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Two lemons at the table

Information asymmetry, payment method and premiums across industries in mergers and acquisitions

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Preface

This master's thesis in business administration was written in the spring semester of 2026 at Mid Sweden University in Sundsvall.

We want to thank our supervisor, Peter Öhman, professor of business administration at Mid Sweden University, for his commitment, valuable insights, and continuous guidance throughout the process. His support has contributed significantly to the continuous improvement and completion of this thesis.

Thanks!

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Abstract

Prior merger and acquisition (M&A) research examining payment method and premium treats information asymmetry as operating similarly across industries. Combining industries with different degrees of information asymmetries does not merely reduce precision, it may obscure the true effect. Focusing on M&A transactions, the purpose of this thesis is to describe and analyze potential relationships between information asymmetry and payment method, and between payment method and premium, as well as the possible indirect effect of information asymmetry on the premium. The former two relationships are being moderated by industry, specifically comparing high-tech and non-high-tech transactions. Drawing on the risk-sharing mechanism and signaling theory, it is predicted that there is a positive relationship between information asymmetry and stock payment, moderated by industry. Stock payment is expected to reduce the premium, and this effect is also moderated by industry. Finally, it is theoretically unresolved whether information asymmetry exerts an indirect effect on the premium.

The final sample comprises 2,515 completed M&A transactions between 2002 and 2025 from the Refinitiv Eikon database, covering North America, Japan, and Europe. Furthermore, a control function approach was used to address endogeneity. Specifically, the payment method is modeled using a multinomial logit (MNL), while the premium is estimated using an ordinary least squares (OLS) method. Additionally, a bootstrap indirect test was performed to estimate the indirect effect of information asymmetry on the premium.

Under double-sided information asymmetry, we find that the acquiring firms are less likely to offer pure stock payment and instead resort to mixed payment. The acquiring and the acquired firm attempt to find an equilibrium where they are insured against adverse selection. These patterns are particularly pronounced in high-tech transactions relative to non-high-tech transactions. In high-tech transactions, the effect of stock on the premium appears attenuated when acquiring firms offer payments containing a stock component, due to the greater valuation uncertainty. These findings highlight the importance of differentiating between industries rather than combining them, with double-sided information asymmetry being considered. Finally, the information asymmetry has an indirect effect on the premium, since the information asymmetry arrives bundled in the stock component itself.

Keywords: *mergers and acquisitions, information asymmetry, payment method, premium, high-tech*

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1. Introduction

This introductory section outlines the background of the thesis, the point of departure for the identified research problem, and the purpose of the thesis.

1.1 Problem background

Mergers and acquisitions (M&A) are defined as transactions in which two firms combine to form a new entity or one firm absorbs another. Due to technological development and digitalization, these transactions are acknowledged as a key strategy to remain competitive in today's business environment. Although characterized by some degree of business risk, firms pursue M&As for various reasons, such as exploiting growth opportunities rather than relying on organic growth, improving competitiveness through diversification, and scaling business operations (Capron, 2016; Heater et al., 2021; Hossain, 2021).

While intended to create value, there is empirical evidence suggesting that M&A can create substantial value transfers. The transaction may result in one firm benefiting at the expense of the other, or in value destruction for both firms (Cumming et al., 2023). This can be exemplified by the merger between America Online (AOL), the leading internet provider in the early 2000s, and media company Time Warner. AOL, whose stock was widely considered overvalued at the time, acquired Time Warner in 2001, seeking to create a media and internet conglomerate. The information asymmetry, defined as an imbalance in knowledge between transacting parties, increased the target firm's difficulty in assessing the risk embedded in stock payment offered by AOL. The acceptance of stock entails bearing the acquiror's valuation uncertainty, consequently, the premium reflects not only expected synergies but also compensation for bearing this uncertainty. Information asymmetry affected Time Warner's ability to assess the stock payment, which ultimately led to misvaluation and significant value destruction in the M&A transaction (Battigalli et al., 2023).

It is well established in previous research that information asymmetry strongly affects deal attributes (Luypaert & Van Caneghem, 2017). Neither party involved in the transaction has full information about the counterparty (Eckbo et al., 2018; Faccio & Masulis, 2005; Rhodes–Kropf et al., 2005). Building on that premise, it is suggested that the success or failure of M&A outcomes is not entirely determined by the strategic fit. Payment method is rather highlighted as one of the most important decisions in M&A, acting as a response to the information asymmetry associated with the transaction (Eckbo et al., 2020; Renneboog & Vansteenkiste, 2019).

While payment method reflects the acquiring firm's consideration, such as valuation uncertainty, the premium reflects the compensation that the target firm requires in response to the choice of payment method. If the acquiring firm chooses cash payment (i.e., cash, stock, or mixed), the premium may be higher due to renounced future gains (Eckbo et al., 1990; Hansen, 1987). The contractual agreement is not a one-sided decision. A deal can be successful, but its terms may change over the course of the transaction, and the acquired firm may have influenced the final terms. Malmendier et al. (2016) emphasized that a complete understanding of these relationships requires consideration of both parties and their degree of information asymmetry. It is therefore important to consider both sides of a transaction. However, previous studies tend to consider one side, either the acquiror (Travlos, 1987) or the acquired firm (Reuer et al., 2004).

Previous research studying these relationships shows inconsistent results. Studies conducted in the US during different time periods exhibit mixed and indecisive evidence concerning the effects of information asymmetry and employing different proxy measures (e.g., de Bodt et al., 2022; Fu et al., 2013; Vermaelen & Xu, 2014). Similarly, there is inconclusive evidence regarding how payment method affects the premium in M&A transactions (e.g., Adra & Barbopoulos, 2018; Alexandridis et al., 2013). Evidence from the European market further contradicts the US findings, with de La Bruslerie (2013) reporting diverging results. Another limitation in previous research is its reliance on cross-industry samples (e.g., Fuller & Pusateri, 2018; Ismail & Krause, 2010), which may obscure important industry characteristics.

The mixed results in previous studies may be a consequence of the prevailing assumption of industry homogeneity. The former literature used to describe the choice of payment method and premium focuses on firm and deal-specific characteristics, implicitly assuming that M&A transactions operate similarly across industries. However, it is acknowledged that M&A activity is altered by characteristics inherent to individual industries (e.g., Andrade et al., 2001; Kanungo, 2021; Mitchell & Mulherin, 1996). There are substantial differences between industries regarding information asymmetry, financial leverage, and asset overvaluation. The literature emphasizes that industry-specific conditions play a role in shaping M&A transactions (e.g., García-Feijóo et al., 2012; Harford, 2005; Lambrecht, 2004).

This limitation may become noticeable in high-tech M&A transactions. High-tech industries are characterized by young and innovative firms developing new technology (Davis & Madura, 2015; Kohers & Kohers, 2001). Unlike non-high-tech firms, which derive a substantial share of their value from tangible assets, high-tech firms derive a larger portion of their value from intangible assets and real options, defined as future courses of action that a firm gains through investment made today. This makes it more difficult to assess their intrinsic value, thereby structurally differentiating them from non-high-tech firms and directly exacerbating information asymmetry (Kohers & Kohers, 2000). Higher information asymmetry in high-tech

transactions intensifies the risk-sharing mechanism predicted by Hansen (1987), thereby increasing the tendency towards stock payment compared to non-high-tech transactions. Additionally, greater exposure to valuation uncertainty may alter how the premium is negotiated, with target firms requesting a higher premium to complete the transaction.

Therefore, treating industries as homogeneous may obscure the real effect. To the best of our knowledge, there is limited research that emphasizes this distinction between high-tech and non-high-tech transactions. Our thesis addresses this gap by focusing on how information asymmetry affects the choice of payment method and, in turn, its effect on the premium in high-tech versus non-high-tech M&A transactions, thereby relaxing the assumption of industry homogeneity.

1.2 Purpose

Focusing on M&A transactions, the purpose of this thesis is to describe and analyze potential relationships between information asymmetry and payment method, and between payment method and premium, as well as the possible indirect effect of information asymmetry on the premium. The former two relationships are being moderated by industry, specifically comparing high-tech and non-high-tech transactions.

2. Literature review and hypothesis development

The following section presents the theoretical framework, previous research, and the development of the hypotheses.

2.1 Information asymmetry and mergers and acquisitions

2.1.1 Information asymmetry

The agency theory framework proposed by Jensen and Meckling (1976) suggests that the agent possesses superior information relative to the principal. The principal engages an agent to perform some kind of task on their behalf. Because both are assumed to be utility maximizers, the information advantage of the agent may create potential conflicts of interest (Öhman & Florin Samuelsson, 2020). There is therefore reason to suggest that the agent does not always act in the best interest of the principal. To mitigate this advantage, agency costs arise. Agency costs are not resolved in the sense of being eliminated, rather they are optimized through contractual agreements. In the context of M&A, information asymmetry can arise between the target firm and the acquiring firm.

With symmetric information, the M&A transactions would be structured in full alignment with the preferences of all parties, and the valuation would accurately reflect the asset's fundamental value. This assumption of no information asymmetry lacks empirical support and does not reflect real-world settings. The quantity and quality of information available are likely to determine payment method and, in turn, affect the premium (Luypaert & Van Caneghem, 2017). Building on the seminal paper of Akerlof (1970), M&A tend to break down due to the lemon problem. Under the conditions of information asymmetry, if the acquiring firm is unable to accurately assess the target firm's value, the firm is instead priced based on an average valuation. As the acquiring firm cannot determine whether the target firm is a high-quality firm or a "lemon", i.e., a low-quality firm, high-quality firms may ultimately be driven out of the market.

Allowing both the acquiring firm and the target firm to have proprietary information of their own value gives rise to an increased lemon problem. Based on Akerlof (1970), Hansen (1987) introduces the notion of "double lemon problem", meaning that each party has superior information of its own value, while having incomplete information of the other party's assets (i.e., double-sided information asymmetry). In a worst-case scenario, this may result in a transactional standstill. However, to prevent the market from breaking down, both parties are incentivized to enter into a contractual agreement (de La Bruslerie, 2013). Given the uncertainty surrounding assets, the acquiring firm, being risk-averse, protects itself from paying an excessive premium by

offering stock as payment. In turn, this discourages the target firm from accepting stock as payment and may instead insure itself by asking for a higher premium (Hansen, 1987; Myers & Majluf, 1984). Therefore, the payment method and premium are used in the contractual agreement to allocate the risk associated with information asymmetry. Within and across industries, information asymmetry is not a fixed constraint, it scales with the degree of information that cannot be fully verified.

2.1.2 Industry differences

Although industries differ in practice, positive accounting theory (PAT), grounded in agency theory, posits that firms' accounting choices stem from underlying incentive conflicts, giving rise to agency costs (such as political costs). Certain industries attempt to avoid political scrutiny, higher taxation, and related regulatory pressures by reporting lower profits. This is particularly relevant for politically sensitive industries, such as oil and tobacco, in which high profits may provoke political responses. Following the PAT framework, firms deemed politically sensitive may be categorized in this manner, among other categorizations (Watts & Zimmerman, 1978).

An alternative categorization is industry-specific characteristics. Firms in highly uncertain environments are subject to greater information asymmetry. High-tech industries are characterized by inherent uncertainty and unproven developments that distinguish them from other industries (Kohers & Kohers, 2000). Barbopoulos et al. (2019) and Davis and Madura (2015) extend this reasoning by conceptualizing it as real options. However, an option's value depends on the underlying assets. Therefore, value uncertainty arises due to not knowing if the real options will materialize in the future. Despite the inherent uncertainty associated with real options, which is further amplified in high-tech firms, the acquiring firm engaging in these transactions must have sufficient confidence in its ability to materialize the real options. Confidence reflects the acquiring firm's willingness to engage in the transaction, thereby signaling favorable real options and justifying the transaction cost associated with meeting the target firm's minimum threshold for accepting the offer (Barbopoulos et al., 2019; Davis & Madura, 2015).

Aggregating firms according to industry-specific characteristics enables the classification of high-tech industries. However, the sample of non-high-tech industries does not emerge as a homogeneous group but rather a heterogeneous one with different characteristics (e.g., García-Feijóo et al., 2012; Kanungo, 2021). Industry classifications are inherently subjective and depend on the author's chosen framework. Although one approach is to classify industries based on PAT, this thesis instead adopts a classification grounded in industry-specific characteristics. Similar to cluster analysis, a more refined classification of industries creates groups that are more homogeneous. However, differences between groups become harder to distinguish. Conversely, fewer groups generally become easier to distinguish at the expense of an accurate representation of reality. To the extent that recognizable patterns exist, an overarching perspective is likely to capture them (Hair et al., 2019, p. 195).

Based on the preceding discussion of heightened information asymmetry in high-tech M&A transactions, the payment method and premium serve as tools through which both the acquiring firm and the target firm manage the risk associated with the transaction. In turn, this provides insight into how the parties jointly mitigate information asymmetry to reach a satisfactory agreement.

2.2 Deal attributes

2.2.1 Information asymmetry and payment method

In the M&A financing decision, the acquiring firm faces different payment considerations. It first identifies a target firm, after which they suggest the appropriate payment method to finalize the transaction. Generally, stock is used to mitigate the limited cash funds available in the financing decision. At the same time, the pecking order theory states that the acquiring firm prefers using internal funds as payment, i.e., using cash rather than issuing debt, and stock being the least preferred option (Martin, 1996). Pecking order considerations are largely firm-specific, reflecting differences in firms' capital structure and financing capacity. As such, firms within the same industry do not necessarily share similar conditions regarding their ability to finance acquisitions with cash. The use of stock as payment, rather than issuing debt, may be driven by several underlying factors. It may be due to the acquiring firm deviating from optimal capital structure, thereby finding it problematic to use cash or debt. Stock may also provide flexibility to take advantage of investment opportunities as they occur (de La Bruslerie, 2013; Kohers & Kohers, 2000).

Although capital structure acts as a determinant, stock payment may impede firm control when ownership is concentrated. As Faccio and Masulis (2005) and Martin (1996) suggest, a higher level of ownership concentration involves a greater tradeoff concerning dilution of voting rights and the possibility of risk spreading, favoring the use of cash. However, previous research generally regards tax considerations as a secondary effect, greater firm control can intensify the tradeoff between dilution and financial constraints, thereby amplifying the effect of taxation. Studying a US sample, Ayers et al. (2003, 2004) argue that shareholders are compensated for accelerating capital gains taxes, thereby neutralizing the disadvantage of cash as payment. Erickson (1998) finds limited evidence that capital gains taxes are the deciding factor when deciding payment method. Although taxes may influence the timing of transactions that are already bound to occur, they are not significant enough to affect payment methods. Therefore, they have a limited effect in explaining industry differences (Boone et al., 2014).

The literature acknowledges several determinants of payment method in M&A transactions, including tax considerations, firm control, and financial constraints. Although these factors provide some meaningful explanation in certain contexts, they do not systematically vary across industry boundaries. They seem to be insufficient in

explaining the differences between high-tech and non-high-tech M&A transactions (Fuller & Pusateri, 2018).

As indicated, information asymmetry affects the acquiring firm's payment method, which in turn conveys the acquiring firm's assessment of the target firm (Fishman, 1989; Myers & Majluf, 1984). The announcement of cash payment may be perceived as a credibility signal of high target quality and overall transaction quality, as the acquiring firm is willing to bear the full risk of future profitability (Croci et al., 2012; de La Bruslerie, 2013). As information asymmetry increases, incentives for the transacting parties to use risk-sharing mechanisms may become relevant. These incentives become particularly relevant in the present research setting because high-tech firms' value is frequently embedded in intangible assets and real options, thus heightening information asymmetry. It is argued by Hansen (1987) that in the case of high information asymmetry, stock payment is used to spread the risk between both parties. Since the intrinsic value of the target firm is unknown, the lemon problem, the acquiring firm attempts to mitigate the adverse selection by transferring some part of the risk to the target firm.

Although stock is commonly used as a risk-sharing mechanism, Myers and Majluf (1984) and Rhodes–Kropf et al. (2005) contend that stock signals overvaluation, temporarily exploiting its own overvaluation to buy assets in the target firm. In the context of high-tech industry, which is often perceived as overvalued, this perception may explain the more frequent use of stock payments within the industry. However, Eckbo et al. (2018), studying a US sample, dispute this presumption, asserting that acquiring firms cannot exploit their overvaluation and instead advocate a rational payment design. This implies that exploitation of stock overvaluation is context-dependent, rather than a prevalent explanation for the use of stock as payment.

Previous literature has commonly conceptualized payment method as a dichotomous choice between cash or stock, potentially overlooking the consideration of combining cash and stock. Mixed payment is not necessarily structured as a fixed 50/50 split between cash and stock but rather represents a flexible continuum in which the proportion is not predetermined. In a sample of European transactions, Martynova and Renneboog (2009) find that the number of stock payments accounted for 18.2 percent of total transactions, marginally less than mixed payments (19%). De La Bruslerie (2012) and Klitzka et al. (2021) present a competing mechanism regarding the choice of payment method. De La Bruslerie (2012) argues that mixed payments could be inferred as departing from extreme payment choices. In the sense of double-sided information asymmetry, each party in the transaction is risk-averse. The extreme solutions would consequently only resolve one party's adverse selection, as the valuation uncertainty would either be shifted to the acquiring firm when cash is used, or to the target firm when stock is used. Following the risk-sharing mechanism presented by Hansen (1987), de La Bruslerie (2012) proposes that the use of stock payment forces the target firm to share valuation uncertainty, as the value of the

shares will decline if the target firm proves to be worth less than initially claimed. Klitzka et al. (2021) suggest that the cost of evaluating a target firm increases with information asymmetry. Beyond a certain point, these costs may outweigh the benefits of further valuation, leading the acquiring firm to prefer cash payment and bear the valuation risk. Conversely, de La Bruslerie (2012) suggests that cash serves as a credibility signal of the transaction while limiting the need to share future gains.

Taken together, it can be hypothesized that greater information asymmetry in high-tech transactions, in contrast to non-high-tech transactions, will lead to an increased use of stock payment to spread risk. Thereby, it can be proposed:

H1: *There is a positive relationship between information asymmetry and the choice of stock as payment method, moderated by industry.*

2.2.2 Payment method and premium

The choice of payment method reflects the acquiring firm's consideration, while the premium represents the target firm's minimum threshold for accepting the offer. The target firm is not required to accept the offer, instead, it would rather negotiate a premium that compensates for the information asymmetry. The trade-off between risk and desired return shapes the premium. Generally, it is argued that a higher proportion of stock reduces the premium, due to the target firm participating in future value appreciation. Cash payment entails forgoing this value appreciation, necessitating immediate compensation for the forfeited future real options (Battigalli et al., 2023; de La Bruslerie, 2013). Studying M&A transactions in the US between 1985 and 2019, Battigalli et al. (2023) find that the premium was 10.8 percent higher when cash was used as payment method.

A limitation of previous research is its lack of industry differences and the characteristics associated with high-tech and non-high-tech industries. Additionally, the use of Standard Industrial Classification (SIC) codes, which classify industries based on primary business operations, does not adequately capture what is effectively being acquired in the transaction. Specifically, SIC codes fail to reflect the underlying real options and intangible assets that are pronounced in high-tech industries (Kile & Phillips, 2009). According to Barbopoulos et al. (2019) and Davis and Madura (2015), firms with additional real options will attract a higher premium. Folta and Miller (2001) find that M&A transactions involving target firms are more likely when faced with less information asymmetry, rather than committing to large irreversible investments. Conversely, acquiring firms will use stock to mitigate irreversibility. However, the target firm's acceptance of stock depends on the risk associated with the real options materializing. When stock is used as payment, a larger portion of the risk is borne by the target firm, thereby raising the minimum threshold that is accepted by the target firm (Folta & Miller, 2001).

While cash payment increases the acceptable premium due to the forgoing of future gains, stock payment exposes the target firm to post-transaction uncertainty. This

effect is particularly pronounced in high-tech transactions, which increase the risk associated with accepting stock due to having incomplete information about the acquiring firm. As a result, the target firm demands a higher premium even when stock is used as payment, partially offsetting the general cash advantage of eliminating post-transaction risk. Consequently, although stock payments are associated with a lower premium, this negative relationship is expected to be weaker in high-tech transactions due to inherently higher risk (Barbopoulos et al., 2019; Davis & Madura, 2015; Folta & Miller, 2001). Therefore, it can be hypothesized:

H2: *There is a negative relationship between stock payment and premium, moderated by industry.*

Whether the payment method and premium are determined simultaneously or sequentially in the transaction is uncertain. Previous research distinguishes between two different standpoints. On the one hand, it is suggested by Battigalli et al. (2023) and de La Bruslerie (2013) that the payment method and premium discussion occur in the same contractual negotiation. Under the assumption of simultaneity, it is not justified to discuss sequential determination since the payment method and premium determination are not separate considerations. On the other hand, Fishman (1989) and Hansen (1987) propose that the payment method and premium are determined sequentially. They argue that the process occurs through a series of sequential steps in which the choice of payment method is contingent upon the degree of information asymmetry (Hansen, 1987). As the initial premium is unknown, the final premium depends on subsequent negotiations of the payment method, consequently, the payment method occurs earlier in the process and defines the boundaries of the premium (Fishman, 1989). Due to the inconsistencies in the literature regarding which mechanisms govern M&A transactions, it cannot be determined whether information asymmetry has an indirect effect on the premium, mediated by the payment method.

The simultaneous perspective does not refute the sequential perspective of the model. Rather, in practice, the negotiation process may unfold with near simultaneity, such that the payment method does not fully convey the effects of information asymmetry before the premium is determined. Thus, while the relationship may be conceptualized as sequential in theory, it may appear effectively simultaneous in an empirical context (de La Bruslerie, 2013; Fishman, 1989). Therefore, based on the discussion in section 2.2.2, a third hypothesis is proposed as a null hypothesis:

H3: *There is no indirect relationship between information asymmetry and premium, mediated by payment method.*

2.3 Analytical framework

The framework in Figure 1 models a relationship between information asymmetry, payment method, and premium, with industry type as a moderating variable. The

first part of the analysis focuses on the relationship between information asymmetry and payment method (H1). Illustrated by the left and central squares in the figure, payment method may take one of three forms: cash, stock, or mixed.

The second part of the analysis focuses on the relationship between payment method and premium, see the center and right squares. Information asymmetry relates to H1, whereas the relationship between payment method and premium is related to H2. H3 focuses on whether an indirect relationship exists between information asymmetry and premium, through the mediating effect of payment method, as illustrated by the curved dashed arrow at the bottom of the figure. While the literature provides a basis for a potential indirect relationship between information asymmetry and premium, it does not establish whether such a relationship exists at all. Therefore, H3 is proposed as a null hypothesis.

Industry type is incorporated as a moderating variable, positioned at the top of the model. Industry type is categorized as high-tech versus non-high-tech and moderates the strength and direction specified in H1 and H2, as illustrated by the dashed arrows extending from the moderator towards the respective direct relationships in the figure.

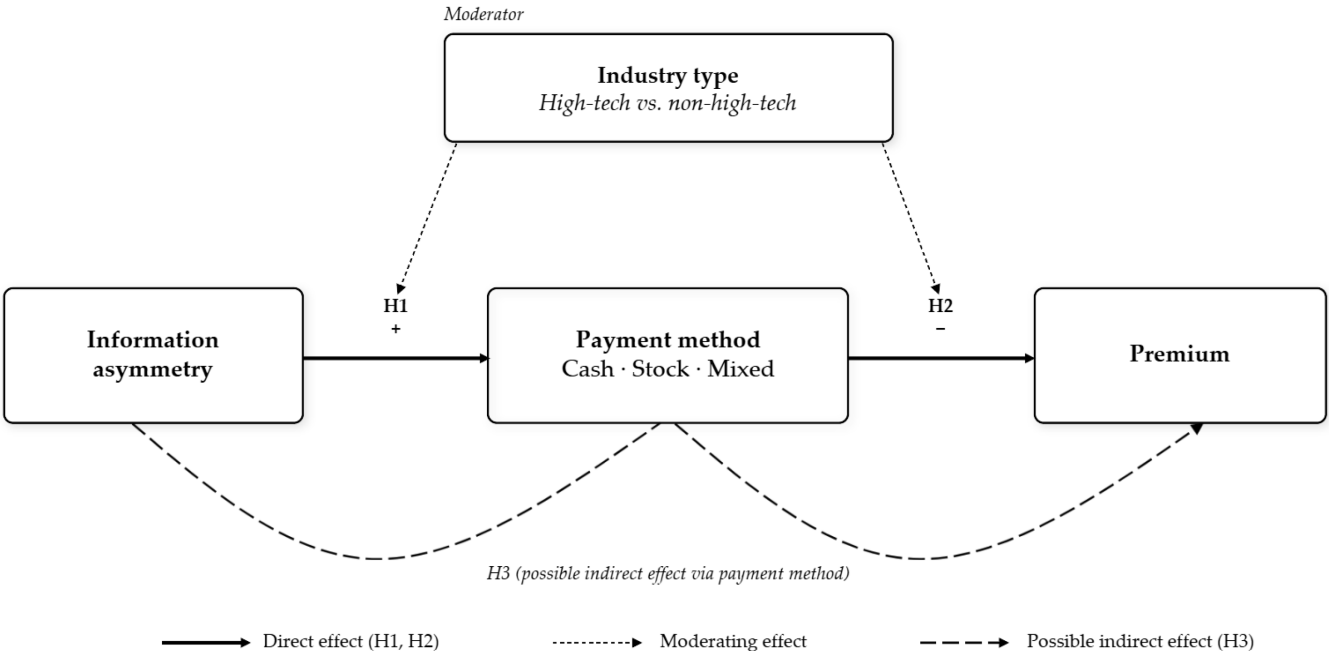

Figure 1. Analytical framework (developed by the authors)

3. Methodology

The following section describes the methodology employed to conduct the thesis. For instance, it provides an account of the data collection and data analysis procedures, as well as methodological considerations related to the different components of the research design.

3.1 Literature search and source criticism

The literature search was conducted primarily based on peer-reviewed scholarly articles retrieved from the academic database Web of Science. Targeting peer-reviewed work in the research area of M&A transactions, articles meeting two criteria were included: (i) the journal is included in Web of Science, and (ii) the journal is ranked in the Academic Journal Guide (AJG). AJG ranks journals, ranging from 1 (lowest) to 4* (highest). Consequently, the thesis excluded journals ranked 1 in the AJG, as well as journals that were not ranked and therefore considered to have a ranking of 0 (cf. Breitenstein et al., 2021).

Keywords were identified based on peer-reviewed articles. This search was conducted using the following keywords: "Method of Payment", "Information Asymmetry", "Premium", "Mergers and Acquisitions", "High-Technology firm", to ensure the search corresponded to the purpose of the thesis. Building on the initial keywords and literature, the search terms were altered to find additional literature, e.g., using "Means of Exchange" as a supplement to "Method of Payment". To further narrow the sample, the search was filtered by: (i) Web of Science Categories Business, Business Finance and Economics, and (ii) relevance (cf. Linnenluecke et al., 2020; Tranfield et al., 2003).

Given the literature retrieved when conducting the search, the sample was further reduced by reading the abstract and assessing each article's relevance to the current thesis. This is a commonly applied approach to identify relevant research for more in-depth reviews (Saunders et al., 2023, pp. 95-107). In contrast, the abstract provides only a concise summary, which may omit relevant aspects of the research essential for a more in-depth analysis. Additionally, several relevant articles were not captured due to different terminology or alternative use of keywords compared to the primary keywords used. To ensure a comprehensive search for literature, a second search phase was conducted. This supplementary search was carried out through forward and backward snowballing. For instance, the article by Kohers and Kohers (2000) was obtained through the initial keywords. Subsequently, articles citing this work were identified using the "cited by" function in Web of Science. These additional articles were assessed against the two inclusion criteria, leading to the identification of the article by Davis and Madura (2015). Snowballing is commonly employed to identify relevant articles that may not be retrieved through keyword searches (Webster &

Watson, 2002). The thesis sought to include both seminal older articles, which establish the core foundations of M&A transactions and continue to be widely cited today, as well as more recent studies that refine and challenge existing theories, consistent with contemporary M&A research (e.g., Eckbo et al., 2020).

It is acknowledged that the use of a single database and predetermined criteria for ranking and assessing article relevance was intended to ensure a high academic standard and replicability. Simultaneously, this presents some limitations as the use of a single database and journal ranking may limit the amount of available research. This may reproduce existing frameworks, reinforcing assumptions in previous research, rather than questioning them. Additionally, this may also be the case when using keywords in accordance with previous research. Using identical keywords despite non-standardized terminology increases the risk of overlooking relevant research. However, this is partly mitigated using forward and backward snowballing, but it cannot be dealt with completely (cf. Linnenluecke et al., 2020; Tranfield et al., 2003).

In addition to peer-reviewed articles, academic textbooks and chapters were utilized to guide methodological considerations and theory. These sources provide theoretical contributions and are usually more systematically arranged, making them suitable for explaining what and why certain considerations were made (Braun & Clarke, 2013, p. 13). Methodological textbooks often provide more comprehensive explanations and clearer conceptual descriptions, whereas scholarly articles tend to emphasize the practical applications and limitations of methods rather than providing descriptive methodological explanations and often assume prior knowledge (Saunders et al., 2023, p. 89). Although these sources have not been peer reviewed to the same degree as journal articles, they are authored by established scholars and are used as course literature at reputable universities. Thereby, numerous methodological textbooks and scholarly articles were selected to avoid relying on a single methodological perspective.

3.2 Research design

Deductive research was deemed appropriate, implying that the hypotheses were developed based on established theory (Bell et al., 2022, p. 79). This approach follows the methodology employed in previous literature within the same research field (e.g., Battigalli et al., 2023; Luypaert & Van Caneghem, 2017). Previous research treats the variables used as objectively observable and quantifiable, making them well-suited for statistical analysis, a quantitative methodology was therefore chosen. Given the chosen methodology, secondary data were obtained from established financial databases, a common approach within empirical M&A research. This enabled the analysis of multiple variables across numerous transactions over an extended period, facilitating a longitudinal approach (Bell et al., 2022, pp. 189-191). The limitation

concerning secondary data is the reduced ability to assess data quality and the procedures by which the data were collected (Hair et al., 2019, p. 5).

A disadvantage concerning the deductive process is its preconception as a clear and linear sequence of steps. The inherent messiness often means the data does not fit the original hypotheses or variables, forcing authors to revise their hypotheses or variables after the data collection has occurred (Bell et al., 2022, pp. 90-91). Despite these limitations, the chosen methodological approach remained appropriate. The thesis was not aimed at examining the underlying subjective or social factors motivating M&A transactions. A qualitative approach, primarily intended to explore meaning, would be deemed less appropriate when examining many M&A transactions to draw general conclusions (Braun & Clarke, 2013, pp. 20-21).

3.3 Sample selection and data collection

The sample was derived from Refinitiv Eikon and limited to transactions between 2002 and 2025, which is largely equivalent to the period used by de Bodt et al. (2022). The rationale for the specific sample period used was based on previous M&A literature indicating that merger activity exhibits clustering patterns (Ahern & Harford, 2014; Bianchi & Chiarella, 2018). The dot-com period, characterized by the late 1990s technology stock market bubble of heightened valuations and speculative behaviors, may distort the results. Accordingly, the sample period was limited to 2002-2025 in an attempt to ensure a more representative sample. Similarly, the sample period was further divided into periods of 2002-2007, 2008-2012, 2013-2019, and 2020-2025 to group together time-varying market conditions, particularly the 2008 financial crisis and the COVID-19 pandemic period beginning in 2020.

Transactions were filtered based on the following criteria. First, a minimum transaction value of 100 million USD was used. Lower transaction values are associated with smaller firms, which are more likely to demonstrate noisy data, such as limited transparency (cf. Klitzka et al., 2021). Second, the deal must be completed, reflecting an agreement between the transacting parties. When not completed, the variables related to payment method and premium are not final, as these may change during the negotiation (cf. Adra & Barbopoulos, 2018). Finally, both the acquiring firm and target firm are or have been listed on the stock market. Public companies are required to disclose according to regulations, making it possible to obtain variables from databases. In contrast, private firms follow different reporting practices and disclosure standards, which may lead to inconsistent and less comparable data (cf. Vermaelen & Xu, 2014). The initial sample comprised 5,113 observations. A series of exclusions was then applied, including duplicates, non-imputed variables (124 observations), payment methods with non-standard definitions (unknown, other, choice between cash or stock or a combination of both, choice involving other non-cash and non-stock considerations), hostile deals with non-applicable values, and

observations with missing premium data. Appendix A presents a detailed breakdown of the sample selection and observation exclusions. The final sample consisted of 2,515 observations. The sample was collected jointly by both authors, with both present during the data collection process in an attempt to ensure that the sampling procedure and data collection were conducted correctly and consistently.

Following de La Bruslerie (2013), the thesis excluded offers from less developed countries, thereby limiting our sample to every country in Europe, North America, and Japan. Consequently, the European sample consists to a large extent of Western (i.e., developed) countries. In addition to M&A transaction data being obtained through Refinitiv Eikon, information regarding the initial public offering (IPO) dates was retained from the Edgar database. The database provided IPO registration filings used to identify firms and extract relevant IPO dates for the analysis.

Our thesis deviates from previous research, such as de Bodt et al. (2022), Faccio and Masulis (2005), and Uysal (2011), concerning how industries were identified. Previous research focuses on industry SIC codes to differentiate between high-tech and non-high-tech M&A firms. The use of SIC codes has been criticized because they do not necessarily reflect possible asset complementarities. Instead, it is based on the product description (Renneboog & Vansteenkiste, 2019). Kile and Phillips (2009) extend the discussion of the effectiveness of using SIC codes as a classification system for high-tech firms. They contend that SIC codes are grounded in the intuition of what constitutes high-tech firms. Furthermore, they fail to provide an adequate classification of the service sector and emerging technologies, resulting in systematic misclassification.

The approach was instead based on Bhussar et al. (2022), Kohers and Kohers (2000), and Wei et al. (2025), see Appendix B. As previously mentioned, high-tech firms are characterized by rapid growth, high uncertainty, and continued innovation. Respective articles were cross-referenced to identify recurring themes of high-tech classification. These classifications were subsequently mapped according to Refinitiv Eikon's Thomson Reuters Business Classification (TRBC), an industry classification of global companies, to identify high-tech firms. High-tech firms included biotechnology, computer hardware and software, electronics, and communication, among others. As discussed by Bhussar et al. (2022), Kohers and Kohers (2000), and Wei et al. (2025), it is important to acknowledge that while the classification captures a variation of different high-tech firms, there are no universal definitions to encompass all high-tech areas. Additionally, a robustness test was conducted to test whether the definitions of high-tech firms affect the results by applying an alternative classification based on SIC codes, following Loughran and Ritter (2004).

3.4 Data analysis

3.4.1 Operationalization

Dependent variables: in the first equation, the dependent variables are payment method. The payment method constitutes a categorical variable and is coded as follows, cash = 0, mixed = 1, and stock = 2. In the second equation, the premium constitutes the dependent variable. Premium is defined as the percentage between the offered price and the share price during the estimation window of (-20,0) trading days before the announcement date of the M&A transaction. The 20-day pre-announcement window was intended to account for potential information leakage before the public announcement, which may affect the premium. The definition follows previous research, e.g., Kanungo (2021) and Uysal (2011).

Independent variables: the payment method and residuals estimated in the first multinomial logit (MNL) regression are included in the second regression to capture how the financing decision affects the premium. However, the main explanatory variable in the first model is information asymmetry derived from the factor score described in section 3.4.3.

Control variables: these variables are used to isolate the effect of each model. In the payment method equation, the following controls were applied: acquiring firm leverage and acquiring firm cash holdings. In the premium equation, the following control variables are included: hostile deal and challenged deal. Hostile deal refers to acquisition attempts undertaken without the approval of the target firm's board. Challenged deal refers to the number of firms attempting to acquire the target firm in the M&A transaction.

The instrument variable to account for endogeneity of the payment method was target firm leverage, in accordance with de La Bruslerie (2013). To satisfy the exclusion restriction, it is required that the instrument affect the premium only through the payment method and not via a direct association. The validity of the instrument may be justified by the argument that a target firm with low leverage possesses assets that are not fully mortgaged, which an acquiror can use as collateral to finance the transaction. While the premium reflects expected synergies and compensation for the chosen payment method, target leverage does not inherently justify a higher premium. This is consistent with the view that capital structure solely affects payment method rather than the premium (de La Bruslerie, 2013).

3.4.2 Missing data

Observations of missing values in the sample were identified before the analysis. Missing observations may be classified as either missing completely at random (MCAR), missing at random (MAR), or missing not at random (MNAR). Financial data rarely occur completely at random. Instead, it may reflect systematic differences in reporting requirements and/or data coverage (Buuren & Groothuis-Oudshoorn, 2011). The missing value mechanism was identified using Little's MCAR test, as

suggested by Hair et al. (2019, p. 65) and Little (1988). Based on the prevailing results, the missing data mechanism indicated that the missing values were MAR. Using listwise deletion, whereby entire observations are removed, risks introducing bias in the estimate. Addressing this issue of missing data, a multiple imputation method was used to mitigate bias arising from non-random missingness. In the sample, market value and analyst coverage were largely observed, whereas the intangible assets ratio was substantially less complete, accounting for most of the missing observations. The remaining variables were comparatively well observed across the sample.

Additionally, missing values of the number of analysts variable were imputed using a regression model following Bhushan (1989) and Chang et al. (2023). They suggest that the number of analysts variable is correlated with market value, industry affiliation, and nation of incorporation. Financial data is not missing at random, and this may suggest that the missingness of observations may be classified as MAR. Consequently, the imputation method used market size, industry affiliation, and other related variables to account for systematic missingness.

3.4.3 Factor analysis

Previous research uses various proxies for information asymmetry that affect the outcome of the M&A transaction. However, the various proxies employed do make the results hard to interpret between studies (Chemmanur et al., 2009; Cheng et al., 2016; Officer et al., 2008). It is questioned by Callen (2015) that proxies are based more on intuition rather than being empirically motivated. The use of proxies creates friction because the measure is not grounded in theory. Since information asymmetry is unobservable, it is not possible to claim the existence of a universal definition that captures the "true" effect of information asymmetry. Because not universally defined, previous research distinguishes between information asymmetry and uncertainty as two distinct concepts. Information asymmetry refers to unequal access to information between the target firm and the acquiring firm. Uncertainty, by contrast, reflects the inherent unpredictability of a firm's intrinsic value drivers, it is equal among the two parties and cannot be mitigated through additional effort (Luypaert & Van Caneghem, 2017). The thesis does not adopt this distinction but follows much of the literature that does not account for it. While this perspective may offer a theoretically sound and potentially more empirically accurate framework, the ability to adopt this perspective was constrained by limited access to databases.

Addressing the concern of multiple proxies, research has focused on two different approaches, either including proxies separately, one at a time, or creating a factor from these measures. The former approach risks introducing multicollinearity into the analysis, as the different measures aim to capture the same underlying concept. Therefore, a factor analysis was used to construct the information asymmetry factor, see Table 1. This method is comparable with the approach of Borochin et al. (2018) and Karpoff et al. (2013).

Table 1. Information asymmetry (IA) factor construction

Variable / Statistic	Target firm IA	Acquiring firm IA
Panel A: factor loadings (PC1)		
− Firm age	-0.057	-0.121
− Log firm size	-0.878	-0.851
− Analyst coverage	-0.886	-0.851
+ Intangible ratio	+0.437	+0.506
Panel B: fit statistics		
Kaiser-Meyer-Olkin (KMO)	0.537	0.558
Bartlett's χ^2 (df = 6 / 28)	1,530.4	1,211.8
p-value	< 0.001	< 0.001
Panel C: explanatory power		
Eigenvalue (PC1)	1.750	1.717
Variance explained (%)	43.75	42.93

Panel D: individual measures of sampling adequacy (MSA)			
Variable	MSA	Threshold	Interpretation
− Firm age (target firm)	0.537	≥ 0.50	Acceptable
− Log firm size (target firm)	0.751	≥ 0.50	Very good
− Analyst coverage (target firm)	0.895	≥ 0.50	Very good
+ Intangible ratio (target firm)	0.510	≥ 0.50	Acceptable
− Firm age (acquiring firm)	0.556	≥ 0.50	Acceptable
− Log firm size (acquiring firm)	0.783	≥ 0.50	Very good
− Analyst coverage (acquiring firm)	0.783	≥ 0.50	Very good
+ Intangible ratio (acquiring firm)	0.519	≥ 0.50	Acceptable

Notes: N = 2,515 M&A transactions, 2002-2025 | Factor loadings represent each variable's correlation with the first principal component (PC1) | Individual-construct KMO values (0.537 and 0.558) and all per-variable MSA values exceed 0.50 (Kaiser, 1974) | Bartlett's test confirms significant intercorrelations ($p < 0.001$) for all specifications | Eigenvalues exceed unity consistent with Kaiser's retention criterion | This table reports PCA results for the IA factor construction | Four proxies are standardized before extraction: firm age (−), log firm size (−), analyst coverage (−), and intangible ratio (+) | Signs reflect the theoretical direction with respect to information asymmetry

The factor analysis was constructed from four different variables reflecting the information asymmetry. Measures of firm visibility, including number of analysts, capture how external monitoring reduces information asymmetry. Firm characteristics, namely firm size and firm age, capture the transparency of the firm, while intangible assets ratio reflects the extent to which the assets are observable and contribute to firm value. Originally, the factor consisted of 10 variables, see Appendix C, however, the final selection was constrained by data availability in the databases.

To assess whether the final variables were suitable for factor analysis, a Kaiser-Meyer-Olkin (KMO) test was employed. KMO is a statistical measure of sampling adequacy (MSA) between variables. Authors should obtain an overall MSA value above 0.50 before proceeding with factor analysis, while higher values indicate greater factorability (Hair et al., 2019, pp. 136-137). In Table 1, the KMO values for the target firm (0.537) and the acquiring firm (0.558) are presented, they are considered sufficient

to proceed with the factor analysis. Further, the Bartlett test ($p<0.01$) indicates that the variables are sufficiently correlated to be reduced into a common factor. A relatively lower KMO value does not necessarily indicate insufficient theoretical relevance but rather the multidimensionality of the concept being measured. This issue has been observed in previous studies, such as Borochin et al. (2018).

While it is problematic to conclude that information asymmetry is captured by a single underlying concept, the use of Refinitiv Eikon to collect large-scale data and multiple proxies for information asymmetry may enhance the credibility of the inferred relationship while helping to mitigate this issue (Hair et al., 2019, pp. 13-14). Furthermore, by drawing on a large sample from a global database rather than relying on a convenience sample, the findings are more likely to be generalizable to a broader population (Bell et al., 2022, pp. 484-485).

3.4.4 Economic model

The thesis deviates from previous research that models the determination of payment method and premium within simultaneous equations. Studies applying this approach explicitly assume that payment method and premium are jointly determined in the contractual negotiation (e.g., de La Bruslerie, 2013). Although this may be theoretically plausible, the thesis adopts an approach consistent with the literature on sequential bidding in M&A transactions. This implies that the choice of payment method is determined conditionally on the information asymmetry, before the full value of the deal is displayed (Fishman, 1989; Hansen, 1987).

Instead of modeling a fully simultaneous equation system, a two-stage residual inclusion approach was employed, namely a control function to control for endogeneity, in line with Officer et al. (2008) and Wooldridge (2015). Specifically, in the first stage, an MNL model is estimated since the choice of payment method is a categorical variable consisting of three categories, following de La Bruslerie (2013) and Martynova and Renneboog (2009). The endogenous variable (payment method) is regressed on a set of explanatory variables and an instrument. Because the model observes the endogenous variable in the second stage ordinary least squares (OLS) regression, generalized residuals are used, in line with Faccio and Masulis (2005) and Travlos (1987). The results are statistically significant at the five percent level. Within business and management research, a significance level of 0.05 is a commonly applied threshold. Accordingly, each hypothesis is supported if the estimated effects are statistically significant in at least one of the models.

This approach provides a tool to manage endogeneity, but also accommodates that payment method contains more than two categories, making them ill-suited for simultaneous equations. While simultaneous equations require several instrument variables in both equations, the method allows for consistent measurement with fewer instruments (Wooldridge, 2015; Wooldridge, 2016, p. 479).

Furthermore, two models are presented below. Formally, the probability of using payment method j in deal i is given by the following formula.

$$P(M_i = j \mid IA_i, Z_i, X_i^M) = \frac{\exp(\alpha_j + \beta_j IA_i + \gamma_j Z_i + \delta_j X_i^M)}{1 + \sum_{k=1}^{2} \exp(\alpha_k + \beta_k IA_i + \gamma_k Z_i + \delta_k X_i^M)}, \quad j = 1,2$$

IA_i denotes the information asymmetry measure for deal i, Z_i is an instrument excluded from the second stage that satisfies the relevance and exclusion restrictions, and X_i^M represents a set of control variables. Following the estimation of the first-stage model, the generalized residuals $\hat{\varepsilon}_i$ are computed. These residuals serve as a measurement of unobserved factors that influence the choice of payment method and are carried forward into the second-stage model to account for endogeneity.

In the second stage, the effect of information asymmetry and payment method on the premium is estimated using OLS, specified by the following model:

$$PRM_i = \alpha + \beta_1 IA_i + \beta_2 M_i Stock + \beta_3 M_i Mixed + \beta_4 CHALLENGED_i + \beta_5 HOSTILE_i + \lambda_1 \hat{\varepsilon}_i + \lambda_2 \hat{\varepsilon}_i + \mu_i$$

PRM_i denotes the premium for deal i, measured as the percentage above the market price of the target, four weeks before the announcement date. M_i^{Stock} and M_i^{Mixed} serve as explanatory variables for stock and mixed-financed deals, with cash as the reference category. $HOSTILE_i$ and $CHALLENGED_i$ constitutes the control variables capturing resistance and competition in the transaction. The terms $\lambda_1 \hat{\varepsilon}_i$ and $\lambda_2 \hat{\varepsilon}_i$ represents the generalized residuals from the first stage and is included to account for the potential endogeneity of payment method. If λ_1 or λ_2 are statistically significant, this provides evidence that payment method is indeed endogenous, justifying the use of a control function approach. If not statistically significant, this suggests that the variable is exogenous (Wooldridge, 2015).

3.4.5 Endogeneity

Endogeneity is a prevalent problem within many studies and is defined as the explanatory variable being correlated with the error term, rejecting the assumption of no correlation in OLS methods. Endogeneity arises due to three different issues: omitted variables, measurement error, and simultaneity (Wooldridge, 2010, pp. 50-51).

This is a potential concern arising from estimating the relationship between information asymmetry, method of payment, and premium. Due to the joint determination of payment method and premium, simultaneity cannot be ruled out (Battigalli et al., 2023; de La Bruslerie, 2013). Furthermore, Battigalli et al. (2023) and de La Bruslerie (2013) argue that if the payment method were exogenous, one would expect the choice not to differ for the same firm. However, in practice, the same firm employs different payment methods for different transactions. This implies that there

is a likelihood that the decision is based on firm- or deal-specific characteristics, which may lead to biased estimates if not accounted for.

This strategy relies on the assumption that the instrument Z_i is correlated with the choice of payment method (relevance), while affecting the premium solely through its influence on the payment method (exclusion restriction).

3.4.6 Bootstrap indirect test

A bootstrap indirect test is an approach to assess if the relationship between an independent and a dependent variable is mediated through another variable. For instance, the effect of variable A on variable C is affected by variable B. In Figure 1, the independent variable is represented by information asymmetry (A) and the dependent variable by premium (C). The bootstrap indirect test was used to determine whether information asymmetry had no effect on the premium, mediated by the payment method (B). By drawing a large number of subsamples from the original data, it then re-estimated the model for each sample. The resulting distribution of estimates was then used to calculate confidence intervals and determine whether the estimated effects were statistically different from zero. The confidence interval served as an acceptance criterion. If the interval did not contain zero, this indicated an indirect effect (Hair et al., 2019, pp. 777-781).

3.5 Limitations and quality criteria

3.5.1 Limitations

The MNL constituted the main empirical model for identifying the payment method, due to its categorical properties. Ai and Norton (2003) address that the interaction terms in MNL models do not correspond to the interaction effect, therefore a methodological limitation arises in the interpretation of the interaction terms. The interpretation is not equal to a linear model, such as regression models, rather the interaction terms are contingent on all other variables in the model. Addressing this, a structural break-test was performed to assess whether an alternative model specification was warranted. Group differences are further addressed through a split sample. Greene (2010) argues that this approach is preferred over interaction terms in answering two questions: (i) whether there is a structural difference between groups, and (ii) how this should be interpreted. Using split samples allows each model to have its own model specification and provides a clearer interpretation of group differences.

Another limitation arises from applying two separate models, through which the control variables may reverse sign from positive to negative and vice versa. Within a single model, for instance, an MNL, the control variables are held constant, resulting in a positive or negative coefficient for all observations. However, between models, e.g., high-tech transactions versus non-high-tech transactions, the control variables are allowed to vary. A positive coefficient for acquiring firm cash holdings in the MNL may be negative for non-high-tech transactions (cf. Ai & Norton, 2003; Greene, 2010).

Consequently, the control variables should be interpreted as context-dependent and sensitive to model specification, rather than as stable economic variables.

Additionally, a methodological limitation arises in the analysis. Treating the payment method as categorical rather than as a continuum may fail to capture that mixed payment is not necessarily structured as a fixed 50/50 split between cash and stock. Collapsing mixed payment into a single category may bias the estimated coefficient by obscuring the actual variation in the payment method (cf. de Bodt et al., 2022; Eckbo et al., 2018).

3.5.2 Validity

Validity refers to the credibility of the conclusions drawn from the thesis, specifically whether the thesis measures what it intends to measure and whether the empirical findings support the intended inferences (Bell et al., 2022, pp. 475-479). This thesis considers validity in terms of construct validity, internal validity, and external validity.

Construct validity concerns whether the operational measures adequately capture the underlying theoretical concepts, which is particularly relevant for the unobservable nature of information asymmetry. This challenge is emphasized by Callen (2015), who argues that proxies are often selected on intuition and convenience. In response to this limitation, multiple proxies were combined using factor analysis to capture different dimensions of information asymmetry. This was an attempt to strengthen construct validity by avoiding reliance on a single variable to measure information asymmetry. Nevertheless, the factor remains an estimate of the underlying construct, and the challenge emphasized by Callen (2015) cannot fully be solved, only mitigated.

Internal validity refers to whether the estimated relationships reflect the causal mechanisms implied by the economic model presented in section 3.4.4. A fundamental question concerns endogeneity, particularly the simultaneity between payment method and premium that may introduce bias in the estimates. This issue is addressed using a control function approach, in which an instrument was applied to isolate exogenous variation in payment method. The relevance and exogeneity of the instrument are central to the validity of this approach. Omitted variable bias may also affect internal validity, as firm-specific or unobserved deal characteristics may influence both the explanatory and dependent variables. By including control variables and distinguishing between high-tech firms and non-high-tech firms, the thesis mitigates this risk (Hair et al., 2019, pp. 276-278).

External validity concerns the extent to which the findings of the thesis can be generalized beyond the sample. The use of the Refinitiv Eikon Database to collect data, a database frequently employed by both practitioners and previous literature (Barbopoulos et al., 2019; Davis & Madura, 2015), enhanced the generalizability within comparable contexts. However, the sample criteria, such as listed firms, transaction size, and geographical scope, limit the broader generalizability of the findings.

Furthermore, classification into high-tech industries and non-high-tech industries may oversimplify heterogeneity, particularly within the non-high-tech group discussed in greater detail in section 2.1.2, which should be considered when interpreting the results.

3.5.3 Reliability

Reliability concerns the consistency of a measure and whether the findings are stable and consistent over time (Bell et al., 2022, p. 150). A reliable study should yield similar findings if the same procedures are applied under comparable circumstances.

Reliability in this thesis is supported using secondary data obtained from Refinitiv Eikon and EDGAR, which reduced the risk of data-collection bias. As the data were not originally collected for the specific purpose of this thesis, they instead constitute an objective compilation of market activity. This was an attempt to strengthen the stability of the results, as the data remains constant regardless of when the analysis is conducted. To further strengthen consistency, the sample was collected jointly by both authors, with both being present throughout the data collection process. This joint approach was applied in an identical manner across all observations, reducing the risk of inconsistencies that might otherwise arise from individual judgment or divergent interpretations. Bell et al. (2022, pp. 471-475) emphasize that consistency in data collection procedures is central to reliability, and the presence of both authors throughout the data collection process was therefore intended to strengthen consistency and reliability.

Methodological considerations are not neutral, they are grounded in the assumptions that one makes and thereby make them biased (cf. Linnenluecke et al., 2020; Tranfield et al., 2003). Therefore, multiple methodological sources were set against each other, creating a more objective picture of how the thesis is structured, as well as acknowledging limitations of the chosen approach. Using multiple sources creates some kind of methodological triangulation, as multiple sources identify similar patterns and relationships. Specifically, Hair et al. (2019, p. 390) and Wooldridge (2015) differ from Officer et al. (2008) in their view on the suitability of using a control function approach to address endogeneity. The former two emphasize the ideal case of when a control function is appropriate, while the latter emphasizes the limitations within an M&A context. However, both studies converge on the view that a control function may be more appropriate than a simultaneous equation, as obtaining valid instruments is difficult and can introduce additional bias into the estimates. This strengthens the rationale of our methodological choice to assume that estimates remain relatively stable over time.

The sample selection criteria, variable definition, and data-processing procedures were documented throughout the methodology section, in an effort to further strengthen transparency and replicability. Similarly, the Python code used in the empirical analysis was made publicly available in accordance with the transparency

and reproducibility standards proposed by Christensen and Miguel (2018) and Vilhuber (2020), see Appendix D.

Certain aspects of the thesis may nevertheless limit reliability. Callen (2015) discusses limitations with construct validity surrounding proxies, which are seldom theoretically grounded and therefore subjected to some degree of measurement error. As multiple variables are used to capture information asymmetry, a set of variables under certain periods may produce different results compared to alternative variables during other periods.

Additionally, the use of imputation for missing data introduces model-based assumptions, while data transformations such as winsorization may influence the findings. Furthermore, the classification used to distinguish between high-tech industries and non-high-tech industries may also affect the findings.

3.6 Ethical and societal considerations

Business research and methods used were shaped by ethical principles and the broader societal context. Research ethics refers to the moral principles regarding appropriateness, fairness, and integrity of a study, particularly in relation to how an author treats the entities they study. As the thesis relied on secondary data, the primary ethical considerations concern the appropriate handling, interpretation, and reporting of data (Bell et al., 2022, p. 320).

The data used in the thesis were collected from established databases and managed in accordance with the databases' access and usage conditions. Although the sample consisted of publicly listed entities, the thesis ensured that no personal or sensitive data were collected, thereby mitigating the risk of privacy violation or unintended disclosure of sensitive information (Bell et al., 2022, p. 340). Transparency was maintained by clearly presenting variable definitions, methodological choices, and data sources, thereby reducing the risk of misleading conclusions, as highlighted by Bell et al. (2022, p. 486).

The societal considerations of this thesis primarily concern the interpretation and application of the findings. The thesis contributes to increased knowledge of M&A transactions and may therefore be relevant to various stakeholders, including authors, practitioners, and investors. However, the findings should be interpreted within the context and limitations of the thesis, and the implications should not be overstated.

3.7 Use of AI tools

Following the literature on artificial intelligence (AI) tools in economic research, the thesis adheres to the guidelines of AI transparency. In line with Korinek (2023) and to satisfy the transparency criteria, the text should provide three descriptions of

information: (i) specification of AI tools, (ii) description of the task performed by AI, and (iii) how to verify the results. Accordingly, a general mention such as "AI has been used" is insufficient to satisfy these transparency criteria.

The thesis employed Claude (Anthropic), an AI tool, to assist in developing the Python code aimed at conducting: (i) data cleaning, (ii) variable construction, and (iii) empirical analysis. Furthermore, the AI tool did not perform an independent methodological consideration. All methodological considerations, such as sample specification and model specification, were carried out by the authors, with the AI tool serving only as a technical aid to support the coding process. To meet the final requirement, since AI-generated output is assumed to be incorrect ex ante, two validation strategies were employed. Firstly, we validated the classification of high-tech firms and non-high-tech firms by comparing the output from the AI tool with the classification criteria in the raw data file. Additionally, we validated the direction and significance in relation to the empirical results (cf. Korinek, 2023). The order of magnitude, i.e., the scale of the economic effect, should be cautiously interpreted and is specific to the context of this thesis. Additionally, to validate if the code did what it was intended to do, an external validation from a backend developer was conducted, independent of the authors.

In addition to the transparency criteria, this thesis adhered to guidelines established by Christensen and Miguel (2018) and Vilhuber (2020) to ensure the replicability of empirical studies in economics and business administration. They emphasize that code used in empirical analysis should be documented to allow for independent replication and validation checks. In accordance with this discussion, we documented the Python code in a public repository on Github, as suggested by Gentzkow and Shapiro (2014), as mentioned in section 3.5.3, see Appendix D.

Furthermore, ChatGPT and Grammarly were used to improve grammar, spelling, and phrasing for clarity. Following the use of AI tools, all revisions were reviewed and edited to ensure accuracy of terminology and factual claims, as well as coherence with academic standards (cf. Korinek, 2023).

4. Results and analysis

The following section presents the descriptive statistics and the main results, i.e., hypothesis tests.

4.1 Descriptive statistics

Table 2 presents summary descriptive statistics for M&A transactions completed between 2002 and 2025, distinguishing between high-tech transactions and non-high-tech transactions.

Table 2. Descriptive statistics for M&A transactions (2002–2025)

	High-tech (HT)		Non-high-tech (NHT)		Diff.
Characteristic	Mean	Median	Mean	Median	(HT − NHT)
Panel A: deal characteristics					
Deal value (USD, millions)	3,577.64	889.78	2,589.54	715.59	
Premium (%, 4-week)	53.53	40.02	175.80	26.46	
Premium, winsorized at 1% level (%, 4-week)	52.42	40.02	33.79	26.46	
Panel B: firm characteristics					
Target firm no. of analysts	10.80	10.00	9.90	9.00	0.90***
Acquiring no. of analysts	16.56	15.00	12.36	11.00	4.20***
Target firm intangible asset ratio	0.25	0.21	0.16	0.12	0.08***
Acquiring intangible asset ratio	0.33	0.31	0.17	0.12	0.15***
Target firm age (years)	13.39	12.00	13.99	12.51	−0.60
Acquiring firm age (years)	19.94	16.00	19.34	17.00	0.60
Target firm market value (USD, millions)	3,795.93	594.56	2,302.67	584.95	1,493.26*
Acquiring market value (USD, millions)	401,194.01	11,347.37	676,389.67	3,731.66	−275,195.66
Panel C: payment method distribution					
Cash only	71.3%		39.1%		
Stock only	12.2%		36.2%		
Mixed (cash & stock)	16.5%		24.8%		

Notes: N = 2,515 M&A transactions completed between 2002 and 2025 | The sample is divided into high-tech and non-high-tech groups based on industry classification | Deal value, target firm market value, and acquiring firm market value are reported in USD millions | Premium is the percentage above target firm market price four weeks before announcement | Intangible asset ratio is intangible assets divided by total assets | Firm age is measured from IPO date to announcement date | Number of analysts reflects analyst coverage before announcement | Payment method percentages are share of total deals in each group | Significance: * p<0.10, ** p<0.05, *** p<0.01 (two-tailed t-test on means)

Panel A contains deal characteristics, high-tech transactions exhibit a higher average deal value than non-high-tech transactions (with mean deal values of USD 3,577.64

million and USD 2,589.54 million, respectively). The median values follow a similar pattern, suggesting that high-tech transactions are larger in scale. Relative to high-tech transactions, the average premium is higher in non-high-tech transactions. However, when the premium variable is winsorized at the one percent level, it reduces the mean, and the average premium is instead higher in high-tech transactions, indicating that the mean may be driven by extreme outliers.

In examining information asymmetry, a set of proxies is employed and presented in Panel B of Table 2. High-tech firms display higher values across several characteristics and are also characterized by a greater number of analysts, with these differences being statistically significant. Additionally, the intangible asset ratio for both target firms and acquiring firms is higher in high-tech, with significant differences in the Diff. column ($p<0.01$***) relative to non-high-tech firms. This is consistent with the assumption that high-tech firms are more reliant on intangible assets and therefore harder to value (Kohers & Kohers, 2000). Firm age does not differ significantly between the groups. The mean target firms' and acquiring firms' market values are higher in high-tech transactions, similar to deal values, the means appear to be skewed by extreme outliers as reflected in the closer median values across the two groups. Furthermore, acquiring firms are, on average, notably larger than target firms.

Panel C presents the distribution of the payment method between the two groups. Panel C shows that high-tech transactions rely almost entirely on cash as payment method. Specifically, our high-tech sample contains 71.3 percent (39.1% of the non-high-tech sample) pure cash offers, 12.2 percent (36.2%) pure stock offers, and 16.5 percent (24.8%) mixed offers. The number of pure stock offers is notably smaller in high-tech transactions compared to non-high-tech transactions. However, high-tech transactions are using a larger proportion of pure cash payments.

While Table 2 presents differences between high-tech and non-high-tech transactions, M&A activity is altered by industry characteristics, as indicated by Ahern & Harford (2014) and Davis & Madura (2015). Differences in industry characteristics may interact with time-varying market conditions. Table 3 subsequently disaggregates the premium by time periods to present how the premium differentiates itself over time. The premium in high-tech transactions has grown steadily over time and is statistically different from the mean value of non-high-tech transactions at the one percent level.

Table 3. Premiums by time period, industry classification

All mergers & acquisitions 2002–2025 *	n	Share of deals	Mean premium (%)	Mean premium (%)**	Median premium (%)**	Std. dev. (%)**
Full sample	**2515**	**100%**	**133.41**	**40.25**	**30.21**	**45.74**
2002–2007	*777*	*100%*	*35.75*	*32.56*	*27.36*	*35.22*
2008–2012	*472*	*100%*	*51.03*	*48.79*	*36.94*	*51.72*
2013–2019	*802*	*100%*	*272.55*	*39.01*	*28.56*	*44.35*
2020–2025	*464*	*100%*	*140.22*	*46.57*	*34.01*	*54.23*
High-tech	**872**	**34.7%**	**53.53**	**52.42†**	**40.02**	**51.13**
2002–2007	*307*	*39.5%*	*37.31*	*37.56†*	*32.43*	*34.03*
2008–2012	*167*	*35.4%*	*59.33*	*58.89†*	*44.42*	*54.25*
2013–2019	*243*	*30.3%*	*58.14*	*56.16†*	*42.59*	*54.57*
2020–2025	*155*	*33.4%*	*72.17*	*68.99†*	*56.10*	*62.04*
Non-high-tech	**1643**	**65.3%**	**175.80**	**33.79**	**26.46**	**41.18**
2002–2007	*470*	*60.5%*	*34.74*	*29.29*	*23.38*	*35.63*
2008–2012	*305*	*64.6%*	*46.49*	*43.26*	*34.89*	*49.51*
2013–2019	*559*	*69.7%*	*365.76*	*31.55*	*24.43*	*36.72*
2020–2025	*309*	*66.6%*	*174.35*	*35.33*	*26.61*	*46.00*

Notes: * the sample comprises 2,515 completed acquisitions announced between January 2002 and December 2025, drawn from Refinitiv Eikon | Industry classification follows Bhussar et al. (2022), Kohers and Kohers (2000) and Wei et al. (2025) industry characterization consistent with TRBC taxonomy | Premium is the four-week pre-announcement premium (%), winsorised at the 1st and 99th percentiles. ** Winsorized at the 1% level | † denotes that the high-tech mean premium is statistically different from the non-high-tech mean at the 1% level (two-tailed t-test)

4.2 Main results

4.2.1 Payment method model and split sample

The results of the data set on the MNL model are presented in Table 4. The Diff. column in Panel B, specifically row IA target firm in stock vs. cash, provides evidence that the use of stock does not differ significantly across high-tech industries and non-high-tech industries ($p>0.05$), providing no support for H1 (*There is a positive relationship between information asymmetry and the choice of stock as payment method, moderated by industry*).

The coefficient is to be interpreted as a log-odds ratio relative to the cash reference category. A positive coefficient for mixed payment means that one standard deviation increase in the information asymmetry raises the log-odds of a mixed payment relative to cash, rather than implying that the absolute probability of a mixed payment necessarily increases.

Table 4. Payment method model and split sample analysis

Panel A: payment method model — MNL (H1)

Dep. var: payment method (Cash=0, Mixed=1, Stock=2). Reference category: cash. N=2,515. McFadden R^2=0.1611.

Variable	Coef. (Stock)	SE (Stock)	z (Stock)	Sig.	Coef. (Mixed)	SE (Mixed)	z (Mixed)	Sig.
Intercept	-0.436	0.108	-4.049	***	-0.884	0.112	-7.873	***
IA target	0.289	0.064	4.486	***	0.397	0.065	6.108	***
IA acquiror	-0.969	0.076	-12.675	***	-0.69	0.078	-8.821	***
IA target firm × high-tech	-0.017	0.111	-0.153		0.135	0.102	1.319	
IA acquiring firm × high-tech	-0.017	0.126	-0.137		-0.092	0.123	-0.744	
Acquiring firm leverage	-0.49	0.284	-1.726	*	0.039	0.29	0.133	
Acquiring firm cash holdings	-1.554	0.504	-3.087	***	0.308	0.497	0.62	
Target leverage	0.502	0.169	2.979	***	0.65	0.175	3.716	***

Panel B: split sample analysis — MNL by high-tech classification

High-tech vs. non-high-tech estimated separately. Reference category: cash. Structural break LRT = 103.011, df=10, p<0.001.

Variable	Coef. (HT)	SE (HT)	z (HT)	Sig. (HT)	Coef. (NHT)	SE (NHT)	z (NHT)	Sig. (NHT)	Diff.	SE (Diff.)	Sig.
Stock vs. cash											
Intercept	-1.698	0.242	-7.02	***	-0.059	0.123	-0.484		-1.638	0.271	***
IA target firm	0.348	0.113	3.084	***	0.287	0.063	4.543	***	0.062	0.129	
IA acquiring firm	-0.896	0.122	-7.376	***	-0.865	0.074	-11.65	***	-0.031	0.142	
Acquiring firm leverage	0.018	0.609	0.029		-0.619	0.336	-1.841	*	0.637	0.696	
Acquiring firm cash holdings	0.963	0.975	0.988		-1.587	0.642	-2.473	**	2.55	1.167	**
Target leverage	0.452	0.321	1.408		0.025	0.22	0.112		0.427	0.389	
Mixed vs. cash											
Intercept	-2.109	0.231	-9.112	***	-0.483	0.133	-3.625	***	-1.626	0.267	***
IA target firm	0.630	0.092	6.837	***	0.392	0.065	5.988	***	0.238	0.113	**
IA acquiring firm	-0.681	0.101	-6.726	***	-0.646	0.078	-8.34	***	-0.035	0.128	
Acquiring firm leverage	1.611	0.499	3.23	***	-0.67	0.369	-1.815	*	2.281	0.621	***
Acquiring firm cash holdings	3.488	0.836	4.171	***	-0.575	0.684	-0.84		4.063	1.08	***
Target leverage	0.248	0.287	0.864		0.585	0.246	2.381	**	-0.337	0.378	

Notes: Panel A presents the full-sample MNL estimates of payment method (stock and mixed relative to cash), with interaction terms for high-tech classification | Panel B presents split-sample MNL results estimated separately for high-tech (HT; N=872, McFadden R^2=0.3706) and non-high-tech (NHT; N=1,643, McFadden R^2=0.0783) samples, together with pairwise coefficient difference tests | Difference test: $z = (\beta\_HT - \beta\_NHT) / \sqrt{(SE^2\_HT + SE^2\_NHT)}$, two-tailed | Heteroskedasticity-consistent standard errors performed | Significance: * p<0.10, ** p<0.05, *** p<0.01

Estimating the effect of double-sided information asymmetry indicates that target firm information asymmetry in Panel A exerts a positive and significant effect on both stock (0.289***) and mixed (0.397***) payment relative to cash. This indicates that the log-odds shift more strongly toward mixed payment. Contrarily, information asymmetry among the acquiring firm reduces the likelihood of non-cash payment, with a more pronounced negative effect for stock (-0.969***) than for mixed (-0.690***).

Furthermore, Panel A provides an initial test of the moderating role of industry. The interaction terms IA target firm × high-tech and IA acquiring firm × high-tech are not significant across both payment methods, which may suggest that industry does not

moderate the relationship. The absence of significant interaction terms does not rule out the existence of structural differences between high-tech and non-high-tech industries. Panel B addresses this concern by estimating the model separately for high-tech industry and non-high-tech industry. A likelihood ratio test (LRT = 103.011, df = 10, $p<0.001$) is conducted to assess whether structural differences exist across industries. The results reject the null hypothesis that information asymmetry operates uniformly across industries, confirming that the considerations of payment methods differ between high-tech industry and non-high-tech industry. However, the differences between groups for stock payment are not significant, rejecting H1 that industry has an effect on stock payment.

Therefore, Panel A is primarily useful for identifying the existence of heterogeneity, rather than for interpreting within-group effects. In contrast, Panel B estimates the models separately for high-tech and non-high-tech firms, allowing the coefficients to differ across groups. This approach improves the accuracy of interpreting both the size and direction of effects within each industry (Ai & Norton, 2003; Greene, 2010).

In Panel B, target firm information asymmetry increases the likelihood of stock and mixed payment in both high-tech industry (0.348***, 0.630***) and non-high-tech industry (0.287***, 0.392***). In contrast, acquiring firm information asymmetry decreases the likelihood of stock and mixed payments in high-tech industry (-0.896***, -0.681***) and non-high-tech industry (-0.865***, -0.646***). Industry has a significant moderating effect on the likelihood of mixed payment between the groups.

Acquiring firm leverage and acquiring firm cash holdings show limited ability in explaining the payment method in Panel A, except for the latter, exhibiting a significant negative effect on the stock payment (-1.554***). However, Panel B indicates that these variables exert opposite effects on high-tech transactions and non-high-tech transactions. In Panel A, acquiring firm leverage and acquiring firm cash holdings are positive, while Panel B exerts a negative effect.

4.2.2 Premium model and split sample

The regression results are highlighted in Table 5, Panel A, specifically the Sig. column on row stock and row stock × high-tech. The net effect of these two rows indicates that the payment method has a significant effect on the premium in transactions, moderated by industry ($p<0.01$), thereby supporting H2 (*There is a negative relationship between stock payment and premium, moderated by industry*).

Table 5. Premium model and split sample analysis

Panel A: premium regression — OLS with control function approach (H2)

Dep. var: premium (4-week, %). N=2,515. R^2=0.1517, Adj.R^2=0.1476, F=37.276.

Variable	Coefficient	SE	t-statistic	p-value	Sig.	95% CI lower	95% CI upper
Intercept (β_0)	49.633	9.069	5.473	0	***	31.858	67.408
IA target firm (β_1)	-10.526	2.161	-4.871	0	***	-14.762	-6.29
IA acquiring firm (β_2)	-0.071	3.631	-0.02	0.984		-7.188	7.045
Stock (β_3)	-66.885	19.69	-3.397	0.001	***	-105.478	-28.293
Mixed (β_4)	24.482	25.93	0.944	0.345		-26.341	75.305
IA target firm × high-tech (β_5)	-3.909	2.044	-1.912	0.056	*	-7.916	0.098
IA acquiring firm × high-tech (β_6)	9.842	2.215	4.443	0	***	5.5	14.184
Stock × high-tech (β_7)	18.05	5.612	3.216	0.001	***	7.05	29.051
Mixed × high-tech (β_8)	3.605	3.856	0.935	0.35		-3.953	11.163
Hostile deal (β_9)	12.337	8.291	1.488	0.137		-3.914	28.588
Challenged deal (β_{10})	28.872	6.24	4.627	0	***	16.642	41.101
λ_1 Residual stock	55.608	20.163	2.758	0.006	***	16.089	95.127
λ_2 Residual mixed	-30.233	25.967	-1.164	0.244		-81.129	20.663

Panel B: split sample analysis — premium regression by high-tech classification

Dep. var: premium (4-week, %). Chow F=6.315, df1=9, df2=2,497, p<0.001.

Variable	Coef. HT	SE HT	t HT	Sig. HT	Coef. NHT	SE NHT	t NHT	Sig. NHT	Diff.	SE (diff)	Sig.
Intercept (β_0)	50.151	12.817	3.913	***	37.858	12.046	3.143	***	12.294	17.589	
IA target firm (β_1)	-14.917	4.023	-3.708	***	-11.646	2.457	-4.74	***	-3.271	4.714	
IA acquiring firm (β_2)	9.783	5.18	1.889	*	3.4	4.68	0.727		6.383	6.98	
Stock (β_3)	-46.191	35.054	-1.318		-41.493	26.609	-1.559		-4.699	44.009	
Mixed (β_4)	34.754	44.919	0.774		36.286	30.518	1.189		-1.532	54.305	
Hostile deal (β_5)	21.106	5.906	3.574	***	2.983	4.768	0.626		18.123	7.59	**
Challenged deal (β_6)	30.35	10.98	2.764	***	30.417	7.956	3.823	***	-0.067	13.559	
λ_1 Residual stock	46.429	35.789	1.297		33.522	26.869	1.248		12.907	44.753	
λ_2 Residual mixed	-44.225	45.145	-0.98		-38.684	30.507	-1.268		-5.541	54.487	

Notes: HT: N=872, R^2=0.1438, Adj.R^2=0.1349. NHT: N=1,643, R^2=0.1029, Adj.R^2=0.0980 | Control function residuals transferred from full-sample MNL | Heteroskedasticity-consistent standard errors performed | Year fixed effects included in Panel A | Significance: * p<0.10, ** p<0.05, *** p<0.01 (two-tailed tests)

Transactions paid with stock are associated with a negative and statistically significant effect on the premium (-66.885***), suggesting that stock reduces the premium. Likewise, there is a negative association between target firm information asymmetry and the premium (-10.526***), indicating that the willingness to pay a higher premium reduces as target firm opacity increases.

Accordingly, characteristics embedded in high-tech industry, in comparison to non-high-tech industry, are expected to moderate this relationship. The interaction terms

provide a test to see if there exists a structural difference between the groups. Panel A states that IA target firm × high-tech is negative and significant (-3.909*), implying that the premium is further reduced for the high-tech sample relative to the non-high-tech sample (-10.526***). Conversely, the interaction term IA acquiring firm × high-tech (9.842***), respectively, stock × high-tech (18.050***) are both positive and significant. Despite positive coefficients, the net stock effect (-66.885***) remains negative in high-tech industry, though partially mitigated by the positive industry effect (18.050***). The results indicate that both IA acquiring firm and stock × high-tech interaction exert a weaker effect on the premium in high-tech industry.

In Panel A, there is a positive coefficient for mixed payment (24.482). However, this is not significant, implying that there is no effect on the premium. Additionally, the interaction term mixed × high-tech is insignificant, suggesting that there is no moderating effect between the high-tech group and the non-high-tech group. The result from Panel A also indicates that the control variable of challenge deal is significant and contributes positively to the premium (28.872***), while the hostile deal variable is positive but not significant. The residual for stock derived from the control function is positive and significant, indicating that the use of the control function is motivated to control for endogeneity in the payment method. However, the residual for mixed is not significant.

The results of the split sample in Panel B indicate that the direction of the relationship between the payment method and premium is persistent across the groups. However, the coefficient is not significant when the groups are measured separately, except for the control variables hostile deal and challenged deal in the high-tech group, as well as IA target firm and IA acquiring firm, respectively. Furthermore, the Chow test ($p<0.01$) indicates that there is a structural difference between the groups and that the relationship between payment method and premium is not governed by a common underlying factor.

4.2.3 Indirect and direct effects of information asymmetry

To assess whether the theoretical model is persistent, a bootstrap indirect test is employed in Table 6, based on 5,000 replications. The analysis decomposes the relationship between information asymmetry and the premium into direct and indirect effects, thereby determining whether the payment method mediates the effect of information asymmetry on the premium. The bootstrap test indicates that there is both an indirect and direct effect, dominated by the former one ($p<0.05$), thereby rejecting H3 (*There is no indirect relationship between information asymmetry and premium, mediated by payment method*). Specifically, the Sig. column for the indirect, direct, and total effect in the IA acquiring firm row indicates that the indirect effect (8.3347**) dominates the direct effect (-0.4000***) due to its larger coefficient, resulting in a significant total effect (7.9347**).

Table 6. Bootstrap indirect test

Effect component	Point Estimate	Bootstrap SE	95% CI Lower	95% CI Upper	Sig.	n_draws
IA target firm						
Marginal effect → P(stock) [AME]	0.0313***	0.0118	0.0086	0.0544	<0.01	5000
Marginal effect → P(mixed) [AME]	0.0521***	0.0102	0.0323	0.0721	<0.01	5000
→ Indirect via stock (AME_s × β_3)	*-2.1606***	*1.0312*	*-4.4820*	*-0.4674*	*<0.01*	*5000*
→ Indirect via mixed (AME_m × β_4)	*1.0235*	*1.7888*	*-1.9437*	*5.1637*	*0.5780*	*5000*
Indirect effect	**-1.1370**	**2.1861**	**-5.0505**	**3.6765**	**0.5396**	**5000**
Direct effect (β in premium reg)	**0.1660*** **	**0.0290**	**0.1106**	**0.2237**	**<0.01**	**5000**
Total effect (direct + total indirect)	**-0.9710**	**2.1816**	**-4.8568**	**3.8482**	**0.5816**	**5000**
IA acquiring firm						
Marginal effect → P(stock) [AME]	-0.1386***	0.0153	-0.1695	-0.1096	<0.01	5000
Marginal effect → P(mixed) [AME]	-0.0624***	0.0119	-0.0852	-0.0395	<0.01	5000
→ Indirect via stock (AME_s × β_3)	*9.5383****	*2.8273*	*4.3786*	*15.3844*	*<0.01*	*5000*
→ Indirect via mixed (AME_m × β_4)	*-1.2036*	*2.1191*	*-6.2331*	*2.3527*	*0.5780*	*5000*
Indirect effect	**8.3347****	**3.7724**	**0.7271**	**15.5897**	**0.0340**	**5000**
Direct effect (β in premium reg)	**-0.4000*****	**0.0338**	**-0.4689**	**-0.3360**	**<0.01**	**5000**
Total effect (direct + total indirect)	**7.9347****	**3.7667**	**0.3486**	**15.1476**	**0.0428**	**5000**

Notes: the table reports bootstrap mediation analysis results based on 5,000 bootstrap replications | The mediation framework decomposes the total effect of information asymmetry on premiums into (i) an indirect effect mediated by payment method choice [P(stock) and P(mixed)], and (ii) a direct effect | Marginal effects [AME] are average marginal effects from the payment-method MNL model | Bootstrap standard errors and two-tailed p-values are reported | 95% confidence intervals are percentile bootstrap intervals | IA target firm denotes target firm information asymmetry, IA acquiring firm denotes acquiring firm information asymmetry | β_3 and β_4 are the OLS coefficients on stock and mixed in the premium regression | Significance: * p<0.10, ** p<0.05, *** p<0.01

For the target firm, the total effect is close to zero (-0.9710) and not statistically significant. The indirect effect (-1.1370) and the direct effect (0.1660***) operate in opposite directions, suggesting offsetting mechanisms. In turn, the use of stock payment is associated with a significant decrease in the premium (-2.1606**), whereas the use of mixed payment is associated with an increased premium (1.0235), although this effect is not statistically significant. For the acquiring firm, a similar pattern of opposing effects is observed between the indirect effect (8.3347*) and the direct effect (-0.4000***). However, the indirect effect is substantially larger in magnitude, resulting in a positive and statistically significant total effect (7.9347*). This suggests that the indirect component dominates the overall relationship.

While information asymmetry exerts a negative direct effect on the premium, its primary influence operates indirectly through the payment method. This indirect effect is largely driven by the stock channel (9.5383***), whereas the effect via mixed is negative but not statistically significant (-1.2036). Overall, this suggests that the impact of information asymmetry on the premium for the acquiring firm predominantly operates through stock payment, rather than through mixed payment.

A pattern of opposite effects is also observed in the absolute likelihood of choosing a specific payment method. Target firm information asymmetry increases the absolute likelihood of choosing stock (0.0313**) and mixed (0.0521***), whereas the opposite effect is observed for the acquiring firm, which reduces the absolute likelihood of choosing both stock and mixed.

4.3 Robustness test

To assess the robustness of the result, the thesis employs an alternative classification of high-tech industry based on SIC codes, Tables 7 and 8 are estimated following the implementation of the alternative classification. The results from Table 7 indicate that target firm information asymmetry has a positive and significant effect on stock (0.3266***) and mixed (0.4582***) payment methods relative to cash. In contrast, acquiring firm information asymmetry reduces the likelihood of stock (-1.0529***) and mixed (-0.7838***) payment. When the interaction term is included, the coefficients reverse sign from positive to negative and vice versa. This indicates that neither the main result nor the robustness test provides support for H1. Acquiring firm leverage (-0.4797*) and acquiring firm cash holdings (-1.4661***) reduce the likelihood of stock being used as payment, while acquiring firm leverage (0.0250) and acquiring firm cash holdings (0.3533) increases the likelihood of mixed payment, although these effects are not statistically significant.

Table 7. Multinomial logit — robustness (SIC-based high-tech)

	Stock payment				Mixed payment				
Variable	Coef.	SE	z-stat	Sig.	Coef.	SE	z-stat	p-value	Sig.
Intercept	-0.4701	0.1062	-4.4258	***	-0.9108	0.1112	-8.1912	0	***
IA target firm	0.3266	0.061	5.356	***	0.4582	0.0607	7.5453	0	***
IA acquiring firm	-1.0529	00728	-14.4605	***	-0.7838	0.0732	-10.7025	0	***
IA target firm × high-tech SIC	-0.0966	0.1217	-0.7939		-0.006	0.1097	-0.0544	0.9567	
IA acquiring firm × high-tech SIC	0.242	0.1281	1.8886	*	0.1632	0.1242	1.3146	0.1886	
Acquiring firm leverage	-0.4797	0.2841	-1.6885	*	0.025	0.29	0.0861	0.9314	
Acquiring firm cash holdings	-1.4661	0.4991	-2.9377	***	0.3533	0.4951	0.7135	0.4755	
Target firm leverage	0.5073	0.1682	3.0161	***	0.6692	0.1742	3.8414	0.0001	***

Notes: reference category Cash (0) | N=2,515 | Log-Likelihood = −2316.6557 | McFadden R^2 = 0.1615 | Significance: * p<0.10, ** p<0.05, *** p<0.01

The results in Table 8 show how the premium is affected by payment method when the classification of high-tech industry is altered. The results suggest that when stock is used, there is a negative and significant effect on the premium (-36.5023*). This indicates that stock payment reduces the premium and does not require immediate compensation. When the interaction term is included to test for structural differences between both groups, stock × high-tech is positive (3.9012), indicating that high-tech

industry partially mitigates the negative effect of using stock payment. Although statistically insignificant, the direction of the coefficient remains consistent with the main results, thereby providing partial support for H2.

Table 8. Premium regression — robustness (SIC-based high-tech)

Variable	Coefficient	SE	t-statistic	p-value	Sig.	95% CI upper
Intercept (β_0)	48,5723	9,2049	5,2768	0,0000	***	66,6140
IA target firm (β_1)	-13,4851	2,4089	-5,5980	0,0000	***	-8,7637
IA acquiring firm (β_2)	8,3978	4,1030	2,0467	0,0408	**	16,4397
Stock (β_3)	-36,5023	20,5491	-1,7763	0,0758	*	3,7740
Mixed (β_4)	3,9782	26,0247	0,1529	0,8785		54,9867
IA target firm × high-tech SIC (β_5)	5,9487	1,8285	3,2533	0,0012	***	9,5326
IA acquiring firm × high-tech SIC (β_6)	-3,7630	2,3280	-1,6164	0,1061		0,7999
Stock × high-tech SIC (β_7)	3,9012	5,6629	0,6889	0,4909		15,0005
Mixed × high-tech SIC (β_8)	-5,3807	3,7470	-1,4360	0,1511		1,9634
Hostile deal (β_9)	12,6129	8,3680	1,5073	0,1319		29,0142
Challenged deal (β_{10})	29,2328	6,2900	4,6475	0,0000	***	41,5612
λ_1 residual_stock (SIC)	27,6943	21,1585	1,3089	0,1907		69,1650
λ_2 residual_mixed (SIC)	-7,7893	26,0548	-0,2990	0,7650		43,2780

Notes: N = 2,515 | R^2 = 0.1412 | Adj. R^2 = 0.1371 | Heteroskedasticity-consistent standard errors performed | Significance: * p<0.10, ** p<0.05, *** p<0.01

The control variable challenged deal indicates that the number of firms involved raises the premium (29.2328***). In contrast, the hostile deal coefficient is positive but not significant, supporting the findings in the main result. The residual derived from the control function does not indicate that the control function is appropriate to control for endogeneity, as neither stock nor mixed is significant.

4.4 Summary of hypothesis tests

Table 9 presents a summary of the hypothesis tests. H2 is supported, indicating that stock payment affects the premium, and this relationship is moderated by industry. Although H1 and H3 are not supported by the empirical results, this suggests that information asymmetry does not have a significant effect on the use of stock payment when moderated by industry. In contrast, H3 proposes that information asymmetry is mediated by payment method, resulting in an indirect effect on the premium. The outcome of the hypothesis tests should not be interpreted as absolute proof or falsification of the hypotheses. Instead, it may be a result of the methods used to validate them.

Table 9. Hypothesis test results

Hypothesis	Hypothesis description	Result
H1	There is a positive relationship between information asymmetry and the choice of stock as payment method, moderated by industry	Rejected
H2	There is a negative relationship between stock payment and premium, moderated by industry	Supported
H3	There is no indirect relationship between information asymmetry and premium, mediated by payment method	Rejected

5. Discussion

The following section analyzes the findings in relation to previous research and relevant theoretical perspectives.

5.1 The effect of information asymmetry on the payment method

The findings from the payment method models reveal that the double-sided information asymmetry exerts opposing effects on the payment method consideration in transactions. Our findings align with previous research showing that both sides' information asymmetry is significant in determining the payment method (Chemmanur et al., 2009; Luypaert & Van Caneghem, 2017; Malmendier et al., 2016). However, previous research shares a common assumption that information asymmetry operates similarly across industries.

These findings of target firm information asymmetry point to a risk-sharing mechanism of Hansen (1987). When the acquiring firm faces greater uncertainty about the target firm's value, there is an increased likelihood of non-cash payment, shifting the payment method towards stock and mixed relative to cash. Resorting to stock or mixed, the acquiring firm shifts the valuation uncertainty to the target firm, thereby avoiding committing to assets whose value is unknown and cannot be fully verified. The opposite effect occurs for acquiring firm information asymmetry, which reduces the probability of stock and mixed relative to cash, consistent with the signaling mechanism proposed by Myers and Majluf (1984). An acquiring firm facing greater information asymmetry regarding its own value avoids stock and mixed payment. Anticipating the target firm's interpretation, the acquiring firm recognizes that proposing stock or mixed payment prompts the question of why it is favored over cash. Unable to verify the acquiring firm's true value, the target firm may perceive the use of stock payment as an attempt to exploit overvalued assets, because of the difficulties in distinguishing between the stock being overvalued or not. Resorting to cash prevents the deal from being rejected, as there is no need to assess the acquiring firm's value. Instead, offering cash is perceived as a credibility signal of high target firm quality and overall transaction quality. However, the use of cash entails a cost, upon cash being used, the acquiring firm bears the risk of the transaction not materializing (Croci et al., 2012; de La Bruslerie, 2013). Notably, Eckbo et al. (2018) reported that the use of stock payment is not primarily opportunistic, which our findings support. Instead, stock payment reflects the acquiring firm's concern regarding adverse selection.

While previous research regards risk-sharing and signaling theories as opposite and irreconcilable, our findings indicate that when both the acquiring firm and target firm

possess proprietary information regarding their own value, consistent with Hansen's (1987) "double lemon problem", the two perspectives are not mutually exclusive. Rather than operating in isolation, they occur simultaneously within the same contractual agreement. However, the true effect of information asymmetry on payment method may be obscured when only one side is considered, either the acquiring firm (Travlos, 1987) or the target firm (Reuer et al., 2004).

Relative to previous research that does not consider how information asymmetry varies across industries (e.g., Fuller & Pusateri, 2018; Ismail & Krause, 2010), this thesis provides evidence suggesting that industry differentiation is consequential. The structural break test rejects the assumption of a common factor governing the M&A transactions. Target firm information asymmetry has a more pronounced effect in high-tech transactions compared to non-high-tech transactions (0.630 versus 0.392, $p<0.05$). A plausible explanation lies in the characteristics of the assets being acquired. High-tech firms derive a larger portion of their value from intangible assets and real options, the realization of which is inherently uncertain (Davis & Madura, 2015; Kohers & Kohers, 2000). Greater target firm opacity amplifies the acquiring firm's incentive to use stock as a risk-sharing mechanism, mitigating the risk of overpaying in cash, given that the intrinsic value is more difficult to ascertain relative to non-high-tech firms.

Contrary to our initial expectations of a positive relationship between information asymmetry and the use of stock as payment method, moderated by industry, the findings do not lend support to this notion. Instead, as the target firm's information asymmetry increases, both the absolute and the relative likelihood of using stock payment increases less than that of mixed payment. One plausible explanation for H1 not being supported by empirical evidence is the limited sample size of pure stock payment. The interaction terms in MNL models are known to be difficult to detect in full-sample specifications, as they require the moderating effect to be sufficiently large relative to within-group variance to achieve statistical power (Hair et al., 2019, p. 30).

Furthermore, in a European sample, Martynova and Renneboog (2009) find that the number of transactions using stock payments (18.2%) was marginally less than the number of mixed payments (19%). This distribution may indicate that the observed prevalence of stock payment is not solely a result of statistical properties but may instead reflect actual payment method preferences. The risk-sharing mechanism does not operate through pure stock payment, but rather through a compromise in the form of mixed payment, which receives significant support across industries. Assuming that both parties are concerned about adverse selection, consistent with Hansen's (1987) notion of the "double lemon problem", pure cash- or stock payment may fail to materialize, as the party on the more exposed side of the payment structure would bear the full risk. As transactions are more likely to be completed when an equilibrium is reached between cash and stock, i.e., mixed payment (de La Bruslerie, 2012, 2013).

In this setting, both parties seek to minimize risk (Hansen, 1987; Myers & Majluf, 1984). As the payment method shifts toward mixed payment, the composition of the payment method becomes critical. As the empirical specification is expressed relative to cash, higher target firm information asymmetry leads to a positive mixed payment coefficient, reflecting a higher proportion of stock within the mixed offer. Conversely, a negative coefficient, driven by higher acquiring firm information asymmetry, indicates a lower proportion of stock and, correspondingly, more cash. Consistent with this, mixed payment declines less than pure stock payment, indicating that it retains a meaningful cash component. The final proportion of cash and stock in mixed deals can thus be interpreted as an equilibrium outcome that balances both parties' exposure to adverse selection, thereby enabling the completion of the transaction (de La Bruslerie, 2012, 2013). Our findings do not discredit previous studies, instead, they extend existing theoretical frameworks by positioning them within a context that accounts for double-sided information asymmetry and industry differences.

Double-sided information asymmetry in the high-tech sample appears to amplify the tendency toward an equilibrium between cash and stock. However, this stands in apparent tension with the observations in high-tech transactions that rely predominantly on cash payment. This may be interpreted as an attempt by the acquiring firm to reduce the cost of information asymmetry that cannot be fully verified. As previously mentioned, high-tech firms derive a larger proportion of their value from intangible assets and real options compared to non-high-tech firms (Davis & Madura, 2015; Kohers & Kohers, 2000). As target firm opacity is greater in high-tech firms, the subsequent cost of receiving this information would increase (Klitzka et al., 2021). In this setting, mixed payment being typically preferred under information asymmetry may instead be discarded in favor of cash. The acquiring firm, facing excessive costs in assessing the target firm's value under information asymmetry, may prefer bearing the full risk rather than entering into a risk-sharing agreement that cannot be adequately priced.

To assess the sensitivity of our findings, a robustness test was performed. The main effect of information asymmetry on the payment method, when the SIC codes of high-tech industry are used, remains equal to the main results. A noteworthy divergence occurs in the interaction term. Contrary to the main result, target firm information asymmetry and acquiring firm information asymmetry reverse direction. This is consistent with Myers and Majluf (1984) and Rhodes–Kropf et al. (2005), suggesting that acquiring firms with greater information asymmetry attempt to exploit their temporary overvaluation to buy assets in the target firm. A plausible explanation is that classification using SIC codes systematically misclassifies firms, shifting companies with different characteristics into the high-tech sample and vice versa for the non-high-tech sample, thereby producing more heterogeneous groups (Kile & Phillips, 2009). Relative to TRBC, SIC codes capture an average effect across

heterogeneous firms, creating a situation in which the interaction term no longer captures the phenomenon of interest.

5.2 The effect of payment method on the premium

In the contractual negotiations, the payment method reflects the acquiring firm's management of information asymmetry, while the premium represents the target firm's minimum threshold for bearing the risk associated with the transaction. This provides a theoretical lens through which the premium can be understood as contingent upon the payment method (Eckbo et al., 1990; Malmendier et al., 2016). This sequential dependency, whereby the premium is shaped by the chosen payment method, constitutes the core logic of the theoretical framework, with industry moderating this relationship.

The findings suggest that the use of stock payment in transactions reduces the premium. While cash requires the acquiring firm to bear the full risk of value realization, the use of stock shifts part of the risk to the target, which becomes a participant in future value realization. Due to the target firm retaining ownership in the new combined entity, the need for immediate compensation through a higher premium is reduced. As part of the compensation is deferred in the form of stock and becomes contingent on the post-acquisition performance of the combined entity. These findings are consistent with the evidence provided by Battigalli et al. (2023) and de La Bruslerie (2013), who show that stock-based payment is associated with lower premiums, while cash commands a higher premium due to forgone future value participation.

Previous research provides evidence that industry characteristics alter how M&A transactions are structured. Specifically, industry differences shape the relative strength of these mechanisms between industries (e.g., Ahern & Harford, 2014; García-Feijóo et al., 2012). In accordance with our initial expectation of stock having a negative effect on the premium, moderated by industry, the findings lend support to this moderating effect of industry. The interaction term provides evidence that high-tech industry attenuated the negative net stock effect of payment method and premium. Notably, acquiring firm information asymmetry in high-tech industry is also positive and significant, positively affecting the premium.

These findings suggest that the attenuated premium associated with stock payment in high-tech industry cannot be attributed solely to the payment method. Instead, it reflects the interaction between the payment method and the target firm's ability to assess the value of the stock received. High-tech firms, whose value is largely derived from intangible assets and real options, limit the target firm's ability to value the stock received. This difficulty in assessing stock is consistent with the findings of Barbopoulos et al. (2019) and Davis and Madura (2015). In this setting, M&A transactions are inherently irreversible, accepting stock exposes the target firm to part

of the downside risk of real options not materializing, thereby raising the minimum threshold for accepting the offer (Folta & Miller, 2001). The attenuated negative relationship between stock and premium in high-tech transactions does not reflect a shift in preference for deferred compensation, but rather a fundamental constraint in the target firm's ability to value the stock received.

We find no evidence that the results are driven by cyclical fluctuations, consistent with controls in Table 5, Panel A, and explicitly presented in Table 3. This strengthens confidence in the robustness of the result. Although certain variables are not statistically significant, the Chow test rejects the null hypothesis of no structural differences across industries, suggesting that industry characteristics do in fact moderate the relationship.

To further assess the sensitivity of our findings, a robustness test was performed. First, to alter the classification of high-tech firms, we adopt the approach of Loughran and Ritter (2004) by using SIC codes. The findings that stock payment, being negative and significant, thereby reducing the premium, are consistent under this alternative classification. Second, a noteworthy divergence occurs concerning the interaction term used to see if a difference exists across industries, they shift signs relative to the findings in the main model. The high-tech industry classification using TRBC is homogeneous as they follow the same type of characteristics. However, as noted by Kile and Phillips (2009), the SIC codes fail to capture the economic characteristics of the firms. This implies that SIC codes produce groups that are more heterogeneous, this may produce composite effects that yield different results, not necessarily because the effect is absent but rather because the groups differ in composition.

Additionally, the control function residuals for stock are not significant in the regression model. This implies that the instrument used to capture the endogenous part of the payment method is insufficient. A plausible explanation is that SIC codes produce heterogeneous groups in which industry-specific effects offset one another, as individual industries exhibit substantially different characteristics (e.g., García-Feijóo et al., 2012; Harford, 2005; Kanungo, 2021). These findings indicate that the moderating effect of industry is sensitive to the classification of high-tech firms and non-high-tech firms.

5.3 The effect of information asymmetry on the premium

The bootstrap indirect test provides evidence that stock payment constitutes an economically meaningful pathway linking information asymmetry to the premium. This decomposition of the total effect into direct and indirect effects directly addresses whether the payment method and premium are jointly determined within the contractual agreement or instead determined sequentially (Battigalli et al., 2023; de La Bruslerie, 2013; Fishman, 1989; Hansen, 1987). Contrary to our expectations of no indirect relationship between information asymmetry and the premium, our findings

suggest that while the direct effect remains significant, the relationship also operates through an indirect pathway.

Furthermore, we find that the direct and indirect effects are not symmetrical over the double-sided information asymmetry. The acquiring firm's information asymmetry has a dominant effect on the premium, mainly mediated by the indirect effect. While the total effect of target firm information asymmetry is close to zero, these results should not be interpreted as indicating no effect. Instead, the direct and indirect effects approximately offset each other. This is consistent with the theoretical proposition of Fishman (1989) and Hansen (1987), suggesting that the premium is contingent on the payment method prior to the full value being displayed.

The theoretical perspective that the payment method and premium act simultaneously within the same contractual negotiation, proposed by Battigalli et al. (2023) and de La Bruslerie (2013), does not necessarily imply that this perspective is theoretically wrong. In accordance with de La Bruslerie (2013) and Fishman (1989), the negotiations may empirically appear simultaneous, as it is difficult to distinguish when the process transitions from determining the payment method to determining the premium. While the simultaneous perspective does not preclude a sequential perspective, neither does the reverse hold. However, the empirical evidence supports the sequential structuring of these decisions.

6. Conclusion, implications, and suggestions for future research

This concluding section presents the conclusions of the thesis. It further discusses the theoretical and practical implications, limitations, and suggestions for future research.

6.1 Conclusion

During M&A transactions, mixed payment weighing both cash and stock reflects the preference of both the target firm and the acquiring firm, as both firms are simultaneously exposed to double-sided information asymmetry. The acquiring firm faces uncertainty regarding the intrinsic value of the assets being acquired, while the target firm similarly questions the true value of the stock received. Consequently, the payment method serves as a risk-sharing mechanism between both parties. Neither pure cash nor pure stock payment can fully resolve double-sided information asymmetry. Rather, the optimal payment method represents an equilibrium that directly resolves adverse selection (de La Bruslerie, 2012; Hansen, 1987; Myers & Majluf, 1984). Industry differences further amplify risk aversion by relaxing the assumption of industry homogeneity (e.g., García-Feijóo et al., 2012; Kanungo, 2021). The distinction between high-tech transactions and non-high-tech transactions primarily lies in the nature of the assets being acquired, as high-tech firms rely more heavily on intangible assets and uncertain real options. As a result, adverse selection becomes more pronounced in high-tech M&A transactions, increasing the demand for how double-sided information asymmetry is managed while simultaneously narrowing the scope for reaching an equilibrium.

The implications extend beyond the choice of payment method to the determination of the premium. When the acquiring firm offers stock, the target firm must assess whether the stock is overvalued or not. The value of the stock is inherently tied to intangible assets and the realization of real options. Consequently, the target firm's willingness to accept stock depends not only on the payment method itself but also on its ability to accurately assess the value of the stock received (e.g., Barbopoulos et al., 2019; Davis & Madura, 2015). This ability is further constrained in high-tech industries due to uncertainty regarding whether the real options will materialize. The inability to resolve this valuation uncertainty raises the minimum threshold for accepting any stock component (Folta & Miller, 2001). Stocks carry a greater degree of information asymmetry, as the target firm cannot separately price the risk of unrealized real options and the risk of the acquiring firm's stock being overvalued. Instead, both risks arrive bundled in the stock component of the offer, implying that the acquiring firm's information asymmetry indirectly affects the premium. The premium, therefore, does not merely compensate for forgoing future gains, as it would in a cash payment, but also compensates for accepting a payment method whose value

is itself contingent upon the information asymmetry that motivated the use of stock in the first place.

6.2 Implications

6.2.1 Theoretical implications

The findings of this thesis give rise to important theoretical implications for how M&A research is conceptualized and developed. Based on Hansen's (1987) notion of "double lemon problem", Malmendier et al. (2016) emphasize the importance of accounting for information asymmetry of both the target firm and the acquiring firm. The results of this thesis support this perspective, demonstrating that information asymmetry of both sides influences M&A transactions, affecting both the choice of payment method and, in turn, the negotiated premium. Accordingly, research would benefit from moving beyond analyzing target firm and acquiror firm information asymmetry in isolation and instead adopting a joint framework that accounts for both their interactions.

A further implication related to the "double lemon problem concerns the assumption of industry homogeneity in M&A research. Kanungo (2021) suggests that M&A transactions are shaped by industry characteristics. In line with this, the findings show that the structure of M&A transactions varies systematically across industries due to their distinct characteristics. This suggests that theoretical models should incorporate industry-specific differences to more accurately capture the underlying mechanisms driving transaction outcomes. Consequently, theory development could explicitly account for industry heterogeneity to ensure external validity.

6.2.2 Practical implications

The findings of this thesis give rise to several practical implications for firms involved in M&A transactions. First, the results suggest that both parties possess proprietary information about themselves, creating inherent incentives to protect themselves against adverse selection. In such settings, negotiations can be expected to converge toward a mixed payment method, as this allows both parties to share risk and mitigate adverse selection, thereby facilitating the completion of the transaction (de La Bruslerie, 2012, 2013).

Second, the findings indicate that acquiring firm information asymmetry affects both the choice of payment method and, in turn, the negotiated premium. This suggests that both parties have incentives to manage adverse selection, implying that efforts to reduce information asymmetry should not be limited to the acquiring firm (Klitzka et al., 2021). Two implications follow. Partially, both parties should engage in thorough due diligence processes. Partially, in high-tech transactions, where firm value is largely driven by intangible assets and real options, there are stronger incentives to allocate additional time and resources to due diligence compared to other industries.

Finally, the results highlight that the assumption of industry homogeneity affects both the structuring of payment methods and the negotiation of premiums. Contractual negotiations differ across industries due to their distinct characteristics, suggesting that standardized contractual frameworks may inadequately capture the complexity of M&A transactions (García-Feijóo et al., 2012). Accordingly, greater emphasis should be placed on industry-specific contract design.

6.3 Limitations and suggestions for future research

One limitation of the thesis includes the classification of industries, concluding that the findings are sensitive to the classification of the industries. Classifying high-tech firms in accordance with Bhussar et al. (2022), Kohers and Kohers (2000), and Wei et al. (2025) shapes the composition of groups by determining which firms have shared characteristics. An alternative classification may generate different groupings with different underlying characteristics. Accordingly, future research would benefit from treating industry classification as an empirical question, rather than accepting a single classification approach as the definitive one.

A further limitation concerns the proxies used to measure information asymmetry. Callen (2015) is critical of the tendency in literature to rely on convenient proxy measures rather than subjecting them to rigorous theoretical validation. Although the literature addresses the empirical issue of industry classification, results are not directly comparable across studies due to the use of different proxies. Therefore, future research should move away from the uncritical use of proxies and instead theoretically validate them within the context of M&A research.

Another issue concerns the interpretation and determination of hypothesis support. Whether a hypothesis is considered supported or not should not be viewed as a definitive or objective conclusion, as it depends on methodological choices made. Building on Kile and Phillips (2009), the classification of firms (e.g., TRBC & SIC) relies on subjective boundaries and may classify firms differently. Similarly, Callen (2015) argues that a different set of proxies may produce different outcomes. The threshold to determine whether a hypothesis receives support (such as requiring two different statistical tests) involves discretionary judgment rather than objective criteria. Therefore, future research would benefit from altering the classification of firms, model specification, and proxy measures to assess the reliability of the outcomes.

Additionally, the thesis cannot conclusively determine whether the payment method and the premium are determined simultaneously (de La Bruslerie, 2013) or sequentially (Hansen, 1987) within negotiations. This highlights the potential for qualitative approaches to complement existing empirical work in M&A research. More studies are therefore encouraged to examine the sequencing of these decisions, particularly whether the premium is contingent on the payment method.

The final limitation stems from restricting the sample to North American, European, and Japanese firms, following de La Bruslerie (2013). Consequently, the findings are primarily representative of developed markets. While such markets offer more extensive and reliable data on M&A transactions, the results may not generalize to emerging markets, where institutional settings and transaction dynamics may differ.

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Appendices

Appendix A. Sample selection and observation exclusions

Criterion	Excluded	Retained
Initial sample	—	5 113
Missing premium data	(1 575)	3 538
Inconsistent payment method	(529)	3 009
Hostile deals	(363)	2 646
Duplicates	(7)	2 639
Non-imputed variables	(124)	2 515
Final sample	**—**	**2 515**

Appendix B. High-technology industries

(Based on Bhussar et al., 2022, Kohers and Kohers, 2000, and Wei et al., 2025)

The categories present the high-technology industries characterized by rapid growth and a high level of risk, depending on the development and application of new technologies.

Category	Activity	Activity
Biotech and health care	Artificial organs/limbs	General medical instruments/supplements
	General pharmaceuticals	Genetically engineered products (human)
	Health care services	In-vitro diagnostic products
	Lab equipment	Medical imaging systems
	Medical lasers	Medical monitoring systems
	Medicinal chemicals	Nuclear medicines
	Other biotechnology	OTC drugs
	Rehabilitation equipment	Vaccines/specialty drugs
	Surgical instruments/equipment	
Computer software/service	Applications software (business)	Applications software (home)
	Communication/network software	Computer consulting services
	Database software/programming	Desktop publishing
	Operating systems	Other computer-related services
	Other software (including games)	Programming services
	Utilities/file management software	Data-processing services
Computer hardware	CAD/CAM/CAE/graphics systems	CD-ROM drives
	Disk drives	Mainframes and super computers
	Microcomputers (PCs)	Modems
	Monitors/terminals	Networking systems (LAN, WAN)
	Other computer systems	Other peripherals
	Portable computers	Printers
	Scanning devices	Workstations
Communications	Alarm systems	Cellular communications
	Data communications (excl. networking)	Facsimile equipment
	Internet services and software	Messaging systems
	Microwave communications	Other telecommunications equipment
	Satellite communications	Telephone interconnect equipment
Electronics	Precision/measuring test equipment	Printed circuit boards
	Process control systems	Search, detection, navigation
	Superconductors	Other electronics
Defense	Defense related	
Other	Lasers	Propulsion systems
	Research and development	Robotics

Appendix C. Information asymmetry variable definitions

(Based on Borochin et al., 2018)

These are the definitions of the 10 variables that were intended to be used but were later reduced to mirror the data available.

Variable	Description
Information asymmetry factor	The first factor obtained from factor analysis using 10 well-documented information asymmetry proxy variables
Number of analysts following the firm	Averaged over the year to the acquisition announcements
Firm age	Measured as the number of years between the firm's IPO year and the year of the acquisition announcements
Firm size	Measured as the natural log of the book value of total assets in the year before the acquisition announcements
Intangible assets	Measured as the non-property, plant, and equipment divided by total assets, the year before the acquisition date
Average bid–ask spread	Calculated as the yearly average daily bid-ask spread relative to the closing price preceding the acquisition announcement
Abnormal accruals	Measured as the absolute deviation of firm-specific abnormal accruals from the median of its peers
Return volatility	Measured as the standard deviation of daily stock returns over the year to the acquisition announcements
Analyst forecast error	Calculated as the absolute difference between the mean and actual earnings per share (EPS), divided by the price, and the average year before the acquisition announcement
Analyst forecast dispersion	Calculated as the standard deviation of EPS forecasts, scaled by price, and averaged over the year before the acquisition announcement
Amihud	Measured as the mean of daily return divided by daily trading volume during the pre-announcement year

Appendix D. Digital source code repository

The empirical analysis was conducted using Python, covering data cleaning, variable construction, and the full empirical analysis, including the MNL, OLS regressions, and the bootstrap indirect test. In accordance with the transparency and reproducibility standards outlined in section 3.7, the code has been made publicly available via GitHub.

Data cleaning and main results - GitHub

Bootstrap indirect test - GitHub