimations, I replicate the Owen & Yawson (2010)'s model by using the retained earnings scaled by total assets (RE/TA) as a proxy for life cycle as well as all the control variables used in the mentioned study (Equation I.1). Moreover, all explanatory variables are considered in the $t-1$ since the decision to engage in M&A usually is taken after a long period of analysis (Wangerin, 2019). By doing so, I increase the chance to capture the company setting at the right decision moment.

$$P(d\_deal_{it} = 1 \mid X) = \beta_0 + \beta_1 RE/TA_{it-1} + \beta_2 ROA_{it-1} + \beta_3 GroSales_{it-1} + \beta_4 MTB_{it-1} +$$

$$\beta_5 FCF_{it-1} + \beta_6 Leverage_{it-1} + \beta_6 Liquidity_{it-1} + \beta_7 FirmSize_{it-1} + \beta_8 IGRO_{it-1} + \quad \text{(I.1)}$$

$$\beta_9 ISHK_{it-1} + \alpha_{ind} + \delta_{year} + \varepsilon_{it}$$

RE/TA is retained earnings scaled by total assets, ROA (Return on assets) is the profitability of the firm's asset. $GroSales$ is the relative growth in sales from t-1 to t. MTB is the market-to-book ratio that represents the growth opportunities according to market participants. FCF is the free-cash flow, calculated by subtracting the capex from the operating cash flow. $Leverage$ means the level of external capital dependency. $Liquidity$ is the relative size of cash and short-term investments. $FirmSize$ is the log of total asset. $IGRO$ is the industry sales growth using previous five years. $ISHK$ is the industry sales shock, calculated as the

absolute difference between an industry's 5-year growth rate in sales and the average 5-year growth rate in sales across all industries. All variables are detailed in Appendix I-A.

Next, I include the dummies of life cycle stages still according to Owen & Yawson (2010), classifying firms as "Young", "Mature", and "Old", using the quartile of retained earnings scaled by total assets. In order to compare the measures of life cycle, I introduce the five-stage model. I argue that all variables described as drivers of M&A in previous model are consistently different across life cycle stages. Then, a simple switch of measure would create a theoretical multicollinearity. Therefore, to examine the effect of the theoretical drivers of M&A controlled by the firm life cycle, I first restrict the data sample to firms classified in each life cycle stage prior to the acquisition.

After comparing the proxies of firm's life cycle, I offer an adequate design to examine the theoretical drivers of management efficiency controlled by firm's life cycle stages (Hypothesis 1), by employing the Equation I.2.

$$P(d\_deal_{it} = 1 \mid \boldsymbol{X}) = \beta_0 + \beta_1 Tgt.Inefficient_{it} + \beta_j \sum_2^5 Tgt.LCS_{it} +$$

$$\beta_k \sum_6^{10}\big(Tgt.Inefficient_{it} * Tgt.LCS_{it}\big) + \beta_l \sum Controls_{it} + \alpha_{ind} + \delta_{year} + \varepsilon_{it}$$

(I.2)

$Tgt.Inefficient$ is an indicator that assumes one if the target managerial ability measure is below the percentile 33.3 of its industry. I use the Management Ability measure of Demerjian et al. (2012), which is a residual from a firm efficiency function, using Sales as outputs and Net PPE, Net Operating Leases, Net R&D, Purchased Goodwill, and Other Intangibles as inputs. The authors argue that these inputs capture the management choices to generate revenue. Data Envelopment Analysis (DEA) is proceeded by industry since firms in the same industry are expected to present same technologies and same business structures. Managerial ability is a component of the overall firm efficiency measure. Specifically, the authors regress firm size, firm market-share, cash availability, life cycle (firm age), operational complexity, and foreign operation on firm efficiency. $Tgt.LCS_{it}$ represents a set of dummies

for the target life cycle stages. The interaction of these variables (β_k) allows to test whether firms with lower management efficiency are more likely to be targeted when targets are not in stages that represent lower management risk.

To examine the free-cash flow perspective controlled by firm's life cycle on the likelihood to engage in M&A as acquirer (Hypothesis 2), I imply the Equation I.3.

$$P\left(d_{deal_{it}}\right) = 1 \mid X) = \beta_0 + \beta_1 FCF_{it} + \beta_K \sum_2^5 Acq.LCS_{it} + \beta_l \sum_6^9\left(FCF_{it} * Acq.LCS_{it}\right) +$$
$$\beta_j Controls_{it} + \alpha_{ind} + \delta_{year} + \varepsilon_{it} \tag{I.3}$$

FCF is the free-cash flow, calculated by subtracting the CAPEX from the operating cash flow. β_K captures the interaction of FCF with Acquirer firm's life cycle stages, and this enables to test the hypothesis that financial unconstrained firms are more likely to engage in M&A activities as a bidder when classified as mature, compared to firms in other stages of life cycle (H_{2a}) and that financial unconstrained firms are less likely to engage in M&A activities as a bidder when classified as introduction, growth, and decline, compared to firms at the shake-out stage (H_{2b}).

Subsequently, I use the same econometric approach to test the null hypothesis that over and undervaluation are not different across firms' life cycle stages (H_{3a}). After rejecting the null, I finally examine the misvaluation perspective controlled by firm's life cycle on the likelihood to engage as bidder and as target in M&A deals (Hypotheses $H_{3b}, H_{3b}, and\ H_{3b}$), using the equation I.4.

$$P(d\_deal_{it} = 1 \mid X) = \beta_0 + \beta_1 Tgt.Undervalued_{it} + \beta_k \sum_2^5 Tgt.LCS_{it} +$$
$$\beta_l \sum_6^{10}\left(Tgt.Undervalued_{it} * Tgt.LCS_{it}\right) + \beta_{11} Overvalued_{it} + \beta_l \sum_{12}^{15}\left(Tgt.Undervalued_{it} * \right. \tag{I.4}$$
$$\left. Tgt.LCS_{it}\right) + \beta_j Controls_{it} + \alpha_{ind} + \delta_{year} + \varepsilon_{it}$$

$Tgt.Undervalued_{it}$ is an indicator that assumes one when the target firm's Economic Value-to-Sales (EVS) is below the percentile 33.3 of its respective industry average (Eaton et

al., 2021; Imperatore et al., 2021). Under the acquirer's perspective, the indicator $Overvalued_{it}$ assumes one if acquirer EVS is above the percentile 66.6 of its industry average.

4.2. Descriptive Results

Table I.2 shows the descriptive statistics. Panel A reports the full sample, Panel B and C show the descriptive statistics for firms that engaged in M&A activity and firms that did not, respectively. To alleviate concerns about outliers' effect, all metric variables are winsorized at 1% and 99%, following related studies (Ames et al., 2020; Eaton et al., 2021; Imperatore et al., 2021).

Table I.2
Descriptive Statistics
This table shows the descriptive statistics segregated into full sample (panel A), firms that do not engaged in M&A activity (panel B), and firms that do engaged in M&A (Panel C) where all metric variables are winsorized at 1% and 99%.

Variables	N	Mean	SD	Min	p25	p50	p75	Max
Panel A:	*Full Sample*							
RE/TA	129,883	0.79	0.62	0.00	0.26	0.69	1.23	1.93
ROA	114,803	-0.11	0.30	-0.93	-0.17	0.01	0.07	0.14
GroSales	102,192	0.10	0.26	-0.29	-0.06	0.07	0.23	0.63
MTB	109,341	182.81	239.54	-22.93	18.35	71.00	240.96	731.61
FCF	128,953	-0.09	0.23	-0.67	-0.15	0.00	0.07	0.12
Leverage	129,998	0.17	0.19	0.00	0.00	0.11	0.30	0.58
Liquidity	130,451	0.22	0.23	0.01	0.03	0.12	0.35	0.70
Firm Size	130,673	5.18	2.76	-6.91	3.40	5.22	7.06	13.68
IGOR	71,836	0.10	4.59	-0.99	-0.18	0.00	0.21	1046.84
ISHK	71,787	0.38	12.00	0.00	0.09	0.19	0.37	2762.06
Panel B:	*d_deal == 0*							
RE/TA	128,479	0.80	0.63	0.00	0.26	0.69	1.24	1.93
ROA	113,518	-0.12	0.30	-0.93	-0.17	0.01	0.07	0.14
GroSales	100,915	0.10	0.26	-0.29	-0.06	0.06	0.23	0.63
MTB	108,068	180.75	238.20	-22.93	18.06	69.83	236.96	731.61
FCF	127,561	-0.09	0.23	-0.67	-0.15	0.00	0.06	0.12
Leverage	128,607	0.17	0.19	0.00	0.00	0.11	0.30	0.58
Liquidity	129,050	0.22	0.23	0.01	0.03	0.12	0.35	0.70
FirmSize	129,269	5.15	2.75	-6.91	3.38	5.19	7.02	13.68
IGOR	70,961	0.10	4.61	-0.99	-0.18	0.00	0.21	1046.84
ISHK	70,913	0.38	12.07	0.00	0.09	0.19	0.37	2762.06

Panel C:	d_deal == 1						
RE/TA	1,404	0.70	0.44	0.00	0.38	0.61	0.91	1.93
ROA	1,285	-0.02	0.21	-0.93	-0.02	0.05	0.09	0.14
GroSales	1,277	0.20	0.24	-0.29	0.04	0.15	0.34	0.63
MTB	1,273	356.89	285.30	-22.93	93.34	258.45	731.61	731.61
FCF	1,392	0.02	0.12	-0.67	0.00	0.04	0.08	0.12
Leverage	1,391	0.24	0.17	0.00	0.09	0.22	0.36	0.58
Liquidity	1,401	0.15	0.15	0.01	0.04	0.09	0.21	0.70
FirmSize	1,404	8.05	2.08	0.19	6.58	8.07	9.60	13.39
IGOR	875	0.05	0.38	-0.80	-0.18	-0.01	0.23	3.50
ISHK	874	0.30	0.68	0.00	0.09	0.21	0.38	18.41

I observe that acquirers present a mean (median) of ROA of -2% (5%) against -12% (1%) for non-acquirers. Likewise, the mean (median) of free-cash flow is -0.09 (0.000) against 0.02 (0.04) for the group of acquirers. To further analyze such differences, Table I.3 shows the difference means (t-test) and median (Wilcoxon) tests between groups of firms that engage in M&A (d_deal==1) and firms that did not (d_deal==0).

Table I.3
Difference means and medians tests.

Variables	d_deal == 0		d_deal == 1		Diff in Means	Diff in Medians
	Mean	Median	Mean	Median		
	(1)	(2)	(3)	(4)	(1) – (3)	(2) – (4)
RE/TA	0.79	0.69	0.79	0.61	0.00	0.08**
ROA	-0.12	0.01	-0.02	0.05	-0.12***	-0.04***
GroSales	0.10	0.06	0.13	0.15	-0.02**	-0.09***
MTB	180.75	69.83	356.89	258.45	-181.06***	-188.62***
FCF	-0.08	0.00	0.02	0.04	-0.11***	-0.04***
Leverage	0.17	0.11	0.24	0.22	-0.03***	-0.12***
Liquidity	0.22	0.12	0.15	0.09	0.02***	0.03
Firm Size	5.15	5.19	8.05	8.07	-2.60***	-2.87***
IGRO	0.1	0	0.05	-0.01	0.03	0.01**
ISHK	0.38	0.19	0.3	0.21	0.01	-0.01

Using univariate tests, I show that acquirers have greater ROA, FCF, and lower retained earnings when compared to non-acquirers. Other fundamentals are significantly different when comparing pairs of acquirer and non-acquirer firms, except for liquidity and industry shock,

where I find no differences between groups for median values. Though, these univariate results are preliminary since there are no control variables. Next, Table I.4 presents the Spearman correlation matrix to analyze possible linear relations among control. However, to rule out a concern of multicollinearity, I analyze the Vector of Inflation Variance (VIF) after the main regression models.

Table I.4 shows the frequencies of acquirers and targets across the life cycle stages.

Table I.4
Correlation Matrix
This table shows the Spearman correlation coefficients for the control variables. All metric variables are winsorized at 1% and 99%. *** $p<0.01$, ** $p<0.05$, * $p<0.10$

VARIABLES	RE/TA	ROA	GroSales	MTB	FCF	Leverage	Liquidity	FirmSize	IGRO	ISHK
RE/TA	1									
ROA	0.318***	1								
GroSales	-0.0315***	0.0115***	1							
MTB	-0.137***	0.0440***	0.0974***	1						
FCF	0.363***	0.793***	-0.0162***	0.0433***	1					
Leverage	0.0813***	0.0584***	-0.0499***	0.0140***	0.0896***	1				
Liquidity	-0.293***	-0.331***	0.0670***	0.0829***	-0.328***	-0.358***	1			
FirmSize	0.116***	0.604***	0.0122***	0.329***	0.615***	0.262***	-0.300***	1		
IGRO	-0.00188	0.0292***	-0.0344***	0.0399***	0.0279***	0.0357***	-0.0123***	0.0748***	1	
ISHK	-0.0110***	0.0470***	-0.0106***	0.0211***	0.0250***	-0.0175***	-0.0368***	0.0269***	0.331***	1

Table I.5
Descriptive Statistics for Acquirer and Target Life Cycle Stages – Cross Analysis

Target LCS	Acquirer Life Cycle Stages					Total
	Introduction	Growth	Mature	Shake-Out	Decline	
Panel A: Frequency						
No Info Available	50	186	149	37	41	463
Target Introduction	29	71	78	19	29	226
Target Growth	15	150	98	27	6	296
Target Mature	21	218	130	23	6	398
Target Shake-Out	15	57	41	16	8	137
Target Decline	25	38	40	22	25	150
Total	155	720	536	144	115	1670
Panel B: Relative to total						
No Info Available	3%	11%	9%	2%	2%	28%
Target Introduction	2%	4%	5%	1%	2%	14%
Target Growth	1%	9%	6%	2%	0%	18%
Target Mature	1%	13%	8%	1%	0%	24%
Target Shake-Out	1%	3%	2%	1%	0%	8%
Target Decline	1%	2%	2%	1%	1%	9%
Total	9%	43%	32%	9%	7%	100%

My design requires working with acquirers' and targets' perspective separately to properly test the hypotheses. However, to further describe the engaged firms, I merge the data in order to show the combination of acquirer's and target's life cycle stages. So, under the acquirer's perspective, I keep target firms with no information about Cash Flows Statement, I separate a group termed "No Info Available", which represents 28% of the acquisitions.

While acquirers are concentrated at the growth and mature stages (43% and 32%, respectively), targets are less concentrated in a single stage. The greater incidence is mature, followed by growth, and introduction. However, since some hypotheses require the use of a target's perspective database, I also analyze separately the incidence of deals across life cycle stages for acquirer and target. Figure I.1 shows this distribution across the stages.

Figure I.1
Targets and Acquirers Life Cycle Stages (in difference basis)
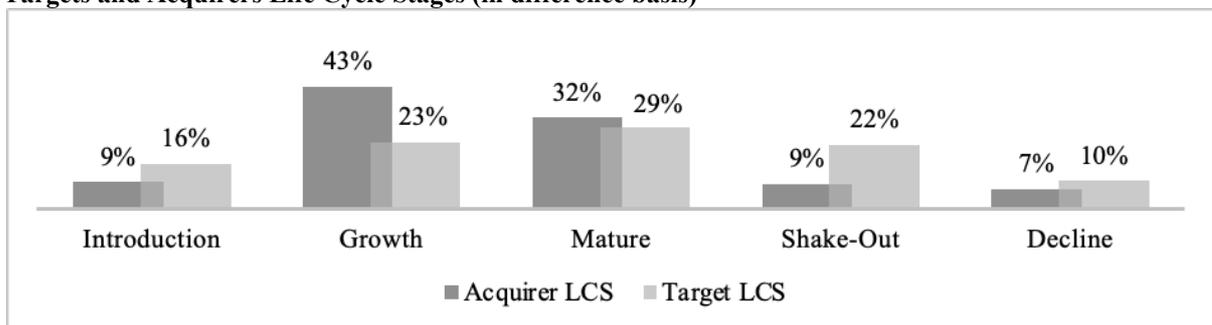
I observe a greater incidence of deals where targets are classified in the shake-out stage (22%). Collectively, this descriptive analysis shows that firms in all life cycle stages engage in M&A deal activity both as acquirer as target. Subsequently, I test whether they engage motivated by different reasons.

4.3. Linear Regressions

Before start testing the proposed hypotheses, I replicate the estimation as reported in Owen & Yawson (2010) by using the retained earnings, scaled by total assets, as a proxy for life cycle stages. Table I.5 presents the results.

Table I.5
The impact of life cycle on M&A engagement
This table presents the results from examining the impact of target firm's life cycle stage on the likelihood to engage in M&A. The sample consists of US deals concluded between 2000 and 2021, merged with Compustat overall financial dataset. A constant term is included in all regressions, but not reported. All variables are defined in Appendix A. The t-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES	Dep. Var.: d_deal				Dep. Var.: d_deal (in restricted samples of firm's life cycle stages)							
	3-Stage Model (Miller & Friesen, 1984)				3-Stage Model (Miller & Friesen, 1984)			5-Stage Model (Dickinson 2011)				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	OY_2010	MF_1984	MF_1984	MF_1984	Young_MF	Mature_MF	Old_MF	Intro	Growth	Mature	Shake	Decline
Young_MF		-0.005***										
		(-2.715)										
Mature_MF			0.004***									
			(3.355)									
Old_MF				-0.006**								
				(-2.561)								
RE/TA	0.001	-0.001	0.002*	0.004**	0.013***	0.012***	0.005***	-0.002	0.007**	0.001	-0.000	-0.002
	(0.466)	(-0.710)	(1.815)	(2.183)	(4.000)	(4.068)	(3.049)	(-1.419)	(2.021)	(0.349)	(-0.035)	(-1.153)
ROA	-0.006**	-0.007**	-0.007**	-0.006**	-0.007	-0.006	-0.011***	-0.001	-0.022	-0.004	0.009	-0.005
	(-2.008)	(-2.220)	(-2.249)	(-2.121)	(-1.061)	(-1.160)	(-2.657)	(-0.371)	(-1.625)	(-0.512)	(1.038)	(-0.618)
GroSales	0.004**	0.004*	0.004*	0.004**	0.002	0.005	0.004	0.004	-0.001	0.005	0.001	0.008*
	(2.052)	(1.867)	(1.849)	(1.963)	(0.540)	(1.607)	(1.357)	(1.444)	(-0.207)	(1.097)	(0.163)	(1.866)
MTB	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000	0.000***	0.000***	0.000***	0.000
	(7.219)	(7.195)	(7.200)	(7.222)	(2.816)	(5.345)	(2.728)	(0.251)	(3.794)	(5.045)	(3.864)	(1.557)
FCF	0.007*	0.005	0.005	0.006	0.012*	0.005	0.001	-0.004	0.069***	0.008	0.001	0.007
	(1.823)	(1.482)	(1.418)	(1.618)	(1.692)	(0.752)	(0.339)	(-1.054)	(5.167)	(0.867)	(0.129)	(0.843)
Leverage	0.002	0.001	0.001	0.001	0.000	-0.003	0.002	0.005	0.013	-0.004	0.000	-0.008
	(0.432)	(0.305)	(0.308)	(0.392)	(0.001)	(-0.455)	(0.479)	(1.057)	(1.134)	(-0.785)	(0.018)	(-1.641)
Liquidity	0.004	0.004	0.004	0.004	-0.003	0.008	0.004	-0.001	0.012	0.013**	0.013	0.004
	(1.102)	(1.232)	(1.263)	(1.189)	(-0.410)	(1.641)	(1.179)	(-0.190)	(1.202)	(2.166)	(1.619)	(0.675)
Firm_Size	0.005***	0.005***	0.005***	0.005***	0.005***	0.008***	0.003***	0.004***	0.011***	0.006***	0.003***	0.002***
	(13.510)	(13.450)	(13.460)	(13.497)	(5.847)	(11.114)	(6.928)	(5.556)	(10.137)	(7.993)	(4.134)	(3.828)
IGRO	-0.001	-0.001	-0.001	-0.001	0.002	-0.005	0.003	0.000	0.005	-0.008**	0.010	0.006
	(-0.329)	(-0.337)	(-0.332)	(-0.325)	(0.362)	(-1.183)	(1.080)	(0.083)	(0.772)	(-2.271)	(1.539)	(0.912)
ISHK	0.004	0.004	0.004	0.004	0.005	0.005	-0.000	-0.006	0.010	0.007	-0.005	-0.000
	(1.047)	(1.031)	(1.027)	(1.037)	(0.635)	(0.917)	(-0.113)	(-1.038)	(1.012)	(1.340)	(-0.472)	(-0.034)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	55,290	55,290	55,290	55,290	7,065	31,633	16,430	8,520	13,406	22,397	5,589	5,377
Adjusted R-squared	2.0%	2.1%	2.1%	2.1%	2.2%	2.3%	0.8%	0.9%	3.4%	2.6%	1.8%	0.5%

Unlike Owen & Yawson (2010), I find no evidence of significance for retained earnings prior to acquisition on the propensity to engage in M&A as bidder in the first model (column 1). Though, I find the retained earnings to significantly affect the propensity to engage only when I control for each proxy of life cycle separately. According to this approach, mature firms have more propensity to become bidder, while "young" and "old" are less likely to make acquisitions on average. Moreover, I use the same measure of classification into firm life cycle stages to restrict the sample. In these tests (columns 5, 6, and 7), I find shifting results, where retained earnings significantly explain the participation in an M&A when the acquirer is classified as a "young" firm.

In columns 8-12, I show the M&A drivers' effect when analyzing the groups of acquirers in each life cycle stage prior to acquisition using the five-stage metric of life cycle stages. Comparing them with the results using the three-stage model, I notice different significance for Growth in Sales (GroSales), market-to-book (MTB), Free-cash Flow (FCF), and Liquidity. In sum, the five-stage model allows a superior analysis of firm life cycle by promoting a clearer distinction of firms concerning their financial structure. These results convey an information that prior evidence on literature is not sufficient to address the question of why firms in different life cycle stages engage in M&A. Then, to examine the first theoretical mechanism, Table I.6 shows the results for the hypothesis H_1 that firms with lower management ability are more likely to be targeted when classified as growth and mature.

Table I.6
The impact of target firm's inefficiency on M&A engagement, controlled by life cycle.

This table presents the results from examining the impact of target firm's management inefficiency on the likelihood to engage in M&A, controlled by firm's life cycle. The sample consists of US deals concluded between 2000 and 2021, merged with Compustat overall financial dataset. A constant term and all control variables are included in all regressions, but not reported. All variables are defined in Appendix A. The t-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

			Dep. Var: d_Deal	
VARIABLES	(1)	(2)	(3)	(4)
	Naïve	LCS	LC Persist 2y	LC Persist 3y
Tgt_Inefficient	**-0.002***	-0.000	-0.003	-0.003
	(-1.689)	(-0.060)	(-1.441)	(-1.522)
Tgt_Introduction		0.002	-0.000	0.000
		(0.627)	(-0.049)	(0.053)
Tgt_Growth		0.002	-0.001	-0.004
		(0.826)	(-0.409)	(-1.371)
Tgt_Mature		-0.001	**-0.006***	**-0.010***
		(-0.212)	(-3.328)	(-5.162)
Tgt_Shake-out			-0.001	-0.006
			(-0.291)	(-1.112)
Tgt_Decline		0.000	**-0.007**	-0.005
		(0.117)	(-2.487)	(-1.339)
Tgt_Inefficient * Tgt_Life Cycle Stages				
Tgt_Introduction		-0.005	-0.002	-0.005
		(-0.867)	(-0.351)	(-0.854)
Tgt_Growth		-0.003	-0.001	-0.003
		(-0.653)	(-0.237)	(-0.563)
Tgt_Mature		0.000	0.002	0.002
		(0.040)	(0.657)	(0.680)
Tgt_Shake-out			-0.002	0.011
			(-0.192)	(0.585)
Tgt_Decline		-0.006	0.003	-0.004
		(-1.106)	(0.469)	(-0.381)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	69,491	69,491	69,491	69,491
Adjusted R-squared	1%	1%	1%	1%

The first estimation has a F-stat of 34.11 (significant at 1%), which evidences a valid model to explain the dependent variable variation. On average, I find that lower efficiency is negatively associated (-0.002*) with the overall likelihood to be a target, at 10% of statistical significance. In addition, I find that firms that reside in the mature stages (for 2 or more years) are less likely to be targeted, regardless the management efficiency. This is consistent with the idea that mature firms have greater knowledge about its industry, greater profitability (Dickinson, 2011; Quinn & Cameron, 1983), but lower growth opportunities when compared to growing firms, for example. In addition, the control for life cycle stages seems to override the management inefficiency effect and does not help to disentangle the relation between inefficient management and the engagement as target. Therefore, I fail to validate the Hypothesis 1.

Table I.7 shows the results for the hypothesis 2 of growth capital where financial unconstrained firms are more likely to engage in M&A activities as bidder when classified as mature, compared to firms in other stages of life cycle (H2).

Table I.7
The impact of acquirer's free cash flow on M&A, controlled by life cycle.

This table presents the results from examining the impact of acquirer firm's excess of free-cash flow on the likelihood to engage in M&A, controlled by firm's life cycle. The sample consists of US deals concluded between 2000 and 2021, merged with Compustat overall financial dataset. A constant term is included in all regressions, but not reported. All variables are defined in Appendix A. The t-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES	Dep. Var: d_Deal			
	(1)	(2)	(3)	(4)
	Naïve	LCS	LC_Persist_2y	LC_Persist_3y
FCF	0.004	0.022**	0.004	0.004
	(1.136)	(2.353)	(0.876)	(0.925)
Acq_Introduction		-0.006**	-0.008***	-0.008**
		(-2.386)	(-3.269)	(-2.439)
Acq_Growth		-0.002	-0.000	-0.002
		(-0.729)	(-0.209)	(-0.674)
Acq_Mature		-0.008***	-0.008***	-0.004*
		(-3.784)	(-4.614)	(-1.864)
Acq_Shake-out			0.002	-0.002
			(0.501)	(-0.304)
Acq_Decline		-0.004	-0.008**	-0.010***
		(-1.265)	(-2.373)	(-3.073)
FCF * Acq Life Cycle Stages				
Acq_Introduction		-0.038***	-0.022***	-0.020***
		(-3.783)	(-3.609)	(-2.736)
Acq_Growth		0.011	0.025	0.032
		(0.705)	(1.252)	(1.380)
Acq_Mature		0.085***	0.114***	0.076**
		(4.313)	(4.379)	(2.222)
Acq_Shake-out			0.043**	-0.016
			(2.100)	(-0.901)
Acq_Decline		-0.040***	-0.029***	-0.033***
		(-3.790)	(-4.035)	(-3.912)
Control Variables	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	54,523	54,523	54,523	54,523
Adjusted R-squared	2%	2%	2%	2%

As predicted, the results evidence that the greater is the access to growth capital the greater is the likelihood for a firm to become a bidder (0.022***). Moreover, confirming the H_2, I find evidence that mature firms use this advantage to go to market to make acquisitions (0.085***), different from firms in other stages. This result is even robust when I analyze the

persistence in 2 or more years as a mature firm. Meanwhile, I provide evidence that firms at introduction and decline stages are less likely to engage as acquirer the higher is their free-cash flow, comparatively to firms at shake-out stage. This is consistent with the idea that introducing firms are more prone to invest in organic growth, while decline stage firms tend to use free-cash flow to recover via strategies other than making acquisitions under this scenario. Therefore, I show that acquisitions made by introducing and declining firms are driven by factors other than access to growth capital.

Next, in untabulated results, I reject the hypothesis H_{3a} that undervaluation is not different across the firm's life cycle stages. I find consistent results that introduction, growth, mature, and decline are less likely to be undervalued, comparative to shake-out stage firms (omitted dummy). This is consistent with the idea that shake-out firms are trying to reestablish and to find their way to grow, which configures an enhanced uncertainty level that is priced. I also find the transition from growth and mature to other stages increasing the likelihood to be undervalued (Table I.11 in Appendix I.A).

Afterwards, Table I.8 shows the results for the misvaluation perspective, where there are different incentives for under and overvalued firms to engage in M&A (*H3b-d*).

Table I.8
The impact of target's misvaluation on M&A, controlled by life cycle.

This table presents the results from examining the impact of target firm's misvaluation (under and overvaluation) on the likelihood to engage in M&A, controlled by firm's life cycle. The sample consists of US deals concluded between 2000 and 2021, merged with Compustat overall financial dataset. A constant term is included in all regressions, but not reported. All variables are defined in Appendix A. The t-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

	Dep. Var: d_Deal			
VARIABLES	(1)	(2)	(3)	(4)
	Naïve	LCS	LC Persist 2y	LC Persist 3y
Tgt_Undervalued	0.006***	0.002	0.006***	0.006***
	(3.876)	(0.521)	(3.193)	(3.408)
Tgt_Overvalued	-0.004***	-0.011***	-0.006***	-0.003*
	(-2.725)	(-2.669)	(-3.114)	(-1.893)
Tgt_Introduction		-0.002	0.000	0.000
		(-0.375)	(0.102)	(0.099)
Tgt_Growth		-0.003	-0.003	-0.007*
		(-0.747)	(-1.064)	(-1.804)

Tgt_Mature		-0.003	**-0.005****	**-0.006****
		(-0.809)	(-1.995)	(-2.390)
Tgt_Shake-out			-0.004	-0.005
			(-0.632)	(-0.640)
Tgt_Decline		-0.004	**-0.007***	-0.003
		(-1.019)	(-1.741)	(-0.392)
Tgt_Undervalued * Life Cycle Stages				
Tgt_Introduction		0.000	-0.006	-0.004
		(0.043)	(-1.060)	(-0.475)
Tgt_Growth		0.004	-0.002	0.005
		(0.821)	(-0.458)	(0.704)
Tgt_Mature		0.004	-0.001	-0.003
		(0.832)	(-0.365)	(-0.651)
Tgt_Shake-out			0.003	0.010
			(0.383)	(0.635)
Tgt_Decline		0.007	-0.000	-0.007
		(1.143)	(-0.061)	(-0.660)
Tgt_Overvalued * Life Cycle Stages				
Tgt_Introduction		**0.010***	0.004	-0.001
		(1.868)	(0.798)	(-0.107)
Tgt_Growth		**0.012****	**0.011****	0.005
		(2.393)	(2.289)	(0.874)
Tgt_Mature		0.005	0.001	-0.006
		(1.013)	(0.263)	(-1.645)
Tgt_Shake-out			0.003	-0.007
			(0.346)	(-0.719)
Tgt_Decline		0.005	0.004	-0.004
		(0.973)	(0.686)	(-0.537)
Control Variables	*Yes*	*Yes*	*Yes*	*Yes*
Year FE	*Yes*	*Yes*	*Yes*	*Yes*
Industry FE	*Yes*	*Yes*	*Yes*	*Yes*
Observations	*69,491*	*69,491*	*69,491*	*69,491*
Adjusted R-square	*1%*	*1%*	*1%*	*1%*

I show an overall positive (negative) effect of undervaluation (overvaluation) on the propensity to be purchased. On the one hand, I fail to find effect for undervalued firms after controlling for life cycle stages. This result does not validate the misvaluation theory for target's undervaluation (Rhodes–Kropf et al., 2005). On the other hand, I do show consistent evidence that growing firms are more likely to engage as target when they are overvalued. This result may signalize that firms go to market when overvaluation relies on (or coincides with) observed growth potential based on recent track records. So, since CEOs have private motivation on higher golden parachutes, stocks, and stock options grants, there should be an extra incentive to sell the firm (Fidrmuc & Xia, 2019). However, this economic intuition is still a conjuncture and may be subjected to further analysis i.e., who have initiated the negotiation.

To alleviate the concern about an alternative explanation of coincidence, I find a positive significant effect of industry shock (when firm's revenue growth exceeds the industry growth) on the likelihood to be overvalued. This result is consistent with the Dickinson et al. (2018)'s findings of greater optimism for growing firms, compared to firms in introduction and decline stage firms. Afterwards, Table I.9 shows the effect of acquirers' overvaluation on the likelihood to become bidder. The intuition is that firms in certain situations would have incentive to make acquisitions when their market price exceeds the privately known fair value. Though, I argument that such incentives hold differently across the life cycle stages.

Table I.9
The impact of acquirer's overvaluation on M&A, controlled by life cycle.

This table presents the results from examining the impact of acquirer firm's overvaluation on the likelihood to engage in M&A, controlled by firm's life cycle. The sample consists of US deals concluded between 2000 and 2021, merged with Compustat overall financial dataset. A constant term is included in all regressions, but not reported. All variables are defined in Appendix A. The t-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES	(1) Naïve	(2) LCS	(3) LC Persist 2y	(4) LC Persist 3y
			Dep. Var: d_Deal	
Acq_Overvalued	0.000	-0.001	-0.000	0.001
	(0.308)	(-0.297)	(-0.013)	(0.600)
Acq_Introduction		-0.003	-0.004**	-0.004**
		(-1.324)	(-2.386)	(-1.964)
Acq_Growth		-0.000	0.001	-0.002
		(-0.039)	(0.410)	(-0.529)
Acq_Mature		-0.000	0.001	0.003
		(-0.207)	(0.266)	(1.231)
Acq_Shake-out			-0.001	-0.003
			(-0.136)	(-0.453)
Acq_Decline		-0.003	-0.005**	-0.004*
		(-1.110)	(-2.546)	(-1.705)
Acq_Overvalued * Life Cycle Stages				
Acq_Introduction		0.006	0.007**	0.008**
		(1.207)	(2.148)	(2.154)
Acq_Growth		-0.001	-0.003	-0.001
		(-0.160)	(-0.682)	(-0.216)
Acq_Mature		-0.001	-0.003	-0.007*
		(-0.210)	(-0.889)	(-1.745)
Acq_Shake-out			0.013	0.003
			(1.168)	(0.244)
Acq_Decline		0.015***	0.020***	0.017***
		(2.706)	(3.719)	(3.476)
Control Variables	Yes	Yes	Yes	Yes

Year FE	*Yes*	*Yes*	*Yes*	*Yes*
Industry FE	*Yes*	*Yes*	*Yes*	*Yes*
Observations	54,523	54,523	54,523	54,523
Adjusted R-squared	2%	2%	2%	2%

First, I show no overall effect of overvalued market price on the likelihood to acquire. However, the control for life cycle stages reveals that declining firms are more prone to make acquisitions when overvalued. This result is robust to the persistence at decline for two years (column 3) and to stock-based acquisitions (nontabulated). These findings are consistent with the view that declining firms should find a way to transit back to other stages, by expanding the business to different markets, gaining new clients, and increasing the resources to reduce competition. Additionally, the engagement of a decline-stage firm in a M&A as a bidder may signalize a seek for knowledge not for asset, where a new management may help to execute a "turn around" in terms of operation and, consequently, value creation (Ib Löfgrén et al., 2020; Martin, 2016). However, this paper does not address this perspective, and it may be investigated in future research.

In addition, I show that firms persist at the introduction stage for more than 2 years also seek a target potentially incentivized by their overvalued market prices. This is aligned with the view that firms have abnormal access to funding in order to finance acquisitions in their first years after going public (Wiggenhorn et al., 2007). However, my results show the incentives not to be necessarily related to new listing firms, but with the characteristics of introduction some firms are able to show. Basically, the introduction stage is characterized by massive investment in structure with lower bargain power and comparatively lower access to funding (Dickinson, 2011; Miller & Friesen, 1984). However, overvaluation may facilitate this path to acquire in order to reach an expected growth. Table I.10 shows further examinations, showing the deal's effect on life cycle transition.

Table I.10
The impact of M&A deals on the life cycle transition.

This table presents the results from examining the impact of the M&A on the acquirer firm's life cycle transition, so dependent variables are in t+1. The sample consists of US deals concluded between 2000 and 2021, merged with Compustat overall financial dataset. A constant term is included in all regressions, but not reported. All variables are defined in Appendix A. The t-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES	(1) DV: F. Intro	(2) DV: F. Grow	(3) DV: F. Mat	(4) DV: F. Shake	(5) DV: F. Decl	(6) DV: F. LCNC	(7) DV: F. LCPC
Acq_Introduction	**0.165***	**-0.020***	**-0.062***	**-0.075***	-0.007	**-0.074***	**0.445***
	(21.778)	(-2.842)	(-8.084)	(-10.975)	(-1.176)	(-27.842)	(76.661)
Acq_Growth	**-0.022***	**0.189***	-0.011	**-0.107***	**-0.049***	**0.232***	
	(-4.795)	(26.256)	(-1.393)	(-16.272)	(-11.437)	(56.260)	
Acq_Mature	**-0.028***	**0.028***	**0.150***	**-0.104***	**-0.047***	**0.208***	
	(-6.597)	(4.501)	(19.774)	(-15.800)	(-11.570)	(57.497)	
Acq_Shake-Out							**0.604***
							(87.110)
Acq_Decline	0.005	**-0.051***	**-0.080***	**-0.054***	**0.179***	**-0.090***	**0.381***
	(0.659)	(-6.801)	(-9.860)	(-6.741)	(20.178)	(-30.528)	(58.985)
d_Deal	**-0.070***	0.007	0.025	0.057	-0.019	**0.056***	**-0.014***
	(-3.133)	(0.137)	(0.419)	(1.065)	(-0.864)	(6.477)	(-6.078)
d_Deal * Life Cycle Stages							
Acq_Introduction	-0.016	0.039	-0.109	-0.008	**0.094***	0.023	0.055
	(-0.267)	(0.553)	(-1.541)	(-0.126)	(1.863)	(1.453)	(1.069)
Acq_Growth	0.031	**-0.110***	0.074	-0.031	0.037	**-0.077***	
	(1.324)	(-1.933)	(1.152)	(-0.560)	(1.629)	(-4.207)	
Acq_Mature	**0.058***	-0.011	-0.022	-0.056	0.031	**-0.064***	
	(2.736)	(-0.186)	(-0.329)	(-0.996)	(1.365)	(-3.363)	
Acq_Shake-Out							**0.101***
							(1.857)
Acq_Decline	**0.133***	-0.034	-0.109	-0.056	0.066	0.014	-0.028
	(2.126)	(-0.498)	(-1.520)	(-0.783)	(0.929)	(0.934)	(-0.549)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	58,872	58,872	58,872	58,872	58,872	58,872	58,872
Adjusted R-squared	35%	14%	29%	5%	26%	14%	46%

Before discussing the economic implication of the results, I note that all models are significant in explaining the dependent variable.

Consistent with the idea of buying growth, growing firms are less likely to persist at the growth stage after the deal (-0.110*) and also less likely to move to an undesirable stage (-0.077***) after engaging in an M&A. This result expands the findings reported by Dickinson (2011) about growth firms being "fairly stable" and less likely to move to decline. After deal, I find that mature firms are more likely to switch to introduction (0.058***), restarting the journey to grow, but possibly benefitting from the greater knowledge acquired during the firm's life. Likewise, I find that declining firms are also more likely to be classified as introduction after M&A (0.133**). However, the intuition is that firms at decline should seek a movement of "turn around", entering new markets with new personnel. Future research may address this subject in greater details. Moreover, I find a positive and significant coefficient for the *Acq_Shake-out* variable (0.604***) and for the interaction between shake-out and deal (0.101*) to explain the propensity to be classified in LNPC.

Collectively, they help to clarify the shake-out as a transitory stage, and firms seem to engage in different strategies to switch back to growth or maturity stages, and M&A is one of these strategies. Last but not least, I find evidence that the decision to grow via M&A seems to be even more risky for firms at introduction once they have a higher likelihood to become a declining firm after deal. Future research may address these specific transitions, helping to clarify the effects of a singular decision to grow or to survive via acquisitions.

5. Conclusion

This paper examines whether and how firms' life cycle stages dynamic influences mergers and acquisitions activities. The M&A literature relies on drivers such as firm misvaluation (Rhodes–Kropf et al., 2005); target management inefficiency (Manne, 1965; Matos, 2001; Palepu, 1986), and the excess of free cash-flow (Jensen, 1986a). I use these

theoretical approaches to offer the firm's life cycle dynamic prior to the acquisition as an additional informational that helps to disentangle the M&A drivers.

As predicted, I show that mature firms apparently are the only to use their greater access to growth capital to make acquisitions. In turn, introduction and decline stage firms are motivated by overvaluation. On the sell-side, I show that growing firms are motivated by their overvaluation to seek a buyer. In addition, I show the deal effects on life cycle transition, which are consistent with the idea of taking additional risk to grow.

My findings provide contributions in at least three perspectives. *First*, I contribute to the life cycle stage and M&A literatures by showing some of the M&A drivers to be sensitive to the firm's life cycle stages. Then, my findings provide new steps to prior literature (Ames et al., 2020; Dickinson, 2011; Miller & Friesen, 1984; Owen & Yawson, 2010). However, I fail to find the effect of target's management inefficiency (Healy et al., 1992, 1997; Palepu, 1986), which demands further exploration i.e., regarding the effects of knowledge transference. Moreover, I propose the analysis of persistence and transition in life cycle stages as an additional measure for this topic.

Second, my findings contribute market analysts and financial advisers, who play a distinct role in the M&A process. By recognizing the life cycle stage prior to acquisition (in both sides), these professionals may incorporate additional concerns when projecting future benefits according to the management point of view. Such a concern may reflect both in decreasing the future expected benefits and increase the discount rate when proceeding with the valuation analysis. Moreover, life cycle stages can also be an additional factor to screening for peer comparable when proceeding with valuation analysis using multiples.

Third, informed and non-informed shareholders can also benefit from my findings since I show some deal to be motivated by overvalued shares. Although this motivation is well-known in the literature, I show an extra filter to identify a potential overvalued acquisition. Then,

assuming that overpayments are constantly seen in the M&A industry (Ames et al., 2020; Fu et al., 2013; Shleifer & Vishny, 2003), my findings may help to shed light to this topic and maybe help to save investor's money.

Future research may investigate additional effects on this tension moment of a firm, such as the participation of activist shareholders, since they are claimed to force some deals, but also are recognized as a monitor of management that push towards greater efficiency. Future research may also investigate different measures of managerial ability to rule out the possibility of this new wave of M&As to be driven by additional factors. Ultimately, new research can address not motives to engage, but the drivers to reach the success in M&A.

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Appendix I-A
Variables description.

Variable	Description	Reference
Dependent Variables		
d_Deal	Indicator that assumes one for the year when the deal is concluded	Owen & Yawson (2010)
Independent Variable		
FCF	Ratio of cash flow from operations minus Capital Expenditures to Total assets	Owen & Yawson (2010)
Mgmt_Ability	Residual from the firm efficiency function, retrieved by https://peterdemerjian.weebly.com/managerialability.html	Demerjian et al. (2012)
Tgt_Inefficient	Indicator that assumes one when the firm Mgmt_Ability is below the percentile 33.3 of its respective industry average.	Demerjian et al. (2012)
Acq_Overvalued	Indicator that assumes one when the acquirer firm EVS is above the percentile 66.6 of its respective industry average	Imperatore et al. (2021)
Tgt_Undervalued	Indicator that assumes one when the target firm EVS is below the percentile 33.3 of its respective industry average	Imperatore et al. (2021)
Control Variables		
ROA	Ratio of income before extraordinary items to the total assets	Hasan & Habib (2017) and Owen & Yawson (2010)
GroSales	Relative growth in sales from previous to current year.	Owen & Yawson (2010)
FirmSize	Natural logarithm of total assets	Hasan & Habib (2017) and Owen & Yawson (2010)
MTB	Ratio of the market value of common equity to the book value of common equity	Hasan & Habib (2017) and Owen & Yawson (2010)
Leverage	Ratio of total debt to total asset	Ames et al. (2020); Hasan & Habib (2017); Owen & Yawson (2010)
Liquidity	Ratio of cash and marketable securities to total assets.	Owen & Yawson (2010)
IGRO	Previous 5 years growth in sales	Owen & Yawson (2010)
ISHK	Absolute difference between an industry's 5-year growth rate in sales and the average 5-year growth rate in sales across all industries	Owen & Yawson (2010)

Table I.11
The impact of life cycle transition on Target firm's undervaluation.

This table presents the results from examining the impact of the target firm's life cycle transition on the likelihood to be undervalued. The sample consists of US deals concluded between 2000 and 2021, merged with Compustat overall financial dataset. A constant term is included in all regressions, but not reported. All variables are defined in Appendix I-A. The t-statistics are reported below coefficient estimates in parentheses and are calculated based on standard errors clustered at the firm level. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES	Dep. Var.: Tgt_Undervalued	
	coef.	t-stat
Tgt_Introduction	**-0.020****	(-2.175)
Tgt_Growth	**-0.035*****	(-3.964)
Tgt_Mature	-0.000	(-0.042)
Tgt_Decline	-0.004	(-0.448)
Tgt_LCNC	**0.091*****	(12.687)
Control Variables	Yes	
Year FE	Yes	
Industry FE	Yes	
Observations	75,086	
Adjusted R-square	16%	

Chapter II – Knowledge transfer, life cycle stages, and M&A success.

Abstract

Acquiring another company has long been understood as a growth or survival strategy. Nonetheless, prior literature consistently shows that most of the deals are value-destroying. I address this setting by investigating the knowledge transfer as a driver of M&A success, arguing that the control for the firms' life cycle stages clarifies how this driver perform differently for firms in different conditions. Using a sample of 1,671 US M&A deals concluded between 2000 and 2021, I predict and find new evidence that firms at the growth and mature stages reach better outcomes by acquiring and properly integrating the target firm resources. Meanwhile, I show that firms at the decline stage achieve better operational results by attracting new management via a reverse knowledge transfer, where the acquired knowledge is employed to help the firm to return to profitability. I also show this relation using alternative perspective of deal outcome. First, I show different patterns of knowledge transfer effect on goodwill impairment. While the effect is negative for growth-stage firms, the likelihood to overpay in a negotiation is greater for introduction and decline-stage firms. As a result, the effect is the opposite for these firms. Second, I find evidence of better abnormal returns subsequent to deal for firms at the introduction and decline stages. Collectively, the results are consistent with the absorptive capacity theory that predicts more than motivation but the managerial ability to reach better outcomes. The overall findings support the underlying theory and can benefit financial analysts, financial advisors, managers, entrepreneurs, and institutional investors interested in M&A deals.

1. Introduction

This paper examines the knowledge transfer controlled by the firm's life cycle stage as a mechanism under which acquirer firms succeed in M&A deals. Theory predicts that M&A deals are ultimately motivated by the seek for synergies, which are expected to create value for shareholders (Mueller, 1969). However, in past decades, 70 up to 90% of the acquisitions have failed in this goal (Martin, 2016). Prior evidence shows that bidders' overpayment is one factor that could explain the undesirable outcomes (Gu & Lev, 2011). Researchers, in turn, have been struggling to find other consistent explanations for value-destroying deals as well as existing drivers of success (Aktas et al., 2016; Chen et al., 2018; Harford et al., 2012; Jensen, 1988; Roll, 1986b). In short, the pursuit of synergy in M&A deals has two main reasons: to grow or to survive. In this regard, prior literature in accounting and finance evidence a firm's life cycle effect on M&A (Owen & Yawson, 2010), where declining firms are more prone to engage in diversifying deals as a path to survive (Ames et al., 2020).

However, achieve the success in an M&A requires more than motivation, the firm must have *a priori* the necessary ability to conduct a management integration (Ruth et al., 2013), otherwise, such ability to reinvent will have to be purchased. Linnanen (1995) introduces a framework where the company's decision-making process reflects the firm's life cycle, where the integration demands the optimization of the impacts caused by the products system during its life cycle. Assuming the firm to be an aggregate of its products (Dickinson, 2011a; Mueller, 1972b), the firm's life cycle approach offers an attractive perspective to examine this complexity as a mechanism to identify better outcomes.

On the one hand, accounting researchers argue that these theoretical gains are hard to estimate due to compounded factors such as a flurry of reconstructing that follows the deal completion (Dickinson et al., 2016; Jensen, 1988) and due to the market booming (Bouwman et

al., 2009). On the other hand, practitioners suggest other factors to reach the estimated synergy, such as providing the acquired firm with access to growth capital, enhancing managerial oversight, transferring valuable skills, and sharing valuable capabilities (Martin, 2016). See the anecdotal example of some of these factors in the *New York Times (Nov 19th, 2022)*[1], where a former executive of Time Warner comments on the $100 billion-dollars acquisition by AT&T in 2016: the "vibrant culture of creative energy and success nurtured over decades was destroyed in months". In this case, AT&T tried to enter a new market (media) due to increasing competition in their main market (telecommunication). However, fierce competition in the streaming industry has dampened their ability to reach the expected goals. As a result, this megadeal now also stands for a "mega failure" where earnings have considerably decreased (-38%), and market value had decreased over $47 billion dollars after the deal completion.

Although the AT&T case is allegedly filled with political issues, this scenario is consistent with studies developed from the management perspective. However, prior studies show limited evidence on the proposed theories to explain M&A outcomes (Castro Casal & Neira Fontela, 2007; Ruth et al., 2013; Sarala et al., 2016; Yahiaoui et al., 2016). In the accounting literature, little attention has been given to this setting where new resources must be properly integrated with the existing ones, consistent with the firm's life cycle stage in the attempt to achieve better outcomes.

To fill this gap, I shed light on this conflicting setting under the assumption that knowledge transfer is a driver of synergy, but I argue that while acquirers with growth opportunities employ their ability to better allocate acquired assets, other acquirers walk in the opposite direction, demanding the target management team to conduct the managerial integration and drive the business. Demerjian et al. (2012) support that firm's life cycle affects the set of opportunity for

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[1] *The New York Times* (2022, Nov 19) retrieved February 14, 2023,
from https://www.nytimes.com/2022/11/19/business/media/att-time-warner-deal.html

new projects. Therefore, although the managerial ability impacts the firm growth, the management team is only the internal driver. The authors remind that outside aspects also interfere the firms' ability to grow. Under the Structure-Conduct-Performance framework (Bain, 1959; Porter, 1981), the firm plays a game with other participants, where the actions are taken considering the overall scenario. While some firms engage in acquisition to raise the barriers to entry, other engage in an attempt to react/adapt to a new structure (Teece et al., 1997).

Hence, I address the question of how the knowledge transfer controlled by the firm's life cycle stage impacts M&A outcomes.

I predict that introduction, growth, and mature firms achieve better M&A outcomes by transferring the existing knowledge to the acquired firms. Meanwhile, declining firms tend to seek for fresh and more efficient management to conduct turnarounds or to facilitate entrance to new markets. Therefore, I predict that acquirers at the decline stage tend to reach synergy creation due not to their knowledge but due to the target's management ability.

I obtain US deals announced between 2000 and 2021 from SDC Platinum, following the literature to include only publicly traded US firms. Deal size must be greater than $10 million (Boyson et al., 2017), and I also require bidders to own less than 50% of the target's stock before the bid and more than 50% after the deal. I follow the recent literature to use the five-stage model of a firm's life cycle (Bhattacharya et al., 2020; Dickinson et al., 2018; Habib & Hasan, 2017; Shahzad et al., 2020, 2022; Vorst & Yohn, 2018), and I use the Demerjian et al. (2012)'s measure of management ability to estimate the knowledge transfer. I examine acquirer and target management ability both separately and as a ratio (acquirer-to-target management ability ratio), and the latter allows me to address the idea of "transfer". I follow the existing literature to proxy M&A outcomes by using the industry-adjusted operational return, the recognition of goodwill

impairment in subsequent years, and the cumulative abnormal market return (Barber & Lyon, 1996; C.-W. Chen et al., 2018).

First, I assume and validate the assumption of life cycle stages' effect on management ability, expanding prior literature (Demerjian et al., 2012) with further evidence under a modern view of firm's life cycle. *Second*, as predicted, I find evidence that growth and mature firms reach a significantly superior performance the higher the knowledge transfer to target. Meanwhile, declining firms reach superior post-deal performance by purchasing knowledge instead of fixed assets. *Third*, the effect of knowledge transfer from introduction-stage firm to target is not straightforward. Although market investors create abnormal expectations, the operational return is negative subsequent to acquisition. The market investors also recognize the reverse knowledge transfer as a success driver, then they absorb this event as a factor that can return the firm to profitability.

Prior literature on life cycle shows underestimation for firms classified at stages characterized by greater uncertainty, i.e., introduction and decline (Dickinson et al., 2018). This result finds support on the absorptive capacity theory, where absorptive capacity is the innovative capability to use the existing knowledge to identify targets but also to assimilate and transform the target's knowledge into growth in the resulting firm (Bae et al., 2020; Cohen & Levinthal, 1990).

The results of my research contribute to at least three streams of the accounting literature. (1) I show different directions of knowledge transfer to affect better deal outcomes. (2) I further explain the results of Ames et al. (2020). While the authors argue that declining firms are more prone to seek diversifying deals, I clarify the driver of success for firms in this situation. On top of that, I also evidence the strategy of introduction-stage firms to achieve success. (3) The results contribute to corporate governance literature by showing the effect of existing management ability across life cycle stages, especially in growth and mature firms, to affect post-deal performance. I

also discuss the potential issues in using alternative proxies for deal outcomes. Collectively, my results are helpful to potential bidders, financial analysts, and investors while considering an M&A.

The remainder of the paper proceeds as follows. I develop the hypotheses in Section 2. In Section 3, I define the research design, describing the sample selection, the sources of data, and the econometric models. In section 4, I present the main results and perform some robustness tests. I finally offer concluding remarks in Section 5.

2. Hypotheses Development

2.1. Integration Process and Absorptive Capacity

M&A is an event that changes the firm nature (Mueller, 1969). Ultimately, firms engage in M&A mostly to grow or to survive. However, from the acquirer perspective, most of the acquisitions fail to achieve the expected outcomes, and researchers have long been struggling to find explanations for value-destroying acquisitions as well as to find drivers of success (Clifford, 2008; Harford et al., 2012; Healy et al., 1992; Moeller et al., 2005). One explanation lies in the fact that more important than motivation for the acquisition is the managerial ability to conduct the integration process with the acquired firm resources (Ruth et al., 2013), so that the acquirer transfer the existing knowledge to the acquired firm. A second explanation fit the scenario where the acquirer has exhausted the all the possible investment opportunities to maintain the business, and then the management team pursue new directions to the business. In this adverse context, monetary resource is less important than managerial ability (Cohen & Levinthal, 1990; Jensen, 1986b). Then, the "fountain of youth" should probably come from a new management, via a reverse knowledge transfer (Nair et al., 2015).

Regardless the knowledge transfer direction, a management integration requires the target resources, including the accrued knowledge, to fit the acquirer firm structure (Milliman et al., 1991; Zollo & Singh, 2004), where a significant cost must be considered to proceed with the integration

(Lengnick-Hall & Lengnick-Hall, 1988). Depending on the acquirer and target firms' conditions, the integration process will demand a partial or integral renovation, dealing with strategic and operational issues, such as human resource (re)allocation, contracts revisions, new policies, and new sort of products development. Regardless of whether the renovating flow starts from the acquirer or from the target, the managerial ability relies on the absorptive capacity of the firm (Bae et al., 2020; Cohen & Levinthal, 1990). The underlying theory predicts that absorptive capacity exceeds the concepts of individual knowledge. Instead, it depends on the ability to transfer the knowledge from a unit to another (Cohen & Levinthal, 1990). In other words, M&A deals success relies on the understanding of merging external acquired resources with internal knowledge as a strategic instrument to achieve competitive advantage after merger (Bae et al., 2020; Lane et al., 2006).

Though, managerial ability is not necessarily a synonym of firm efficiency because the former considers the management-specific efficiency driver while the latter implies a broader view of a firm (Demerjian et al., 2012). Moreover, the authors support that ability to drive the business must be consistent with the firm's life cycle stage. Firms in different life cycle stages are expected to present different patterns of strategy and governance (Filatotchev et al., 2006b; Jenkins & Kane, 2004b; Mueller, 1972b). Then, understanding the absorptive capacity consistent with the firm's life cycle stage enhance the view of the former as a governance mechanism that can affect the firm's performance.

2.2. Management Integration and Life Cycle Stages

Life cycle theory characterizes firms at the introduction stage when the business model and overall structure are not as consolidated as firms at the growth and mature stages (Mueller, 1972b; Penrose, 1959b). However, these components of uncertainty are different from firms in the decline stage, and can be reduced as long as the management team come up with innovative ideas (and

strategies to implement them) in order to seek growth (Mueller, 1972b). Stigler (1950) draw the first stage of a product commercialization to have a length related to the ease of copying the initial innovator but also the size of the market for the new product. Then, growing via acquisitions is one of the strategies to lead this race. Penrose (1959, p. 20) states that growth relies on the firm's versatility, driven by "creative and dynamic interaction between a firm's productive resources and its market opportunity."

Consistent with this idea, some firms as soon as they go public, they acquire other firms in the attempt to increase the market-share and raise the entry barrier for new entrants (Brau et al., 2012). However, acquiring another firm during the first stage is a riskier attitude, because introduction-stage firms usually present higher asymmetry, lower access to fund, and higher intrinsic risk these firms use to have (Al-Hadi et al., 2016b; Hasan et al., 2015a). If going public usually requires internal changes such as recruiting more professionalized personnel and increasing the information environment, making acquisitions in the early stages is an even more challenging effort, which enhances the uncertainty. In the initial stage, the firm value primarily relies on discretionary future investment (Myers, 1977).

On the other hand, Wernerfelt (1984, p. 937) suggests that the uncertainty reduction to grow is alleviated by "the way the uncertainty is introduced". In other words, achieving success in M&A, even for introduction-stage firms, depends even more on the management ability to allocate resources during the challenging period of management integration. Therefore, if early growth can result in market-share and profit maximization (Wernerfelt, 1984b), then introduction-stage firms with high-level management can benefit from new market changes in order to succeed post an M&A deal, but it depends on the ability to conduct the integration.

Before the integration, the challenge is to align the existing resources with the ones available to be purchased in the market (Healy et al., 1992, 1997; Palepu, 1986). In general, the

ideal target for an acquisition should have a set of assets that fit with the acquirer's current structure and capabilities. Such target's assets should offer enough potential for synergies and growth for the acquirer to make the acquisition worthwhile. In the case of introduction-stage acquirer, the target should have a comparatively lower managerial ability in order for the acquirer to be able to properly integrate and manage the target's assets. With such a combination of assets and managerial abilities, the acquirer can make the most of the acquisition and maximize its returns after the deal.

I predict that introduction-stage firms with greater managerial ability will seek potential targets where the acquirer team management will be able to allocate the acquired assets appropriately. The intuition is that introduction-stage firms have a considerable amount of uncertainty due to a low track record, but the management team of an introduction-stage firm has incentives to believe in delivering a great growth opportunity. Relying on the premise of "administrative coordination and authoritative communication" (Penrose, 1959, p. 18), the author posits that the existing management team of introduction-stage firms will work to redefine the boundaries of the firm by (re)allocating the acquired resources. Spence (1979) uses the richness of structure to state that investment and growth are limited by physical and financial factors, and more capable management of early-stage firms anticipates investment to exploit the advantages of leading the market. This is consistent with an specific finding reported by Richardson (2006), which supports the view that firms make significant investment in new opportunity in early stages. Under this scenario, I hypothesize:

H1: Introduction firms have better M&A outcomes the greater the knowledge transfer from the acquirer to the target.

Next, growth and mature firms are characterized by having greater knowledge about their operation, which results in greater profitability compared to firms in other stages (Dickinson, 2011; Jenkins & Kane, 2004; Mueller, 1972). On the other hand, growth firms still have some barriers to

remove, such as trying to gain new clients, to retain the existing ones, and to optimize internal processes (D. Miller & Friesen, 1984). Subsequently, the firm proceeds with the assumed strategy: to add differential attributes to justify an increase in price or to cut expenses in order to reach the cost leadership position (M. Porter, 1996). Then, growth firms may adopt the buying growth strategy to accelerate this process. Again, hunting synergic targets is challenging because the integration must fit not only the acquirer structure but the pace the acquirer is at; otherwise, the integration would hinge the growth expectation instead of contributing to do so.

Unlike firms in the introduction stage, the market value of growth firms is supported by a historic of real revenue growth and market-share increase. Miller & Friesen (1984, p. 1164) describe the growth-stage firms as those with "established competences" and that "enjoyed initial product-market success". Firms in this stage are advancing in consolidating contracts with clients and suppliers. As a result, growth firms achieve better operating performance (Dickinson, 2011a), lower intrinsic risk (Hasan et al., 2015a) as the informational asymmetry (Al-Hadi et al., 2016b) decreases. Spence (1979) posits the timing of capital investment to put firms in asymmetrical positions. Then, in the particular context of M&A, assuming that the team management has conducted the firm to the growth stage, the existing knowledge is vital to the integration process, by timely adapting and appropriately allocating the acquired resources (Kogut & Zander, 1993). Therefore, I predict that better outcomes derive from an acquisition where the knowledge transfer flows from the growth-stage acquirer to the target, denoting the appropriate allocation of acquired assets to finally reach the expected results.

A parallel understanding can be applied to firms at the mature stage, but the motivation to acquire is slightly different. The expectation is that growth firms evolve to maturity as they stabilize sales (in a high level) and enrich their structure (D. Miller & Friesen, 1984). Empirical literature shows these firms to have lower informational asymmetry (Habib et al., 2019; Quinn & Cameron,

1983), easier access to funding (Hasan et al., 2015a; Myers, 1977), and higher profitability (Dickinson, 2011a).

However, higher profitability that generate high dividends do not necessarily satisfy the investors of a mature firm. Instead, because the market dynamic insert pressure via competition, engaged investors claim for new investment projects with the potential to add value and increase the firm return. Consequently, the management team is pressured to revisit the existing resources and products portfolio, with closer attention to the organizational capital (process, practices, and learning). The objective is to analyze whether there is a room for organic growth, via innovating ideas or if new investments such as acquisitions are necessary to insert innovation and then increase the firm value. In particular, although it seems easier for mature firms to grow via acquisitions, different factors disturb this process, contributing to failure: misalignment incentives (A. L. Boone & Harold Mulherin, 2008; Fung et al., 2009) and comparatively greater access to capital growth (Richardson, 2006), that facilitates overconfidence (Roll, 1986b).

Such complexity reassembles the need for organization growth (D. Miller & Friesen, 1984), where the management team understands the environment, strategy, and structure to then take the appropriate decision to enhance firm value. In the particular case of engaging in an M&A, the expectation is that the existing management will find synergic targets to attend the new strategy. If the plan is to reduce total unit cost and increase profitability, the firm may pursue a vertical integration, by purchasing a supplier. But if the intention is to enhance the product portfolio, the team management may pursue a horizontal deal, where the acquirer purchases a competitor with a promising product or business model.

For instance, when the "Whole Foods Inc." was acquired by "Amazon.com" in 2017 (at mature in the previous year), the Amazon board of Directors announced that the deal was an effort "to actively assess rapidly evolving industry dynamics, intensifying competitive conditions,

deflationary price pressures and technological changes relevant to the Company's business and its long-term prospects" (See Fairness Opinion - Schedule 14A[2]). More specifically, the reasoning behind the purchase was to cover a growing demand for healthier food dealing with a superior client segmentation, where new process and technologies (such as Alexa support for orders and new cameras system) cold be applied by Amazon's team in order to gain market share and increase the overall firm value. This case illustrates how mature firms may conduct the resource integration in order to increase firm value by enhancing the organization growth and understanding the environment complexity mentioned by Miller & Friesen (1984).

Then, I hypothesize:

H2: Growth and Mature firms have better M&A outcomes the greater the knowledge transfer from acquirer to target.

Meanwhile, fierce competition, saturation of market, as well as internal problems related to products and team management may lead the firm to hazardous conditions, where uncertainty rises again. But different from the uncertainty of introduction firms, the situation for a decline-stage firm is supported by different arguments. According to Penrose (1959), internal managerial services limit the scope of the growth potential. While initiating firms have a business model to be validated, the management team of a decline-stage firm may had exhausted the available opportunities to grow in the attempt to increase the firm value. Such undesirable situation may also be a reflect of a stagnant attitude while the specific industry dries up (D. Miller & Friesen, 1984). Under this scenario, new investment projects for returning to profitability - such as via acquisitions - would be conducted with a biased outlook, likely leading to a risk of failure. Therefore, new external managerial service could help to better allocate the acquired collection of resources.

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[2] Proxy Statement Pursuant to Section 14(a) of the Securities Exchange Act of 1934, retrieved by https://www.sec.gov/Archives/edgar/data/865436/000157104917006539/t1702003-prem14a.htm.

The understanding is similar to the cross-border acquisitions, where the acquirer enters a new geographic market, and forces a management integration with no consideration to differences in culture, payment methods, language issues. As a result, this style of integration likely destroys the firm value. For a decline-stage acquirer, the acquisition is regarded as an ultimate effort to survive, seeking to renovate the business model, via turnarounds, in order to facilitate the penetration in new markets (Ib Löfgrén et al., 2020).

An example is tentative to survive is the acquisition of "Uranerz Energy Corp" by "Energy Fuels Inc." in 2015 (decline prior to acquisition). The target was in the introduction stage, theoretically generating growth expectation. In a letter to shareholders[3], the CEO announced "Despite general weakness in the energy sector, the recent strength of uranium might be the best kept secret in energy and commodities markets. Indeed, we may be in the early stages of a recovery. Though we continue to manage our business conservatively, we are increasingly optimistic about uranium markets. This belief is demonstrated by our growth through M&A and by maintaining – and increasing – our ability to scale-up production as prices continue to increase." (p.1). Nonetheless, the remaining company has been presenting an unstable situation, floating between introduction and decline stage so far.

Theorists on management integration (Cohen & Levinthal, 1990) support that willingness or even some access to funding are not the most important factor to return or achieve growth. In this situation, the understanding of managerial ability is even more vital. Unlike the other stages, decline-stage firm's management should consider bring new management, opening a room for a reverse knowledge transfer (Nair et al., 2015). Therefore, I hypothesize:

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[3] Energy Fuels Issues Annual Letter to Shareholders (2015), retrieved by
https://www.sec.gov/Archives/edgar/data/1162324/000106299315001581/form425.htm

H3a: Decline firms have better M&A outcomes to the extent the knowledge transfer from target to acquirer increases.

If the decline situation is also a result of a downward in the specific industry (e.g., low demand or new client preferences), a rational attitude to survive would be migrate to a different industry. Consistent with this view, Anand & Singh (1997) propose that a firm can redeploy by entering new market, and that the degree of fungibility of resources depends on the organizational conditions. A recent study shows that decline-stage firms are more likely to engage in diversifying acquisition (Ames et al., 2020). The argument lies on the lack of competitive advantage, which opens a room for entering new business to survive, with a cautiously arrangement of contract so that the new management can be incentivized to better run the renovated business model (Shleifer & Vishny, 1988). Therefore, if a firm is trying to reposition its business model, it is plausible to assume that the acquired firm's management is better positioned to execute the plan in order to return to growth. Then, the reverse integration will be even more crucial to achieve better outcomes in diversifying deals.

H3b: Decline firms achieve better M&A outcomes in diversifying deals as the knowledge transfer from target to acquirer increases.

3. Data and Variables

3.1. Sample

I obtain M&A data from the SDC Platinum on deals completed between January 2000 and December 2021 involving traded US firms, according to the following criteria. I exclude observations with generic serial acquirers (namely Creditors, Investor Group, US Dept of the Treasury, Bondholders, Shareholders, Public Investment Fund, and Undisclosed Acquiror). Moreover, I exclude information from deals where acquirer and target have the exact CUSIP-6 number, and serial acquirers (with 4 or more acquisition in a single year), following Laamanen &

Keil (2008). Serial acquisitions respond to a distinct growth strategy, with mutually interrelated acquisition, where the specific drivers are confounded (Fuller et al., 2002). For firms that acquired more than once, I keep the most relevant event, considering the deal value. I collect financial information from Compustat for acquirer and target firms, requiring bidders to hold less than 50% of the target's share before the announcement and more than 50% after the completion.

Table I.1 summarizes the M&A database selection process:

Table II.1
Sample Selection – M&A Dataset

M&A Data Selection Criteria	Number of deals
M&A deals concluded between 2000 and 2021	12,639
Exclude generic and governmental acquirers	-1,380
Exclude deals without deal value information on SDC Platinum	-1,433
Percent of shares sought ≥ 50	-3,629
Exclude deals where acquirer and target have the exact CUSIP number	-57
Exclude deals of serial acquirers (≥4 deals in a single year)	-58
Exclude non-top deals for multiple acquisitions in the same year	-500
Exclude repeated deal information	-2
Final Sample (Gross)	5,580

Next, I merge the database of deals with Compustat overall dataset using CUSIP6, resulting in 2,404 deals and a total sample of 216,707 firm-year observations, excluding firms without SIC industry information and without information required to calculate the interesting variables. Following the related literature (DeAngelo et al., 2004, 2006; Fama & French, 2001; Owen & Yawson, 2010), I exclude firms from the financial (SIC codes 6000-6999) and utility (SIC codes 4900-4999) to focus on "industrial firms" firms. Financial services and utilities firms are usually dropped from general accounting research because their specificity is not equally captured by accounting financial reports. Following the same studies, I also drop firms with negative book

value of equity to mitigate the chance to consider a positive return on equity that comes from negative income and negative book value. This screening process results in 1,713 deals.

3.2. Variables

I follow prior literature to examine different approaches for M&A deal outcomes (Chen et al., 2018). The first perspective of outcome concentrates in capturing the operational result (Equation II.1), which is expected to drive all others in the long-term.

$$\Delta ROA\_IND_{it} = \left[\left(\sum_{i=1}^{3} ROA\right) - \left(\sum_{i=-1}^{-3} ROA\right)\right] - \left[\left(IND\_ROA_{(t-3);(t-1)}\right) - \left(IND\_ROA_{(t-3);(t-1)}\right)\right] \qquad \text{(II.1)}$$

I adjust the accounting return on asset to the firm's two-digits SIC median to alleviate concerns about industry overall movements. ROA is the net income divided by the average of total assets between current and previous fiscal year (Barber & Lyon, 1996). I follow the notion that more important than increase the firm's profitability is increasing it above the median industry. Moreover, by using an average of a three-years window post and prior to acquisition, I alleviate the concern about when the new configuration effectively generates result to the combined firm (e.g., via sales growth, cost reduction) (Chen et al., 2018).

One can concern that eventual bargain purchase gains may inflate the net income subsequent to acquisition, but ASC 805 disciplines that bargain purchases are less frequent and, when occurred, the economic gains should be immediately recognized. I remind that the design applied to this research is robust to such a concern because I calculate the variation in ROA considering the averages three years before and after the deal conclusion. Therefore, I ignore the year when the deal officially occurred.

Second, I explore several goodwill-related variable to capture an alternative measure of synergy (value) creation (Chen et al., 2018). Depending on the firm and industry, great part of the potential to generate future benefits that the acquirer believes to obtain does not attend to

accounting rules, then this amount is not explicitly reported in the balance sheet of the target. Indirectly, though, non-recognized intangible assets (e.g., brand reputation, intellectual property, and accrued knowledge) are a reflect of the revenues and/or earnings historic growth. Therefore, when the deal value is settled, the amount of money that exceeds the asset fair value (minus debt) is classified as goodwill. This "premium" represents the expectation of future benefits derived from factors other than those clearly visualized in the target balance sheet. In subsequent years, this amount is submitted to impairment test (Accounting Standard Codification - ASC 350 – Intangibles–Goodwill and Other). If the expectation of future benefits is confirmed, the acquisition will somehow positively reflect in the income statement in subsequent years.

According to the accounting rules, at least once a year, the firm should submit the assets to an impairment test. In the particular case of an acquisition, when the overall investment recoverable amount of cash-generating unit(s) is lower than the recognized amount, the goodwill is reduced first, and the other assets are reduced pro rata (ASC 350). Therefore, the relative variation of goodwill is expected to capture the speed with which this estimated future benefits takes place or not. So, lower variations of goodwill reflect better deal outcomes (Barber & Lyon, 1996; Chen et al., 2018).

Then, I use the amount of goodwill (GDWL - Compustat #204) recognized subsequent to the acquisition, scaled by Total Asset (Compustat #06). For firms that recognized amounts in goodwill in one year, I replace missing values in subsequent years for zero. This procedure significantly increases the number of observations. Alternatively, I test the change in two, three, and four years in robustness tests to mitigate the effects of artificial growth due to business combination. In addition, following Chen et al. (2018), I use an indicator that assumes one if the firm reports goodwill impairment (GDWLIP – Compustat #368) in the fiscal year the acquisition is completed (year t) or either of the three years subsequent to the completion, and zero otherwise.

Third, also following Chen et al. (2018), I use the acquirer's three-day announcement returns as a measure of acquisition efficiency. The Cumulative Abnormal Return (CAR) is the stock market-based view of the deal outcome. CAR represents the overall impact of an event on a stock's performance, beyond what would normally be expected, as reported in Equation II.2:

$$CAR_{it} = exp\left(\sum_{i=1}^{3} log(1 + AbRET)\right) - 1 \qquad (II.2)$$

The $AbRET$ is the Abnormal Return, calculated as the difference between realized returns (R_i) and expected returns ($E(R_i)$) using the factors model of Fama-French directly retrieved from Compustat. This approach relies on the Efficient-Market Hypothesis (EHM) into the semi-strong-form (Fama, 1970), where investors and market analysts are able to anticipate the new potential to generate future benefits and then they adjust the firm's stock price after the acquisition announcement (Barber & Lyon, 1996; Chen et al., 2018).

To calculate the independent variable of interest, I use the Management Ability measure of Demerjian et al. (2012), which is the residuals from a firm efficiency function using Sales as outputs and Net PP&E, Net Operating Leases, Net R&D, Purchased Goodwill, and Other Intangibles as inputs. The authors argue that these inputs capture the management choices to generate revenue. Data Envelopment Analysis (DEA) is proceeded by industry since firms in the same industry are expected to present same technologies and same business structures. Managerial ability is a component of the overall firm efficiency measure. Specifically, the authors regress Firm Size, Firm Market Share, Cash Availability, Life Cycle (Firm Age), Operational Complexity, and Foreign Operation on Firm Efficiency. Therefore, using this measurement of managerial ability of acquirer (Acq_MA_Score) and target firm (Tg_MA_Score), I estimate a proxy for the Knowledge Transfer, which accounts for the way the combination of resources will be conducted during the management integration, as presented in Equation II.3.

$$Knowledge\ Transfer_{it} = \frac{Acq\ MA\ Score}{Tgt\ MA\ Score} \qquad\qquad (II.3)$$

Therefore, values for Knowledge Transfer greater than one indicate that the management integration flows from the acquirer to target, and values lower than 1 represents that target firm have greater management ability and will conduct the management integration. Notably, I use the terms "knowledge transfer" and "transfer of managerial ability" interchangeably. I also test the acquirer's and target's managerial ability separately to conduct additional tests.

Consistent with the recent literature (Bhattacharya et al., 2020; Dickinson et al., 2018; Habib & Hasan, 2017; Shahzad et al., 2020, 2022; Vorst & Yohn, 2018), I use the five-stage model of firm's life cycle proposed by Dickinson (2011), where a firm is classified into Introduction, Growth, Mature, Shake-out, and Decline according to the signals of cash flow from operating, investing, and financing activities, as shown in Panel II.1.

Panel II.1
Combination of cash flow signals

Cash Flow	Intro	Growth	Mature	Shake-out			Decline	
From **Operating** Activities	-	+	+	-	+	+	-	-
From **Investing** Activities	-	-	-	-	+	+	+	+
From **Financing** Activities	+	+	-	-	+	-	+	-

Source: Dickinson (2010, p. 9)

In addition, since the cash flow statement explains the variation in structure, this measure allows to capture non-progressive transitions, where a firm can be classified as decline in *t* and move to growth in *t+1*. Such transition would reflect a recovery in structure, while a firm that persists in decline convey a significantly different signal. Therefore, to robust the notion behind the measure that it reflects "differential behaviors in the persistence and convergence patterns of profitability" (Dickinson, 2011, p. 1969), I use the persistence in each stage for two or more years prior to acquisition. To reduce the concerns about discretion on determining the time, I also test the persistence in at least three years.

4. **Research Design and Main Results**

Before proceeding with the main tests, I examine the differences of managerial ability across the acquirer's life cycle stages using Equation II.4:

$$Managerial\ Ability_{it} = \beta_0 + \beta_1 Intro_{it} + \beta_2 Growth_{it} + \beta_3 Mature_{it} + \beta_4 Decline_{it} +$$
$$\beta_k Controls_t + \alpha_{ind} + \delta_{year} + \varepsilon_{it} \tag{II.4}$$

Following the life cycle literature (Dickinson, 2011; Hasan et al., 2015; Shahzad et al., 2022), I use the shake-out stage as the omitted dummy due to the absence of consistent theorical support. Hence, compared to firms at the shake-out stage, I expect significantly negative coefficients to introduction (β_1) and decline-stage firms (β_4) and positive and significant coefficients to growth (β_2) and mature-stage firms (β_3).

To finally examine the hypotheses H_1, H_2, H_{3a}, and H_{3b} about the knowledge transfer impact, controlled by a firm's life cycle stage, on better M&A deal outcomes, I use the Equation II.5:

$$Outcome_{it} = \beta_0 + \beta_1 KnowledgeTransfer_{it} + \beta_j \sum_{j=1}^{4} FirmLCS + \sum_{k=5}^{8} \beta_k (KnowledgeTransfer *$$
$$Acq\_LCS) + \beta_k Controls_t + \alpha_{ind} + \delta_{year} + \varepsilon_{it} \tag{II.5}$$

$Outcome_{it}$ assumes three different perspectives: (1) Change in industry-adjusted ROA (*Δ_ROA_IND*), (2) Goodwill impairment (*GW_IMP*), and the (3) Cumulative abnormal return (*CAR*). I also explore different lines of income: i) Net Income (*ni*); Income before extraordinary items (*ib*); and Operating Income before depreciation and amortization (*oibdp*). However, because the results of an acquisition can impact both operational and financial structure, including the tax perspective, I consider the net income the main measure of operational outcome.

Following recent literature in accounting (DeHaan, 2021; Donelson et al., 2022; Imperatore et al., 2021), I use a feasible and computationally efficient estimator of linear regression with

correction and control by multiple level of fixed effects developed by Correia (2016). This adjusted linear regression model controls for unobservable factors that stay constant within an economic unit. For every level g of every fixed effect f the mean of the residuals must be zero (Correia, 2016). Also, consistent with prior studies, I winsorize all continuous variables at the 1% and 99% levels by year at the firm-year level to mitigate the influence of outliers.

The hypotheses are tested via the coefficient $\beta_k(KnowledgeTransfer * Acq\_LCS)$, where H_1 and H_2 predicts a positive relationship between the better outcomes and the knowledge transfer from acquirer to target in deals where the acquirer is at the introduction (H_1), growth, and mature stages (H_2). On the other hand, H_{3a} predicts a negative relationship between better outcomes and the knowledge transfer. Indirectly, this negative signal implies an idea of "reverse knowledge transfer". I segregate the deals into different types to test the hypothesis H_{3b} of better outcomes for reverse knowledge transfer in diversifying deals, when acquirer is at the decline stage. Then, the expectation is of a negative and significant coefficient for the interaction $Knowledge\ Transfer * Decline$.

Control variables are segregated into deal-related variables and firm-related variables, following the consistent literature (Ames et al., 2020; Chen et al., 2018; Habib & Hasan, 2017; Owen & Yawson, 2010). Appendix A describes each variable. In short, the deal-related control variables comprise the following: *All_Cash, All_Stock, Diff_Ind, Hostile, Rel_Size, Target_ROA,* and *Target_Lev*. Firm-related variables are as follows: *FCF, ROA, FirmSize, MTB, Leverage, Liquidity, IGRO,* and *ISHK*. Descriptive Results

Table II.1 shows the descriptive statistics for the full sample, where all metric variables are winsorized at 1% and 99%.

Table II.1
Descriptive Statistics

Variable	N	Mean	SD	Min	p25	p50	p75	Max
Dependent Variables								
Δ_ROA_ni_IND	908	-0.014	0.307	-4.846	-0.049	-0.012	0.021	3.678
Δ_ROA_ib_IND	920	-0.012	0.242	-3.721	-0.047	-0.011	0.022	2.839
Δ_ROA_oibdp_IND	905	-0.011	0.221	-3.646	-0.050	-0.013	0.023	2.671
Goodwill-Write-off (3Y)	1086	-0.001	0.011	-0.232	0.000	0.000	0.000	0.064
GW_Impairment (3Y)	1713	0.290	0.454	0.000	0.000	0.000	1.000	1.000
CAR	985	-0.008	0.096	-0.397	-0.049	-0.007	0.029	0.510
Independent Variables								
Acq_MA_Score	1489	0.051	0.178	-0.261	-0.072	0.004	0.127	0.683
Tg_MA_Score	1008	0.005	0.133	-0.261	-0.076	-0.016	0.054	0.683
Knowledge Transfer	985	0.545	7.400	-34.970	-0.767	0.527	1.605	35.940
Deal related Control Variables								
All_Cash	1713	0.433		0.000	0.000	0.000	1.000	1.000
All_Stock	1713	0.208		0.000	0.000	0.000	0.000	1.000
Diff_Ind	1713	0.507		0.000	0.000	1.000	1.000	1.000
Hostile	1713	0.004		0.000	0.000	0.000	0.000	1.000
Friendly	1713	0.971		0.000	1.000	1.000	1.000	1.000
Rel_Size	1459	0.298	0.450	0.001	0.033	0.143	0.377	2.853
Tgt_ROA	981	-0.300	1.450	-10.902	-0.224	0.012	0.093	2.011
Target Leverage	1231	0.167	0.222	0.000	0.000	0.050	0.277	1.015
Firm-related Control Variables								
Acq_Leverage	1687	0.236	0.178	0.000	0.089	0.221	0.361	0.599
Acq_Liquidity	1699	0.149	0.155	0.006	0.036	0.092	0.208	0.656
Acq_Firm_Size	1709	8.013	2.261	-1.619	6.484	8.073	9.694	13.614
IGRO	1096	0.025	0.274	-0.335	-0.200	-0.010	0.209	0.506
ISHK	1095	0.247	0.179	0.029	0.088	0.205	0.395	0.554

Similar to Chen et al. (2018), who studied the 1983-2009 period, I find a mean (median) of -1% (0%) for change in industry-adjusted return on asset. While the mean values of ROA using the operating income (*oibdp*) is seemingly and expectably higher than the others, the median values show a different pattern, with ROA using the net income (*ni*): -0.012 against -0.011 of ROA using the income before extraordinary items (*ib*). Such differences are also observable in the max values, where the highest value of *Δ_ROA_ni_IND* indicates a firm have appreciated a variation of 3.67

p.p. after the acquisition, while the Δ _ROA_ib_IND_ indicates a change of 2.839p.p. The differences between them basically lies on the tax issues. Indeed, some deals are motivated by tax attributes, such as the amount of net operating loss carryforwards and tax credits (Hayn, 1989).

Moreover, I find both mean and median of Cumulative Abnormal Return close to -1% for acquirers, which is close to the findings reported by Chen et al. (2018). The average of Goodwill write-offs presents a lower rate compared to the previous study. I find positive mean and median, even when I test the variation in two, three or four years. Although this approach is sensitive to a decision to disclose the impairment goodwill, which is only found in a few cases, this different pattern may signalize a different merger wave compared to previous studies. Figure II.1 shows the frequency of M&A deals during the period of analysis.

Figure II.1
Mean of M&A deals across time
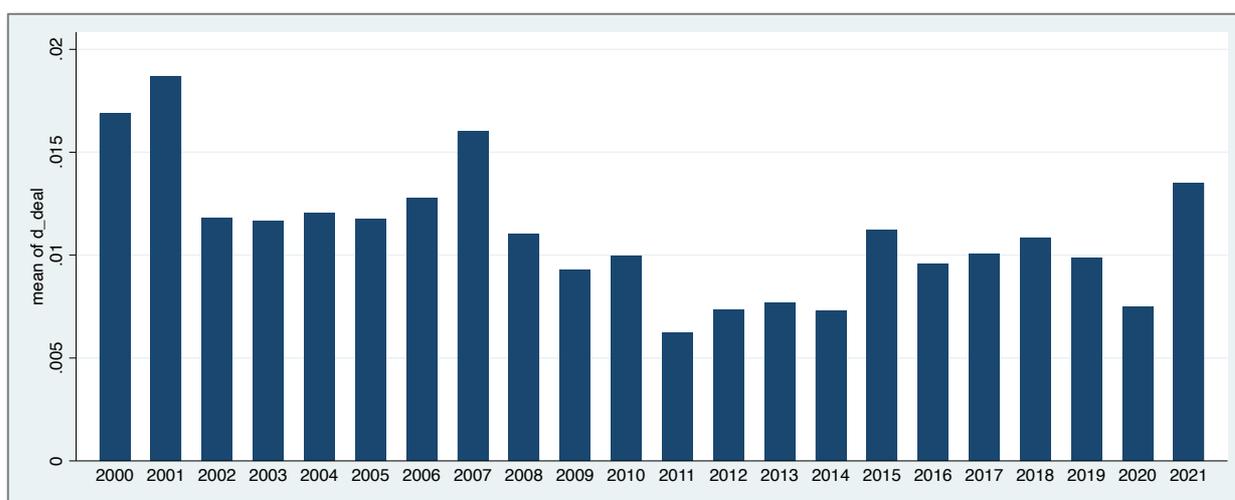
I observe that the greatest percentages of deals (in this sample) occurred during the 2000's internet bubble, but also in 2007, during the market booming, which was ended by the economic crises in 2008. A considerable pike occurred in 2021 during the covid pandemic. This new wave has been interpreted as a signal of recovery after the pandemic, not only in the US. See NY Times

(Oct. 19th, 2021)[4]. To further examine the main variable of interest, Table II.2 shows the mean differences (t-tests) of managerial ability across the life cycle stages.

Table II.2
Univariate Test – Mean Difference Test

Variables	Acq_MA_Score	Tg_MA_Score	Difference
Full	0.052	0.003	0.048***
Panel A: Acquirer's Life Cycle Stage			
Acq_Introduction	-0.004	-0.007	0.003
Acq_Growth	0.033	0.001	0.032***
Acq_Mature	0.084	0.019	0.064***
Acq_Shake-out	0.083	-0.019	0.101***
Acq_Decline	0.028	0.013	0.014
Panel B: Target's Life Cycle Stage			
Tgt_Introduction	0.070	-0.008	0.078***
Tgt_Growth	0.057	0.016	0.040***
Tgt_Mature	0.034	0.006	0.027***
Tgt_Shake-out	0.037	-0.005	0.042**
Tgt_Decline	0.085	0.003	0.082***

I operationalize this test in three ways: First, I test overall management ability for acquirers compared to target firms, and find that, on average, acquirers have greater managerial ability than target firms. Second, I segregate the sample into the acquirer's life cycle stage, and I find that introduction and decline-stage firms present no significant difference in managerial ability; growth, mature, and shake-out stage firms present greater levels of managerial ability than their targets, on average. Third, I explore the target's life cycle stage, and find that acquirers have significantly greater managerial ability than their targets.

Table 3 shows the spearman correlation matrix.

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[4] *The New York Times* (2022, Oct 19) retrieved February 22, 2023, from
https://www.nytimes.com/2021/10/15/business/wall-street-banks-earnings-mergers.html

Table II.3
Correlation Matrix

#	VARIABLES	1	2	3	4	5	6	7
1	*Acq Mgmt_Ability*	1						
2	*Tgt_Mgmt_Ability*	0.296***	1					
3	*All cash*	0.034***	0.031	1				
4	*All stock*	0.009***	-0.029	-0.003	1			
5	*Diff_Ind*	-0.047	-0.032	0.004	-0.002	1		
6	*Hostile*	-0.011	-0.045	-0.012	-0.031	-0.021	1	
7	*Friendly*	-0.029	0.018	0.008	0.072***	-0.022	-0.345***	1
8	*Rel_Size*	-0.124	-0.026	-0.246***	0.126***	-0.081***	0.021	-0.015
9	*Tgt_ROA*	-0.134	0.081**	0.039	0.007	-0.010	0.013	0.0533*
10	*Tgt_Leverage*	0.004	-0.133***	-0.139***	-0.034	-0.047	0.024	-0.026
11	*Acq_Leverage*	-0.119***	-0.152***	0.018***	0.000	-0.015	0.020	0.009
12	*Acq_Liquidity*	0.170***	0.118***	-0.022***	-0.006**	-0.034	-0.0470*	-0.001
13	*Acq_Firm_Size*	0.032***	0.039	0.082***	0.032***	-0.034	0.0405*	-0.005
14	*IGRO*	0.019***	0.041	0.009***	-0.009***	-0.033	0.009	0.029
15	*ISHK*	0.040***	0.074*	0.009***	0.004	-0.011	0.000	-0.049

#		8	9	10	11	12	13	14
8	*Rel_Size*	1						
9	*Tgt_ROA*	0.023	1					
10	*Tgt_Leverage*	0.105***	0.022	1				
11	*Acq_Leverage*	0.136***	0.086***	0.288***	1			
12	*Acq_Liquidity*	-0.094***	-0.205***	-0.225***	-0.358***	1		
13	*Acq_Firm_Size*	-0.180***	0.0764**	0.187***	0.262***	-0.300***	1	
14	*IGRO*	0.048	0.024	0.036	0.032***	-0.013***	0.079***	1
15	*ISHK*	-0.093***	0.028	0.002	-0.015***	-0.030***	0.038***	0.337***

Spearman correlation matrix provides some hints about acquirers and targets characteristics. For example, I note a positive but low significant correlation between acquirer and target management ability (0.296***). This indicates that, on average, firms with high management ability are not intended to purchase another firm where the existing management team in at the same level of managerial ability. In sum, the overall analysis of correlation matrix helps to alleviate

the concerns about hazardous correlation about the explanatory variables, which could characterize multicollinearity. Even so, I test the Variance Inflation Factor subsequent to the estimations.

4.1.Linear Regressions

Before testing the main hypotheses, I test the assumption about the impact of life cycle stages on acquirer management ability via a linear regression model. After employing the basic OLS regression model, I proceed with the due tests to identify the appropriate functional form. Table II.4 summarizes the results:

Table II.4
Diagnostic, Adequacy, and Data Quality Tests

This table reports the results that enables the examination on the suitability of the functional form and other concerns after using an OLS regression. The employed model examines the impact of life cycle stages on acquirer management ability. *** p<0.01, ** p<0.05, * p<0.10.

Post-estimation Tests	Pooled	Fixed Effect	Random Effect
VIF	1.79		
Ramsey RESET test	F = 343.63***		
Omnibus (Doornik and Hansen) Test	D-H = 1.99e+04***		
Breusch–Pagan/Cook–Weisberg test	Chi^2 = 3495.26***		
Chow Test		F = 7.03***	
Breusch–Pagan Test			$Chibar^2$ = 64810.95***
Hausman Test			Chi^2 = 361.97***

Although the pooled regression indicates no multicollinearity issues (Average VIF = 1.79), other problems are identified: (1) Ramsey test rejects the null of adequate functional form (F = 343.63***), which suggests the problem of omitted variables; (2) Omnibus test rejects the hypothesis (D-H = 1.99e+04***) that the residuals are normal distributed; (3) Breusch–Pagan/Cook–Weisberg test rejects the null of constant variation of error term (Chi2 = 3495.26***), which signalizes the problem of heteroskedasticity. Collectively, these results suggest several concerns about the usual regression estimation. Subsequently, I test the approach that fit the dataset characteristics by employing the (4) Chow test. The null rejection (F = 7.03***) indicates the

existence of specific heterogeneity, where the same linear regression does not hold for different groups (firms) in the dataset (Chow, 1960). This means that the fixed-effect approach would be preferable compared to pooled estimation.

Moreover, (5) Breusch–Pagan Test suggests the random effect estimation (Generalized Least Squares - GLS) to be more appropriate than the polled one by rejecting the null (Chibar2 = 64810.95***). This result suggests random intercepts in each period that are not correlated with explanatory variables (Breusch & Pagan, 1980). (6) Hausman test rejects the null hypothesis (Chi2 = 361.97***) that the covariance between the unobservable error term (c_i) and regressors (X) equals zero. As a result, between the two options, fixed effect is preferable.

However, I find a negative adjusted R-square when I estimate the regression under the firm fixed effect approach. Then, I employ an alternative estimator that controls for multiple fixed effects (Industry and Year), with clustered errors by firm (Correia, 2016). Table II.5 shows the coefficients for the linear regression comparing usual fixed effect approach (column 1) with multiple fixed effect (column 2). I also verify robust estimations for firm life cycle persistence (columns 3 and 4).

Table II.5
Impact of Life Cycle Stages on Acquirer Management Ability

Variables are detailed in appendix A. Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.10. Control variables are omitted to ease the exposition, but I use the same as in previous models. Independent variables are all lagged.

	Dep. Var.: Acquirer Management Ability			
VARIABLES	*(1)*	*(2)*	*(3)*	*(4)*
	Life Cycle	*Life Cycle*	*Persist 2y*	*Persist 3y*
Acq_Introduction	-0.010***	-0.020***	-0.026***	-0.034***
	(-4.723)	(-8.431)	(-11.052)	(-11.833)
Acq_Growth	0.013***	0.006***	0.012***	0.015***
	(7.514)	(2.835)	(6.970)	(6.726)
Acq_Mature	0.010***	0.012***	0.015***	0.020***
	(6.212)	(6.137)	(10.792)	(13.268)
Acq_Shake-Out			0.007*	0.028***
			(1.851)	(4.140)
Acq_Decline	-0.017***	-0.019***	-0.011***	0.006

	(-7.151)	(-7.074)	(-3.288)	(1.214)
Leverage	**-0.031***	**-0.040***	**-0.040***	**-0.040***
	(-7.883)	(-12.315)	(-12.297)	(-12.171)
Liquidity	**0.020***	**0.088***	**0.084***	**0.083***
	(4.539)	(25.331)	(24.350)	(24.092)
Firm_Size	**-0.005***	**0.004***	**0.005***	**0.005***
	(-6.789)	(16.376)	(19.061)	(20.508)
IGRO	**0.008***	**0.007***	**0.007***	**0.007***
	(4.456)	(2.827)	(2.834)	(2.814)
ISHK	-0.004	**0.009****	**0.009***	**0.009****
	(-1.260)	(2.536)	(2.606)	(2.516)
Constant	**0.026***	**-0.038***	**-0.042***	**-0.043***
	(5.623)	(-14.697)	(-20.227)	(-21.333)
Firm FE	*Yes*	*No*	*No*	*No*
Year FE	*No*	*Yes*	*Yes*	*Yes*
Industry FE	*No*	*Yes*	*Yes*	*Yes*
Observations	*60,598*	*60,596*	*60,596*	*60,596*
Adjusted R-square	*-16%*	*14%*	*14%*	*14%*

Although the slight differences in the coefficients, the direction and significance of interest variables are the same: the management ability is consistently different across the life cycle stages. Using the full sample, the models estimated via multiple fixed effects approach explain 14% of firm's management ability variation. In the spirit of Habib & Hasan (2017), I find an "inverted-U pattern" of the acquirer's managerial ability, where the coefficients of growth and mature stages are greater than shake-out (omitted dummy), and the introduction and decline-stage firms have lower levels of managerial ability compared to shake-out firms. Results are robust to life cycle persistence in 2 or more years.

These results expands the Demerjian et al. (2012)'s findings about the life cycle effect on management ability. While prior study shows a positive relationship with firm's age, I indirectly show the management ability increases from introduction to mature stage, and then it decreases as the firm moves to the decline stage. Such difference supports the modern notion that firm's life cycle does not necessarily coincides with firm's age (Dickinson, 2011a).

Next, to test the hypotheses H_1, H_2, and H_{3a}, I firstly run a regression using the basic OLS estimator, which results in (1) an average VIF of 3.27, ruling out concerns about the multicollinearity; (2) reject the normal distribution of residuals (D-H: 499.35***), and also reject

constant variance of errors (chi2 = 4.45**). Moreover, using the OLS, the null hypothesis that the model has no omitted variables is also rejected (F= 4.88***). The Chow test rejects the pooled approach against the fixed effects (F=2.38***), Breusch and Pagan test rejects the pooled approach (Chibar2=3.06**) against random effects, and the Hausman test rejects the null (Chi2= 46.89***), which would indicate the fixed approach as the more appropriate to conduct the analyses. Nonetheless, my sample accounts for events, not for a traditional panel data.

The sample comprises only 39 firms (2%) of repeated IDs during the period of analysis. Therefore, there is less incentive to used firm fixed effect and more incentives to capture different aspects, such as industry and year. The firm fixed effects estimation loads virtually the same results, but evidence a high negative correlation between the residuals and the explanatory variables (-0.89). Due to all that, I employ an alternative estimator that controls for multiple fixed effects (Industry and Year) and is robust to heteroskedasticity (Correia, 2016) beyond clustering the errors by firm, following the recent literature (DeHaan, 2021; Donelson et al., 2022; Imperatore et al., 2021).

Table II.6 shows the results for the linear regressions that captures the impact of managerial ability transfer controlled by firm's life cycle on the M&A outcomes. I use both the previous year classification (Life cycle) and the Life Cycle Persistence in 2 or more years (Persist 2y) prior to deal announcement using two operational return perspectives: the change in the firm's ROA (Δ_ROA_ni) and the change in the industry-adjusted ROA ($\Delta\_ROA\_ni\_IND$).

Table II.6
Impact of Knowledge Transfer controlled by Acquirer's Life Cycle Stage on M&A Outcomes

Variables are detailed in appendix A. Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.10. Control variables are omitted to ease the exposition, but I use the same as in previous models. Independent variables are all lagged.

VARIABLES	Dep. Var.: Δ_ROA_ni		Dep. Var.: Δ_ROA_ni_IND	
	(1)	(2)	(3)	(4)
	Life Cycle Stage	LC Persistence	Life Cycle Stage	LC Persistence
knowledge Transfer	-0.001**	-0.000	-0.001**	-0.000
	(-2.138)	(-1.208)	(-2.198)	(-1.211)
Introduction	0.025	0.365***	0.026	0.368***
	(0.293)	(3.350)	(0.305)	(3.390)
Growth	0.015	0.006	0.014	0.006
	(0.417)	(0.404)	(0.408)	(0.377)
Mature	0.002	-0.009	0.001	-0.009
	(0.052)	(-0.562)	(0.035)	(-0.563)
Shake-out		-0.074		-0.073
		(-0.817)		(-0.797)
Decline	0.092	0.133	0.091	0.133
	(1.305)	(1.445)	(1.294)	(1.444)
knowledge Transfer * Acq_Life Cycle				
Introduction	-0.006*	-0.134***	-0.006*	-0.134***
	(-1.734)	(-2.830)	(-1.678)	(-2.858)
Growth	0.001*	0.000	0.001*	0.000
	(1.665)	(0.301)	(1.726)	(0.295)
Mature	0.001**	0.000	0.001**	0.000
	(2.209)	(1.493)	(2.263)	(1.480)
Shake-out		-0.024		-0.024
		(-1.199)		(-1.175)
Decline	-0.022	-0.026**	-0.022	-0.026**
	(-1.471)	(-2.345)	(-1.460)	(-2.335)
Constant	-0.041	-0.048	-0.043	-0.049
	(-0.508)	(-0.965)	(-0.523)	(-0.993)
Control	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Observations	306	306	306	306
Adjusted R-square	1%	16%	2%	16%

The number of observations decreases from 1.713 deals to 306 because I require the firms to have information in seven years (three years before and after the announcement year) to calculate the variation. The coefficient of determination (R-square) is 1% and 2% for the models that use the acquirer life cycle stages prior to deal, and 16% in the models that uses the life cycle persistence. Although I follow the existing literature to use as much control variables as possible, other factors may help to improve the model specification and power of explanation.

The only control variable significant is the relative size (Rel_Size) of the deal value, relative to the acquirer's market value. Indirectly, this variable captures the financial effort to purchase the target firm. On average, greater deals seems to increase the challenge to generate better outcomes. This result can be interpreted under two channels: or greater deals demand more complex integration (Grossman & Hart, 1986; Zollo & Singh, 2004), or overpayment inflates the relative size and compromise the financial structure after the deal (Dutta & Jog, 2009).

Examining the former perspective, I find a negative and significant coefficient for the variable Knowledge Transfer (-0.001**), which denotes an overall challenge to combine accrued knowledge of both firms to improve the firm's result. Analyzing this combination across the life cycle stage, I find a negative relationship between the knowledge transfer (from introduction-stage acquirer to targets) and the firm's operational return after the deal. Then, unlike the prediction in Hypothesis H_1, this denotes that the greater the acquirer managerial ability compared to the target's one the lower the operational profitability after deal. The results hold for both perspectives of operational return (-0.006* and -0.007*, respectively) and for the life cycle stages persistence form (-0.134*** and -0.139***). On the other hand, the negative relation could suggest an inverted knowledge transfer angle, as expected to decline-stage firms, where the target's management team has a greater managerial ability and then conduct the integration in the combined firm.

To better understand this result, I use a multinomial logit to test the impact of the acquirer's life cycle stage (prior to deal) on the probability to purchase target in specific life cycle stages. On average, I find that introduction-stage firms are more likely to acquire targets also at the introduction stage (results are reported in appendixes). Subsequently, I test whether the management team of an introduction-stage target can lead the acquirer also at the introduction-stage (prior to deal) to find better outcomes. Results (also reported in appendixes) show a positive and significant coefficient (1.421***), which signalizes that this combination (acq_intro x

tgt_intro) positively impacts the operational outcomes. However, I do not consider the knowledge transfer in this test not to incur in a triple interaction. Future researchers are invited to address this matter in more details.

I find that growth and mature firms achieve better outcomes when they conduct the integration and allocate the acquired resources. Aligned with expectation, growth and mature firms have established competences (Miller & Friesen, 1984), including consolidating contracts with clients and suppliers. In general, these firms benefit from greater knowledge about their markets, comparatively to firms in other stages (Dickinson, 2011a; Spence, 1977). Moreover, these results are aligned with Kogut & Zander (1993) about the timing to allocate acquired assets. Then, I confirm the hypotheses H_2 that growth and mature firms have better M&A outcomes the greater the knowledge transfer from acquirer to target.

For declining firms, I find a negative relation between knowledge transfer and operational return, other things equal (-0.026**), as predicted in hypothesis H_{3a}. This result holds for both perspective of operational return, but only when analyzing the persistence at the decline stage for two or more years. Again, although one could interpret this result as negative impact on change in ROA, I claim this significant coefficient stands for the knowledge transfer in the opposite direction. An acquisition is an even riskier movement for a decline-stage firm. In appendix, I show that decline-stage firms are more likely to acquire targets at the introduction and decline stages, and this can be viewed as "hail marry" to innovate and/or to survive. To illustrate this view, Figure II.2 shows the Demerjian et al., (2012)'s managerial ability values (rank) dividing the firms into those that achieve success (1), which means a positive variation of ROA, and (0) otherwise.

Figure II.2
Median values of acquirer and target managerial ability.
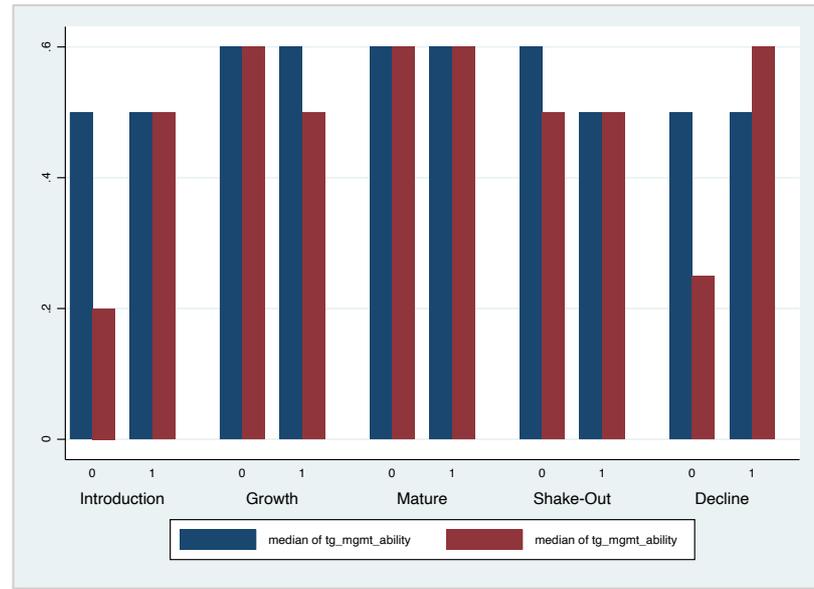
I note that decline-stage firms that appreciate positive variation of industry-adjusted ROA are those where the median values of target's managerial ability are greater than the acquirer's one. This result confirm the hypothesis H_{3a}, and is consistent with the literature about assimilating and transforming the target's knowledge into growth (Bae et al., 2020; Cohen & Levinthal, 1990).

For instance, Table II.7 shows the deals where the acquirers were at the decline stage prior to deal and the change in operating result suggest a successful deal.

Table II.7
Persistent Declining Firms with positive change in industry-adjusted ROA

Year	Acquirer Name	Target Name
2001	Alliance Pharmaceutical	Molecular Biosystems Inc
2003	GenVec Inc	Diacrin Inc
2015	Luna Innovations Inc	Advanced Photonix Inc
2009	Park City Group Inc	Prescient Applied Intelligence
2009	Tara Gold Resources Corp	Tara Minerals Corp
2017	Ultragenyx Pharmaceutical Inc	Dimension Therapeutics Inc
2016	Westport Fuel Systems Inc	Fuel Systems Solutions Inc
2004	Zhone Technologies Inc.	Sorrento Networks Corp

Analyzing these deals, I note that 62.5% are diversifying deals, and 37.5% are horizontal deals. This number of successful deals represent 36.3% of the deals where the acquirer is classified as persistent decline for two or more years. In other words, engaging in M&A to survive is significantly riskier for these firms, demanding a high level of managerial ability to conduct the process of integration to finally reach the expected results.

Collectively, my findings support the notion that the ability to drive the business must be consistent with the firm's life cycle stage since firms in different life cycle stages are expected to present different patterns of strategy and governance (Filatotchev et al., 2006; Jenkins & Kane, 2004b; Mueller, 1972).

4.1.1. *Alternative proxies for M&A outcomes*

I test two alternatives to consider deal outcomes. Table II.8 shows the results for Goodwill write-offs and the Cumulative Abnormal Return (CAR). Due to limited number of records in goodwill-related accounts, I use an indicator that assumes one if the firm reports a goodwill impairment in the fiscal year subsequent to acquisition or in any of the three subsequent periods. Then, positive signal indicates worse M&A outcomes. The CAR is calculated using a window of three days around the deal announcement.

Table II.8
Impact of Managerial Ability controlled by Acquirer's Life Cycle Stage on M&A Outcomes

Variables are detailed in appendix A. Robust t-statistics in parentheses *** p<0.01, ** p<0.05, * p<0.10. Control variables are omitted to ease the exposition, but I use the same as in previous models. Independent variables are all lagged.

VARIABLES	Dep. Var.: GW_Imp3		Dep. Var.: CAR (-3; +3)	
	(1)	(2)	(3)	(4)
	Life Cycle Stage	LC Persistence	Life Cycle Stage	LC Persistence
knowledge Transfer	-0.003	0.000	0.000	**0.000***
	(-1.100)	(0.647)	(0.443)	(2.687)
Introduction	0.122	**-0.233**	0.028	0.052
	(0.981)	(-2.120)	(0.666)	(0.634)
Growth	0.120	-0.078	-0.006	0.006
	(1.268)	(-1.153)	(-0.238)	(0.366)
Mature	0.088	**-0.123***	-0.024	-0.007

	(0.925)	(-1.654)	(-0.924)	(-0.466)
Shake-out		0.122		**0.072***
		(0.597)		(2.825)
Decline	**0.297**	0.003	-0.027	**-0.154***
	(2.048)	(0.017)	(-0.630)	(-4.446)
knowledge Transfer * Acq_Life Cycle				
Introduction	**0.019***	**0.210***	-0.002	**0.186***
	(1.652)	(3.691)	(-0.408)	(3.068)
Growth	0.003	**-0.005***	-0.000	-0.002
	(1.107)	(-1.765)	(-0.059)	(-1.472)
Mature	0.003	-0.000	-0.000	-0.000
	(1.004)	(-0.323)	(-0.317)	(-1.275)
Shake-out		**0.056***		**0.009***
		(1.920)		(1.829)
Decline	**-0.078***	**-0.083***	**-0.054***	
	(-3.331)	(-3.096)	(-4.566)	
Constant	0.061	**0.325***	0.011	0.044
	(0.348)	(1.949)	(0.248)	(1.272)
Control	*Yes*	*Yes*	*Yes*	*Yes*
Year FE	*Yes*	*Yes*	*Yes*	*Yes*
Industry FE	*Yes*	*Yes*	*Yes*	*Yes*
Observations	*453*	*453*	*300*	*300*
Adjusted R-square	*3%*	*3%*	*9.0%*	*9.7%*

First, all estimations are significant at 1% or 5%. to explain the dependent variables variation, explaining 3% and 9%, respectively. In the specific case of goodwill recognition, I use the same linear estimator since the intention is not to specify the odds ratio, but to indicate the direction of the association. I find that introduction-stage firms are more likely to recognize goodwill impairment subsequent to acquisitions as the knowledge transfer increases. Goodwill impairment for introduction-stage firms can arise from, at least, three channels: overpayment, bad choice of target, or market changes. All of them potentially reveal the fact that introduction-stage firms are dealing with riskier projects, with lower background. These scenarios concur with the previous findings about lower operational return.

On the other hand, the market participants positively evaluate these acquisitions since I observe higher cumulative abnormal returns as the knowledge transfer increases from introduction-stage acquirers to target (0.186***). Though I note that this result load only for acquirers that persist at the introduction stage. I view this result as a reflect of the market *ex-ante* perspective.

Although the literature shows that market has long been anticipating the firm's performance and then adjusting the stock price (Ball & Brown, 1968), the M&A is distinct event that enhance the uncertainty about the combined firm.

For growth-stage firms, I find a significantly negative effect on the likelihood to recognize goodwill impairment subsequent to acquisition as the knowledge transfer increases, but only when the firm persists at the growth stage (-0.005*). This result concurs with the prediction (H_2) that growth stage firms with greater managerial ability seek adequate targets to timely integrate the business in order to achieve the expected results (Kogut & Zander, 1993). The market viewpoint, though, is different. I find neither significant result for growth nor for mature-stage firm. I interpret the nonsignificant coefficients as a response to ongoing business, where market participants can better predict the outcome, since they have more stable earnings generation (Dickinson, 2011a). Then no abnormal return is perceived, since the expectation is better calibrated for firms in these stages (Vorst & Yohn, 2018).

The interpretation of decline stage-firms is again challenging. Assuming the inverted knowledge transfer, as mentioned in previous subsection, the effect on goodwill impairment is positive. Similar to the interpretation of introduction-stage firms, decline-stage firms have lower bargain power. As a result, they are more likely to overpayments. Even considering this possibility that reduces the net income, the inverted knowledge transfer result in better accounting performance. This result is aligned with prior literature (Ames et al., 2020; Sun & Zhang, 2017) that indicates greater propensity to overpay. On the other hand, to the extent the target-firm transfer their managerial ability to acquirer, the firm appreciate a higher cumulate abnormal return (-0.054***). In other words, the market participants absorb the information as a driver of success, assuming a recovering for the so far deteriorating firm. This also reveals that because decline-stage

firms have great amount of uncertainty, the stockholders positively value the new perspective considering the upcoming knowledge, perhaps through a turnaround on the business model.

Diversifying deals under new management can be viewed as facilitating the penetration in new markets (Ib Löfgrén et al., 2020). However, I find no significant result for the variables of interest when I examine the type of deals (horizontal, vertical, and diversifying. The absence of significance can be explained by different reasons, but mainly due to the few numbers of observation. Therefore, my result does not validate the hypothesis H_{3b} about the inverted knowledge transfer effect on diversifying deals where the acquirer is at the decline stage.

5. Conclusion

This paper addresses the question of how the knowledge transfer controlled by the firm's life cycle stage impacts the M&A outcomes under the acquirer point of view. The literature indicates the knowledge transfer adequacy as a determinant factor of success in M&A deals, and I show how firms in different life cycle stages achieve better M&A outcomes. While firms at the introduction, growth, and mature stages pursue M&A to grow, declining firms engage in M&A to survive. On average, M&A deals end up with decreases in both operating and market results. This supports the notion that more important than the motivation to engage is the mechanism to succeed. This paper uses the knowledge transfer approach as this mechanism, controlling for the firm life cycle.

First, I find the impact of the life cycle stage on the acquirer management ability. In addition, consistent with predictions, I find that growth and mature firms find greater improvement in operational return, compared to the industry median, when the knowledge transfer flows from the acquirer to the target, and the opposite is true for consistently declining firms. Collectively, the results support the idea of absorptive capacity as a governance mechanism to strategically combine

knowledge in order to reach the success (Gorton et al., 2009; Zollo & Singh, 2004), depending on the firm's life cycle stage (Demerjian et al., 2012).

My findings contribute to at least three perspectives. *First*, I contribute to the life cycle stage and M&A literatures by showing an M&A outcomes theoretical driver to be sensitive to the firm's life cycle stages. Then, my findings expand prior literature (Ames et al., 2020; Dickinson, 2011; Miller & Friesen, 1984; Owen & Yawson, 2010) with a new perspective of life cycle impact. I also validate the robust analysis of firm life cycle stage using a persistence in each stage for 2 or more years. Then, future researchers should analyze the persistence in each stage in order to verify the consistence of firm life cycle, since the 5-stage measure enables a non-progressive changing.

Second, my findings contribute to financial analysts and financial advisors, who can assess both firms' life cycle stage and the expected flow of knowledge transfer as a mechanism to predict better outcomes. Moreover, these intermediary parties can contribute to the way investors interpret the coming event, and I show results consistent with Dickinson et al. (2018) about the undervaluation of firms in a riskier stage.

Third, the findings contribute to managers, potential participants of an M&A deal, both as acquirers as targets, including institutional investors. Prior research cast some concerns about an absence of fit when merging two firms (Lengnick-Hall & Lengnick-Hall, 1988; Milliman et al., 1991; Zollo & Singh, 2004). Then, my finding supports the arguments of Ruth et al. (2013) of managerial ability to properly conduct the integration process with the acquired firm resources.

Future research can exploit further characteristics to assess the individual ability of firms' management teams across life cycle stages during M&A deals. In addition, future research may investigate eventual changes in the management team periods before the decision to engage in the M&A. Finally, further exploitation of the goodwill perspective of deal success and different specifications while calculating the CAR may help explain the results.

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Appendix II.A

Variable	Description	Reference
Dependent Variables		
Ind-Adj Δ_ROA	Change in ROA. Measured as the difference between three-year benchmark-adjusted ROA after the acquisition and three-year benchmark-adjusted ROA before the acquisition. Benchmark is the 2-digit SIC firms. ROA is calculated by dividing the net income (Compustat item #02) to total asset (Compustat item #06)	Chen (2018)
GW_Imp3	Indicator that assumes one if the firm reports goodwill impairment (GDWLIP – Compustat #368) in the fiscal year the acquisition is completed (year t) or either of the three years subsequent to the completion, and zero otherwise.	Chen (2018)
Δ Goodwill	Change in the amount of goodwill recognized subsequent to an acquisition. Measured as the change in GDWL (Compustat item #204) scaled by Total Asset (Compustat #item 06). Alternatively, I use the change in two, three, and four years.	Gu & Lev (2011); Chen (2018)
CAR	Acquirer cumulative abnormal return measured over three days around the acquisition announcement. Abnormal return is the excess of return considering the Fama-French factor model.	Barber and Lyon (1996); Chen (2018)
Independent Variable		
Mgmt_Ability	Management Ability is the residual from a firm efficiency function. This variable is retrieved from https://peterdemerjian.weebly.com/managerialability.html	Demerjian et al. (2012)
Knowledge_Transfer	Acquirer's management ability divided by target's management ability measure. Positive values denote transference from acquirer to target, and negative values represent the transference in the opposite direction.	
Deal-related Control Variables		
All_Cash	Indicator that assumes one if the acquisition was financed at least 90 percent by cash, and zero otherwise	Chen (2018)
All_Stock	Indicator that assumes one if the acquisition was financed at least 90 percent by acquirer's stocks, and zero otherwise	Chen (2018)
Diff_Ind	Indicator that assumes one if the acquirer and the target are in different industries based on 2-digit SIC code, and zero otherwise	Chen (2018)
Hostile	Indicator that assumes one if the acquisition was achieved through a hostile takeover, and zero otherwise	Chen (2018)
Rel_Size	Relative deal size. Measured as the ratio of the transaction value to the market value of the bidder.	Chen (2018)
Target_ROA	Target return on assets for the year ended before the announcement year, measured as operating income before depreciation scaled by average total assets	Chen (2018)

Target_Lev	Target's pre-acquisition leverage. Measured as the sum of long-term debt and short-term debt deflated by total assets at the fiscal year-end prior to an acquisition announcement	Chen (2018)

Firm-related Control Variables

FCF	Ratio of cash flow from operations minus Capital Expenditures to Total assets	Owen & Yawson (2010)
ROA	Ratio of income before extraordinary items to the total assets	Hasan & Habib (2017) and Owen & Yawson (2010)
FirmSize	Natural logarithm of total assets	Hasan & Habib (2017) and Owen & Yawson (2010)
MTB	Ratio of the market value of common equity to the book value of common equity	Hasan & Habib (2017) and Owen & Yawson (2010)
Leverage	Ratio of total debt to total asset	Ames et al. (2020); Hasan & Habib (2017); Owen & Yawson (2010)
Liquidity	Ratio of cash and marketable securities to total assets.	Owen & Yawson (2010)
IGRO	Previous 5 years growth in sales	Owen & Yawson (2010)
ISHK	Absolute difference between an industry's 5-year growth rate in sales and the average 5-year growth rate in sales across all industries	Owen & Yawson (2010)

Table II.9
Multinomial Logit for the Impact of Acquirer's Life cycle Stage on the probability to acquirer firms at different life cycle stages.

Variables are detailed in appendix A. *** p<0.01, ** p<0.05, * p<0.10. Control variables are omitted to ease the exposition, but I use the same as in previous models, except those related to the target-firm. Independent variables are lagged.

VARIABLES	(1) Tgt_Introduction	(2) Tgt_Growth	(4) Tg_Shake_Out	(5) Tgt_Decline
Acq_Introduction	**1.871***	0.970	0.094	0.932
Acq_Growth	0.679	**0.848**	-0.496	-0.231
Acq_Mature	-0.337	0.124	-0.456	**-1.298***
Acq_Decline	**1.982**	0.731	0.696	**1.656*
Constant	-1.255	**-2.016***	-0.110	-1.118
Control Variables				Yes
Observations				780
Pseudo R-Square				9.3%

Table II.10
Combined Impact of Acquirer's and Target's Life cycle Stages on the M&A outcome

Variables are detailed in appendix A. *** p<0.01, ** p<0.05, * p<0.10. Control variables are omitted to ease the exposition, but I use the same as in previous models, except those related to the target-firm. Independent variables are lagged.

VARIABLES	Coef.	Dep. Var.: Δ_ROA_ni_IND Robust t-stat
Acquirer Life Cycle Stage		
Introduction (A)	**-1.141****	(-2.455)
Growth (B)	0.015	(0.299)
Mature (C)	0.037	(0.866)
Decline (D)	0.148	(1.110)
Target Life Cycle Stage		
Tgt_Introduction (A*)	0.029	(0.490)
Tgt_Growth (B*)	0.056	(1.180)
Tgt_Mature (C*)	0.032	(0.568)
Tgt_Decline (M*)	-0.008	(-0.126)
(A) x (A*)	**1.421****	(2.921)
(A) x (B*)	**1.283****	(2.701)
(A) x (C*)	**1.203****	(2.565)
(A) x (D*)	**1.554****	(3.150)
(A) x (A*)	-0.020	(-0.287)
(B) x (B*)	-0.022	(-0.390)
(B) x (C*)	-0.026	(-0.419)
(B) x (D*)	0.109	(1.417)
(C) x (A*)	-0.011	(-0.178)
(C) x (B*)	-0.060	(-1.214)
(C) x (C*)	-0.032	(-0.550)
(C) x (D*)	-0.009	(-0.106)
(D) x (A*)	-0.133	(-0.822)
(D) x (B*)	-0.115	(-0.838)
(D) x (C*)	-0.247	(-1.321)
(D) x (D*)	0.173	(1.034)
Constant	-0.066	(-1.030)
Control		Yes
Year FE		Yes
Industry FE		Yes
Observations		468
Adjusted R-square		0.39

Chapter III - The spillover effect of shareholder activism on target-sought fairness opinions

Abstract

Active shareholders are increasingly proactive over their invested companies, especially when the invested firm is about to be acquired. This paper provides new evidence on how activist shareholders discipline the firm management and how they indirectly impact the financial advisors in elaborating the fairness opinion (FOs) during M&A deals. Using a hand-collected fairness opinion database comprising US deals announced between 2000 and 2020, I hypothesize that, in the presence of activist shareholders, financial advisors better incorporate the financial information about investment efficiency to provide FO valuation. Results are consistent with predictions but sensitive to some factors. Specifically, (1) I validate that activist shareholder ownership is associated with a greater likelihood of balancing the investment in new projects with the internal capital generation (*benchmark firms*). (2) I validate that firms increase the financial report quality after the activist shareholders' scrutiny. (3) I provide evidence that the higher the ownership of activist shareholders in firms that invest more efficiently, the greater the likelihood of a positive bias in the FO valuation. Positive bias is a favorable difference between the expected value calculated in the valuation and the actual amount agreed upon in the transaction. (4) As the activists' ownership increases in firms classified as benchmarks, the difference between the FO valuation best-case scenario and deal value reduces. In other words, I show that activists help to assure the reasonableness of management investment forecasts. The results are subjected to several robustness checks, including the particular declared motives for activism to account for endogeneity issues. Collectively, overall results strengthen the role of fairness opinion as a negotiation tool when activists exercise their disciplining role.

Keywords: Fairness opinions; Deal negotiation; Activists; Mergers and acquisitions; Valuation.

1. Introduction

This paper examines the role of activist shareholders on the valuation attributes incorporated into target-sought fairness opinions (FOs) during mergers and acquisitions deals (M&A). Corporate governance theory suggests that large shareholders can induce value creation by reducing agency costs of a firm (Corum & Levit, 2019; Shleifer & Vishny, 1997). There are conflicting views about the consequences of shareholders actively participating in the board decisions. On one hand, practitioners and critics have been labeling activist shareholders as "vulture lord", "corporate raider", and "short-term predators", blaming them to generate externalities such as cut-backs in long-term investment as well as to manage delegated blocks ("wolf pack") to collectively influence the firm's control when they are no part of a group pursuant to Section 13(d)(3) of the Securities Exchange Act of 1934 (Admati & Pfleiderer, 2009; Coffee Jr. & Palia, 2016; Dasgupta & Piacentio, 2015; Hotchkiss & Mooradian, 1997; Klein & Zur, 2009). In an anecdotal case, the management of Verint Systems Inc (VRNT) recently reported the 10K (Fiscal Year 2021) saying that "these activist investors may disagree with decisions we have made or may believe that alternative strategies or personnel, either at a management level or at a board level, would produce higher returns. Such activists may or may not be aligned with the views of our other stockholders, may be focused on short-term outcomes, or may be focused on building their reputation in the market".

On the other hand, prior evidence indicates that activists create value by influencing the firm's corporate policies by closely monitoring the management decisions (Albuquerque et al., 2022; Aslan & Kumar, 2016; Boyson et al., 2017; Brav et al., 2008; Klein & Zur, 2009; Krishnan et al., 2016). Further, recent result shows that activists hinder overinvestments (Deb et al., 2019; Richardson, 2006). In this study, I draw this conflicting setting under the scenario of M&A,

specifically by the sell-side (target), which is a unique opportunity to observe economic agents other than shareholders and managers in action.

In a circumstance of M&A, activist shareholders raise their skepticism over the management because target-firm CEOs would have private incentives to facilitate the deal completion. Consistent with this view, prior evidence shows that CEOs of firms surrounded by M&As are repeatedly incentivized by bidders to complete the deal in charge of golden parachutes, job positions, or other private benefits (Harford, 2003; Ishii & Xuan, 2014; Kisgen et al., 2008; Lambert & Larcker, 1985; McLaughlin, 1990).

Activists help overcome informational frictions such as when the target management failing to properly perform due diligences or to work for optimal terms from bidder (Corum & Levit, 2019; Fich et al., 2015; Jiang et al., 2018). Then, shareholders' disagreement may cause the delay or a failure of a deal (Boyson et al., 2017; Jiang et al., 2018) or even increase the litigation risk after the deal completion (A. Boone et al., 2019; Jetley & Ji, 2015).

Even though close monitoring can be viewed as a channel to increase firm value, the evidence are mixed concerning the relationship between activists and financial reporting quality (Adams & Neururer, 2020; Biddle et al., 2009). Financial reporting is a critical source of information for financial advisors to evaluate the firm prospectus in the fairness opinion. This valuation is a key component in the M&A process, that can play significant roles in this institutional tension: supporting the price negotiation (ex-ante) and justifying the price to investors (ex-post). Although theses tensions are not mutually exclusive, this paper mostly addresses the former by examining the mechanisms under which financial advisors formulate the target valuation.

The advisor's opinion relies on estimated numbers that can be adjusted during the due diligence process, which usually takes several months (Denis & Macias, 2013; Wangerin, 2019a). At the end of this process, the financial advisor meets the board, sometimes along with an auditor

but in the absence of any representative of minority shareholders (Swidler et al., 2019), to present the valuation and its assumptions for peer selection, capital expenditures, growth expectation, and exposure to risk. After the board consent, the advisor formalize the Fairness Opinion (FO) that will compose the paperwork to be sent to investors so they can digest the rationale behind the numbers, compare the range of prices estimated by the advisor with the bidder offer, and finally vote for or against the deal (Cain & Denis, 2013; Davidoff, 2006; Wangerin, 2019).

This paper answers a call for "more granular examination of individual activities and decisions, a more com- prehensive analysis of the interplay among the different actors involved in the pre-deal phase" (Welch et al., 2020, p. 843). The institutional setting of M&A exhibits different tensions where acquirers pursue the lower price to achieve the best result post-acquisition, while targets are seeking for the highest price possible, but target's CEOs have private incentives to facilitate the deal, which can deteriorate the target's shareholder wealth. Meanwhile, external deal advisors also have incentives to accelerate the deal in order to receive contingent fees (Cain & Denis, 2013; Imperatore et al., 2021; Kisgen et al., 2008; McLaughlin, 1990; Shaffer, 2019, 2020). Therefore, I shed light to the frictions potentially generated among the bidders, target CEOs, deal advisors, and activist shareholders to analyze the extent to which activists affect the target management incentives when hiring the financial advisor and how some valuation attributes are considered by such an external analyst in M&A deals.

Specifically, this paper answers the question of *whether and how activist shareholders affect the quality of fairness opinion.* I assess this tension via two different channels: *Indirectly*, by improvements in corporate governance practices, which may result in higher financial reporting quality and more efficient investment decisions (Albuquerque et al., 2022; Aslan & Kumar, 2016; Biddle et al., 2009; Krishnan et al., 2016; PwC, 2022); and *directly*, by examining whether the board is picking the advisor (adverse selection). In other words, activist shareholders would

pressure the board to select unbiased target advisor (Gan & Lee, 2020), and then reduce agency costs.

To rule out any concern about endogeneity, I anticipate I also scrutinize granular data of activism in robustness tests: I examine the declared motives of activists when they file the Schedule 13D (when investors undertake more than 5% and have intention to influence the control), instead of the 13G (when there is no intention), with SEC. Moreover, I state that activist shareholders have no access to the ongoing process, so the deal and activists are conceptually independent bodies. These subjects are better discussed in Section 4.

The quality of advisory can have indirect impact on the quality of M&A, in terms of deal premium and shareholder's wealth, but also due to deal with the projection of operational improvement. However, the literature has shown little or mixed evidence on these topics (Cain & Denis, 2013; Eaton et al., 2021; Imperatore et al., 2021; Kisgen et al., 2008; Shaffer, 2020). One of the issues is the independence of the advisor. A large proportion of the advisory fees are contingent to the deal conclusion. As a result, contingent fees would incentivize the deal advisors to reduce the target valuation, making the bidder offer seems to be more generous, facilitating its acceptance by the target shareholders (Cain & Denis, 2013; Imperatore et al., 2021; Kisgen et al., 2008; McLaughlin, 1990; Shaffer, 2019, 2020). Meanwhile, complex deals increase the demand for top-tier deal advisors (Kisgen et al., 2008; Song et al., 2013), which produce more accurate valuations than lower-tier advisers (Cain & Denis, 2013).

First, I follow Biddle & Gilles (2006) to assume that higher financial reporting quality is associated with future investment efficiency. Further, Biddle et al. (2009) evidence that accounting quality reduces future investment for firms more prone to overinvest. Also, the mentioned study also evidences the presence of institutional investors to be negatively associated with the likelihood of overinvesting. Although institutional investors are not necessarily synonym of activist investors,

I predict that advisors incorporate the presence of activist shareholders as a signal of greater investment efficiency (Deb et al., 2019). Consistent with the predictions, I find significant results to validate my assumption that activists are associated with the likelihood of a firm to become a benchmark in terms of investment efficiency. This is aligned with arguments and findings on existing literature (Brav et al., 2008; Coffee Jr. & Palia, 2016), where activists indeed propose strategic remedies to success, although the negative arguments and comments that seem to be based on anecdotal evidence (Dasgupta & Piacentio, 2015; Hotchkiss & Mooradian, 1997)

Other sources of conflicts of interests between target shareholders and target managers also seem to reduce the Fairness Opinion (FO) valuation, such as management buyouts deals (Eaton et al., 2021) and high litigation risk (Imperatore et al., 2021). Both behavior patterns might be understood as paths to facilitate the deal and receive the contingent fees. In some circumstances, though, activist shareholders hire a private financial advisor to contest the management about an offer allegedly bellow the "fair" price (Jiang et al., 2018).

My hypotheses are primarily developed under an assumption of greater demand for financial information from activists and that better reporting quality has implications on fairness opinion. Consistent with this view, Bourveau & Schoenfeld (2017) indicate that activists are satisfied with more voluntary financial information (earnings and sales forecast). In turn, Chen (2019) provides evidence that accounting report characteristics have implications on the selection of peer comparable firms. Finally, when the conflict of interest is high, the incentives to hire multiple fairness opinion increases with the financial reporting quality (Liu, 2020).

Then, assuming the final deal price as the fair value of the transaction, I use the difference between the target-sought valuation and the deal value is the "accuracy" of the fairness opinion valuation. Therefore, consistent with the arguments and evidence above, I predict the presence of activists to be positively related to greater FO accuracy and that activists are associated with

positive differences or "positive bias". The expected relations denote that financial advisors do consider the presence and scrutiny of activist shareholders by disciplining the management about investments decisions in their projections. In other words, I test a mechanism under which activists create an incentive (or limit the opportunism) for advisors to provide higher quality fairness opinion valuation, and then to improve its relevance to shareholders as a price negotiation tool.

An alternative view is that the sense of shareholder's wealth extra protection is limited to the return that activist shareholders have already achieved before the merger announcement. Another view is that activists do not concern the service rendered by the advisor because they have other ways to increase their wealth. This understanding finds support in a sharp increase of merger appraisals claims (or "dissenters' rights") on the form of appraisal arbitrage after merger (Boone et al., 2019; Denes et al., 2017; Jetley & Ji, 2015). Then, if activists do not care about the fairness opinion, there will be no differences on the valuation attributes between firms with activist investors and firms without. Likewise, there will be no effect of the relative size of activists on the voting board over such valuation inputs.

Because valuation bias is a fraction of FO Valuation divided by Deal Offer, its variation can be driven by fluctuations in the numerator as well as in the denominator. Thus, I provide additional tests to rule out a concern about positive bias being derived from an eventual downgrade in the offer, and not from the Fairness Opinion valuation.

I obtain US M&A deals announced between 2000 and 2021 from SDC Platinum, following the literature to include only publicly traded US target firm and deal greater than US $10 millions (Boyson et al., 2017). I also require bidders to own less than 50% of the target's stock before the bid and more than 50% after the deal. Shareholders' activism is proxied by the Schedule 13D filed with SEC (Albuquerque et al., 2022; Boyson et al., 2017; Brav et al., 2008; Renneboog & Szilagyi,

2011), while Fairness opinion valuations data are obtained by a hand-collected database from EDGAR/SEC filings (Imperatore et al., 2021).

Consistent with the predictions, I find a significantly positive signal for the relation between the presence of activists and the fairness opinion valuation attributes. Collectively, the results enlighten the role of activist shareholders on firms' investment efficiency and on financial reporting quality, which are key components of valuation in an M&A process. These results clarify previous findings which suggest that fairness opinions information do not affect the target shareholders' wealth (Fich et al., 2015; Kisgen et al., 2008), and add incremental information to Cain & Denis (2013)'s findings by pointing that activist shareholder participation has implication on financial reporting quality and greater efficiency, leading to a greater fairness opinion accuracy.

Fich et al. (2015) shows that institutional investors are motivated monitors to the extent that the target company is more representative in their portfolio. The authors find no association between investors who undertake positions between 5% and 10% of target shares (classified as "blockholders") and a downward bid revision during the M&A process. Such an association is only found for investors who undertake more than 10% of target shares ("institutional investors"). Notably, the mentioned research does not examine the real intention of such a scrutinization of the management (via Schedule 13D), not even explore the financial advisors' incentives and idiosyncrasies. Different from prior, my intuition is that activists influencing power exceed the size of their position, and the effects of their stakes are driven by their kinds as well as by their assumed interests on the company decisions.

The results of my research contribute to three streams of the M&A and corporate governance literature. First, the aggregate of the recent literature points towards the notion that financial advisors have limited idea of the potential implications of their choices while selecting

their valuation inputs. My results shows that advisor's private interests and agency conflicts are weakened by activist shareholders.

Second, while a handful of empirical studies focus on observable actions (e.g., proxy fights, litigation, public campaign), I am focused to reveal the effects of the engagement behind the scenes via an indirect mechanism prior to deal (Levit, 2019). Then, the evidence of a positive effect of the active monitoring role of informed large shareholders should be regarded as an extra protection for the minority ones (Deb et al., 2019; Richardson, 2006). In the spirit of Alchian & Demsetz (1972), the activists shareholders are the specialized monitors that discipline the management team and increase overall shareholders' wealth.

Third, practitioners and regulators have expressed concern about the conflict of interest generated in M&A deals. My results evidence an extra condition when the conflicts of interests are potentially enhanced and how the related cost of agency can be reduced. To our knowledge, this is the first study to directly address this issue. The role of activism arises when these shareholders maintain their positions seeking to induce changes that will benefit themselves and the minorities (Renneboog & Szilagyi, 2011).

The remainder of the paper proceeds as follows. I develop the testable hypotheses in Section 2. In Section 3, I describe the sample selection, the sources of data, and the econometric models. In section 4, I present the research design, the main results, alternative economic explanations, and perform some robustness tests. I finally offer a conclusion in Section 5, with contributions and avenues for future research.

2. Background and Hypotheses Development

2.1. Shareholders' Activism

Under the 1934 Securities Exchange Act, investors (individually or as a group of investors) are required to file a Schedule 13G in case of purchase of 5% or more of firm shares, whereas there

is no intention to change or to influence control over the issuer, so this configures a "passive investor". This filing is duty under 45 days after the calendar year (Rule §240.13d.). On the other hand, when those investors declare the intention to change or to influence the control, they are characterized as "activist shareholders", and they have 10 days to file the Schedule 13D (and 13D/A in case of variation of 1% on the holdings). Schedule 13D is also required for purchases greater than 20%, regardless the intention.

Recently, the SEC proposed an amendment to the Regulation 13D-G to accelerate the filing deadlines for Schedules 13D from 10 to 5 days in order to reduce the information withholding from other shareholders and enable timely market moving (SEC, 2022). The SEC has expanded their concerns about institutional investors intervention with some initiatives such as 14a-8 Rule (governing shareholder proposal and director nomination), 14a-11 Rule (proxy access for director nomination), Dodd-Frank Act, and Say-on-Pay votes Rule (Ertimur et al., 2011; SEC, 2011).

Scholars have been casting doubt about the role of large institutional investors on public firms (Ferreira & Matos, 2008; Greenwood & Schor, 2009; Hotchkiss & Mooradian, 1997). Practitioners and commentators allege hedge funds to destroy companies via short-term strategy. See, for example, such rhetoric on *The Wall Street Journal* (April 22nd, 2015), where the CEO of BlackRock says that activists "can jeopardize a company's ability to generate sustainable long-term return[5]". Another example is found on *Forbes* (October 30th, 2019), where the criticism is that "private equity companies are not job creators. In fact, private equity firms cause significant unemployment[6]".Scholars have been casting doubt about the role of large institutional investors on

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[5] *The Wall Street Journal* (2015, April 22) retrieved October 10, 2022, from https://www.wsj.com/articles/the-surprising-market-response-to-activist-hedge-funds-1429743683
[6] *Forbes* (2019, October 30) retrieved October 10, 2022, from https://www.forbes.com/sites/mayrarodriguezvalladares/2019/10/30/private-equity-firms-have-caused-painful-job-losses-and-more-are-coming/?sh=22eb9e917bff

public firms (Ferreira & Matos, 2008; Greenwood & Schor, 2009; Hotchkiss & Mooradian, 1997).

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See, for example, such a rhetoric on *The Wall Street Journal* (April 22nd, 2015), where the CEO of

BlackRock says that activists "can jeopardize a company's ability to generate sustainable long-

term return[7]". Another example is found on *Forbes* (October 30th, 2019), where the criticism is that

"private equity companies are not job creators. In fact, private equity firms cause significant

unemployment[8]".

However, the shareholder theory predicts that large investors exert a greater monitoring

role, influencing the management to make better decisions to the firm (Alchian & Demsetz, 1972;

Grossman & Hart, 1980; Shleifer & Vishny, 1997). The empirical results sustain that different

institutional investors have different interests on firms' long-term value, taking different attitudes

to reach their goals (Borochin & Yang, 2017).

When some activist shareholders are not comfortable with the ongoing situation of the firm,

there are evidence that activists influence CEO compensation reduction (Brav et al., 2008), cuts in

R&D and capital expenses (Klein & Zur, 2009a), sometimes resulting in unwanted loss of human

capital for the firm (Chen et al., 2021). In more extreme cases, activist shareholders launch activism

campaigns (*e.g.* press release, traditional, and social media) as the ultimate attempt to induce a

change on the firm management and/or operation (Chapman et al., 2021; Del Guercio et al., 2008;

Hotchkiss & Mooradian, 1997; Krishnan et al., 2016).

Conversely, extent literature has shown that firms realize higher operational performance

after being targeted by activists shareholders (Albuquerque et al., 2022; Aslan & Kumar, 2016;

Krishnan et al., 2016), and market reacts favorably to this sort of intervention in the short and long-

term (Boyson et al., 2017; Brav et al., 2008; Chen et al., 2021; Klein & Zur, 2009). The explanation is that large shareholder, such as hedge funds, are able to create value when they observe management inefficiencies in terms of internal control, financial reporting quality, and investment decisions.

Unravelling the different patterns, Brav et al. (2008) clarify that hedge funds, different from mutual and pension funds, are not subject to regulation, and are able to hold concentrated position (leverage being considered) in a small number of companies. Meanwhile, mutual and pension funds are more subject to conflicts of interest since these groups of investors are beholden to the management of the invested firm. Then, hedge funds would be relatively better positioned to act as informed investors.

Consistently, evidence on literature show that activists, who are informed investors, influence firm's corporate policies, generating productive efficiency, lower agency cost, and increase operational performance in short and long-term (Boyson et al., 2017; Greenwood & Schor, 2009). In addition, investors with small position and high portfolio turnover (also termed "transient") are more likely to be myopic traders, while the "dedicated" ones usually invest for the long-run of the firm, taking into consideration strategic activities such as M&A (Borochin & Yang, 2017; Bushee, 1998).

2.2. Activist Shareholders and M&A activities

M&A is one of the most significant event in a firm, because the traditional conflict of interest (Jensen & Meckling, 1976) is severely enhanced between managers and shareholders (type II agency problem), especially when activists undertake position on the firm (Harford, 2003; Shleifer & Vishny, 1997). All economic agents involved are committed to satisfying their utility curves. See, for example, *The Wall Street Journal*, February 2nd, 2022, where Sharon Bell, a leading equity strategist at Goldman Sachs Group Inc. says that the "opportunity to restructure businesses

and improve returns that have been low in recent years makes the U.K. attractive to activist investors, private equity or other global investors"[9]. This illustrates how some activist investors can move the directions in order to satisfy their responsibilities along with their bondholders.

Consistently, prior evidence suggest that activist investors have an ability to force a target into a takeover to benefit from short and long-term abnormal market returns (Greenwood & Schor (2009). The authors show that firms targeted by activists are more likely to be acquired. In addition, Klein & Zur (2009) analyze target firms' decisions subsequent to a takeover, and find that while hedge funds target more healthy firms, reduce cash holdings and dividend payouts, other activists reduce CAPEX and R&D investments. This behavior is aligned with Krishnan et al., (2016)'s findings under the argument that activists exercise their clout and expertise to gain representation and improve the firm performance.

Recently, Gantchev et al. (2020) find that firm managements with a tendency to pursue diversifying acquisitions attract activist shareholders so they can increase the pace of engagement in divestiture, such as changes in CEOs position, executive compensations and new directors indication as a path to improve acquisition strategy. However, activists are less likely to conduct large acquisitions, diversifying acquisitions, and are more reluctant in merger deals.

In the context of M&A, activists raise their skepticism over the management, motivated by cases in which target CEOs have been incentivized to facilitate the deal closure. A well-known example is the pack of $55bi as "retention bonus" that executives from Hewlett-Packard and Compaq received after the companies' merger (see *The New York Times*, November 16th, 2001[10]).

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[9] *The Wall Street Journal*, (2022, February 2) retrieved October 12, 2022, from
https://www.wsj.com/articles/activist-investors-take-aim-at-u-k-inc-11643797427
[10] *The New York Times* (2001, November 16) retrieved from
https://www.nytimes.com/2001/11/16/business/technology-executive-bonuses-included-in-the-hewlett-compaq-deal.html.

Although this amount was not considered illegal or at least was not charged in Court, this strategy might be interpreted as a path to reduce shareholders' wealth via a management entrenchment attitude.

Other examples of approach can be seen in proxy voting solicitation[11] such as the one submitted by the activist Einav Snir to shareholders of First Montauk Financial Corporation (FMFN), requesting to represent them on the next board meeting: "accordingly, we urge you to vote your proxy card for Shlomo Eplboim and Michael A. Poutre as Class I Directors, and Dr. Eli E. Hendel as a class III Director. We also urge you to vote against a proposal to amend the company's restated certificate of incorporation. We believe the submissions from the company serve to benefit the company and its directors, and not the shareholders." (p.3)

Consistent with this appealing rhetoric, prior evidence show that activists usually intervene when they understand that directors' decisions are hazardous to the shareholder's value. Then, the intervention serves as governance remedy for outside shareholders. Another example is the recent threat made by Daniel Loeb, who is the founder of Third Point Investors, to Disney's management. Among other topics, Loeb suggested the ESPN to be spun off to reduce Disney's overall debt (See *CNN Business, August 15th, 2022)*[12].

During M&A contests, activists help overcome informational frictions such as failing to perform due diligence and failing to work for optimal terms from bidder. Assuming that institutional investors monitoring role is enhanced during acquisitions, Fich et al. (2015) analyze 1,601 deals among target and acquirer from US publicly listed firm, during the period 1984-2011,

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[11] Securities Exchange Commission (May 26, 2005) retrieved November 01, 2022, from https://www.sec.gov/Archives/edgar/data/1305127/000114420405018886/v20098_pre14a.txt.
[12] *CNN Business (August 15*, 2022) retrieved October 15, 2022, from https://www.cnn.com/2022/08/15/investing/disney-third-point-dan-loeb-hulu-espn/index.html.

and find that the relevance of target in the institutional investors' portfolio is associated with greater bid completion rates, higher premiums and lower acquirer returns.

Jiang et al. (2018) analyze 3,216 US deals, over 2000-2014, and show that when the deal agreement contains a special severance payment to the target's top management team upon successful completion of the merger, the odds of intervention are 60% higher. A well-known example of intervention attempting occurred in 2013, when one the largest global activist, Carl Icahn, filed a letter with SEC directly to Dell's stockholders [13]. He alleged the Silver Lake Partners' offer to undervalue Dell. At that time, Icahn was the greatest individual investors, holding 9% of the Dell's shares.

In case of disagreement with the fairness opinion or the whole deal, there are other paths to pursue their wealth increase (Renneboog & Szilagyi, 2011), such as follow the "wall street" rule, which means selling or threating to sell their holdings (Admati & Pfleiderer, 2009; Dasgupta & Piacentio, 2015). However, prior evidence shows that the threat of appraisal does not limit the firm from being acquired (A. Boone et al., 2019). Moreover, pressuring the advisors could damage their reputation (Kale et al., 2003).

Activists could also organize activist campaigns in an attempt to block the deal (Chapman et al., 2021; Corum & Levit, 2019; Del Guercio et al., 2008). Jiang et al. (2018) analyze 3000 deals over the period 2000-2015, comprising 277 activists arbitrage events, and find that, on average, such activists seem to succeed to block the deal most of the time or increase the deal premium. Another possibility is to file a lawsuit after the merger is consumed (Boone et al., 2019; Korsmo & Myers, 2014). Prior evidence shows that the exposure to risk of prestige loss is lower than the

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[13] Carl Icahn letter filled with SEC, retrieved from
https://www.sec.gov/Archives/edgar/data/826083/000092166913000029/dellexhibit19913.htm

economic benefit of going to trial. However, a recent reform in Delaware in 2015 discouraged strike suits and interest-rate-driven appraisal cases (Jiang et al., 2016).

Due to this sort of interest misalignments, the transaction quality seems to rely on the ability to conduct the process. On one hand, the target firm have to prepare consistent information during the due diligence, on the other, the deal advisor must have the ability to properly identify value drivers to incorporate in the valuation (Liu, 2020). Consistently, although complex deals increase the demand for high-quality deal advisors, prior evidence finds that the wealth gain in a takeover relies on the advisor reputation (Kale et al., 2003). The authors analyze successful US takeovers during the period 1981-1994, and find a positive relation between the relative reputation of the bidder advisors over the target advisor and the bidder wealth gain. Kisgen et al. (2008), analyzing M&A deals over the period 1994-2003, document that fairness opinion has been largely used by target firms (80%), but its disclosure seems not to be value relevant to target shareholders. The authors argument that fairness opinions are interpreted by shareholders as a minimum legal protection. In turn, Cain & Denis (2013) analyze 585 fairness opinion of US deals over 1998-2005 period, and use two different measures for accuracy, basically concerning the difference between the merger offer price and the fairness opinion valuations. As a result, although top-tier advisors charge greater fees, they produce more accurate valuations than lower tier advisors, on average.

Some researchers argue that activists insert pressure on the financial advisor to review the valuation inputs (Chen & Martin, 2011). However, activists have no information to act in advance and claim on valuation attributes, so they can only react after receiving the formal opinion from the firm management.

2.3. Fairness opinion and advisors' interests

The fairness opinion has been under scrutiny over the years concerning the fiduciary duties from the investment banks by rendering this technical service to shareholders. For instance, in

Weinberger v UOP, Inc., 1983, the Delaware Court ruled out the advisors' fiduciary duty to minority shareholders. However, in *Schneider v. Lazard Frères & Co.,* 1990, the New York Court decided to charge the advisor under the argument that the special committee which hired the advisor was a representative of minority shareholders, and consequently, the advisors did have fiduciary duties (Haire, 1999). In United States, this professional and independent opinion has been traditionally required for target-firm directors when considering corporate control transactions since Delaware's case between *Smith v. Van Gorkom*, in 1985 (Cain & Denis, 2013). However, the growing of disagreements encouraged intense discussions over the last decades among practitioners and academics about the effective role of fairness opinion.

Fairness opinion is a formal opinion provided by supposedly independent and reputable professional financial advisors, such as investment banks and individual financial advisors. After identifying an apparently suitable acquirer (or target, if advisors are hired by acquirer), a due diligence process is conducted, eventually starting before signing the merger agreements (Wangerin, 2019a). The goal is to guarantee the compliance of normative accounting rules and rule out "material adverse events" (MAE) or "material adverse changes" (MAC) (Denis & Macias, 2013; Hall, 2002; R. T. Miller, 2009). After checking the due formality, the output is a technical opinion concerning the fairness of the transaction "from a financial point of view" based on an estimated valuation range that incorporates different scenarios (see Appendixes A1 and A2).

 The valuation memorandum outlines the information of growth expectation, cost of capital and several other assumptions to then conduct, most of the times, a discounted cash flow and valuation multiples to finally estimate the economic value of the firm (Alford, 1992; DeAngelo, 1990). In this regard, valuation inputs seem to be a flourishing subject under debate.

Prior literature points out mixed evidence about fairness opinion valuations being driven by conflicts of interests. Cain & Denis (2013) find that target-sought advisors provide FOs with

valuation eight percent lower (median) than offer price, but also find no difference in accuracy when sample is segregated into advisors paid contingent and non-contingent fees. The authors also find no difference between affiliated and non-affiliated clients for the full sample. On the other hand, when the targets have prior relationship with the advisors, the negative valuation errors are seemed to be greater.

Liu (2020) analyzes deals between 1996 and 2013 and finds that complex deals such as buyouts, stapled financing and hostile takeovers significantly increase the chance for a second opinion. In addition, Eaton et al. (2021) analyze mergers announced from 1995 to 2017. They find that, on average, the advisors discretionally select large peers with high valuation multiple, attempting to boost the target price. However, to the extend the interests are divergent between management and advisors (*e.g.,* management buyouts deal), the advisors systematically choose lower valuation peers.

Under another perspective, Imperatore et al. (2021) analyze 1,579 target-sought fairness opinion in 1,490 deals during the period 2000-2015, and find that advisors are more strategic in selecting lower-valued peers when the litigation risk of the M&A is high. The authors estimate the Peer Portfolio Percentage (PPP), which means the propensity for a firm at the same industry (2-digits SIC) to be selected as a peer. In an example, the authors demonstrate that while the advisor selects eight comparable firms, they estimate forty-three to be selected under a size-adjusted basis. Beyond the number of peer comparable, this indicates a systematic reduction in the price range, making the bidder offer seems to be more generous, facilitating its acceptance by the target shareholders.

2.4. Hypotheses Development

Corporate governance theory suggests that *ceteris paribus* large shareholders reduce agency costs of a firm, because, different from minority shareholders, large shareholders do not rely on the

same instruments to protect their interests. Instead, they somehow exercise part of the firm's corporate governance to protect their wealth (Shleifer & Vishny, 1997). For example, Dao et al. (2012) show that firms exposed to activists scrutiny increase the agency cost by paying higher audit fee. However, subsequent restatement is less likely for them, and the financial reporting quality is higher, which is also reported in a recent study (Guo et al., 2021). The reasoning behind is that activists spur more diligence and more transparency. As a result, the presence of activist investors reduces the cost of capital (Pham et al., 2012) and induces value creation (Albuquerque et al., 2022; Corum & Levit, 2019; Shleifer & Vishny, 1997).

During M&A deals, consistent with this view, activists help overcome informational frictions such as when the target management failing to properly perform due diligences or to work for optimal terms from bidder (Corum & Levit, 2019; Fich et al., 2015; Jiang et al., 2018). At this point, the support is not direct, because any misconduct (i.e., information leaks during the due diligence) could terminate the negotiation. So, activists help by constantly scrutinizing the board requiring more (and better) information, which may increase the financial reporting quality (Adams & Neururer, 2020; Biddle et al., 2009). Financial reporting is a critical source of information for investment decisions (Biddle & Gilles, 2006) and is also critical for the financial advisors to operationalize the firm valuation.

Therefore, I formalize the first hypothesis:

H1: Activists help to overcome informational frictions during M&A deals by increasing Financial Reporting Quality.

In addition, activist shareholders scrutinize investment decisions (Deb et al., 2019), require the management to reduce expenses (Brav et al., 2008) as well as influence changes in board position, proposing strategies, eventually replacing chief executive officers (Klein & Zur, 2009). Brav et al. (2018) provides evidence that activist shareholders discipline the firm's management in

terms of innovation, by reallocating innovative resource and by promoting change in the board-level expertise. As a result, these interventions have implication on firm's investment efficiency. In this regard, in line with the Pecking Order Theory (Myers, 1984), Biddle & Gilles (2006) argue that efficient capital investments are aligned with the productive capacity of assets to generate revenue. Internal capacity alleviates the frictions potentially generated between managers and external capital providers (Jensen, 1986). Therefore, I assume (and validate later) a positive association between activist shareholder participation and subsequent firm's investment efficiency. In the circumstance of M&A, such an effect may implicate the way the deal advisor incorporates information on the fairness opinion valuation.

Prior literature has shown mixed evidence on the usefulness of fairness opinion under the angle of an ex-post mechanism to justify price to investors (Cain & Denis, 2013; Eaton et al., 2021; Kisgen et al., 2008; Shaffer, 2019). Differently, I address the mechanisms under which financial advisors formulate the target valuation that will be useful as a tool for negotiation purposes. In the spirit of Knechel (2016), Figure 1 illustrates a conceptual model of firm invested by activist shareholder's indifference curves for optimal choice of financial advisors concerning two main factors: independency and expertise.

Figure III.1 – Financial advisor independence and expertise optimal choice under activists' disciplining role constraints.
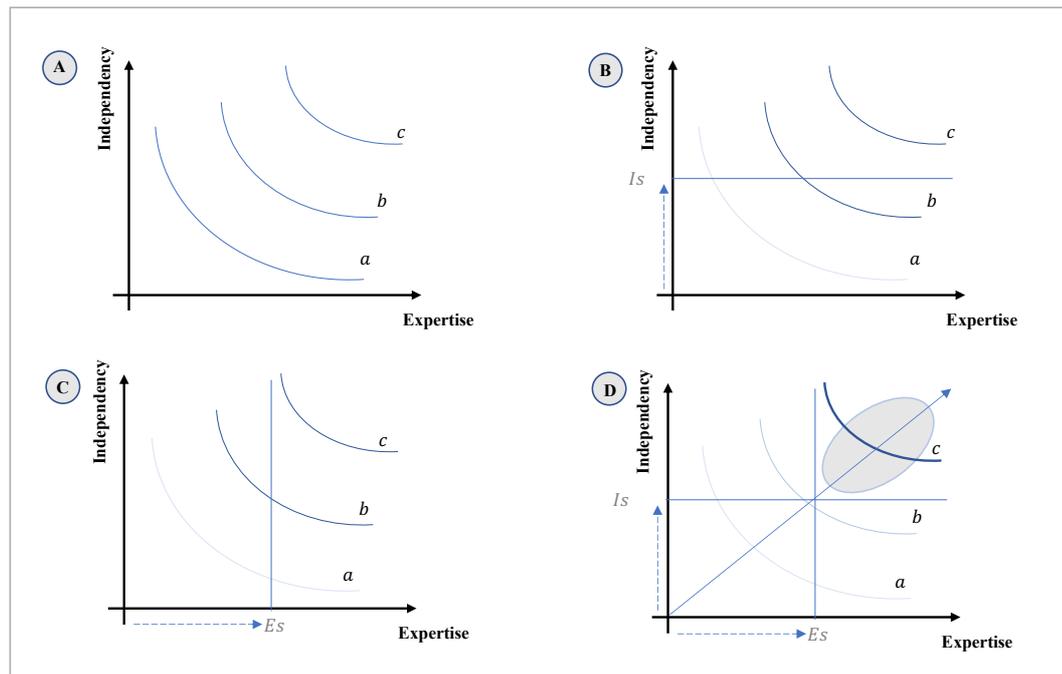
Panel A presents a naïve picture with different activist's indifference curves. Panel B considers the inclusion of a minimum level of independence (I_s). In this scenario, curve a does not satisfy the shareholders demand of information. Higher independency may reduce the likelihood of entrenchment between advisors and firm management. Panel C adds a constraint of Expertise (E_s) indirectly demanded by shareholders to protect their wealth. I consider expertise in this model as the capacity to evaluate both the reasonableness of accounting numbers, management forecast, and the likelihood to take efficient investment decisions. Finally, Panel D shows that, under the restrictions imposed by such a scrutiny, c is the indifference curve that may satisfy the real demand for information so that the fairness opinion can play a role as a negotiation tool.

Figure 2 summarizes the framework.

Figure III.2 – Framework of optimal choice for advisor independence and expertise under activist constraints.
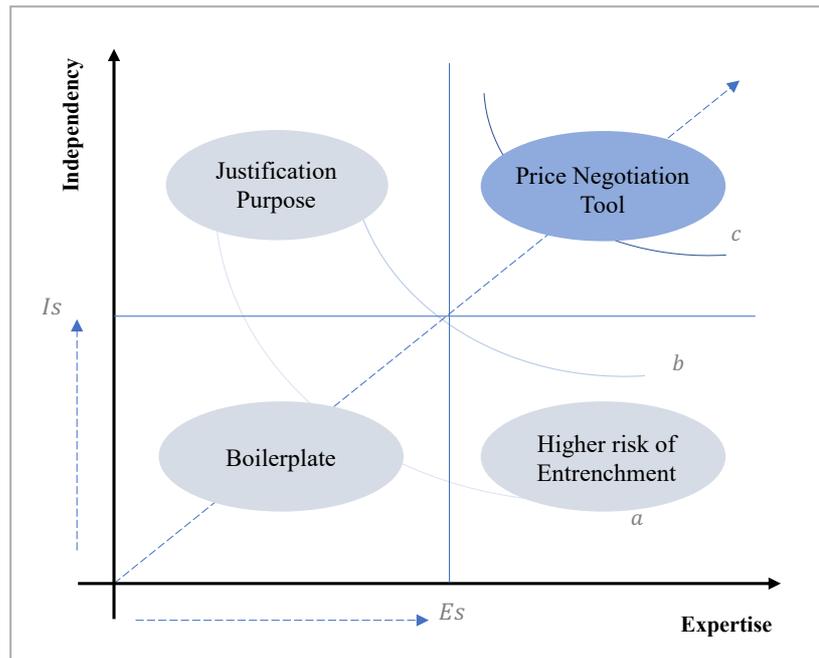
The three undesirable scenarios in gray illustrates a concern related to incentives to issue pro-management FOs in the hope of future relationship (Bebchuk & Kahan, 1989; Fink, 2006). Although some researchers argue that this concern would only find reason under the acquirer side Cain & Denis (2013), the literature is still scarce of evidence on the incentives mechanism concerning target advisors to pursue private interests.

Therefore, management teams of firms targeted by activist shareholders may concern about hiring low-quality financial advisors due to the scrutiny of activists and greater likelihood of dispute after a debatable deal (Renneboog & Szilagyi, 2011). However, requiring greater expertise does not necessarily means incurring in higher fees to hire top-tier financial advisors. This would play against the underpinning view of pursuing greater efficiency (Brav et al., 2008). Based on this rationale, I predict:

H2: Financial advisors incorporate the presence of activist shareholders and related effects of investment efficiency on the fairness opinion valuation attributes.

3. Data and Variables

3.1. Data Sources and Samples Selection

The sample comprises US deals announced between 2000 and 2020, obtained from SDC Platinum. Shareholders' activism data are obtained from WRDS Audit Analytics, and financial and market data are obtained from Compustat and CRSP, respectively. Fairness opinion database is obtained by a hand-collected database from SEC's Electronic Data Gathering, Analysis, and Retrieval (EDGAR) system (Imperatore et al., 2021). I follow the recent literature (Boyson et al., 2017; Eaton et al., 2021; Imperatore et al., 2021) to include *i)* only publicly traded US target firm, *ii)* deal size greater than US $10 millions, and *iii)* bidders to own less than 50% of the target's stock before the bid and more than 50% after the deal.

I use the deal number to merge the sample with the Fairness Opinions database. Then I use CUSIP (6 digits) to merge the new dataset with Compustat financial information in t-1 in an attempt to capture the period of the M&A decision, which usually takes roughly one year (Imperatore et al., 2021; Wangerin, 2019a). Next, I merge with activist shareholder database also using CUSIP. I drop the type forms others than "SC 13D" and "SC 13D/A" that represents the Schedules 13D and 13D/A, respectively. Finally, I drop observations without main identification information, i.e., CUSIP number and industry. Ultimately, I check granular data for activism, coding all possible segregation declared by activists when filling the schedule 13D and 13D/A. In robustness checks, I use the number of fillings in each category to identify the effect of each type of activism.

After all procedures and constraints, the final sample comprises 2,232 observations, including deals announced but not necessarily concluded. This procedure allows examining, among other additional analysis, the propensity of withdrawn deals in the presence of activists. Since the fairness opinion is not a mandated service, some deals have no information about FOs. Among

those deals with FOs, some do not present valuation numbers. So, for models where the valuation is the dependent variable, the sample comprises 957 observations.

3.2. Variables

3.2.1. *Valuation attributes*

To examine the role of activist shareholders on the valuation attributes presented on target-sought fairness opinions (FOs) during mergers and acquisitions deals (M&A), I imply the FO Valuation Bias, in the spirit of Cain & Denis (2013):

$$Valuation\ Bias\ = \frac{(FO\ Max\ -\ FO\ Min\ )/2}{Deal\ Value} \tag{III.1}$$

FO Max and *FO Min* are the maximum and minimum values presented in the fairness opinion valuation provided by the target-sought advisor. In the case of multiple FOs, I calculate the median value of the single average prices. Accordingly, a *Posit_Bias* indicator assumes one if the average valuation is greater than the deal price and zero otherwise.

Although the bias-related approach may be debatable in the financial analyst literature, I claim that the M&A setting is substantially different, where two or more sides are competing while they assess the firms' fundamentals. Even though financial advisors also use analyst forecasts, the incentives are different. In this paper, I examine the role of activist shareholders as a mechanism that pressures the firms' management to enhance financial reporting quality and make better resource allocation.

To alleviate these concerns, I use the logarithmic basis of the ratio between the best-case scenario (maximum valuation) and the deal value to calculate to *Diff_Max* (Difference to Maximum) as an attempt to validate the fairness opinion valuation as a negotiation tool. The intuition is that lower values reflect positive aspects of negotiation for the target firm. To further validate, I also employ an uncertainty level analysis by computing the fairness opinion valuation

ranges (*Value_Range)* to examine whether this dispersion is influenced by the presence of activist shareholders, investment efficiency, and the effect of financial reporting quality.

3.2.2. Shareholder Activism

Following the recent literature (Albuquerque et al., 2022; Boyson et al., 2017; Brav et al., 2008; Renneboog & Szilagyi, 2011), I explore the Schedule 13D computing both filings of 13D and 13DA to analyze the eventual increase of stake of activists in a single company. Activists may reserve the right to discuss any matters with the management about the firm's operations and investment policies. To further investigate these matters, I categorize the fillings into *i)* agreement keys; *ii)* concerns keys; *iii)* control keys, *iv)* discussion keys, *v)* dispute keys, and *vi)* other keys. Each of these groups is divided into several subgroups. For instance, the agreement keys are subdivided into (1) Transaction (Securities, Warrants, Options, Debt, Bonds etc.), (2) Merger or acquisition agreement, (3) Collaborative or licensed business agreement, (4) Voting agreement, (5) Reorganization, (6) Board composition, (7) Standstill Agreement, (8) Litigation settlement, (9) Lockup Agreement, (10) Commitments to management, and (11) Bankruptcy settlement.

I consider the latest position of an activist shareholder in a single year. To get this information, I follow prior literature and group multiple Schedule 13D/A within the same firm-year as a single activism observation. I then consider the aggregate number of shares and number of activist shareholders for the following years of the sample to create a panel. Afterwards, in the spirit of Chen & Jung (2016), I calculate the Aggregate Activist Shareholder Participation, by dividing the aggregate number of shares to the total number of outstanding shares (multiplied by 1 million).

Although one can concern about maintenance of the shareholding position in future periods, I posit that if the activist shareholder (partial or entirely) shorts its position, another schedule 13D/A would be filed, which would be capture by dataset. Then, in the absence of a new 13D/A, I hold

the latest position constant. Noteworthy, I keep the participation constant instead of the number of shares, assuming the possibility of new shares outstanding.

Since the dataset relies on schedule filing (and not on annual activist participation), I kept the position until the next scheduled filing. I employ the same procedure for other activism characteristics. One caveat, though, is that the influence power of activist shareholders may exceed the amount of stake as well as the specific reason why some filings are announced to be. Last but not least, in the absence of activist shareholder, I set zero for activist participation.

3.2.3. Investment Efficiency

Following Biddle et al. (2009), I first calculate *Investment_S* as the sum of investments in research and development, capital expenditures, and acquisitions, scaled by lagged asset. Next, I regressed the Equation III.2.

$$Investment\_S_{it} = \beta_0 + \beta_1 Revenue\ Growth_{it-1} + \varepsilon_{it} \qquad \text{(III.2)}$$

Revenue Growth is a proxy for growth opportunity and is calculated as the percentage change in sales from *t-1* to *t*. I use the residuals (ε_{it}) to measure the equilibrium between sources and applications of resources. In other words, an efficient investment decision does not compromise the capital structure. Therefore, in line with Myers (1984)'s argument concerning the order of capital supply, an efficient investment decision should be primarily driven by the firm's revenue growth. Consequently, the amount of investment variation not explained by the variation in revenue growth represents the absence of capital structure equilibrium. So, firms in the first quartile of residuals (lower values) are considered to be more prone to *underinvest* while firms in the fourth quartile (higher values) are more likely to *overinvest*. Firms in the two median quartiles are considered the *benchmark* in terms of investment efficiency (Biddle et al., 2009).

3.2.4. Financial Reporting Quality

In the spirit of Biddle et al. (2009), I estimate the *Financial Reporting Quality (FRQ)* using a combination of accrual quality measures. First, I use the Dechow & Dichev (2002)'s model of working capital accruals, adjusted by McNichols & Stubben (2008), as described in the following Equations:

$$TACC_{it} = \beta_0 + \beta_1(\Delta REVT_{it} - \Delta RECT_{it}) + \beta_2 PPENT_{it} + \varepsilon_{it} \tag{III.3}$$

All variables are divided by Total Assets in t-1 (AT) (Compustat item #6). To facilitate future reexaminations, I use the variable names and codes as described in Compustat. *REVT* is the Total Revenue (Compustat item #12), *RECT* is the Net Receivables (item #2), *PPENT* is the Property, Plants, and Equipment (item #8), Δ is the first-difference operator and ε_{it} is the regression residuals, which is interpreted as the discretionary accruals. *TACC* is the Total Accruals, calculated as shown in Equation III.4.

$$TACC_{it} = \frac{(\Delta ACT_{it} - \Delta CASH_{it}) - (\Delta LCT_{it} - \Delta DLC_{it}) - DP_{it}}{AT_{it-1}} \tag{III.4}$$

Where *ACT* is the Current Asset (item #4), *CASH* is the amount of Cash (item #1), *LCT* is the Current Liability (item #5), *DLT* is the Debt in Current Liability (item #34), and *DP* is the amount of depreciation and amortization (item #14). The model is estimated cross-sectionally for each industry with at least 20 observations in a given year based on the Fama and French (1997) 48-industry classification.

Second, I use Kothari et al. (2005)'s performance-based model of discretionary accruals, as described in Equation III.5.

$$TACC_{it} = \beta_0 + \beta_1(\Delta REVT - \Delta RECT) + \beta_2 PPENT + \beta_3 NI_{it} + \gamma_{it} \tag{III.5}$$

NI is the Net Income (item #2), also divided by the lagged Total Asset, as the other variables. This extra explanatory variable stands for the Return on Asset (ROA). Then, I calculate

the Financial Reporting Quality (*FRQ1*) as the average of the both firm-level residuals from models *III.3* and *III.5,* as described in Equation *III.6:*

$$FRQ\_Index_{it} = -1\left(\frac{|\varepsilon_{it}| + |\gamma_{it}|}{2}\right)$$ (III.6)

I use the absolute values of residuals and I multiply the result by negative one. Hence, higher values mean higher financial reporting quality and lower values mean lower financial reporting quality (Biddle et al., 2009).

4. Research Design and Main Results

4.1. Research Design

In the spirit of Logsdon & Van Buren (2009), this paper goes beyond the popular view to examine the effect of unobservable acts. Although, under the SEC rules, shareholders should write a letter to the company management inquiring an issue, this paper shed light to the effect observed on the financial advisor task. In other words, I examine how the firm fundamentals are incorporated in the valuation process in the presence of activist shareholders.

Fundamentally, a valuation relies with the expectation of future cash flow generation, which is strongly dependent on the management ability to properly allocate resources. In addition, the financial reporting quality seems to be associated with such an investment efficiency (Biddle et al., 2009). Therefore, I employ the following regression model to test both hypotheses H_1 that activists help to overcome informational frictions during M&A deals by increasing Financial Reporting Quality and H_2 that financial advisors incorporate the presence of activist shareholders and related effects of investment efficiency on the fairness opinion valuation attributes:

$$Posit\ Bias_{it} = \beta_0 + \beta_1 d.Activist_{it-1} + \beta_2 ActivistPart_{it-1} + \beta_3 Benchmark_{it-1}$$
$$+ \beta_4 FRQ\_Index_{it-1} + \beta_5 (Benchmark * ActivistPart_{it-1})$$
$$+ \beta_6 (FRQ\_Index_{it-1} * ActivistPart_{it-1}) + \sum \beta_k Controls_t + \alpha_{ind}$$
$$+ \delta_{year} + \varepsilon_{it}$$

$$((III.3)$$

$d\_Activist$ is an indicator that assumes one if at least one activist held position in the firm i in year t-1, $ActivistPart$ is relative size of shares held by activists to total issued shares (Boyson et al., 2017), $Investment$ is the sum of investment in R&D, CAPEX, and acquisition expenditure, adjusted by cash receipts from sales of properties, plan, and equipment, multiplied by 100 and scaled by lagged total assets. FRQ_Index is the average of residuals in absolute values derived from two accruals quality models, multiplied by minus one, as described in 3.2.4. Moreover, Appendix III.B provides more details about specific Compustat variables used to compute the abovementioned variables.

Following prior literature (Biddle et al., 2009; Cain & Denis, 2013; Eaton et al., 2021; Imperatore et al., 2021; Liu, 2020; Wangerin, 2019), *Controls* is a vector of control variables theoretically associated with investment decisions and deal outcomes (See Appendix III.B). In sum, I use the firm-related control variables: *Cash*, *Standard deviation of Sales*, *Standard deviation of Investment*, *Operating Cycle*, *Loss*, *Size*, *Market-to-Book ratio*, *Z-Score (financial distress)*, *Tangibility*, *Capital Structure*, *Dividend payment* (Biddle et al., 2009) as well as deal-related controls: *Deal Size*, *Deal length*, *Percent Cash*, *Multiple FO*, *Acquirer-sought FO*, and *Top-tier*. Again, Appendix III.B provides more details about specific Compustat variables used to compute all variables.

Following recent literature in accounting, I use an estimator that allows for the use of multiple fixed effects (year and industry) and missing control variables, and I also cluster errors by

firm (DeHaan, 2021; Donelson et al., 2022; Imperatore et al., 2021). Also, consistent with prior studies, I winsorize all continuous variables at the 1% and 99% levels by year at the firm-year level to mitigate the influence of outliers.

On average, if financial advisors distinguish investment efficiency while preparing the fairness opinion, $\beta_3(Investment_{it-1})$ will be positively significant to explain the valuation bias. I compare the results when using the metric variable of investment size with the mentioned categories of investment efficiency (*underinvesting*, *overinvesting*, and *benchmark*). Consistently, in these alternative estimations, I predict *benchmark* to have a positive (negative) and significant coefficient, while *underinvest* and *overinvest* are expected to have negative coefficient.

In order to finally test the hypothesis H_2, whether financial advisors incorporate the presence of activist shareholders and related effects of financial reporting quality and investment efficiency on the fairness opinion valuation attributes, I predict both $\beta_5(Benchmark_{it-1} * ActivistPart_{it-1})$ and $\beta_6(FRQ\_Index_{it-1} * ActivistPart_{it-1})$ to be significantly positive. Respectively, these coefficients capture the effects of financial reporting quality and investment efficiency on fairness opinion valuation the more intensive is the participation of activist shareholders in the firm's management. Additionally, I switch the dependent variable to test *Diff_Max* as a proxy for the deal negotiation.

4.2. Descriptive Results and Statistics

Panel A of Table III.1 presents the descriptive statistics for the variables described above. In addition, Panel B reports mean and median values of metric variables, segregated into groups "with" and "without activists", followed by their respective significance test (t-test and Wilcoxon). For dummy variables, I use Pearson Chi^2 test for proportions.

Table III.1
Descriptive Statistics

Panel A presents summary statistics for the main sample. Panel B presents the mean and median differences tests.

Variable	N	Mean	SD	Min	p25	p50	p75	Max
Panel A: Descriptive Statistics								
Dependent Variables								
Valuation Bias	957	1.31	2.47	0.13	0.70	0.86	0.99	20.75
Posit Bias	2232	0.67	0.47	0.00	0.00	1.00	1.00	1.00
Interesting Variable								
d_activist	2232	0.23		0.00				1.00
Activist Part	2232	0.05	0.18	0.00	0.00	0.00	0.00	1.43
Investment_S	2232	0.19	0.18	0.00	0.07	0.15	0.25	1.88
Overinvesting	2232	0.29	0.45	0.00	0.00	0.00	1.00	1.00
Underinvesting	2232	0.21	0.41	0.00	0.00	0.00	0.00	1.00
Benchmark	2232	0.50	0.50	0.00	0.00	1.00	1.00	1.00
FRQ_Index	1910	-0.27	0.52	-11.27	-0.27	-0.14	-0.07	-0.01
Deal related control variable								
Deal Length	2232	0.60	0.49	0.00	0.00	1.00	1.00	1.00
MultipleFO_tgt	2232	0.57	0.49	0.00	0.00	1.00	1.00	1.00
MultipleFO_acq	2232	0.14	0.35	0.00	0.00	0.00	0.00	1.00
Top5-Advisor	1781	4.49	0.63	0.69	4.04	4.45	4.88	7.05
Cash	2232	0.30	0.26	0.00	0.07	0.23	0.48	0.99
Firm related control variables								
Std dev Sales	2034	0.20	0.24	0.00	0.07	0.14	0.25	2.40
Std dev Investment	1765	0.08	0.09	0.00	0.02	0.05	0.11	0.95
Operating Cycle	2166	4.61	0.94	-2.32	4.20	4.72	5.17	9.72
Loss	2232	0.51	0.50	0.00	0.00	1.00	1.00	1.00
LogAsset	2232	5.32	1.81	-1.03	4.16	5.20	6.51	13.00
MkttoBook	2054	0.02	0.02	0.01	0.01	0.01	0.02	0.48
ZScore	2165	10.9	65.85	-146.89	-0.18	0.95	5.49	2251.2
Tangibility	2193	0.17	0.18	0.00	0.04	0.10	0.23	0.96
Kstructure	2151	0.14	0.21	0.00	0.00	0.03	0.20	0.99
Dividend	2232	0.18	0.38	0.00	0.00	0.00	0.00	1.00

Panel B: Difference Mean and Median Tests

Variables	No Activists		Activists		Diff in Means	Diff in Medians
	Mean	Median	Mean	Median		
	(1)	(2)	(3)	(4)	(3) - (1)	(4) - (2)
Dependent Variables						
Valuation Bias	1.29	0.87	1.38	0.86	0.10	-0.01
Posit Bias	0.67	1.00	0.69	1.00	0.35	0.00
Interesting Variables						
Investment	0.19	0.15	0.19	0.13	0.00	-0.02**
Overinvesting	0.29	0.00	0.29	0.00	0.05	0.00
Underinvesting	0.21	0.00	0.22	0.00	0.80	0.00
Benchmark	0.50	1.00	0.49	0.00	0.27	-1.00
FRQ_Index	-0.26	-0.14	-0.29	-0.16	-0.03	-0.02
Deal related control variables						
Deal Length	4.49	4.44	4.50	4.48	0.01	0.03

MultipleFO_tgt	0.57	1.00	0.69	1.00	20.03***	0.00***
MultipleFO_acq	0.55	1.00	0.65	1.00	18.06***	0.00***
Top5-Advisor	0.16	0.00	0.12	0.00	3.89**	0.00*
Percent Cash	0.31	0.25	0.28	0.19	0.03**	-0.06***
Firm related control variables						
Std dev Sales	0.20	0.14	0.21	0.13	0.00	-0.01
Std dev Investment	0.08	0.05	0.08	0.05	0.00	0.00
Operating Cycle	4.62	4.72	4.57	4.75	-0.05	0.03
Loss	0.50	0.00	0.56	1.00	5.65**	1.00**
LogAsset	5.31	5.17	5.36	5.33	0.04	0.16
MkttoBook	0.02	0.02	0.02	0.02	0.00	0.00
ZScore	11.31	0.96	9.89	0.93	-1.42	-0.03
Tangibility	0.17	0.10	0.17	0.11	0.01	0.01
Kstructure	0.13	0.02	0.17	0.07	-0.04***	0.05***
Dividend	0.17	0.00	0.22	0.00	7.71***	0.00***

I highlight the overall valuation bias (Panel A), where the average is 1.31, which denotes a right-skewed distribution. Breaking this variable into firms that have and firms that do not have activists (Panel B), the univariate tests evidence no significant difference between groups (*diff in median -0.01*). Activists are positioned in more than 23% of the firms engaged in M&A deals as target. This is considerably larger than the 3% reported by Chapman et al. (2021), however their sample is not limited to firms that engaged in M&A.

I also document a greater percentage of activist if I compared my results with Swidler et al. (2019), who examine the effect of activist investors on M&A outcomes under the acquirer side. The authors use similar procedure to classify a firm with activist shareholder and document about 11% in their sample. Such a difference gives rises to least two kinds of incentives: on the one hand, activists may prefer holding positions in firms that are about to be purchased to engage in appraisal arbitrage after merger (Boone et al., 2019; Denes et al., 2017; Jetley & Ji, 2015).

On the other hand, the incentives may be associated with a genuine purpose of enhance the firm's management practices, improving the investment decision-making process, reviewing supply contracts, and unwilling expenses. As a result, this would increase the firm's profitability

and would increase shareholders' wealth. The literature has several evidence on this disciplining effect (Brav et al., 2008; Coffee Jr. & Palia, 2016).

Moreover, I observe that investment in R&D, CAPEX, and acquisitions are slightly lower for firm with activist shareholders. While firms with no activist shareholders invest 15% (median) of their assets, firms with activist invest 13% (*diff in median -0.02***). This is consistent with expectation, where activists cut-back expenses (Brav et al., 2008; Coffee Jr. & Palia, 2016) and reduce the probability of overinvestment (Deb et al., 2019; Richardson, 2006). Univariate tests show no differences between groups for investment efficiency (under, over and benchmark) and financial reporting quality. However, these variables are further investigated in multivariate approaches.

Analyzing the overall sample (Panel A), I also highlight that while 57% of the target firms hire more than one fairness opinion (*Multiple_FO_tgt)*, only 14% of acquirer firms demand an extra opinion (*Multiple_FO_acq*). However, breaking down the sample (Panel B), I note that firms with no activist respond for 55% of multiple FOs for acquirers and 57% for targets. On average, multiple fairness opinion are demanded by acquirers in 65% of the cases where there are activists in the target firm. Target firm with activists hired multiple FO in 69% of the cases.

Deal length is not different between firms with and without activist shareholders. This supports the notion that activists do not interfere on the due diligence process, consistent with technical assumption that activist shareholders receive the information at the same time other investors do (Wangerin, 2019a). Instead, the expectation is that activists indirectly help financial advisors by overcoming frictions via prior higher financial reporting quality enhancement as well as via spurring the management team to make better investment decisions.

In addition, I note that firms with activists hire top-five deal advisors more often than firms with no activists (*diff in mean 3.89***). Intuitively, more transparent environments ameliorate the

conditions to work, so that lower-tier financial advisors can satisfactorily proceed with the due diligence process and provide a complete picture where acquirers could compare the self-estimated synergies with the calculation provided by the target firm.

Table III.2 reports the Spearman correlation matrix for interesting explanatory and control variables.

Table III.2
Spearman Correlation Matrix

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1	d_Activist													
2	Activist Part	0.52***	1											
3	Top5_Activist_MktCap	-0.8***	-0.2***	1										
4	Top5_Pressing	0.41***	0.29***	-0.4***	1									
5	Investment	-0.0	0.03*	0.00	0.00	1								
6	Overinvesting	-0.0	0.01	-0.0	0.02	0.70***	1							
7	Underinvesting	0.01	0.03*	0.01	-0.0	-0.4***	-0.3***	1						
8	Benchmark	-0.0	-0.0**	0.00	0.00	-0.3***	-0.6***	-0.5***	1					
9	FRQ_Index1	-0.0	-0.0***	-0.0	-0.0	-0.3***	-0.1***	0.03	0.11***	1				
10	Valuation Bias	0.01	0.02	-0.0	0.01	-0.0	-0.0	-0.0	0.03	0.02	1			
11	Posit Bias	0.01	0.05***	0.01	0.03*	-0.0	0.00	0.00	-0.0	-0.0	0.40***	1		
12	MultipleFO_tgt	0.09***	0.06***	-0.0***	0.07***	0.03*	0.03*	-0.0	-0.0	-0.0**	-0.0	0.23***	1	
13	MultipleFO_Acq	0.09***	0.09***	-0.0***	0.05***	-0.0	0.00	0.02	-0.0	-0.0	0.05*	0.13***	0.08***	1
14	Top5 Advisor	-0.0**	-0.0***	0.03	0.00	-0.0	-0.0**	-0.0	0.06***	0.05**	-0.1***	-0.4***	-0.0***	-0.1***
15	Deal Length	0.00	-0.0***	-0.0	-0.0	-0.1***	-0.1***	0.07***	0.03	0.06***	-0.0	0.10***	-0.0	0.02
16	Cash	-0.0***	-0.0	0.02	-0.0***	0.32***	0.28***	-0.2***	-0.0***	-0.2***	0.01	-0.0	-0.0	-0.0***
17	StdDev Sales	0.01	0.07***	0.04**	0.05***	0.04**	0.04**	0.00	-0.0**	-0.1***	0.11***	0.06***	-0.0	0.05***
18	StdDev Investment	0.00	0.02	-0.0	-0.0	0.25***	0.15***	-0.0***	-0.0***	-0.1***	0.02	-0.0	0.01	-0.0

19	Operating Cycle	-0.0	-0.0***	0.00	-0.0	0.01	-0.0	-0.0***	0.08***	0.05**	-0.0	-0.0	-0.0	-0.0***
20	Loss	0.05***	0.07***	-0.0***	0.09***	0.25***	0.26***	-0.1***	-0.1***	-0.1***	0.11***	0.12***	0.09***	0.02
21	LogAsset	0.00	-0.0***	-0.0**	-0.0	-0.2***	-0.2***	0.13***	0.11***	0.16***	-0.1***	-0.1***	0.02	-0.0***
22	Mkt-to-Book	0.02	0.04**	0.02	0.00	0.37***	0.16***	-0.1***	-0.0***	-0.2***	-0.0	-0.0	0.04**	-0.0
23	ZScore	-0.0	-0.0	0.01	-0.0	-0.0***	-0.0***	0.01	0.06***	0.03	-0.0	0.03	0.04**	0.04**
24	Tangibility	0.01	0.01	-0.0	0.02	-0.1***	-0.1***	0.08***	0.05***	0.02	-0.0	0.06***	0.08***	0.05***
25	Kstructure	0.07***	0.06***	-0.0***	0.06***	-0.2***	-0.1***	0.27***	-0.0***	0.07***	0.02	0.04**	0.06***	0.06***
26	Dividend	0.05***	0.02	-0.0	0.03	-0.1***	-0.1***	0.15***	0.03	0.04**	-0.0***	-0.0	0.00	0.04**

		14	15	16	17	18	19	20	21	22	23	24	25
14	Top5 Advisor	1											
15	Deal Length	-0.0	1										
16	Cash	0.00	-0.1***	1									
17	StdDev Sales	-0.0***	-0.0***	0.03*	1								
18	StdDev Investment	0.01	-0.0	0.15***	0.14***	1							
19	Operating Cycle	0.00	-0.0	-0.0	-0.1***	-0.0	1						
20	Loss	-0.1***	-0.1***	0.27***	0.06***	0.14***	-0.0	1					
21	LogAsset	0.23***	0.28***	-0.2***	-0.2***	-0.0***	0.00	-0.3***	1				
22	Mkt-to-Book	0.06***	-0.0***	0.27***	0.09***	0.17***	0.04*	0.08***	-0.1***	1			
23	ZScore	0.03	0.22***	-0.1***	-0.0**	-0.0***	-0.0	-0.1***	0.35***	-0.0	1		
24	Tangibility	-0.0	0.16***	-0.4***	-0.1***	-0.1***	-0.2***	-0.0***	0.15***	-0.1***	0.07***	1	
25	Kstructure	-0.0	0.16***	-0.4***	-0.0***	-0.0	-0.1***	0.00	0.30***	-0.2***	0.07***	0.40***	1
26	Dividend	0.03	0.14***	-0.2***	-0.0***	-0.1***	-0.0	-0.2***	0.29***	-0.0***	0.21***	0.13***	0.14***

First, I do not find high correlations that could suggest concerns to estimate the coefficients via linear regression models. Even though, technical assumptions are validated in post-regression estimations, such as the Variance Inflation Factor (VIF) when possible. Second, I note low correlation coefficients between the activist shareholder and valuation bias. Though, I note a correlation of 0.40*** between *MultipleFO_tgt* and *Valuation_Bias* and a coefficient of 0.13*** for the pair *MultipleFO_Acq* and *Valuation_Bias*. Since the presence of multiple fairness opinion is related to more complex deals (Liu, 2020), these positive associations may reveal a room for negotiation. Third, the presence of activist is positively correlated with *Loss* (0.05***). Because I use contemporaneous information, this is consistent with the notion that activists use to target firms with poor results and poor governance, so they can spur the existing management to recalculate the route towards profitability (Boyson et al., 2017; Greenwood & Schor, 2009).

4.3. Linear Regression Estimations

4.3.1. Positive Bias

Table III.3 reports the estimated coefficients for the model that tests the disciplining role of activist shareholders over the management which, in turn, may provide higher quality accounting reporting so the financial advisor can better estimate the target firm valuation. I use a feasible and computationally efficient estimator of linear model with correction with multiple level of fixed effects. I note that although the dependent variable is an indicator, I follow recent literature in accounting (DeHaan, 2021; Donelson et al., 2022; Imperatore et al., 2021) to imply an adjusted linear regression model that controls for unobservable factors that stay constant within an economic unit. In this estimation, for every level g of every fixed effect f the mean of the residuals must be zero (Correia, 2016).

Table III.3
Impact of Investment and Financial Reporting Quality on FO Valuation bias, controlled by Activism Participation

This table presents the estimated coefficients for the conditional relation between investment and financial reporting quality, and target-sought fairness opinion valuation bias, controlled by activist shareholders. All variables are defined in Appendix B. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES	Posit_bias	Posit_bias
Lagged d_Activist	0.076**	0.0733**
	(2.084)	(2.001)
Lagged Activist_Part	0.068	-0.007
	(0.871)	(-0.065)
Lagged FRQ_Index1	-0.006	-0.005
	(-0.507)	(-0.511)
Lagged (Activist_Part * FRQ_Index1)	-0.019	-0.034
	(-0.153)	(-0.274)
Lagged Benchmark		0.019
		(0.729)
Lagged (Activist Part * Benchmark)		0.175*
		(1.677)
Cash	-0.026	-0.023
	(-0.397)	(-0.361)
StdDev (Sales)	0.163***	0.162***
	(3.329)	(3.292)
StdDev (Investment)	-0.285*	-0.251
	(-1.833)	(-1.578)
Operating Cycle	0.037**	0.036**
	(2.155)	(2.119)
Loss	0.081***	0.083***
	(2.906)	(2.970)
LogAsset	-0.021**	-0.022**
	(-2.466)	(-2.538)
Mkt-to-Book	-0.209	-0.190
	(-0.307)	(-0.280)
ZScore	0.001**	0.001**
	(2.518)	(2.559)
Tangibility	0.187*	0.179*
	(1.936)	(1.855)
Kstructure	0.073	0.073
	(1.025)	(1.037)
Dividend	-0.0038	-0.005
	(-0.108)	(-0.156)
Constant	0.475***	0.468***
	(4.375)	(4.283)
Industry FE	Yes	Yes
Year FE	Yes	Yes
Observations	1,513	1,513
Adjusted R-squared	7%	7%

I highlight that both models are valid to explain the variation of dependent variable since (1) has an F-stat of 4.96 (prob>F 0.000) and (2) shows an F-stat of 4.87(prob>F 0.000). Both estimations present adjusted R-squares of 7%.

First, I find evidence that the presence of activist prior to the M&A year has implications on the valuation attributes. In other words, the presence of activists increases the likelihood of a fairness opinion valuation to be greater than the deal price (0.07**). This signalizes a separating equilibrium of firms with good and bad investment policies and other factors not captured by these models. This is aligned with the results reported by Klein & Zur (2009) related to activists influence changes in board position, proposing strategies, replacing chief executive officers. My findings also aligned with Brav et al. (2018) who documents improvement in firm's innovation after activists intervention. The authors claim that activist shareholders reallocate innovative resource and promote change in the board-level expertise.

Second, the addition of activist shareholders variables isolates the other coefficients effects, resulting in a positive and significant relation between financial reporting quality (*FRQ_Index*) and valuation bias (0.362*). This is consistent with the idea that financial advisors are subject to the transparency level and predictability of accounting numbers. Therefore, the higher the financial reporting quality, the deeper can be the analysis to fundament both a higher growth and/or a lower risk factor. Consequently, the greater is the firm valuation compared to the deal offer. This is aligned with the findings reported by Chen et al. (2018), where better target's informational environment enables better capital allocation in the acquirer's perspective. In my study, I interpret the better financial reporting quality to reflect even internal financial informational environment, which may help overcome frictions during the due diligence process. Other things equal, more transparent environment enables a deeper analysis conducted by the deal advisor. Marquardt & Zur (2015) provide evidence that target's financial reporting quality has implication on deal length and on the probability for the deal to be concluded.

Third, although investment and its categories alone are not significant, the interaction of Benchmark group with the activist shareholding in previous year (*Activist_Part * Benchmark*)

significantly explain the valuation bias (0.175*). Valuation estimates are primarily developed using the Discounted Cash Flow (DCF) technique. According to DeAngelo (1990), deal advisors use the financial report (based on historical accounting basis) delivered by target's management to evaluate the reasonableness of managerial earnings forecast. The author complements that several other aspects of valuation are considered to ultimately help advisors to evaluate the managers' ability to deliver such a forecast. Consistent with this view, better history of investment decisions mitigates the risk of delivery, which allows advisors to increase the FO valuation. Therefore, this result concurs with the hypothesis H_2 that financial advisors incorporate the presence of activist shareholders and its related effects on investment efficiency on the fairness opinion valuation attributes.

4.3.2. Valuation Accuracy and Deal Negotiation

In addition, Bebchuk & Kahan (1989, p. 33) remind that a "'fair' price is not the highest price attainable, but rather a price within the range that a reasonable and prudent board would accept". So, if high valuation ranges could facilitate the possibility of a deal to be accepted, then this could signalize the deal advisors would be catering the management, not attending the overall shareholder's interest (DeAngelo, 1990; Shaffer, 2020), including the activists. Then, larger ranges lead to a worse estimation of economic value compared to lower ranges. For example, if the financial advisor reports a minimum value of 6 per share and maximum value of 40, the average (23) is less representative than a range of 20-26 (average 23).

High ranges of valuations are plausible to be interpreted as related to (1) poor financial reporting quality and (2) misalignments between existing management and activist's interests. While the informational environment obscures the scenarios that are about to be projected, misaligned purposes of the management increase the chances of forecasted scenarios to deviate more from each other. Then, in the spirit of literature on analyst forecast and on audit (Barniv et

al., 2005; Hogan & Wilkins, 2008), larger ranges reflects how environment hinges the ability of deal advisors to formulate scenarios of future cash flow generation.

Moreover, if the fairness opinion is an instrument of price negotiation, the distance between the maximum estimated value and the deal value may reflect the differences in negotiations for price of firms that has been disciplined by activists and firms that has not. As a result, the reasonableness of delivering results may be considered to close the deal. To investigate this perspective, I examine effect of the activist shareholders under the underlying mechanism of investment efficiency and financial reporting quality on the difference between the deal value and the max FO valuation (*Diff_Max*), where lower values represent a positive aspect of negotiation (columns 1-3).

In addition, I use the valuation range as an additional control variable since opportunistic adjusts could enlarger the range only in the minimum size. I also test two alternative estimations to alleviate any concern about a possible direct influence of large activist shareholders. Then, Table III.4 shows the results comparing a model without control for top-activists (1), controlling for top-five activists measured by market cap (2), and measured by number of fillings with SEC (3).

Table III.4
Impact of activist shareholders' mechanism on the difference between the deal value and the max FO valuation.

This table presents the estimated coefficients for the conditional relation between investment and financial reporting quality, controlled by activist shareholders, on the deal negotiation. All variables are defined in Appendix B. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES	Dep. Var.: Diff_Max		
	(1)	(2)	(3)
Lagged d_Activist	0.037	0.196	0.031
	(0.385)	(1.265)	(0.318)
Lagged Activist_Part	0.304	0.265	0.290
	(1.248)	(1.075)	(1.187)
Lagged Benchmark	0.073	0.069	0.073
	(1.257)	(1.181)	(1.262)
Lagged FRQ_Index	0.163**	0.163**	0.162**
	(2.152)	(2.152)	(2.141)
Lagged (Activist_Part * Benchmark)	-1.062*	-1.208**	-1.064*
	(-1.942)	(-2.305)	(-1.930)

*Lagged (Activist_Part * FRQ_Index)*	1.320	1.256	1.327
	(1.547)	(1.510)	(1.557)
Valuation Range	**0.529***	**0.528***	**0.529***
	(13.392)	(13.253)	(13.385)
Top 5 Activist (Market cap)		0.193	
		(1.434)	
Top 5 Activist (Pressing)			0.044
			(0.387)
Constant	0.438	0.248	0.436
	(1.273)	(0.662)	(1.267)
Control Variables	*Yes*	*Yes*	*Yes*
Industry Fixed Effects	*Yes*	*Yes*	*Yes*
Year Fixed Effects	*Yes*	*Yes*	*Yes*
Observations	*591*	*591*	*591*
Adj. R-squared	*73%*	*73%*	*73%*

First, results in columns 3, 4, and 5 show slightly differences between parameters, with equal economic significance. I note that financial reporting quality (*FRQ_Index*) is positively related to deal negotiation (0.163**). Contrary to expectation (H_1), this result can suggest two signals: (1) financial environment itself is not enough for deal advisors to lower the risk while analyzing the reasonableness of managerial earnings forecast; and (2) on average, in the absence of activists, financial advisors increase the range of valuation to facilitate the deal conclusion, even when facing more transparent financial environment. Concerns about the utility of fairness opinion has been expressed by numerous researchers in the literature (Bebchuk & Kahan, 1989; DeAngelo, 1990; Gan & Lee, 2020; Kisgen et al., 2008; La Mura et al., 2011; Shaffer, 2020).

An alternative view stems from prior literature regarding implications on issuing financial guidance. Although Chen & Jung (2016) suggest a negative market implication due to lower probability of public issuance of financial guidance, Nagar & Schoenfeld (2021) provides evidence that as activists increase their ownership, the firm's management has lower incentive to issue financial guidance publicly, but greater incentive to issue those reports privately. So future studies may address different perspective to examine whether improved financial reporting quality impacts on the deal negotiation.

Second, the presence of activist shareholder prior to deal (*Lagged d_Activist*) alone has no significant implication on the negotiation as well the size of the activist participation (*Lagged Activist_Part*). However, consistent with prediction, the activist participation significantly reduces the difference between the deal value and the best scenario of valuation for firms with better trace of investment efficiency (*benchmark*) (-1.062*).

Economic interpretation goes on the notion that activist investors stimulate the management to take better decisions (Klein & Zur, 2009). So, comparatively, a constant scrutiny of activists contributes to the reasonableness of management forecasts. Put differently, factors other than the internal improved ability to deliver the forecasted result creates the differences between scenarios on FO valuation, validating the acceptance of hypotheses H_2. Consistent with this view, I find a positively significant relation between valuation range and *Diff_Max* (0.529***).

Collectively, this result contributes to weaken the idea that deal advisors cater management with valuation high ranges in order to facilitate the deal conclusion, at least in the presence of activist shareholders. This result also contributes to the understanding of larger ranges as a path for facilitating the deal acceptance, which is similar to findings presented by Imperatore et al. (2021). In particular, in the presence of activists, as the firm and increases the balance between the amount of investment in CAPEX, R&D, and acquisitions with the internal cash generation, the deal advisor incorporates the activist shareholding as a signal of discipline and alignment while conducting the business. This result is aligned with prior literature on how activists interact the firm's governance by suggesting strategies, influencing resource reallocation, and by improving innovation (Brav et al., 2008; Klein & Zur, 2009). Therefore, this result confirms the hypothesis H_2, enlightening the role of activist shareholders on firms' investment efficiency around an M&A process.

Collectively, my results support the notion of a spillover effect of activists on valuation attributes. On average, financial advisors incorporate the presence of activist shareholders as

mechanism that disciplines the management, denoting a separating equilibrium about better information environment and resource allocation.

4.4. Additional Tests

I regress several additional tests to examine the credibility and consistence of my findings. First of all, I discuss the endogeneity, which is a common issue in the accounting literature (Andriosopoulos & Yang, 2015; Ertugrul & Krishnan, 2014). Subsequently, I follow the literature to explore the effects of top tier advisors (Cain & Denis, 2013), deal length (La Mura et al., 2011; Wangerin, 2019).

4.4.1. Endogeneity

Endogeneity is an econometrical issue that arise from the functional form and from the choices of explanatory variables (Wooldridge, 2010). This sort of issue generates regression errors that are correlated with the explanatory variables. I address this concern by using two different approaches. First, I use information of activists in periods prior to the deal announcement to alleviate the concern that the eminence of M&A could incentivize the activists' scrutiny over the firm's management. This considers the fact that an M&A negotiation usually takes several months, sometimes more than a year (Wangerin, 2019) to be concluded. Therefore, I claim that these lagged interesting explanatory variables correct issues related to specification form.

Second, to ameliorate the effect of activists, I examine the specific declared motives of activists when they file the Schedule 13D (or D/A) with SEC not directly related to M&A. I explore the amounts of fillings with declared motives, with more emphasis on those that could signalize greater scrutiny ("*Demand information from management*") and misalignments with management ("*Disagree with management actions or strategy*"). It is also important to remind that activist shareholders have no access to the ongoing M&A process (Wangerin, 2019), so the deal negotiation

and activist scrutiny are events conceptually independent. Table III.5 shows the results on the activist specific effect on valuation attributes.

Table III.5
Impact of specific declared motives for activism on positive bias, valuation range, and deal negotiation.

This table presents the estimated coefficients for the conditional relation between specific declared motives for activism at t-1 on positive bias, valuation range, and on the difference between the max valuation and the deal value. All variables are defined in Appendix B. A constant term and all control variables are included in all regressions, but not reported. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES		(1) Posit Bias	(2) Valuation Range	(3) Diff Max
Lagged Tot_concerns_27	Demand information from management	0.153***		
		(5.857)		
Lagged Tot_dispute_14	Disagree with management actions or strategy		-0.187**	-0.107**
			(-2.314)	(-2.387)
Control Variables		Yes	Yes	Yes
Industry FE		Yes	Yes	Yes
Year FE		Yes	Yes	Yes
Observations		1,539	722	729
Adj. R-squared		7%	38%	55%

Consistent with previous arguments, I find specific declared motives to significantly affect the valuation attributes. First, the greater is the filling on the type of concern "*Demand information from management*" in the previous year, the greater is the likelihood of positive bias (0.153***). This result strengthens the argument of greater scrutiny and greater demand for financial reporting. As a result, richer financial environment enables deeper analysis by deal advisor, who may interpret the scrutiny as a disciplining mechanism that forces the firm towards more transparent (potentially better) investment decisions. This is aligned with Nagar & Schoenfeld (2021)'s findings about lower incentive to issue financial information publicly, but greater incentive to enhance the private informational environment.

Second, I find that the more activists disagree with management's ongoing strategy the lower is the fairness opinion valuation range (-0.187**), which signalizes richer valuation

estimation. Third, more disagreement also has a positive impact on the deal negotiation since the deal value is closer the best-case scenario in the fairness opinion valuation (-0.107**). Collectively, these results reinforce previous discussion about how misalignment between management and activists may signalize different scenarios while formulating the fairness opinion.

Nonetheless, both analyses require caution because (1) the activist's declaration does not necessarily represent the real intention to interfere on management control, (2) only few activists declare the specific reason for activism, since it is not mandated under the SEC Rule 13d-2(c), and (3) the effect can be stem from indirect pressure (e.g., activist campaigns) (Admati & Pfleiderer, 2009; Boyson et al., 2017; Coffee Jr. & Palia, 2016).

4.4.2. Deal Length

A contrary argument is that activist could negotiate with management and/or with deal advisors behind the scenes. Although there is no available data to directly test this speculation, if it is true, activist would claim to accelerate the deal length regardless the financial reporting quality and investment efficiency. To address this issue, I compare the deal length of firms with activists and firms without by using a univariate t-test and find no significant difference (t= -0.3595 prob>t = 0.7193). Subsequently, I regress the deal length by d_activist and all explanatory variables used in previous tests. Table III.6 summarizes the results.

Table III.6
Impact of activist shareholders on deal length and on positive bias.

This table presents the estimated coefficients for the conditional relation between activist shareholders, investment and financial reporting quality, and deal length (1). All variables are defined in Appendix III.B. A constant term and all control variables are included in all regressions, but not reported. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES	DV.: Deal_Length	
	coef	t-stat
Lagged d_Activist	0.022	(0.235)
Lagged FRQ_Index1	0.001	(0.031)
Lagged Benchmark	0.020	(0.536)

Lagged (d_Activist * FRQ_Index1)	**0.172***	(1.894)
Lagged (d_Activist * Benchmark)	0.301	(1.508)
Control Variables		Yes
Industry Fixed Effects		Yes
Year Fixed Effects		Yes
Observations		1,235
Adj. R-squared		17%

Lengthier deal length can be a reflect of at least two aspects of the M&A process: (1) advisors are facing technical issues during the due diligence (e.g., "Material Adverse Event" – MAE and "Material Adverse Changes" - MAC) and (2) target firm price negotiation (Davidoff, 2006; Wangerin, 2019). Under the first perspective, I find no significant relationship between the presence of activist shareholder prior to deal (*d_Activist*) and the *Deal Length* (coef. 0.022) but I do find a positive relation between reporting quality in the presence of activists prior to deal and the deal length (0.172*). This contributes to deteriorate the concerns about behind-the-scenes pressure of activists to accelerate the deal completion.

Moreover, I also note that *FRQ_Index* alone is not significant (0.001). Although this result contradicts the findings of Marquardt & Zur (2015), the authors find that accounting quality is positively associated with a deal to be structured as a "negotiation" rather than as an "auction". So, under the second perspective, I view the positive and significant relation between the deal length and the interaction of *d_Activist * FRQ_Index* as a mechanism under which higher financial reporting quality enables management teams that were disciplined by activists to opens a room for longer negotiations. Either way, this relation can be further investigated in future studies with more focus on detailed information contained in M&A-related documents, similar to Wangerin (2019)'s study about transactional due diligence.

4.4.3. Top-tier Advisors

Top-tier advisors' reputation is usually regarded as associated to high quality service (Cain & Denis, 2013). Thus, I regress the *Valuation Range* by an indicator that assumes one if the financial advisor is a top-tier advisor. Similar to what is reported by Imperatore et al. (2021), Goldman Sachs, Morgan Stanley, JP Morgan, BofA Merrill, and Credit Suisse are the investment banks with greater representativeness in my sample: 31.26% of the deals. I find no significant relation between top-tier advisors and the valuation range, even when I include (or interact with) the fee size. This is consistent with prior evidence (Cain & Denis, 2013). The authors find difference in valuation errors (different approach) for acquirers, not for target firms. Further, I re-test the estimation with *Diff_Max* including the indicator of top-tier advisor, but I fail to find significant results. Therefore, I rule out the chance that my results are driven by top-tier advisors.

Moreover, I test the mechanism's effect on the deal negotiation, controlling for the presence of target-sought top-tier advisors. Table III.7 summarizes the results.

Table III.7
Impact of activist shareholders on deal negotiation controlled by top-tier advisors.
This table presents the estimated coefficients for the conditional relation between activist shareholders, investment and financial reporting quality, and deal negotiation, controlled by top-tier advisors. All variables are defined in Appendix III.B. A constant term and all control variables are included in all regressions, but not reported. ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively, using a two-tailed t-test.

VARIABLES	Dep. Var.: Diff_Max		
	(1)	(2)	(3)
	Full	TopTier==0	TopTier==1
Top-tier Advisor	0.027		
	(0.412)		
Lagged d_Activist	0.149	0.168	0.219
	(1.222)	(0.961)	(1.157)
Lagged Activist Part	-0.916**	-1.173**	-1.233
	(-2.137)	(-2.549)	(-1.117)
Lagged Benchmark	0.104	0.160	-0.035
	(1.472)	(1.583)	(-0.394)
Lagged FRQ_Index	0.251*	0.453***	-0.212*
	(1.720)	(2.714)	(-1.846)
Lagged (Activist Part * Benchmark)	-0.452	-0.620	0.222
	(-0.785)	(-1.020)	(0.171)

*Lagged (Activist Part * FRQ_Index)*	-1.838	**-4.191*****	0.019
	(-1.324)	(-3.594)	(0.008)
Control Variables	*Yes*	*Yes*	*Yes*
Industry Fixed Effects	*Yes*	*Yes*	*Yes*
Year Fixed Effects	*Yes*	*Yes*	*Yes*
Observations	*728*	*483*	*237*
Adj. R-squared	*55%*	*49%*	*62%*

After including the top-tier advisors variable, while I find that the greater is the activist's ownership prior to deal the lower is the difference between maximum valuation scenario and deal value (-0.916**), the inclusion of this variable inhibits the effect of interesting variables. Further, I test the mechanism on deal negotiation in a sample where the target firms hired lower-tier advisors. Under this perspective, I find a significant result for the interaction of activists with financial reporting quality (-4.191***) and no result for target-firms that hired only top-tier advisors (0.019). Collectively, these results evidence a sensitiveness of the overall results to the presence of top-tier advisors. Similar to the effect of Big-four companies in auditing quality (Guo et al., 2021), I interpret the activist mechanism as a way to reduce agency cost by demanding greater financial reporting quality, which suggest a protection of overall shareholder's wealth.

5. Conclusion

Active shareholders are increasingly proactive over their invested companies, especially when the firm is about to be acquired. In this circumstance, activist shareholders raise their skepticism over the management, because target-firm CEOs are repeatedly incentivized by bidders to complete the deal in charge of private benefits. This paper answers a call for more granular examination of different actors involved in the M&A setting (Welch et al., 2020) by examining the role of activist shareholders on the valuation attributes incorporated into target-sought fairness opinions (FOs) during mergers and acquisitions deals (M&A) in the United States during the 2000-2021 period.

The results suggest a mechanism under which activists indirectly create an incentive (or limit the opportunism) for advisors to provide higher quality fairness opinion valuation, and then to improve this valuation report relevance to shareholders as a price negotiation tool. I organize my results in four parts.

First, I validate the assumption that activists do discipline the management by requiring more detailed information, and the presence of activists is associated with higher accounting quality. Hence, indirectly, their scrutiny over time help to overcome informational frictions during the M&A process (Badawi et al., 2022; Chen & Jung, 2016). *Third*, in line with Biddle & Gilles (2006) about the relationship between financial reporting quality and better resource allocation, I provide evidence of a significant relationship between activist shareholders and greater investment efficiency. *Fourth* and more important, I show that, during M&A deals, target-sought financial advisor seem to incorporate the activism effect on the target firm valuation. This relation reveals a scrutiny over the management, which may come up with better information to satisfy not only the activist's demand but also contribute to a deeper and more consistent analysis. As a spillover consequence, financial advisors can appreciate more detailed information to project future investment decision, cash flow generation, and reduce the component of intrinsic risk in the fairness opinion valuation. My results are aligned with prior findings in different perspectives (Albuquerque et al., 2022; Aslan & Kumar, 2016; Biddle et al., 2009; Krishnan et al., 2016; PwC, 2022).

This study clarifies a debatable role of activist among practitioners, commentators, and scholars, by showing an overall benefit for all minority shareholders during M&A deals. However, I point out that my results are subject to some caveats. (1) Activist shareholders usually have an influencing effect greater than their relative shareholding. That explains why I did not focus on specify the mechanism shock on the valuation attributes and rather rely primarily on the relation directions. (2) To directly evaluate this effect in future research, it would be necessary to have

access to the discount rates used in the FO. I note that this topic have been recently studied by (Shaffer, 2020), but the author focus on a comparison between the cost of capital used by target and acquirer-sought fairness opinion. (3) A number of studies have extended the concept of activism by considering not only the Schedule 13D/A but also media press (activism campaigns) (Aslan & Kumar, 2016; Boyson et al., 2017; Guo et al., 2021).

Due to the focus on the disciplining mechanism, I explore the declared intention for activism filed with SEC, assuming them to capture the expected effect. Future research may approach the topic also investigating this secondary path of pressure over the firm management. Moreover, alternative measures of financial reporting quality can be examined, such as previous audit adverse opinion, restatement, and textual analysis on the fairness opinion reports, for example, related to material adverse errors (MAE) and material adverse changes (MAC) during the due diligence. Under a different perspective, future researchers can track the presence of activists after the acquisition, and whether they still have a room for discipling the new management team.

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Appendix III.A1
Fairness Opinion – Financial point of view

This appendix provides an example of a Fairness Opinion, highlighting the invariable mention that advisors do to position their opinion "from the financial point of view". I illustrate bellow part of FO concerning the acquisition of Massey Energy by Alpha Natural Resources in 2011.

Opinions of Financial Advisors (beginning on page 92 for Alpha's financial advisor and on page 101 for Massey's financial advisor)

Opinion of Alpha's Financial Advisor. In connection with the merger, the Alpha board of directors considered the opinion of Alpha's financial advisor, Morgan Stanley & Co. Incorporated, which we refer to as Morgan Stanley, which opinion was rendered orally on January 28, 2011, and subsequently confirmed in writing, to the effect that, as of such date and based on and subject to the assumptions, procedures, factors, qualifications and limitations set forth in the opinion, the merger consideration to be paid by Alpha pursuant to the merger agreement was fair from a financial point of view to Alpha. The full text of Morgan Stanley's written opinion, which is attached to this joint proxy statement/prospectus as Annex C, sets forth the assumptions made, procedures followed, matters considered and limitations on the review undertaken. Morgan Stanley's opinion was provided to Alpha's board of directors in connection with its evaluation of the fairness of the merger consideration from a financial point of view to Alpha. It does not address any other aspect of the merger and does not constitute a recommendation to any stockholder of Alpha or stockholder of Massey as to how such stockholder should vote or act on any matters relating to the proposed merger.

Opinion of Massey's Financial Advisor. In connection with the merger, Massey's financial advisor, Perella Weinberg Partners LP, which we refer to as Perella Weinberg, delivered its opinion to the board of directors of Massey that, as of January 28, 2011, and based upon and subject to the various assumptions, qualifications and limitations set forth in its opinion, the per-share merger consideration, consisting of $10.00 in cash, without interest, and 1.025 fully paid and nonassessable shares of Alpha common stock to be received by the holders of shares of Massey common stock, other than holders of certain excluded shares, was fair, from a financial point of view, to the holders entitled to receive such merger consideration.

The full text of Perella Weinberg's written opinion, which describes the assumptions made, procedures followed, matters considered and qualifications and limitations on the review undertaken, is attached to this joint

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Source: Adapted from EDGAR/SEC (2011), retrieved December 21, 2022, from
https://www.sec.gov/Archives/edgar/data/37748/000119312511117153/ddefm14a.htmhttps://www.sec.gov/Archives/edgar/data/37748/000119312511117153/ddefm14a.htm

Appendix III.A2
Fairness Opinion – Valuation Range

This appendix shows the same case to illustrate the valuation range presented in a Fairness Opinion, highlighting declaration of some assumptions, including the use of financial information provided by both sides.

Discounted Cash Flow Analysis

Morgan Stanley performed **discounted cash flow analyses**, which are analyses of the present value of projected unlevered free cash flows using terminal year Aggregate Value to EBITDA multiples based on projected EBITDA, for the Alpha management estimates, the Massey management estimates **and the sensitivity analysis** for Massey.

Morgan Stanley analyzed Alpha's business using publicly available information, information obtained from discussions with Alpha management and certain financial forecasts prepared by Alpha management for the years 2011 through 2015. The terminal value was calculated by applying terminal multiples ranging from 5.5x to 6.5x to fiscal year 2015 EBITDA, as estimated by Alpha management. The range used was based on an analysis of Alpha's multiples historically as well as the current trading multiples of Alpha and its peer group. For purposes of this analysis, Morgan Stanley calculated Alpha's discounted unlevered free cash flow value using discount rates ranging from 9.0% to 12.0%. The range of discount rates was selected based upon an analysis of Alpha's weighted average cost of capital. This analysis resulted in an implied value per share of Alpha common stock ranging from approximately $58 to $72 per share.

Morgan Stanley analyzed Massey's business using publicly available information, information **obtained from discussions with both Alpha and Massey's management and certain financial forecasts prepared by Alpha and Massey management for the years 2011 through 2015**. The terminal value was calculated by applying terminal multiples ranging from 6.0x to 7.0x to fiscal year 2015 EBITDA, as estimated by Massey management and Alpha management.

The range used was based on an analysis of Massey's multiples historically as well as the current trading multiples of Massey and its peer group. For purposes of this analysis, Morgan Stanley calculated Massey's discounted unlevered free cash flow value using discount rates ranging from 9.0% to 12.0%. The range of discount rates was selected based upon an analysis of Massey's weighted average cost of capital. Based on the discounted cash flow analyses described above, Morgan Stanley estimated the implied value per share of Massey common stock as follows:

Estimates	Implied Value Per Share of Massey Common Stock	Implied Value Including Synergies
Massey Management	$ 59 –$77	$ 75 –$94
Sensitivity Analysis for Massey	$ 54 –$72	$ 71 –$88

Source: Adapted from EDGAR/SEC (2011), retrieved December 21, 2022, from
https://www.sec.gov/Archives/edgar/data/37748/000119312511117153/ddefm14a.htm

Appendix III.B
Variables definitions

This appendix provides a detailed description of the procedures to compute the variables used in my analysis.

Variables	Notation	Definition	Source
Dependent Variables			
Valuation Bias	*Valuation_Bias*	Ratio of fairness opinion average valuation to the deal offer	(Cain and Denis, 2013)
Positive Bias	*Posit_Bias*	Indicator that assumes one if the valuation bias is greater than one.	
Valuation Range	*Value_Range*	Natural logarithm of the difference between FO Max and Min valuation estimates. For multiple FOs, I use the median values for max and min.	
Difference to Maximum	*Diff_Max*	Natural logarithmic of the ratio between the best-case scenario (maximum valuation) and the deal value	
Independent Variables			
Activist Shareholder Presence	*d.ActShare*	Indicator equals 1 if at least one Schedule 13D/A is filled.	(Boyson, Ganchev, and Shivdasani, 2017)
Activist Shareholder Relative Size	*ActShareSize*	Relative size of shares held by activists to total issued shares.	(Boyson, Ganchev, and Shivdasani, 2017)
Financial Reporting Quality Index	*FRQ_Index*	Average of two accruals quality models: First, I Dechow and Dechev (2012)'s model adjusted by McNichols & Stubben (2008). Second, I use Kothari (2005)'s performance-based model. Both models are estimated cross-sectionally for each industry with at least 20 observations in a given year based on the Fama and French (1997) 48-industry classification *FRQ_Index* is the average of both residuals in absolute values, multiplied by minus one.	(Biddle et al., 2009)
Investment Size	*Investment*	Sum of research and development expenditure (item 46), capital expenditure (item 128), and acquisition expenditure (item 129) less cash receipts from sale of property, plant, and equipment (item 107) multiplied by 100 and scaled by lagged total assets (item 6).	(Biddle et al., 2009)
Overinvesting Firms	*Overinvesting*	Indicator that assumes one if residuals of revenues growth on investment belong to forth quartile, zero otherwise.	(Biddle et al., 2009)

Underinvesting Firms	*Underinvesting*	Indicator that assumes one if residuals of revenues growth on investment belong to first quartile, zero otherwise.	(Biddle et al., 2009)
Benchmark Firms	*Benchmark*	Indicator that assumes one if residuals of revenues growth on investment belong to second and third quartile, zero otherwise.	(Biddle et al., 2009)
Deal related control variables			
Deal Size	*DealSize*	The natural log of the value of the merger transaction measured at the announcement date of the merger	(Imperatore et al., 2021)
Deal length	*DealLength*	Natural logarithm of the number of days between the merger announcement date and completion date.	(Wangerin et al., 2019)
Percent Cash	*PercentCash*	Percent of the deal paid in cash.	(Malmendier et al. 2016; Imperatore et al., 2021)
Multiple FO	*MultipleFO*	An indicator variable equal to one if the target firm received more than one FO for the merger, and zero otherwise.	(Liu, 2020)
Acquirer-sought FO	*AcquirerSoughtFO*	An indicator variable equal to one if an acquirer-sought FO is available for the merger, and zero otherwise.	(Liu, 2020; Imperatore et al., 2021)
Top tier	*Top5_adv*	The top five investment advisors in the sample, considering market capital.	(Liu, 2020; Imperatore et al., 2021)
Firm related control variables			
Cash	*Cash*	The ratio of cash (item 1) to total assets (item 6).	(Biddle et al., 2009)
$\sigma(Sales)$	*StddevSales*	Standard deviation of the sales deflated by average total assets from years t-5 to t-1.	(Biddle et al., 2009)
$\sigma(Investment)$	*StddevInvestment*	standard deviation of investment (Investment, Capex, and Non-Capex) from years t-5 to t-1.	(Biddle et al., 2009)
Operating Cycle	*Operating_Cycle*	the log of receivables to sales (item 2/item 12) plus inventory to COGS (item 3/item 41) multiplied by 360.	(Biddle et al., 2009)
Loss	*Loss*	An indicator variable that assumes the value of one if net income before extraordinary items (item 18) is negative, and zero otherwise.	(Biddle et al., 2009; Biddle et al., 2009; Imperatore et al., 2021)

Size	*LogAsset*	The log of total assets (item 6).	(Biddle et al., 2009)
Market-to-Book ratio	*Mkttobook*	The ratio of the market value of total assets (item 6 + (item 25 * item 199) - item 60 - item 74) to book value of total assets (item 6).	(Biddle et al., 2009)
Z-Score	*Z-Score*	3.3 (item 170) + (item 12) + 0.25(item 36) + 0.5 ((items 4 - item 5) / item 6).	(Biddle et al., 2009)
Tangibility	*Tangibility*	The ratio of PPE (item 8) to total assets (item 6).	(Biddle et al., 2009)
Capital Structure	*K-structure*	The ratio of long-term debt (item 9) to the sum of long-term debt to the market value of equity (item 9 + item 25 * item199).	(Biddle et al., 2009)
Dividend	*Dividend*	An indicator variable that takes the value of one if the firm paid a dividend (i.e., if item 2140 or 12740), and zero otherwise.	(Biddle et al., 2009)

Concluding Remarks

This dissertation is developed into three distinct papers where the developed hypotheses outline the following thesis: *depending on the firms' life cycle stages, conflicting interests related to managers, activist shareholders, and financial advisors affect distinct dimensions of the M&A participation and the knowledge transfer impact better deal outcomes*.

In short, *Paper 1* shows how theoretical drivers of are moderated by the life cycle stages of acquirer and target to explain the motivations for engaging in M&A activities. I also provide some insights about the effect of M&A deals on the firm's financial and economic structure. *Paper 2* further investigate the knowledge transference as a driver of M&A success, also controlled by the firm's life cycle stage. I provide evidence that introduction, growth, and mature firms achieve better outcomes when the knowledge transfer flows from the acquirer to target, while decline-stage firms achieve better results via an inverted knowledge transfer as a strategy to survive. P*aper 3* explores the institutional setting where activist shareholders scrutinize the management team, which results in greater financial quality and greater investment efficiency. As a result, I show a spillover effect of the activist participation on the external financial advisor, who incorporates the information on investment efficiency in the valuation attributes, enabling the fairness opinion to be used as a negotiation tool instead of a price justification instrument. Therefore, I show the activists to represent an extra protection to minority shareholders.

All of my papers concurrently contribute to managers, financial analysts, financial advisors, and institutional investors, since all of these economic agents are constantly dealing with M&A activities. These economic agents can benefit from the findings to foresee the incentives to participate as bidders or as targets in M&A deals. More specifically, paper 3 contribute to minority shareholders by showing the presence of activist shareholders as an extra-protection for the overall shareholders' wealth. Moreover, beyond the contribution to the M&A

literature, the findings also contribute to accounting, corporate governance, and corporate finance literature by showing new aspects of incentives and consequences related to a firm's financial and governance structures while engaging in M&A deals.

Future investigations on these topics can benefit from what I have done so far. All the papers offer steps forwards but also indicate new avenues to further investigate the discussed incentives and consequences of deal activities. Although M&A has been studied since the 1960's decade (Manne, 1965), this is still a hot topic since different mergers waves have been motivated by different aspects (Gorton et al., 2009; Jensen, 1988). So, new firms' configuration might be a fountain of new investigations in the near future.

Ultimately, I use M&A deals activities involving US firms because of the data quality provided by the EDGAR/SEC system. Indirectly, this research conveys a message that Securities Exchange Commissions from different countries can benefit from local evidence as long as their data on M&A deals are consistent enough to be properly examined, which is virtually impossible so far. For instance, the Brazilian Securities Exchange Commission (CVM) requires the listed companies to file some additional information via Reference Form. Although the entity has issued the OFÍCIO/CIRCULAR/CVM/SEP/Nº 001/2006 requiring information about stockholding superior to 5%, there is no available information comparable to the detail provided by Schedules 13-D and 13-G in the US scenario. In the presence of these data, researchers would be able to conduct further investigation to analyze the local incentives to be an activist in Brazil or to understand the characteristics of activism via the motive declaration or to analyze several possible consequences of local activism.

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