The cost of short-term debt

A study of debt maturity and Swedish real estate firm vulnerability during the 2022-2023 interest rate shock

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Abstract:

This thesis examines whether the 2022-2023 monetary tightening cycle disproportionately affected listed Swedish real estate firms with greater short-term debt maturity exposure. Using an event study and event-based regressions, where firm outcomes are measured around or after specific monetary policy announcements, three mechanisms are tested: equity valuations, borrowing costs, and balance sheet adjustments. Firms with higher short-term debt shares experienced more negative equity market reactions around policy announcements, suggesting that investors viewed short-term refinancing needs as a source of risk during the tightening cycle. For borrowing costs, a positive and statistically significant relationship is found from the two-quarter horizon onward. This indicates that firms with greater short-term maturity exposure experienced larger increases in borrowing costs as refinancing needs materialized over time. No evidence that firms with higher refinancing exposure reduced leverage is found. The results for investment properties point in the expected direction, with more exposed firms showing weaker growth, but the evidence is weak. Overall, the results suggest that debt maturity structure affected firms' exposure to monetary tightening mainly through equity market reactions and increased borrowing costs, while the evidence for balance sheet adjustment through deleveraging and asset-side adjustment is more limited.

Keywords:

Real estate, Debt maturity, Interest rate, Monetary policy

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1. Introduction

The monetary tightening cycle that began in Sweden in 2022 marked one of the fastest interest rate increases in recent decades. In response to persistently high inflation, the Swedish central bank raised the policy rate sharply over a relatively short period. This sudden shift in monetary policy led to a substantial repricing of financial assets and significantly altered financing conditions for firms. Among the sectors most exposed to these developments were real estate firms, where high leverage, long-duration assets, and frequent refinancing needs make firms particularly sensitive to changes in interest rates and financial conditions.

The sharp rise in policy rates in 2022-2023 created a major stress episode for real estate markets. While previous episodes of financial distress, such as the 2008-2009 global financial crisis (GFC), were primarily driven by the collapse of financial intermediaries and severe disruptions in credit supply, the recent tightening cycle was characterized by a rapid increase in the policy rate in response to high inflation and changes in financial market expectations (Sveriges Riksbank, 2024). In this environment, higher interest rates affected real estate firms through several mechanisms. First, rising borrowing costs increased debt servicing expenses and reduced cash flows. Second, higher discount rates reduced the present value of future rental income and compressed property valuations (Sveriges Riksbank, 2023). Declining property values increase leverage ratios and weaken firms' financial positions. The speed of the tightening cycle also contributed to episodes in which access to capital markets became limited or significantly more expensive, highlighting the importance of refinancing, or rollover, risk for firms with maturing debt obligations.

A substantial body of research documents that monetary policy shocks have important effects on asset prices and financial markets. Changes in policy rates can influence equity valuations by affecting discount rates, expected cash flows, and risk premia (Bernanke and Kuttner, 2005; Rigobon and Sack, 2004). These effects can propagate through financial markets and alter financing conditions for firms by increasing borrowing costs. Together, these mechanisms highlight how monetary tightening can affect firms not only through changes in risk-free interest rates but also through broader financial market conditions.

An additional factor that may shape firms' vulnerability to rising interest rates is the structure of their debt maturities. While leverage levels provide a measure of financial risk, the timing of debt repayments can be equally important. Firms with a large share of debt maturing in the short-term face the need to refinance obligations under prevailing market conditions. If financial conditions deteriorate or borrowing costs increase, these firms may experience significant refinancing pressure. Theoretical work by Diamond (1991) highlights the trade-off between short-term and long-term debt financing, emphasizing that short-term debt can expose firms to rollover risk if lenders become unwilling to extend new financing. Empirical evidence also suggests that firms with greater refinancing needs may be more vulnerable during periods of financial stress. For example, Almeida et al. (2012) show that firms with a large share of debt maturing during the global financial crisis experienced stronger declines in investment, indicating that refinancing constraints can have real economic consequences.

These insights suggest that the effects of monetary tightening may vary significantly across firms depending on their financial structures. In particular, firms with large amounts of short-term debt maturities may be especially exposed to sudden increases in borrowing costs. When interest rates rise rapidly, such firms may be forced to refinance existing debt under less favorable terms or adjust their financial policies. Potential responses include asset sales, equity issuance, renegotiation of debt covenants, or reductions in investment activity. By contrast, firms with longer debt maturities may be able to delay refinancing and therefore avoid immediate exposure to deteriorating financing conditions.

These mechanisms may be especially relevant in the real estate sector. Real estate firms are particularly exposed to these dynamics because their business models are capital-intensive and based on long-term rental income streams, making property valuations sensitive to changes in discount rates. As interest rates rise, capitalization rates tend to increase, which reduces the present value of future cash flows and lowers property prices (Geltner et al., 2014). Moreover, real estate firms often operate with relatively high levels of leverage and rely heavily on external financing to fund property acquisitions and development projects. As a result, increases in borrowing costs can significantly affect both the profitability of investments and the financial stability of property firms (Ling and Naranjo, 1997). Real estate assets are typically long-lived and illiquid, making it difficult for firms to adjust their asset base quickly in response to financial shocks. When interest rates increase sharply, firms with substantial short-term debt maturities may face significant refinancing pressure, potentially affecting both their financial policies and market valuations.

Against this background, this thesis examines how the 2022-2023 rate shock affected listed real estate firms through the mechanism of refinancing risk. The central hypothesis is that debt maturity structure, particularly the share of debt maturing within the next 12 months, creates heterogeneous exposure to tightening financial conditions. Firms with significant short-term refinancing needs may have been more strongly affected by the increase in interest rates and the associated tightening of financial conditions.

More specifically, this study addresses the following research question:

Did the 2022-2023 rate shock disproportionately affect real estate firms with high short-term debt maturities? Through which mechanisms did these effects operate; equity valuations, borrowing costs, or balance sheet adjustments?

To answer this question, the thesis analyzes the relationship between debt maturity and firm outcomes among listed real estate companies. The empirical analysis focuses on three potential mechanisms. First, it investigates whether equity markets incorporated refinancing risk into stock price movements, leading to larger valuation declines for firms with higher short-term refinancing needs. Second, the study examines whether firms with greater short-term debt maturities experienced stronger increases in borrowing costs during the tightening cycle. Third, the analysis explores whether firms responded to refinancing pressure by adjusting their balance sheets through changes in leverage or asset holdings.

By examining these mechanisms, the study contributes to several strands of literature. First, it adds to the literature on monetary policy transmission by examining how rapid changes in interest rates affect firms with different financial structures. Second, it contributes to research on corporate debt maturity and refinancing risk by providing new evidence from the recent monetary tightening cycle. Finally, it contributes to the literature on real estate finance by examining how financial shocks propagate through a highly leveraged sector that relies heavily on external financing.

The remainder of the thesis is structured as follows. Section 2 reviews the relevant literature on monetary policy shocks, debt maturity structures, and the transmission of financial shocks through equity valuations, borrowing cost and balance sheets. Section 3 describes the data and empirical methodology used in the analysis. Section 4 presents the descriptive statistics. Section 5 shows the empirical results, examining how debt maturity structures influenced firm outcomes during the 2022-2023 rate shock. Section 6 concludes by discussing the implications of the findings for understanding the transmission of monetary policy to highly leveraged sectors such as real estate.

2. Literature review and hypothesis development

2.1 Monetary policy shocks

Monetary policy plays a central role in shaping financial market outcomes through its influence on interest rates, discount factors, and risk premia. The literature documents that unexpected changes in monetary policy can have immediate and significant effects on equity prices. These effects arise primarily through two mechanisms: changes in the discount rate applied to future cash flows and changes in expected economic activity that affect corporate earnings.

Early empirical work established a strong relationship between monetary policy surprises and stock market reactions. One of the most influential contributions is Bernanke and Kuttner (2005), who examine how U.S. equity markets respond to unexpected changes in Federal Reserve policy rates. Using federal funds futures to isolate monetary policy surprises, they show that unexpected rate cuts lead to substantial increases in equity prices, while unexpected rate hikes lead to declines. Their findings suggest that a 25 basis point unexpected cut in the policy rate is associated with roughly a one-percent increase in broad stock indexes. Importantly, the study shows that a large portion of this response reflects changes in equity risk premia rather than only revised expectations about future dividends. This suggests that monetary policy affects equity valuations not only through expected cash flows but also through the required return investors demand for holding risky assets.

Other research has further examined the mechanisms through which monetary policy influences asset prices. Rigobon and Sack (2004) investigate the identification of monetary policy effects on financial markets and find that monetary policy shocks generate significant responses in both equity markets and interest rate term structures. Their results highlight that policy changes influence financial markets through broad changes in discount rates and financial conditions. Similarly, Gürkaynak, Sack, and Swanson (2005) demonstrate that financial markets react not only to current policy rate changes but also to revisions in the expected path of future monetary policy. Their decomposition of monetary policy surprises into target-rate and path components shows that forward guidance and changes in expected future policy can generate substantial movements in asset prices.

Another important contribution comes from Campbell and Ammer (1993), who decompose stock return variation into news about future dividends, real interest rates, and future excess returns. They show that fluctuations in expected future excess stock returns, that is discount-rate news, account for a large share of equity return variation, while real interest rate news plays a relatively small role. Their framework is useful for thinking about how macroeconomic developments may affect asset prices through discount-rate expectations, although the paper itself is cautious about identifying the deeper economic forces behind those shifts.

Further evidence suggests that the impact of monetary policy on financial markets may vary depending on balance sheet conditions and exposure to external finance. Kashyap and Stein (2000) provide evidence for a bank-lending channel of monetary policy, showing that tighter monetary policy has stronger effects on lending by banks with less liquid balance sheets. Although their analysis focuses on banks rather than non-financial firms, the study is relevant because it shows that monetary policy transmission depends on balance sheet structure and access to liquidity. This provides a basis for expecting monetary policy shocks to generate cross-sectional differences in stock market performance across firms and industries, particularly when firms differ in their dependence on external financing.

2.2 Debt maturity structure and rollover risk

The maturity structure of corporate debt plays an important role in shaping a firm's exposure to changing financial conditions. While leverage is a common measure of financial risk, the timing of debt repayments can also materially affect firm vulnerability. Firms with a relatively large amount of debt maturing in the short-term may be more exposed to refinancing difficulties if borrowing costs rise. This exposure is commonly referred to as rollover risk, since firms may need to refinance existing obligations under less favorable market conditions.

A foundational contribution to the study of debt maturity is Diamond (1991), who develops a model in which firms choose between short-term and long-term debt under asymmetric information about future credit quality. In Diamond's framework, short-term debt may be attractive for some borrowers because it allows them to refinance under improved terms if their credit quality strengthens. At the same time, short maturity exposes firms to liquidity risk, since lenders may have incentives to liquidate or refuse to roll over financing. As a result, firms relying more heavily on short-term debt may be more vulnerable when financing conditions tighten.

Empirical evidence shows that debt maturity can have meaningful real effects during financial crises. Almeida et al. (2012) study the 2007 credit crisis and find that firms whose long-term debt was largely maturing around the onset of the crisis reduced investment significantly more than otherwise similar firms whose debt matured later. Their results suggest that debt maturity structure affects firms' ability to maintain investment when refinancing conditions suddenly worsen.

Related evidence also indicates that firms respond to refinancing risk in their financial policies. Harford, Klasa, and Maxwell (2014) find that firms mitigate refinancing risk by increasing cash holdings and retaining more cash from operating cash flows. This suggests that debt maturity structure is not only a passive balance sheet characteristic, but also an important determinant of how firms prepare for future financing needs.

In the real estate context, rollover risk may be especially relevant because firms often rely heavily on debt financing and may need to refinance substantial obligations during periods of market stress. Sun, Titman, and Twite (2015) show that, during the 2007 to early-2009 crisis period, REITs with higher leverage and shorter-maturity debt experienced larger share-price declines. They also find that REITs with more debt due during the crisis tended to sell more property and issue more equity in 2009, when prices were depressed. This provides sector-specific evidence that short-term debt maturities can amplify distress in listed real estate firms during adverse financing conditions.

2.3 Equity valuation effects of refinancing risk

Equity markets play an important role in reflecting investors' expectations about firms' future financial conditions. Because stock prices incorporate forward-looking information about expected cash flows, discount rates, and financial risk, changes in macroeconomic conditions and financing constraints can be quickly reflected in equity valuations. In the context of monetary tightening, investors may reassess firms' ability to refinance existing debt and maintain profitability under higher borrowing costs. As a result, firms with greater refinancing needs may experience larger declines in equity valuations during periods of rising interest rates.

Literature demonstrates that equity markets react strongly to monetary policy shocks. Bernanke and Kuttner (2005) show that unexpected changes in monetary policy rates lead to immediate movements in stock prices, reflecting adjustments in expected returns and risk premia. Their findings suggest that financial markets rapidly incorporate new information about monetary policy into asset prices. When policy tightening leads to higher discount rates or deteriorating financial conditions, equity valuations tend to decline as investors revise their expectations about firms' future profitability and risk.

Beyond aggregate market responses, research has also documented cross-sectional differences in equity market reactions depending on firm characteristics. Gormsen and Koijen (2020) demonstrate that stock prices respond to changes in expected economic conditions and financial risks, particularly during periods of heightened uncertainty. Firms with weaker financial positions or greater exposure to external financing may experience stronger valuation effects when financial conditions tighten. These findings suggest that financial structure can influence how equity markets respond to macroeconomic shocks.

Debt maturity structure represents one important dimension of financial vulnerability that investors may consider when pricing firms. Firms with large amounts of debt maturing in the short-term face the need to refinance their obligations under prevailing market conditions. If interest rates rise, refinancing costs may increase significantly, reducing expected profitability and increasing financial risk. Almeida et al. (2012) show that firms with greater refinancing needs during the global financial crisis experienced larger declines in investment and financial flexibility, highlighting the economic significance of short-term debt maturities. Investors may anticipate such constraints and incorporate them into equity valuations during periods of financial tightening.

The sensitivity of equity valuations to refinancing risk may be particularly pronounced in highly leveraged sectors such as real estate. Listed real estate firms typically rely on substantial amounts of debt financing to fund property acquisitions and development projects. As a result, rising interest rates can significantly affect both the cost of capital and the availability of financing. Ling and Naranjo (1997) show that returns on real estate securities are influenced by macroeconomic variables and financial market conditions, including interest rate movements. Their findings suggest that the performance of listed real estate firms is closely linked to broader financial market developments.

Another factor that may amplify equity valuation responses is the transparency of financial information available to investors. Publicly listed real estate firms typically disclose information about their debt structures, including maturity profiles and leverage levels. This transparency allows investors to assess which firms may face greater refinancing risks when interest rates rise. Harford, Klasa and Maxwell (2014) argue that corporate maturity structures reflect firms' attempts to manage refinancing risk, but that significant maturity concentrations can still occur. When such maturity clusters coincide with periods of rising interest rates, investors may anticipate higher refinancing costs and adjust equity valuations accordingly.

2.4 Interest expense and debt-service pressure under monetary tightening

Monetary tightening also affects firms through direct financing costs. When policy rates rise, firms with floating-rate debt face higher interest payments, while firms with maturing debt may need to refinance at substantially higher borrowing costs. As a result, rising interest rates can increase interest expense, weaken debt-servicing capacity, and reduce financial flexibility. This mechanism is particularly important for firms that depend heavily on external financing and have significant refinancing needs (Bernanke, Gertler and Gilchrist, 1999; Almeida et al., 2012).

The importance of this mechanism depends partly on debt maturity structure. Firms with longer maturity on debt can delay refinancing and are therefore partly insulated from a sudden rise in market rates. By contrast, firms with a large share of debt maturing in the short-term must refinance under prevailing financial conditions, which may cause a faster effect from monetary tightening to realized financing costs. This is closely related to the concept of rollover risk. Diamond (1991) shows that short-term debt can be advantageous under normal conditions, but it also exposes firms to liquidity and refinancing risk if credit conditions worsen. Similarly, He and Xiong (2012) show that firms financed with short-term debt can become vulnerable to rollover problems when financial conditions tighten, even in the absence of immediate insolvency concerns.

Higher financing costs may have important consequences for firm behavior. When interest expense rises, firms can experience pressure on cash flow, profitability, and interest-coverage ratios. This reduces the resources available for investment and increases focus on maintaining financial targets and covenants. Fazzari, Hubbard, and Petersen (1988) show that financing constraints can materially affect firms' investment decisions, especially when internal funds become more important relative to external finance. Almeida et al. (2012) further find that firms with substantial debt maturing during periods of financial stress reduce investment more than otherwise similar firms whose debt matures later. Their findings suggest that refinancing needs can translate directly into real corporate effects when borrowing conditions worsen.

This mechanism is likely to be particularly important in the real estate sector because of their high leverage and dependence on external debt financing. Morri and Cristanziani (2009) show that leverage is a central feature of the capital structure of listed real estate companies, while Sun, Titman, and Twite (2015) provide evidence that firms with greater leverage and shorter debt maturities were more vulnerable during the financial crisis. In such a setting, a rapid increase in interest rates may lead not only to lower valuations, but also to a direct deterioration in debt-servicing capacity.

Another important aspect of this mechanism is that higher interest expense may act as a precursor to broader balance sheet adjustment. Firms facing rising financing costs may respond by reducing investment, increasing cash retention, selling assets, issuing equity, or attempting to renegotiate liabilities. Harford, Klasa, and Maxwell (2014) show that firms manage refinancing risk through liquidity policies and cash holdings, suggesting that debt maturity structure influences how firms prepare for future financing pressure. When refinancing occurs in a higher-rate environment, the resulting increase in interest burden may therefore trigger wider financial adjustment.

2.5 Balance sheet adjustment

Property values are commonly estimated by capitalizing expected future net operating income, meaning that an increase in required returns directly reduces asset values by raising capitalization rates (Geltner et al., 2014; Duca, Hendershott and Ling., 2017). Ling and Naranjo (1997) show that interest rate variables, including the real T-bill rate and the term structure, are systematic risk factors in real estate returns, reinforcing that the sector's valuations are closely tied to the interest rate environment.

Financing structure compounds this sensitivity further. Allen and Rutherford (1992) show that financing announcements by real estate corporations have significant valuation effects, while Brounen and Eichholtz (2001) find negative price reactions to equity offerings and positive price reactions to debt offerings by European property companies. Morri and Cristanziani (2009) similarly document that leverage is a central feature of the capital structure of European listed real estate companies. Together, these characteristics, long-lived assets, capitalization-rate-based valuation, and high dependence on external financing, mean that when interest rates rise sharply, real estate firms face not only declining asset values but also increased pressure to adjust their balance sheets.

When firms face tighter financial conditions, they often respond by adjusting their balance sheets and financial policies. Changes in borrowing costs, credit availability, or refinancing conditions can force firms to modify their capital structures, investment strategies, and liquidity management. As a result, financial shocks such as sudden increases in interest rates may lead firms to reduce leverage, sell assets, raise new equity, or cut investment expenditures. These balance sheet adjustments represent an important mechanism through which monetary tightening can affect firm behavior and financial outcomes.

The literature has long emphasized that financial constraints can influence firm decisions regarding investment and capital structure. Fazzari, Hubbard and Petersen (1988) provide early evidence that when external financing becomes more costly or difficult to obtain, firms may be forced to scale back investment activity or rely more heavily on internally generated funds. This mechanism implies that changes in credit market conditions can have real effects on corporate investment and financial policy.

Subsequent research has highlighted how refinancing risk can intensify these constraints during periods of financial stress. Almeida et al. (2012) show that firms with a large share of debt maturing during the global financial crisis significantly reduced investment relative to firms with longer debt maturities. Their results indicate that firms facing immediate refinancing needs may adopt defensive financial strategies when credit conditions deteriorate. Such strategies can include reducing capital expenditures, increasing cash holdings, or restructuring existing liabilities to avoid liquidity shortages.

Another important form of balance sheet adjustment involves changes in capital structure. Firms experiencing rising borrowing costs may attempt to reduce leverage by issuing equity or selling assets. Leary and Roberts (2005) document that firms actively adjust their capital structures in response to changing financial conditions and financing costs. When debt becomes more expensive or difficult to obtain, firms may shift toward equity financing or reduce borrowing to maintain financial flexibility. These adjustments can alter the composition of firms' liabilities and affect their risk profiles.

In real estate markets, balance sheet adjustments can also occur through asset sales or reductions in property investment. Because real estate firms typically hold large portfolios of illiquid property assets, financing constraints may force them to dispose of assets in order to meet debt obligations or improve liquidity. Sun, Titman, and Twite (2015) show that REITs with more debt maturing during the financial crisis were more likely to sell properties and issue equity in 2009, when market conditions were depressed. This suggests that refinancing pressure can translate into real changes in property ownership and investment activity.

The potential for balance sheet adjustments may be particularly important in the real estate sector due to its high leverage and reliance on debt financing. When interest rates rise rapidly, firms may face higher debt servicing costs and increased refinancing risk. In response, they may seek to strengthen their balance sheets by deleveraging, issuing new equity, or selling properties to generate liquidity.

Another relevant dynamic is the role of financial market expectations. Investors may anticipate that firms facing refinancing pressure will need to adjust their balance sheets in ways that affect future profitability. For example, asset sales conducted under financial pressure may occur at discounted prices, while equity issuance can dilute existing shareholders. As a result, expectations of balance sheet adjustments may influence equity valuations even before such adjustments occur. Harford, Klasa and Maxwell (2014) argue that firms attempt to manage refinancing risk through maturity management and liquidity policies, but sudden shifts in financial conditions can still force rapid financial adjustments.

2.6 Research gap and hypotheses

The existing literature provides extensive evidence that monetary policy shocks influence financial markets and corporate outcomes through multiple mechanisms. Research in asset pricing demonstrates that unexpected changes in monetary policy can have significant effects on equity valuations by altering discount rates, expected cash flows, and risk premia (Bernanke and Kuttner, 2005; Rigobon and Sack, 2004). These effects can propagate throughout financial markets and influence firm-level outcomes by changing borrowing costs and financial conditions.

The literature also highlights the particular sensitivity of real estate assets and real estate firms to interest rate movements. Because property valuations depend on capitalization rates and long-term income streams, increases in interest rates tend to reduce real estate valuations and raise financing costs for property investors (Ling and Naranjo, 1997; Geltner et al., 2014). Listed real estate firms are therefore exposed not only to changes in property market fundamentals but also to fluctuations in capital market conditions.

In addition to these sector-specific characteristics, corporate financial structure can shape how firms respond to changes in financial conditions. Research on debt maturity structure shows that firms with large amounts of debt maturing in the short-term face greater refinancing risk when credit conditions deteriorate (Diamond, 1991; Almeida et al., 2012). When borrowing costs increase or access to credit becomes more limited, firms with significant short-term refinancing needs may be forced to adjust investment, financing, and liquidity policies.

The literature further suggests that monetary tightening can affect firms through multiple mechanisms. Rising interest rates can directly increase financing costs for firms with short-term refinancing needs, as maturing debt must be rolled over at prevailing market rates (Bernanke, Gertler, and Gilchrist, 1999; He and Xiong, 2012). Investors may also incorporate refinancing risk and financial vulnerability into equity valuations, leading to stronger stock price reactions for firms perceived to be more exposed to tightening financial conditions (Gormsen and Koijen, 2020). Firms facing such pressures may further respond through balance sheet adjustments, including deleveraging, asset sales, or reductions in investment activity (Fazzari, Hubbard and Petersen, 1988; Leary and Roberts, 2005).

While these strands of literature provide important insights into the transmission of financial shocks, relatively little empirical research has examined how these mechanisms interact in the context of the recent monetary tightening cycle that began in 2022. The rapid increase in interest rates during 2022-2023 represents one of the most significant shifts in Swedish monetary policy in recent decades (Sveriges Riksbank, 2024). This episode provides a useful setting for examining how firms with different financial structures respond to sudden changes in financing conditions.

In particular, the interaction between rising interest rates and corporate debt maturity structures remains an important area for empirical investigation. Firms with greater short-term debt maturities may have been more exposed to the effects of the recent rate shock because they were required to refinance existing obligations under substantially higher borrowing costs. This vulnerability may have been reflected in multiple dimensions of firm performance, including equity market valuations, borrowing costs, and financial policy adjustments.

Against this background, this study examines whether the 2022-2023 rate shock disproportionately affected listed real estate firms with high short-term debt maturities. Specifically, the study investigates three potential mechanisms; adjustments in equity market valuations, changes in borrowing costs, and balance sheet adjustments by firms facing refinancing pressure.

Based on the theoretical and empirical insights discussed in the literature review, the following hypotheses are proposed:

H1: Real estate firms with higher shares of short-term debt maturities experienced larger declines in equity valuations during the 2022-2023 monetary tightening cycle.

H2: Firms with higher shares of short-term debt faced larger increases in borrowing costs following the rise in interest rates.

H3: Firms with higher shares of short-term debt were more likely to undertake balance sheet adjustments, such as deleveraging and asset sales, during the period of monetary tightening.

By examining these hypotheses, the study aims to contribute to the literature on monetary policy transmission, corporate financial structure, and real estate finance. In particular, it provides new evidence on how debt maturity structures shape firms' vulnerability to rapid changes in interest rates and financial conditions.

3. Data and empirical design

3.1 Sample collection

The empirical analysis is based on firm-level financial data obtained from LSEG Data & Analytics. LSEG Data & Analytics is used as the main data source because it provides standardized and comparable information on listed firms' balance sheets, debt structures, market valuations, and financing characteristics across time. This makes it well suited for examining how listed real estate firms were affected by the 2022-2023 interest rate shock.

The observation period runs from 2021 to 2025. This window is chosen to capture both the pre-shock period and the period during and after the sharp monetary tightening cycle that began in 2022. Including the years before the shock allows us to establish firms' initial financing positions, especially their debt maturity profiles, leverage, and valuation levels, before interest rates rose materially. Extending the sample through 2025 makes it possible to examine not only the immediate market reaction during 2022 to 2023, but also the subsequent adjustment in firms' financing conditions, capital structures, and assets.

3.1.1 Listed real estate companies

The sample consists of listed real estate companies on Nasdaq Stockholm, First North Stockholm and Spotlight Stock Market. To ensure a relevant and economically consistent sample, we exclude preference shares, D-series shares, and firms that are not purely real estate companies such as property management companies. The focus is therefore on common-equity-listed real estate firms whose business models are exposed to property valuations, debt financing conditions, and capital market repricing. This sampling choice is aligned with the purpose of the thesis, as the research question concerns how the rate shock affected real estate firms with different levels of short-term refinancing needs.

3.1.2 Variables

Table 3.1 summarises all variables while the discussion below focuses on those requiring methodological justification.

Table 3.1: Variables used in regressions or to calculate other variables

Variable	Definition
Event date	The date of a policy rate announcement in which the policy rate was increased, see Appendix 5 for a specification of the event dates
Event window	The day prior to the event date to the date after [-1,+1]
Estimation window	250 days to 60 days prior to the event date [-250, -60]
CAR	Cumulative abnormal return over the event window, where abnormal returns are estimated using the capital asset pricing model (CAPM)
Short-term debt share	Debt maturing within 12 months divided by interest-bearing liabilities
Log market capitalization (MCAP)	Natural logarithm of market capitalization
Idiosyncratic volatility	Standard deviation of residuals from the CAPM estimated over the pre-event estimation window
Leverage	Net debt divided by total assets

Segment dummies	Dummy variables indicating firm exposure to property segments (e.g., residential, office, retail, logistics, industrial)
Report date	Proxy for the firm's financial reporting date, defined as two months after the end of each quarter
Borrowing cost	Quarterly interest expense annualized by multiplying by four, divided by interest-bearing liabilities
Delta borrowing cost	Difference in borrowing cost between the post-event quarter and the pre-event quarter
Liquidity	Cash and cash equivalents divided by total assets
Delta leverage	Difference in leverage between the post-event quarter and the pre-event quarter
Delta log investment properties	Difference in the logarithm of property values between the post-event and pre-event quarters
Event fixed effects	Dummy variables for each monetary policy announcement date

3.1.2.1 Variables used in the event study (H1)

The main dependent variable is CAR, computed as the sum of abnormal returns over the event window. The central explanatory variable is the short-term debt share, which proxies for short-term refinancing exposure. A higher ratio indicates greater need of refinancing, and H1 predicts that firms with higher short-term debt shares experienced more negative CARs around policy events. A full list of the policy events can be found in Appendix 5.

Idiosyncratic volatility is included to control for idiosyncratic risk, since firms with higher return variability may react more strongly to macroeconomic news independently of their refinancing position. Log MCAP controls for size, as larger firms typically have broader funding access. Leverage controls for differences in firms' overall financial risk and balance sheet sensitivity to interest rate changes, which may independently affect equity valuations. Segment dummies control for structural differences across real estate sub-sectors, as variation in business models and cash flow can influence firms' responses to refinancing risk and monetary tightening. Event fixed effects are included to absorb factors common to all firms at each announcement date, ensuring that identification is based on cross-sectional differences in refinancing exposure. Report date is used to ensure all explanatory variables reflect only information publicly available before each event.

3.1.2.2 Variables used in regressions (H2 & H3)

The key explanatory variable in all regressions is the short-term debt share from the latest available financial statement before the event date.

For H2, the dependent variable is delta borrowing cost, this measures the firm's change in cost of debt and is comparable across firms with different debt levels. For H3, two dependent variables capture balance sheet adjustment: delta leverage, the change in net debt divided by total assets, and the change in log investment properties, the change in the logarithm of the property portfolio. The latter captures asset-side adjustment, including disposals and reduced acquisitions. Log MCAP and liquidity enter as controls, alongside segment dummies and event fixed effects. For H2, leverage is added to the controls. Event fixed effects absorb shocks common to all firms in a given period, ensuring the estimates reflect within-firm differences in exposure rather than aggregate time trends.

3.1.3 Data limitations

Several limitations arise from the nature of the available data. First, the sample is subject to survivorship bias. Firms that were most severely affected by the tightening cycle, through delisting, restructuring, or acquisition, drop out of the panel, meaning the estimates are drawn from firms that survived the shock. This may lead to an understatement of the true effect of refinancing exposure on borrowing costs and balance sheet adjustment.

Second, the short-term debt share captures the volume of debt exposed to refinancing but not whether that exposure is hedged. Two firms with identical short-term debt shares may have very different actual sensitivity to rate increases depending on their use of interest rate swaps or similar instruments. Since hedging positions are disclosed only partially and inconsistently, this introduces measurement error into the main explanatory variable and likely attenuates the estimated effects. In addition, there is no consistent data on whether the underlying debt carries fixed or floating interest rates, which further affects firms’ true sensitivity to rate changes.

Third, the short-term debt measure pools together debt maturing in one month with debt maturing in eleven months, treating them as equivalent sources of refinancing pressure.

The urgency of refinancing, and thus the sensitivity to a rate shock, differs considerably within this category, which the measure cannot distinguish.

Fourth, borrowing cost is calculated as interest expense divided by interest-bearing liabilities. However, interest expense reflects costs accumulated over the entire reporting period, while interest-bearing liabilities are measured at a single point in time. This mismatch may introduce measurement error. If a firm takes on a large amount of new debt toward the end of the period, the reported level of liabilities will be high, while the corresponding interest expense will only reflect a short portion of that debt's cost. As a result, borrowing cost may be understated in such cases.

Finally, the analysis is based on a relatively small sample size, which may limit the statistical power and generalizability of the results. Moreover, financial reporting dates are proxied (e.g., assuming a fixed lag after quarter-end), rather than observed directly, which may introduce timing inaccuracies in the alignment of firm-level information with event dates.

3.2 Empirical method

This thesis applies a quantitative research design. According to Bryman and Bell (2011), quantitative research is a strategy that emphasizes the collection and analysis of numerical data and is commonly associated with measurement, causality, generalization, and replication. This approach is suitable for this study, since it examines whether real estate firms with different debt maturity structures were affected differently by policy rate shock, and whether these differences can be identified in observable market and accounting outcomes. More specifically, the study tests whether firms with a larger share of short-term debt maturities were more exposed to tighter refinancing conditions and therefore experienced stronger effects on equity valuations, interest expense, and balance sheet adjustment. This is consistent with Bryman and Bell's (2011) description of quantitative research, as the study translates theoretical expectations into measurable variables and uses statistical analysis to evaluate the proposed relationships.

Within this quantitative design, two empirical approaches are used. First, an event study examines the immediate stock market reaction around selected rate-shock events. Second, an event-based regression examines slower-moving effects on borrowing costs and balance sheet adjustment. This distinction is motivated by the fact that the outcomes adjust over different time horizons. Equity prices adapt quickly to new information, making the event-study approach suitable for capturing the market's immediate reassessment of refinancing risk. By contrast, borrowing costs and balance sheet responses appear gradually in quarterly accounting data and are therefore measured a fixed number of quarters after each event.

All regressions are estimated using ordinary least squares (OLS) with heteroskedasticity-robust (HC1) standard errors. HC1 is a robust standard error that allows error variance to differ across observations and includes a correction for smaller samples. For H1, OLS is applied in a cross-sectional event-study regression where cumulative abnormal returns are regressed on pre-event refinancing exposure and firm characteristics. For H2 and H3, OLS is applied in an event-based regression, where firm characteristics are measured using the latest available financial statement before each monetary policy event and outcomes are measured a fixed number of quarters afterward. Event fixed effects control for shocks common to all firms around the same announcement, while segment dummies account for systematic differences across property types.

3.2.1 Event study (H1)

To test H1, this thesis applies an event study to examine whether firms with greater short-term refinancing exposure experienced more negative stock market reactions around selected monetary policy events during the 2022-2023 tightening cycle. Event studies are a standard empirical approach in finance for evaluating how new information is incorporated into security prices, based on the premise that, in reasonably efficient markets, relevant news is rapidly reflected in stock prices (MacKinlay, 1997).

Following MacKinlay (1997), the analysis begins by estimating abnormal returns, defined as the difference between the actual return of a stock and its expected return in the absence of the event. Expected returns are estimated using the CAPM with the Stockholm Real Estate Index (SX35PI) and Stockholm All-Share Index (OMXSPI) as the market benchmark. The abnormal return for firm *i* on day *t* is therefore given by:

$$AR_{it} = R_{it} - (\alpha_i + \beta_i R_{mt})$$

where R_{it} is the actual return of firm *i* at time *t*, R_{mt} is the market return at time *t*, and α_i and β_i are parameters estimated over the estimation window prior to the event (MacKinlay, 1997). The estimation window is defined as 250 days to 60 days prior to the event date.

To capture the total valuation effect over the event window, abnormal returns are then aggregated into cumulative abnormal returns (CARs):

$$CAR_i(t_1,t_2) = \sum_{t=t_1}^{t_2} AR_{it}$$

where t_1 and t_2 define the event window (MacKinlay, 1997).

The estimated CARs are then related to firms' pre-event refinancing exposure in a cross-sectional regression. The regression can be written as:

$$CAR_{i,e}(t_1,t_2) = \alpha + \beta_1 ShortTermDebtShare_{i,e-1} + X_{i,e-1}'\theta + \delta_e + \varepsilon_{i,e}$$

where

$$X_{i,e-1} = [log(MCAP_{i,e-1}), IdiosyncraticVolatility_{i,e-1}, Leverage_{i,e-1}, SegmentDummies_i]$$

The main explanatory variable is $ShortTermDebtShare_{i,e-1}$, which measures the share of interest-bearing debt that matures in the short-term, based on the latest available financial statement before event e. This ensures that all explanatory variables are predetermined with respect to the event and not influenced by the market reaction itself. This variable captures the firm's refinancing exposure. A higher value indicates that a larger portion of the firm's liabilities must be refinanced shortly after the shock. The coefficient β_1 is therefore the key parameter of interest.

The vector $X_{i,e-1}$ contains the control variables. $log(MCAP_{i,e-1})$ controls for firm size, since larger firms may have broader funding access and greater financial flexibility. $IdiosyncraticVolatility_{i,e-1}$ captures firm-specific return uncertainty beyond general market movements, which may influence how strongly investors react to news. $Leverage_{i,e-1}$ is included because more highly levered firms are likely to be more vulnerable to higher funding costs and declining asset values. Segment dummies are included to account for systematic differences across property types, such as office, residential, retail, logistics, or industrial real estate. Event fixed effects, δ_e, absorb factors common to all firms within a given event, meaning that identification comes from cross-sectional differences between firms exposed to the same monetary policy shock. The error term, $\varepsilon_{i,e}$, captures all unobserved factors affecting the dependent variable that are not explained by the independent variables included in the regression model.

This specification is designed to test whether short-term debt maturity exposure explains variation in CARs after controlling for size, risk, leverage, event-specific shocks, and segment-level heterogeneity. In this way, the event study provides a direct test of whether equity markets priced refinancing risk more severely for firms with larger short-term debt burdens during the tightening cycle.

3.2.2 Event-based regressions (H2 & H3)

To test H2 and H3, this thesis employs an event-based regression design to examine whether firms with greater pre-shock refinancing exposure experience differential changes in borrowing costs and balance sheet adjustments following monetary policy shocks. The regressions exploit both cross-sectional and time variation in the data which allows for a dynamic analysis of the relationships (Wooldridge, 2010). That makes them particularly well suited for the present setting, where pre-shock firm characteristics are used to explain post-shock outcomes.

In contrast to the event study approach used for H1, which captures immediate stock market reactions, this method focuses on slower-moving effects that materialize in quarterly accounting data. Specifically, the analysis links firm characteristics observed prior to each monetary policy event to outcomes measured several quarters after the event. This approach allows for a direct assessment of whether firms with higher exposure to short-term debt maturities experience systematically different post-shock dynamics.

For each monetary policy event *e*, firm-level exposure is measured using the latest available financial statement prior to the event. Outcomes are then measured *h* quarters after the event. The empirical specification is given by:

$$\Delta Y_{i,e-1,e+h} = \beta_1 ShortTermDebtShare_{i,e-1} + X_{i,e-1}'\theta + \delta_e + \varepsilon_{i,e}$$

Here, $\Delta Y_{i,e-1,e+h}$ denotes the outcome variable for firm *i*, measured as the difference between the quarter before the event *e* and *h* quarters after event *e*. The key explanatory variable, $ShortTermDebtShare_{i,e-1}$, captures the firm's short-term debt share based on the latest available financial statement prior to the event. The vector $X_{i,e-1}$ contains control variables measured before the event, and δ_e denotes event fixed effects. These fixed effects are included to absorb event-specific shocks that are common to all firms, consistent with

Wooldridge's (2010) discussion of time effects as factors that influence all cross-sectional units in a given period. $\varepsilon_{i,e}$ denotes the error term.

Outcomes are evaluated at first, second, fourth, sixth, and eighth quarters after each event. A horizon of four quarters is used as the baseline specification. This choice is motivated by the definition of short-term debt as debt maturing within 12 months, meaning that a four-quarter horizon directly captures the period in which exposed firms are expected to face refinancing needs. It also provides sufficient time for refinancing costs and balance sheet adjustments to materialize following a monetary policy shock while maintaining a relatively close link to the original event, reducing the risk that the estimated effects are driven by unrelated macroeconomic developments. While this serves as the baseline, examining alternative horizons is also highly relevant, as it provides insight into the timing and persistence of the effects and helps assess whether the results are sensitive to the chosen horizon.

3.2.2.1 Borrowing cost (H2)

For H2, the dependent variable is the firm's difference in borrowing cost measured the quarter before the event and *h* quarters after the event. The regression can be written as:

$$\Delta BorrowingCost_{i,e-1,e+h} = \beta_1 ShortTermDebtShare_{i,e-1} + X_{i,e-1}'\theta + \delta_e + \varepsilon_{i,e}$$

where control vector is defined as:

$$X_{i,e-1} = [\log(MCAP_{i,e-1}), Leverage_{i,e-1}, Liquidity_{i,e-1}, SegmentDummies_i]$$

The coefficient of interest, β_1, captures whether firms with greater short-term refinancing exposure experience higher borrowing costs following monetary policy shocks.

3.2.2.2 Leverage and investment properties (H3)

To test H3, the dependent variables capture balance sheet adjustments following the event. Two measures are considered: changes in leverage and changes in investment properties.

For leverage:

$$\Delta Leverage_{i,e-1,e+h} = \beta_1 ShortTermDebtShare_{i,e-1} + X_{i,e-1}'\theta + \delta_e + \varepsilon_{i,e}$$

For investment properties:

$$\Delta log(InvestmentProperties)_{i,e-1,e+h} = \beta_1 ShortTermDebtShare_{i,e-1} + X_{i,e-1}'\theta + \delta_e + \varepsilon_{i,e}$$

where the control vector is defined as:

$$X_{i,e-1} = [log(MCAP_{i,e-1}), Liquidity_{i,e-1}, SegmentDummies_i]$$

The coefficient β_1 captures whether firms with higher short-term debt exposure adjust their capital structure more aggressively or reduce their asset base following monetary policy shocks.

4. Descriptive statistics

This section presents descriptive statistics for the variables used in the empirical analysis. The statistics are reported separately for the H1 event-study regression and for the H2 and H3 event-based regressions, since the hypotheses examine different outcome variables and time horizons. Prior to winsorization, observations outside predefined plausibility thresholds are excluded to mitigate the influence of data errors, denominator effects, and extreme accounting values. To further reduce the influence of extreme observations, all continuous regression variables have been winsorized at the 5th and 95th percentiles. The descriptive statistics therefore reflect the winsorized variables used in the regression analysis. This treatment is applied to limit the effect of outliers while retaining the underlying sample size.

4.1 Equity valuation (H1)

Table 4.1 reports descriptive statistics for the variables used in the H1 event-study regression. The sample consists of 225 firm-event observations. The dependent variable, CAR, has a mean of -0.0045 and a median of -0.0028. This indicates that, on average, firms experienced a negative abnormal stock-market reaction around the monetary policy events. The interquartile range from -0.0221 to 0.0165 indicating a meaningful variation in equity-market responses across firms and events.

The key explanatory variable, short-term debt share, has a mean of 0.2302 and a median of 0.1924. This implies that the average firm had approximately 23 percent of its debt maturing in the short-term. The 25th percentile is 0.0836 and the 75th percentile is 0.3173, showing substantial variation in refinancing exposure across firms. The maximum value of 0.6664 indicates that even after limiting the influence of extreme observations, some firms had a relatively large share of debt exposed to short-term refinancing risk. This variation is important for testing whether firms with greater short-term debt maturities experienced larger declines in equity valuations during the tightening cycle.

Table 4.1: Summary statistics of H1

Variable	**Mean**	**Median**	**Min**	**P25**	**P75**	**Max**	**Stdev.**
CAR	-0.0045	-0.0028	-0.0698	-0.0221	0.0165	0.0547	0.0323
Short-term debt share	0.2302	0.1924	0.0151	0.0836	0.3173	0.6664	0.1827
Log MCAP	22.3179	22.1819	19.0614	21.4834	23.4813	24.4639	1.3959
Idiosyncratic volatility	0.0207	0.0186	0.0087	0.0124	0.0278	0.0403	0.0087
Leverage	0.4417	0.4652	0.1959	0.3883	0.5182	0.5755	0.1959

Note: This table reports descriptive statistics for the variables used in the H1 event-study regression. CAR is the dependent variable and denotes cumulative abnormal return around the monetary policy event window. Short-term debt share is the main explanatory variable and measures the share of debt maturing within a year. Log MCAP, idiosyncratic volatility and leverage is included as control variables. The variables are winsorized, the reported minimum and maximum values therefore reflect the 5th and 95th percentile caps.

Table 4.2 reports the event distribution for H1. The sample is distributed across eight monetary policy events between April 2022 and September 2023. The number of firm observations per event ranges from 24 to 33. Mean CAR differs across events, with negative average reactions for most event dates. The most negative average reactions are observed around the events on 28 April 2022 and 26 April 2023, where mean CARs are -0.0105 and -0.0126, respectively. However, some events show positive average CARs, such as 24 November 2022 and 29 June 2023. This indicates that stock-market reactions were not uniform across all monetary policy events, which supports the inclusion of event fixed effects in the regression analysis. Mean short-term debt is also relatively stable across events, ranging from 0.1997 to 0.2745.

Table 4.2: Event distribution for H1

Event date	N	Mean CAR	Mean short-term debt share	Stdev.
2022-04-28	24	-0.0105	0.2452	0.1916
2022-06-30	30	-0.0021	0.2745	0.2003
2022-09-20	29	-0.0090	0.2193	0.1701
2022-11-24	30	0.0055	0.2160	0.1681
2023-02-09	33	-0.0089	0.1997	0.1587
2023-04-26	31	-0.0126	0.2064	0.1886
2023-06-29	24	0.0047	0.2437	0.1981
2023-09-21	24	-0.0014	0.2504	0.2005

Note: This table reports the distribution of firm-event observations across the monetary policy events used in the H1 event-study regression. Mean CAR is the average cumulative abnormal return around each event date. Mean short-term debt share refers to the average short-term debt share among firms included in each event.

4.2 Borrowing cost and balance sheet adjustments (H2 & H3)

Table 4.3 presents descriptive statistics for the variables used in the H2 and H3 regressions. The number of observations differs across variables because of differences in data availability across firms and quarters.

The key explanatory variable, short-term debt share, has a mean of 0.2072 and a median of 0.1787. The 25th percentile is 0.0561 and the 75th percentile is 0.3100. This shows that there is substantial variation in short-term refinancing exposure across firms. The maximum value of 0.5963 indicates that firms in the upper part of the distribution had a materially larger share of debt maturing in the short-term than the median firm.

Table 4.3: Summary statistics of H2 & H3

Variable	N	Mean	Median	Min	P25	P75	Max	Stdev.
Borrowing cost	306	0.0148	0.0128	-0.0019	0.0062	0.0211	0.0418	0.0116
Delta leverage	164	0.0278	0.0206	-0.0572	-0.0012	0.0527	0.1390	0.0512
Delta log investment properties	361	0.0071	0.0155	-0.6205	-0.1125	0.1610	0.5531	0.2796
Short-term debt share	308	0.2072	0.1787	0.0143	0.0561	0.3100	0.5963	0.1706
Log MCAP	393	22.0844	22.0136	19.4580	21.0033	23.3987	24.5961	1.5183
Liquidity	237	0.0225	0.0153	0.0015	0.0066	0.0298	0.0845	0.0216
Leverage	245	0.4479	0.4688	0.2125	0.3994	0.5182	0.5757	0.0939

Note: This table reports descriptive statistics for the variables used in the H2 and H3 regressions. Short-term debt share is the main explanatory variable in all regressions and measures short-term debt maturity exposure before the shock. Borrowing cost are the dependent variable in H2 and measure firms' borrowing costs after the rate shock. Delta leverage and delta log investment properties are the dependent variables in H3A and H3B respectively and capture balance-sheet adjustments. The variables are winsorized, the reported minimum and maximum values therefore reflect the 5th and 95th percentile caps.

Table 4.4 reports the event distribution for the H2 and H3 regressions. The sample is balanced across events, with 50 to 52 firms per event. The target quarters range from 2023 Q1 to 2024 Q2, reflecting that borrowing costs and balance-sheet variables are measured using accounting data and therefore adjust more slowly than stock prices.

For the earliest events, the average post-shock borrowing cost is 0.0158, while later events show average borrowing costs closer to 0.065 to 0.083. This pattern suggests that the transmission of higher interest rates into firms' reported financing costs happened in the short to medium term. Mean delta leverage declines over time, from 0.0364 for the first event to 0.0064 for the final event. Mean delta log investment properties also became negative for later target quarters, suggesting that firms increasingly slowed or reduced the expansion of their property portfolios as the tightening cycle progressed.

Table 4.4: Event distribution for H2 & H3

Event date	N	Target quarter	Mean short term debt share	Mean delta borrowing cost	Mean delta leverage	Mean delta log investment properties
2022-04-28	50	2023-03-31	0.2013	0.0153	0.0364	0.1067
2022-06-30	50	2023-03-31	0.2450	0.0151	0.0443	0.0901
2022-09-20	51	2023-06-30	0.1966	0.0179	0.0299	0.0239
2022-11-24	51	2023-09-30	0.1939	0.0204	0.0352	0.0040
2023-02-09	52	2023-12-31	0.1844	0.0208	0.0287	-0.0613
2023-04-26	50	2024-03-31	0.1973	0.0126	0.0220	-0.0355
2023-06-29	52	2024-03-31	0.2280	0.0083	0.0156	-0.0333
2023-09-21	52	2024-06-30	0.2070	0.0065	0.0064	-0.0291

Note: This table reports the event distribution for the H2 and H3 regressions. Target quarter refers to the accounting quarter used to measure post-shock outcomes. Mean short-term debt is the average debt maturing within one year before the event. Mean delta borrowing cost post measures the change in borrowing cost after the shock. Mean delta leverage and mean delta log investment properties capture changes in leverage and investment property holdings after the shock.

4.3 Correlation matrices

Table 4.5 presents the correlation matrix for the variables used in the H1 regression. CAR is negatively correlated with short-term debt share (-0.136), which is in line with the expectation that firms with higher short-term refinancing exposure experienced weaker abnormal returns around the monetary policy events.

The correlations between CAR and the control variables are small, suggesting that CAR is not strongly related to firm size, idiosyncratic volatility, or leverage in the pairwise correlations. Among the explanatory variables, the strongest correlation is between log MCAP and idiosyncratic volatility (-0.817), indicating that larger firms tend to have lower firm-specific volatility. This suggests some overlap between the two control variables, although it does not directly affect the interpretation of the main variable of interest, short-term debt share.

Table 4.5: Correlation matrix for H1

	CAR	Short-term debt share	Log MCAP	Idiosyncratic volatility	Leverage
CAR	1.000	-0.136	-0.034	0.019	-0.052
Short-term debt share	-0.136	1.000	0.163	-0.150	-0.214
Log MCAP	-0.034	0.163	1.000	-0.817	-0.228
Idiosyncratic volatility	0.019	-0.150	-0.817	1.000	0.222
Leverage	-0.052	-0.214	-0.228	0.222	1.000

Table 4.6 presents the correlation matrix for the variables used in the H2 regression. Borrowing cost is positively correlated with short-term debt share (0.107), which means that firms with higher short-term debt exposure appear to have higher borrowing costs in the simple pairwise correlation. The relationship is relatively weak and should therefore be interpreted together with the regression results, where the model controls for other firm characteristics.

Delta borrowing cost is also negatively correlated with log MCAP (-0.060) and leverage (-0.249), while it is positively correlated with liquidity (0.016). Among the explanatory variables, the strongest correlations are between leverage and liquidity (-0.401), and between log MCAP and liquidity (-0.363). These correlations are moderate and do not suggest severe multicollinearity.

Table 4.6: Correlation matrix for H2

	Delta borrowing cost	Short-term debt share	Log MCAP	Leverage	Liquidity
Delta borrowing cost	1.000	0.107	-0.060	-0.249	0.016
Short-term debt share	0.107	1.000	0.258	-0.121	-0.196
Log MCAP	-0.060	0.258	1.000	-0.094	-0.363
Leverage	-0.249	-0.121	-0.094	1.000	-0.401
Liquidity	0.016	-0.196	-0.363	-0.401	1.000

Table 4.7 presents the correlation matrix for the variables used in the H3A regression. Delta leverage is weakly negatively correlated with short-term debt share (-0.044), suggesting that firms with higher short-term debt exposure do not appear to have larger increases in leverage in the simple pairwise correlation. The relationship is very small and should therefore be interpreted together with the regression results.

Delta leverage is negatively correlated with log MCAP (-0.115) and positively correlated with liquidity (0.579). The relatively strong positive correlation between delta leverage and liquidity suggests that firms with higher liquidity experienced larger increases in leverage during the period. Among the explanatory variables, the strongest correlation is between log MCAP and liquidity (-0.464), indicating that larger firms tended to hold lower liquidity ratios.

Table 4.7: Correlation matrix for H3A

	Delta leverage	Short-term debt share	Log MCAP	Liquidity
Delta leverage	1.000	-0.044	-0.115	0.579
Short-term debt share	-0.044	1.000	0.266	-0.254
Log MCAP	-0.115	0.266	1.000	-0.464
Liquidity	0.579	-0.254	-0.464	1.000

Table 4.8 presents the correlation matrix for the variables used in the H3B regression. Delta log investment properties are negatively correlated with short-term debt share (-0.158), suggesting that firms with higher short-term debt exposure tended to have lower growth in investment properties in the simple pairwise correlation. This is consistent with the expectation that firms with higher refinancing risk may reduce or slow investment during the tightening period. However, the correlation is relatively modest and should be interpreted together with the regression results.

Delta log investment properties are positively correlated with log MCAP (0.155) and negatively correlated with liquidity (-0.211). Among the explanatory variables, the strongest correlation is between log MCAP and liquidity (-0.423), indicating that larger firms tended to have lower liquidity ratios. Overall, the correlations are moderate and do not indicate severe multicollinearity.

Table 4.8: Correlation matrix for H3B

	Delta log investment properties	**Short-term debt share**	**Log MCAP**	**Liquidity**
Delta log investment properties	1.000	-0.158	0.155	-0.211
Short-term debt share	-0.158	1.000	0.208	-0.214
Log MCAP	0.155	0.208	1.000	-0.423
Liquidity	-0.211	-0.214	-0.423	1.000

5. Results and discussion

5.1 Results

This section presents the empirical results of the study. The analysis examines whether real estate firms with higher shares of short-term debt maturities were more negatively affected during the 2022-2023 rate shock.

5.1.1 Equity market response (H1)

Table 5.1 presents the main cross-sectional regression results for H1. CARs are estimated using the OMX Stockholm Real Estate index (SX35PI) as the market benchmark, an event window of [-1,+1], and an estimation window of [-250,-60]. The table reports the relationship between CARs around monetary policy announcements and firms' short-term debt share, controlling for firm size, idiosyncratic volatility, leverage, and industry fixed effects. Appendix 1 presents the full baseline regression.

Table 5.1: Cross-sectional regression of cumulative abnormal returns on short-term debt share

	Coefficient	Std. Error	p-value
Variable			
Short-term debt share	-0.0357**	0.014	0.013
Log MCAP	0.0011	0.003	0.753
Idiosyncratic volatility	0.0430	0.521	0.934
Leverage	-0.0257	0.021	0.220

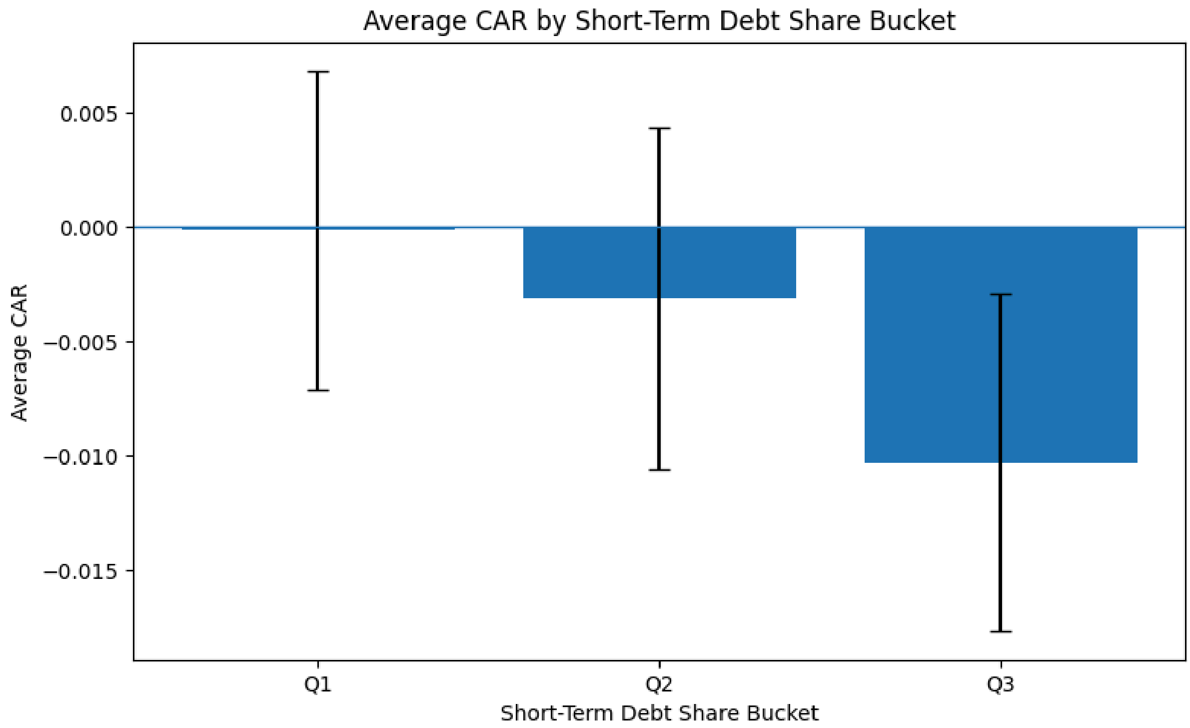
Note: The table reports the results from a cross-sectional regression of cumulative abnormal returns (CARs) on short-term debt share and firm-level control variables. Short-term debt share is the main independent variable and measures the share of debt maturing in the short-term. The event window is set to (-1,+1) and the estimation window to (-250,-60). Log MCAP controls for firm size, Idiosyncratic volatility controls for firm-specific return volatility, and Leverage controls for capital structure. Industry fixed effects are included but not reported in this table. Robust standard errors are used. The p-values correspond to two-sided tests. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

The coefficient on *ShortTermDebtShare* is negative and statistically significant at the 5% level (β = -0.0357, p = 0.013), indicating that firms with a higher proportion of short-term debt maturities experienced more negative stock market reactions around rate announcements. The magnitude of the coefficient suggests that a 10 percentage point increase in short-term debt share is associated with a decline in CAR of approximately 0.36 percentage points.

Among the control variables, none are statistically significant. Firm size, measured by log MCAP, does not appear to systematically influence abnormal returns in this specification. Similarly, idiosyncratic volatility and leverage are not significantly related to CARs. This suggests that the observed cross-sectional variation in stock price reactions is primarily driven by differences in debt maturity structure rather than general firm characteristics.

To further illustrate the economic magnitude of the results, Figure 5.1 plots average CARs across firms grouped into terciles based on their short-term debt share.

Figure 5.1: Average cumulative abnormal returns by short-term debt share bucket



Note: The figure shows the average cumulative abnormal returns (CARs) for firms grouped into terciles based on their short-term debt share. CARs are estimated using the OMX Stockholm Real Estate index (SX35PI) as the market benchmark, with an event window of (-1,+1) and an estimation window of (-250,-60). The error bars represent 95% confidence intervals.

The figure shows a clear negative pattern, where firms in the highest short-term debt share bucket (Q3) experience more negative abnormal returns compared to firms in the lowest bucket (Q1). While the difference between Q1 and Q2 is relatively small, the decline becomes more pronounced for Q3, consistent with the regression results. This provides a visual illustration that firms with greater exposure to short-term refinancing risk are more adversely affected by monetary policy shocks.

To assess the robustness of these findings, Tables 5.2 and 5.3 report results across alternative event windows and market benchmarks.

Table 5.2: Regression results on cumulative abnormal returns estimated with OMX Stockholm Real Estate index (SX35PI)

	β_1	Std. Error	p-value	Observations
Window				
[-3:3]	-0.0237	0.0198	0.2321	225
[-2:2]	-0.0408**	0.0175	0.0199	225
[-1:1]	-0.0357**	0.0144	0.0134	225
[-1:0]	-0.0316**	0.0138	0.0220	225
[0:1]	-0.0253**	0.0111	0.0223	225
[0:2]	-0.0212	0.0143	0.1396	225

Note: The table shows the results from the t-tests performed on the estimated β_1 coefficients, where β_1 captures the effect of the main independent variable, short-term debt share, on cumulative abnormal returns (CARs) estimated through CAPM with OMX Stockholm Real Estate PI (SX35PI) as proxy for market returns. The event window is reported relative to the announcement date, where day 0 denotes the event date. The p-values correspond to two-sided t-tests of whether the estimated β_1 coefficient is statistically different from zero. The number of observations refers to the total number of firm-event observations included in each event window. Industry fixed effects are included but not reported. Robust standard errors are used. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Table 5.3: Regression results on cumulative abnormal returns estimated with OMX Stockholm PI (OMXSPI)

	β_1	Std. Error	p-value	Observations
Window				
[-3:3]	-0.0104	0.0212	0.6251	225
[-2:2]	-0.0217	0.0194	0.2637	225
[-1:1]	-0.0328**	0.0143	0.0222	225
[-1:0]	-0.0269*	0.0151	0.0750	225
[0:1]	-0.0263**	0.0112	0.0194	225
[0:2]	-0.0149	0.0156	0.3388	225

Note: The table shows the results from the t-tests performed on the estimated β_1 coefficients, where β_1 captures the effect of the main independent variable, short-term debt share, on cumulative abnormal returns (CARs) estimated through CAPM with OMX Stockholm PI (OMXSPI) as proxy for market returns. The event window is reported relative to the announcement date, where day 0 denotes the event date. The p-values correspond to two-sided t-tests of whether the estimated β_1 coefficient is statistically different from zero. The number of observations refers to the total number of firm-event observations included in each event window. Industry fixed effects are included but not reported. Robust standard errors are used. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Using the OMX Stockholm Real Estate index (SX35PI) as the market proxy, the coefficient on short-term debt share remains negative across all event windows and is statistically significant in most specifications. In particular, the effect is strongest and most precisely estimated in the narrower windows around the event date, such as [-1,-1], [-1,0], and [0,1], where coefficients range from approximately -0.020 to -0.040 and are significant at conventional levels.

A similar pattern is observed when using the broader OMX Stockholm PI (OMXSPI) as the market benchmark. While the coefficients are somewhat smaller in magnitude and less consistently significant, they remain negative across all event windows. Statistical significance is primarily concentrated in the shorter windows closest to the announcement date, suggesting that the market reaction is immediate and short-lived.

5.1.2 Borrowing cost (H2)

Table 5.4 presents the baseline regression results for the borrowing cost mechanism. In this specification, the dependent variable is borrowing cost measured four quarters after the event. The main explanatory variable is the short-term debt share, which captures the proportion of debt maturing in the short-term. Appendix 2 presents the full baseline regression.

Table 5.4: Baseline regression results for H2

	Coefficient	Std. Error	p-value
Variable			
Short-term debt share	0.0140***	0.004	0.001
Log MCAP	-0.0034***	0.001	0.000
Leverage	-0.0317***	0.011	0.004
Liquidity	-0.0947**	0.044	0.032

Note: The dependent variable is change in borrowing cost measured as the difference between borrowing cost the quarter before the event and four quarters after the event. Short-term debt share captures the share of debt maturing in the short-term. Log MCAP, Leverage, and Liquidity are included as control variables. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

The coefficient on short-term debt share is positive, at 0.0140, suggesting that firms with higher short-term debt maturity exposure experienced higher borrowing costs four quarters after the event. The estimate is statistically significant at the 1% level, with a p-value below 0.001. The baseline specification therefore provides sufficient evidence to conclude that short-term debt exposure had a statistically significant effect on borrowing costs after four quarters.

Among the control variables, log MCAP is negative and statistically significant at the 1% level. This indicates that larger firms had lower borrowing costs, which is consistent with the idea that larger firms generally have better access to credit markets, stronger bargaining power, and lower perceived credit risk. Leverage is also negative and statistically significant at the 1% level. This result is less intuitive, since higher leverage is often associated with higher financial risk and therefore higher borrowing costs. One possible explanation is that the leverage measure captures firm structure or asset intensity rather than only refinancing risk, or that more highly leveraged firms in the sample had already secured longer-term or cheaper financing before the rate shock. Liquidity has a negative and statistically significant coefficient at the 5% level, suggesting that firms with higher liquidity tended to have lower borrowing costs in this specification. This may indicate that liquidity provides financial flexibility and reduces perceived credit risk, allowing more liquid firms to access debt financing on more favorable terms.

To examine whether the interest cost mechanism operates gradually, Table 5.5 reports the estimated coefficient on short-term debt share across different quarterly horizons.

Table 5.5: Effect of short-term debt share on borrowing cost given different post-event horizons

	β_1	**Std. Error**	**p-value**	**Observations**
No. of quarters				
1	0.0026	0.0032	0.4251	191
2	0.0096**	0.0040	0.0170	188
4	0.0140***	0.0044	0.0013	173
6	0.0198***	0.0059	0.0008	171
8	0.0223***	0.0075	0.0029	154

Note: The table reports the estimated coefficient on short-term debt share across alternative post-event horizons. The dependent variable is change in borrowing cost measured as the difference between borrowing cost the quarter before the event and one, two, four, six, and eight quarters after the event. The four-quarter horizon is the baseline specification. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

The horizon analysis suggests that the relationship between short-term debt exposure and borrowing costs becomes stronger over time. For the one-quarter horizon, the coefficient is small and statistically insignificant. At the two-quarter horizon, the coefficient becomes positive and statistically significant at the 5% level. The four-quarter estimate, as well as the six- and eight-quarter horizons, are larger, positive, and statistically significant at the 1% level.

5.1.3 Deleveraging (H3A)

Table 5.6 presents the baseline regression results for H3A. In this specification, the dependent variable is change in leverage, measured four quarters after the event. The purpose of this test is to examine whether firms with a higher share of short-term debt maturities adjusted their capital structure following the 2022-2023 rate shock. Appendix 3 presents the full baseline regression.

Table 5.6: Baseline regression results for H3A

	Coefficient	Std. Error	p-value
Variable			
Short-term debt share	-0.0003	0.024	0.991
Log MCAP	0.0032	0.003	0.275
Liquidity	1.2284***	0.153	0.000

Note: The dependent variable is change in leverage, measured as the difference between leverage the quarter before the event and four quarters after the event. Short-term debt share captures the share of debt maturing in the short-term. Log MCAP and Liquidity are included as control variables. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

The coefficient on short-term debt share is close to zero, at -0.0003, and is not statistically significant, with a p-value of 0.991. This suggests that, in the baseline specification, there is no evidence that firms with higher short-term debt maturity exposure changed their leverage differently from firms with lower exposure four quarters after the event. The estimated effect is both economically small and statistically indistinguishable from zero.

Log MCAP has a positive coefficient, but it is not statistically significant. This indicates that firm size does not appear to explain differences in leverage adjustment in this specification. Liquidity, however, is positive and statistically significant at the 1% level. This indicates that firms with higher liquidity experienced larger increases, or smaller decreases, in leverage after the event. One possible interpretation is that more liquid firms had greater capacity to maintain their debt positions despite tighter financing conditions, while less liquid firms may have faced stronger pressure to deleverage. However, this result should be interpreted with caution, since the interpretation depends on the exact construction of the liquidity variable and the change in leverage measure.

To examine whether the leverage adjustment mechanism changes over time, Table 5.7 reports the estimated coefficient on short-term debt share across alternative quarterly horizons.

Table 5.7: Effect of short-term debt share on change in leverage given different post-event horizons

	β_1	**Std. Error**	**p-value**	**Observations**
No. of quarters				
1	-0.0214	0.0155	0.1689	182
2	-0.0394*	0.0239	0.0994	171
4	0.0003	0.0237	0.9914	133
6	0.0001	0.0269	0.9973	138
8	0.0158	0.0331	0.6331	124

Note: The table reports the estimated coefficient on short-term debt share across alternative post-event horizons. The dependent variable is change in leverage measured as the difference between leverage the quarter before the event and one, two, four, six, and eight quarters after the event. The four-quarter horizon is the baseline specification. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

The horizon analysis provides limited evidence that short-term debt exposure affected leverage adjustment. At the one-quarter horizon, the coefficient is negative but statistically insignificant. At the two-quarter horizon, the coefficient becomes negative and weakly statistically significant at the 10% level. This suggests that firms with higher short-term maturity exposure may have reduced leverage more in the short run following the rate shock. However, this effect does not persist over longer horizons. At the four-, six-, and eight-quarter horizons, the coefficients are close to zero or positive and are not statistically significant.

5.1.4 Asset sales (H3B)

Table 5.8 presents the baseline regression results for H3B. In this specification, the dependent variable is change in log investment properties, measured four quarters after the event. Appendix 4 presents the full baseline regression.

Table 5.8: Baseline regression results for H3B

	Coefficient	Std. Error	p-value
Variable			
Short-term debt share	-0.2418*	0.136	0.076
Log MCAP	0.0046	0.021	0.829
Liquidity	-2.5514**	1.183	0.031

Note: The dependent variable is change in log investment properties, measured as the difference between log investment properties the quarter before the event and four quarters after the event. Short-term debt share captures the share of debt maturing in the short-term. Log MCAP and Liquidity are included as control variables. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

The coefficient on short-term debt share is negative, at -0.2418, and statistically significant at the 10% level, with a p-value of 0.076. This suggests that firms with higher short-term debt maturity exposure experienced a larger decline, or weaker growth, in investment properties four quarters after the event.

Log MCAP has a small positive coefficient but is not statistically significant. This indicates that firm size does not appear to explain variation in changes in investment properties in this specification. Liquidity has a negative and statistically significant coefficient at the 5% level. This suggests that firms with higher liquidity experienced lower growth, or larger reductions, in investment properties after the event. One possible interpretation is that liquid firms may have chosen to preserve cash rather than expand their asset base during the rate shock. However, this result should be interpreted cautiously, since liquidity may also capture differences in firm strategy, balance sheet structure, or pre-existing financial conservatism.

To examine whether the relationship between short-term debt exposure and investment property adjustment changes over time, Table 5.9 reports the estimated coefficient on short-term debt share across alternative quarterly horizons.

Table 5.9: Effect of short-term debt share on change in log investment properties given different post-event horizons

	β_1	Std. Error	p-value	Observations
No. of quarters				
1	-0.1062*	0.0573	0.0638	198
2	-0.0653	0.0914	0.4750	194
4	-0.2418*	0.1362	0.0758	193
6	-0.3149	0.2047	0.1239	195
8	-0.3420	0.2234	0.1258	194

Note: The table reports the estimated coefficient on short-term debt share across alternative post-event horizons. The dependent variable is change in log investment properties, measured as the difference between log investment properties the quarter before the event and one, two, four, six, and eight quarters after the event. The four-quarter horizon is the baseline specification. Control variables are included but not reported. Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

The horizon analysis shows that the coefficient on short-term debt share is negative across all horizons. This indicates a consistent negative relationship between short-term debt maturity exposure and subsequent changes in investment properties. At the one-quarter horizon, the coefficient is negative and weakly statistically significant at the 10% level. The two-quarter estimate remains negative but is not statistically significant. At the four-quarter horizon, corresponding to the baseline specification, the coefficient is again negative and significant at the 10% level. At the six- and eight-quarter horizons, the coefficients become larger in magnitude, but they are not statistically significant.

5.2 Discussion

5.2.1 Equity market response (H1)

The baseline results provide evidence that companies with a higher short-term debt share experienced a more negative market reaction around the monetary policy rate announcement dates. In this result, the estimated effect shows that a 10 percentage point higher short-term debt share is associated with a 0.36 percentage point lower CAR. These findings are consistent with the theoretical mechanisms discussed in the literature. Bernanke and Kuttner (2005) show that monetary policy surprises affect equity prices through changes in discount rates, expected cash flows, and risk premia. In the context of real estate firms, this is likely to be particularly strong since property values are sensitive to discount rates and because firms are often highly leveraged. Another possible explanation is that firms with debt maturing sooner are more exposed to refinancing frictions and therefore experience stronger effects, aligned with what Almeida et al. (2012) discuss.

The results are somewhat sensitive to the choice of market benchmark and event window, as the OMXSPI specifications are less consistently significant than the SX35PI specifications. The difference between the two benchmarks likely reflects the fact that they capture different sources of systematic risk. The real estate index controls for sector-wide movements common to listed property firms, making the CARs reflect firm-specific deviations within the sector. By contrast, OMXSPI captures broader market movements but may not fully account for real estate firms' higher sensitivity to interest rates. This can add noise and explain why the results differ slightly. This divergence is particularly visible in the [0,+2] window, where the two benchmarks produce somewhat different coefficients and levels of significance. One possible explanation is that extending the window to day +2 may introduce additional sector-level variation that is captured differently by the two benchmarks, leading to differences in how returns are classified as abnormal. This does not overturn the baseline finding, but it suggests that the strength of the result depends partly on how abnormal returns are estimated.

The robustness tests across alternative event windows further support the interpretation that the stock market reaction was concentrated around the announcement dates. Using SX35PI as the market benchmark, the coefficient on short-term debt share is negative across all tested windows and statistically significant in most shorter windows. The significance of the [-1,0] window suggests that the market reaction was not limited strictly to the announcement day, but may have included some anticipatory repricing. At the same time, the weaker results for wider windows such as [-3,+3] indicate that the effect becomes less precise when more days are included, likely because longer windows introduce additional market noise unrelated to the monetary policy event.

The control variables provide additional insight into how investors priced different sources of risk during the monetary tightening period. None of the firm-level controls are statistically significant, suggesting that the immediate stock market reaction around rate announcements was not primarily explained by firm size, idiosyncratic volatility, or overall leverage. This is particularly interesting for leverage, since Sun, Titman and Twite (2015) find that real estate firms with shorter debt maturities and higher leverage were more affected during financial distress. However, the leverage variable has the expected negative sign but is insignificant, indicating that investors may have placed greater weight on the timing of debt repayments than on the overall debt level which is only partly consistent with the literature.

5.2.2 Borrowing cost (H2)

The results for H2 suggest that the relationship between short-term debt maturity exposure and changes in borrowing costs becomes stronger over time. The baseline four-quarter specification yields a positive and statistically significant coefficient on short-term debt share, and the extended horizon analysis shows that the coefficient is statistically significant from the two-quarter horizon onward, including at the six- and eight-quarter horizons. Taken together, the results provide support for H2, as firms with higher short-term debt maturity exposure appear to experience larger increases in borrowing costs after the policy events.

One possible explanation for why an effect might appear at longer horizons is that firms do not refinance their entire debt stock at once. Instead, individual debt tranches mature one by one and are rolled over at current market rates. As more debt matures during the tightening period, the share of liabilities carrying higher post-shock borrowing costs increases, which could widen the gap between firms with high and low short-term maturity exposure. Diamond (1991) shows that firms with short-maturity debt are repeatedly exposed to credit market conditions at rollover dates, which makes them more vulnerable when financing conditions worsen. A gradual build-up of this kind would be consistent with strengthening coefficients at longer horizons.

He and Xiong (2012) show that rollover risk can increase financial pressure when firms must repeatedly refinance short-term debt, as lenders may demand higher returns or stricter terms. The pattern observed in the horizon analysis is broadly consistent with this mechanism. The coefficient is insignificant at the one-quarter horizon, but becomes positive and statistically significant from the two-quarter horizon onward, while also increasing in magnitude over longer horizons. One possible interpretation is that borrowing costs do not adjust immediately because firms refinance debt gradually rather than all at once. As additional debt tranches mature during the tightening period, firms with greater short-term debt exposure become increasingly exposed to higher market rates, causing borrowing-cost increases to accumulate over time. The stronger coefficients at the four-, six-, and eight-quarter horizons are therefore consistent with a gradual refinancing-risk channel, where firms with larger short-term maturities become progressively more affected as debt is rolled over under tighter financial conditions.

5.2.3 Balance sheet adjustment (H3)

This hypothesis is tested through two complementary outcomes: changes in leverage, corresponding to H3A, and changes in investment properties, corresponding to H3B. Overall, H3 receives partial support. The deleveraging mechanism is not supported, as firms with greater short-term debt maturity exposure did not systematically reduce leverage relative to other firms. In contrast, the asset-side adjustment mechanism receives more support, as short-term debt share is negatively related to changes in investment properties across all examined horizons, with the baseline estimate significant at the 10% level.

The results suggest that balance sheet adjustment under refinancing pressure may have operated primarily through the asset side rather than through direct reductions in leverage. Firms with greater short-term debt exposure appear to have constrained or reduced their property holdings, while maintaining broadly similar leverage ratios. This pattern is consistent with the idea that real estate firms facing tighter refinancing conditions may adjust investment and asset growth before making more visible changes to capital structure. Thus, while H3 is not fully supported, the evidence provides weak support for the hypothesis that short-term debt maturity exposure contributed to balance sheet adjustment during the monetary tightening cycle.

5.2.3.1 Deleveraging (H3A)

The baseline four-quarter specification provides no evidence that firms with greater short-term debt maturity exposure reduced leverage more than other firms. The coefficient on short-term debt share is close to zero and statistically insignificant. The horizon analysis provides little additional support. At the two-quarter horizon, the coefficient is negative and weakly significant, but this effect does not persist at longer horizons, where coefficients are small and insignificant. H3A is therefore not supported.

The results suggest that leverage dynamics were broadly similar across firms, regardless of their refinancing exposure. This contrasts with the literature, which suggests that tighter financial conditions and refinancing risk can lead firms to reduce leverage or adjust their capital structures (Leary and Roberts, 2005; Almeida et al., 2012). In particular, Almeida et al. (2012) show that firms with greater debt maturing during periods of financial stress tend to adopt more defensive financial strategies. Harford, Klasa and Maxwell (2014) show that firms facing refinancing risk manage their capital structures to avoid forced adjustments. The present results do not show a similar pattern.

The reasons for this are not clear from the data alone. Firms may have been able to refinance or extend existing debt without materially changing overall leverage levels, or other firm-level factors not captured by the model may explain leverage dynamics during this period. However, given the absence of significant results, these remain speculative interpretations rather than conclusions supported by the evidence.

5.2.3.2 Asset sales (H3B)

The evidence for H3B is more supportive, although the results are not fully robust across horizons. The baseline four-quarter specification yields a negative coefficient on short-term debt share. This suggests that firms with greater short-term debt maturity exposure may have experienced weaker growth, or property sales. This is consistent with Almeida et al. (2012) who argue that firms with large short-term debt experienced stronger declines in investment during the global financial crisis. Fazzari, Hubbard, and Petersen (1988) further argue that financing constraints can reduce firms' investment activity, which provides a useful explanation for why firms facing higher refinancing pressure may limit property expansion.

The coefficient is negative across all five horizons examined and increasingly negative at the six- and eight-quarter horizons may suggest that property adjustments materialize gradually, which is intuitive given the time required to execute sales. However, the longer-horizon estimates are not statistically significant, which may reflect greater noise and the increasing influence of other macroeconomic factors as the time between the event and outcome widens. The consistently negative coefficients suggest that firms with higher short-term debt exposure may have experienced a more constrained development of their property holdings during the tightening period.

The findings are broadly consistent with prior literature on financing constraints and refinancing risk. Harford, Klasa, and Maxwell (2014) show that firms actively manage balance sheet structure in response to refinancing risk. More directly related to real estate firms, Sun, Titman, and Twite (2015) find that REITs with more debt maturing during the global financial crisis were more likely to adjust their balance sheets through property sales and equity issuance. The results in this thesis are in line with this mechanism, although in the context of a monetary tightening cycle rather than a financial crisis.

The statistical strength of the H3B evidence should be interpreted with some caution. The baseline estimate is significant only at the 10% level, and the longer-horizon estimates, while larger in magnitude, are not statistically significant. This means that the results should not be interpreted as definitive proof of asset disposals. The evidence is therefore somewhat more supportive of H3B than of H3A, but the conclusion remains moderate rather than strong.

5.2.4 Limitations

Several limitations are inherent to the research design and should be considered when interpreting the findings. The event study relies on the assumption that monetary policy announcements represent genuine surprises to the market. If investors had already incorporated expected rate changes into prices in the days or weeks preceding announcements, the measured CARs will be compressed toward zero regardless of a firm's underlying refinancing exposure, biasing the H1 estimates toward finding no effect. The partial significance of the [-1,0] window suggests some degree of anticipatory repricing, which complicates a clean interpretation of announcement-day returns as the sole mechanism of information transmission.

A related concern is that confounding events, firm-specific news or broader macroeconomic releases coinciding with rate decisions, cannot be fully eliminated despite the inclusion of fixed effects. In a relatively small, sector-specific sample, idiosyncratic news can exert disproportionate influence on individual return observations, making causality difficult to determine. This is a general challenge of event studies and is difficult to resolve without a larger cross-sectional sample that would allow such noise to average out more reliably.

The event-based regressions face a different but equally important constraint. Although several firm-level controls are included, the models may not fully account for characteristics that jointly determine debt maturity structure and sensitivity to tightening conditions. Firms with high short-term debt shares may differ systematically in credit quality, asset composition, geographic exposure, or management strategy. To the extent that these factors are correlated with both the maturity variable and the dependent variables, the estimated coefficients may partly capture broader financial vulnerability rather than the isolated effect of short-term refinancing needs. This concern is particularly relevant for H3, where the asset-side results are consistent with multiple underlying mechanisms, not all of which can be disentangled with the available data.

The construction of the borrowing cost variable also introduces a degree of measurement imprecision. Average interest expense ratios reflect the blended cost of a firm's entire debt stock, including obligations contracted well before the tightening episode. This means the variable responds slowly to changes in market rates, which partly explains the gradual horizon pattern observed in H2 but also means that early-horizon estimates may understate the true repricing effect for firms with the most short-term exposure. A more granular instrument, such as the cost of newly issued debt, would more precisely capture the refinancing mechanism but was not available for this sample.

Finally, the sample covers a single sector within a small, open economy over one specific tightening episode. Swedish listed real estate is characterised by relatively high leverage, concentrated ownership, and a financing structure that combines bank credit with short-term bond markets, features that may amplify refinancing risk relative to other institutional settings. While this makes the Swedish market a relevant and informative case study, it limits the generalisability of the findings to other sectors, countries, or monetary tightening episodes with different structural characteristics.

6. Conclusions

This thesis asks whether the 2022-2023 monetary tightening cycle disproportionately affected listed Swedish real estate firms with greater short-term debt maturity exposure, and through which mechanisms these effects operated. The analysis examines three mechanisms, equity market valuations, borrowing costs, and balance sheet adjustment, based on the premise that debt maturity structure creates heterogeneous exposure to rate shocks.

The evidence is mixed but collectively informative. H1 receives clear support: firms with higher short-term debt maturity exposure experienced significantly more negative cumulative abnormal returns around policy announcement dates, with a 10 percentage point increase in short-term debt share associated with a 0.36 percentage point decline in CAR. The insignificance of overall leverage in the same specification suggests that maturity structure carried information for equity pricing beyond the aggregate level of indebtedness.

H2 receives clear support. The baseline four-quarter coefficient is positive and statistically significant, and the horizon analysis shows that the relationship between short-term debt maturity exposure and changes in borrowing costs becomes more pronounced over time. The coefficient is insignificant at the one-quarter horizon, but becomes positive and statistically significant from the two-quarter horizon onward, including at the four-, six-, and eight-quarter horizons. This pattern is consistent with a gradual refinancing mechanism: as individual debt tranches mature sequentially and are rolled over at higher prevailing rates, borrowing-cost increases become more pronounced for firms with greater short-term maturity exposure.

H3 produces mixed findings. The deleveraging mechanism, H3A, is not supported. The asset-side mechanism, H3B, shows a somewhat more consistent pattern: short-term debt share is negatively related to changes in investment properties across all horizons, with the baseline estimate significant at the 10% level. The contrast between H3A and H3B is notable, though the explanation is not straightforward. It may reflect the difficulty of reducing formal leverage when asset values are simultaneously declining, or a tendency for absorbing financing pressure through investment constraints rather than visible capital structure changes, but these interpretations remain speculative.

Several limitations apply. The event study assumes announcements generated genuine surprises, though pre-announcement effects suggest some anticipatory repricing. Survivorship bias likely understates the true effects. The short-term debt share captures maturity volume but not hedging or obligation urgency, and the borrowing cost measure reflects blended historical costs rather than the marginal rate on new debt. The focus on listed Swedish real estate limits generalisability.

6.1 Future research

Future research could extend the analysis to a broader cross-country sample, incorporate hedging data to sharpen the measurement of refinancing exposure, and examine whether firms strategically extended maturities ahead of the tightening cycle. A comparison with the 2007-2009 GFC would also help clarify which features of rollover risk are specific to rate-shock episodes and which are more general.

Future work could also investigate whether the effects differ across real estate subsectors, such as offices, retail, residential, logistics, and healthcare real estate. This would help identify which parts of the sector were most exposed to the 2022-2023 tightening cycle, as maturity risk may interact with differences in lease duration, vacancy risk, asset liquidity, and sensitivity to discount-rate changes. Another extension would be to examine credit spreads more directly as a mechanism. While equity prices capture market valuation effects, bond yield spreads would provide a cleaner measure of how investors repriced refinancing risk for firms with large short-term maturity walls.

Finally, a more granular debt maturity schedule could further improve the analysis by distinguishing between debt maturing within 12 months, 12-24 months, 24-36 months, and later buckets. This would make it possible to test whether the effect is concentrated among firms facing immediate refinancing needs or whether markets also penalized firms with somewhat longer but still visible maturity walls.

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8. Appendix

Appendix 1

Baseline H1 regression results

Dependent variable:	CAR	**R-squared:**	0.079
Model:	OLS	**Adjusted R-squared:**	0.008
Method:	Least Squares	**F-statistic:**	1.241
Covariance type:	HC1	**Prob. F-statistic:**	0.239
No. observations:	225	**Log-likelihood:**	463.02
Df residuals:	208	**AIC:**	-892.0
Df model:	16	**BIC:**	-834.0

Variable	Coef.	Std. err.	z	P>|z|	95% CI lower	95% CI upper
Intercept	-0.0138	0.084	-0.164	0.870	-0.179	0.152
C(event_date_str)[T.2022-06-30]	0.0104	0.010	1.032	0.302	-0.009	0.030
C(event_date_str)[T.2022-09-20]	0.0010	0.010	0.093	0.926	-0.019	0.021
C(event_date_str)[T.2022-11-24]	0.0152*	0.009	1.691	0.091	-0.002	0.033
C(event_date_str)[T.2023-02-09]	-0.000038	0.010	-0.004	0.997	-0.019	0.019
C(event_date_str)[T.2023-04-26]	-0.0025	0.010	-0.257	0.797	-0.022	0.017
C(event_date_str)[T.2023-06-29]	0.0168*	0.009	1.789	0.074	-0.002	0.035
C(event_date_str)[T.2023-09-21]	0.0107	0.009	1.198	0.231	-0.007	0.028
short_term_debt_share_pre	-0.0357**	0.014	-2.472	0.013	-0.064	-0.007
log_mcap_pre	0.0011	0.003	0.314	0.753	-0.006	0.008
idio_volatility_pre	0.0430	0.521	0.082	0.934	-0.979	1.065
leverage_pre	-0.0257	0.021	-1.226	0.220	-0.067	0.015
Industrial	-0.0082	0.008	-0.966	0.334	-0.025	0.008
Logistics	0.0030	0.009	0.348	0.728	-0.014	0.020

Office	-0.0019	0.007	-0.278	0.781	-0.015	0.011
Retail	-0.0014	0.010	-0.145	0.885	-0.020	0.018
Other	-0.0060	0.012	-0.484	0.628	-0.030	0.018

Note: Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Omnibus:	3.904	**Durbin-Watson:**	1.979
Prob (Omnibus):	0.142	**Jarque-Bera (JB):**	3.307
Skew:	-0.202	**Prob (JB):**	0.191
Kurtosis:	2.564	**Cond. No.**	4.79e+03

Appendix 2

Baseline H2 regression results

Dependent variable:	delta_borrowing_cost	**R-squared:**	0.416
Model:	OLS	**Adjusted R-squared:**	0.356
Method:	Least squares	**F-statistic:**	7.627
Covariance type:	HC1	**Prob. F-statistic:**	4.64e-13
No. observations:	173	**Log-likelihood:**	589.91
Df residuals:	156	**AIC:**	-1146.
Df model:	16	**BIC:**	-1092.

Variable	**Coef.**	**Std. err.**	**z**	**P>|z|**	**95% CI lower**	**95% CI upper**
Intercept***	0.1022	0.021	4.891	0.000	0.061	0.143
C(event_date_str)[T.2022-06-30]	-0.0010	0.002	-0.506	0.613	-0.005	0.003
C(event_date_str)[T.2022-09-20]	0.0020	0.002	0.841	0.400	-0.003	0.007
C(event_date_str)[T.2022-11-24]	0.0032	0.002	1.314	0.189	-0.002	0.008
C(event_date_str)[T.2023-02-09]	0.0048	0.002	1.952	0.051	-1.91e-05	0.010
C(event_date_str)[T.2023-04-26]	-0.0045	0.002	-1.992	0.046	-0.009	-7.14e-05
C(event_date_str)[T.2023-06-29]	-0.0130	0.003	-4.854	0.000	-0.018	-0.008
C(event_date_str)[T.2023-09-21]	-0.0128	0.003	-4.310	0.000	-0.019	-0.007
exposure_pre***	0.0140	0.004	3.216	0.001	0.005	0.023
log_mcap_pre***	-0.0034	0.001	-4.354	0.000	-0.005	-0.002
leverage_pre***	-0.0317	0.011	-2.919	0.004	-0.053	-0.010
liquidity_pre**	-0.0947	0.044	-2.140	0.032	-0.181	-0.008
segment_Industrial***	0.0091	0.002	3.941	0.000	0.005	0.014
segment_Logistics	0.0004	0.003	0.155	0.877	-0.005	0.006
segment_Office**	0.0048	0.002	2.363	0.018	0.001	0.009
segment_Retail*	0.0058	0.003	1.832	0.067	-0.000	0.012

segment_Other***	0.0042	0.001	2.860	0.004	0.001	0.007

Note: Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Omnibus:	17.318	**Durbin-Watson:**	1.945
Prob (Omnibus):	0.000	**Jarque-Bera (JB):**	21.053
Skew:	0.672	**Prob (JB):**	2.68e-05
Kurtosis:	4.056	**Cond. No.**	1.43e+03

Appendix 3

Baseline H3A regression results

Dependent variable:	delta_leverage	**R-squared:**	0.524
Model:	OLS	**Adjusted R-squared:**	0.463
Method:	Least squares	**F-statistic:**	19.74
Covariance type:	HC1	**Prob. F-statistic:**	2.59e-25
No. observations:	133	**Log-likelihood:**	250.08
Df residuals:	117	**AIC:**	-468.2
Df model:	15	**BIC:**	-421.9

Variable	**Coef.**	**Std. err.**	**z**	**P>|z|**	**95% CI lower**	**95% CI upper**
Intercept	-0.0395	0.068	-0.581	0.561	-0.173	0.094
C(event_date_str)[T.2022-06-30]	0.0030	0.015	0.204	0.838	-0.026	0.031
C(event_date_str)[T.2022-09-20]	0.0018	0.014	0.129	0.898	-0.026	0.029
C(event_date_str)[T.2022-11-24]	0.0017	0.015	0.117	0.907	-0.028	0.031
C(event_date_str)[T.2023-02-09]	-0.0050	0.017	-0.303	0.762	-0.038	0.028
C(event_date_str)[T.2023-04-26]	-0.0098	0.015	-0.643	0.520	-0.040	0.020
C(event_date_str)[T.2023-06-29]	-0.0136	0.015	-0.883	0.377	-0.044	0.017
C(event_date_str)[T.2023-09-21]	-0.0273*	0.015	-1.818	0.069	-0.057	0.002
short_term_debt_share_pre	-0.0003	0.024	-0.011	0.991	-0.047	0.046
log_mcap_pre	0.0032	0.003	1.093	0.275	-0.003	0.009
liquidity_pre	1.2284***	0.153	8.012	0.000	0.928	1.529
Industrial	-0.0255**	0.013	-1.986	0.047	-0.051	-0.000
Logistics	-0.0692***	0.012	-5.846	0.000	-0.092	-0.046
Office	-0.0249**	0.011	-2.308	0.021	-0.046	-0.004
Retail	-0.0476***	0.011	-4.167	0.000	-0.070	-0.025
Other	-0.0114	0.012	-0.939	0.348	-0.035	0.012

Note: Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Omnibus:	2.544	**Durbin-Watson:**	2.079
Prob (Omnibus):	0.280	**Jarque-Bera (JB):**	2.187
Skew:	-0.155	**Prob (JB):**	0.335
Kurtosis:	3.547	**Cond. No.**	1.28e+03

Appendix 4

Baseline H3B regression results

Dependent variable:	delta_log_investment_properties	**R-squared:**	0.220
Model:	OLS	**Adjusted R-squared:**	0.154
Method:	Least squares	**F-statistic:**	4.602
Covariance type:	HC1	**Prob. F-statistic:**	2.19e-07
No. observations:	193	**Log-likelihood:**	14.533
Df residuals:	177	**AIC:**	2.933
Df model:	15	**BIC:**	55.14

Variable	**Coef.**	**Std. err.**	**z**	**P>|z|**	**95% CI lower**	**95% CI upper**
Intercept	0.0454	0.510	0.089	0.929	-0.954	1.044
C(event_date_str)[T.2022-06-30]	0.0181	0.074	0.246	0.806	-0.127	0.163
C(event_date_str)[T.2022-09-20]	-0.0361	0.078	-0.465	0.642	-0.188	0.116
C(event_date_str)[T.2022-11-24]	-0.0275	0.075	-0.365	0.715	-0.175	0.120
C(event_date_str)[T.2023-02-09]	-0.1301*	0.075	-1.725	0.085	-0.278	0.018
C(event_date_str)[T.2023-04-26]	-0.1222*	0.072	-1.693	0.091	-0.264	0.019
C(event_date_str)[T.2023-06-29]	-0.1274	0.084	-1.509	0.131	-0.293	0.038
C(event_date_str)[T.2023-09-21]	-0.1096	0.076	-1.436	0.151	-0.259	0.040
short_term_debt_share_pre	-0.2418*	0.136	-1.775	0.076	-0.509	0.025
log_mcap_pre	0.0046	0.021	0.215	0.829	-0.037	0.046
liquidity_pre	-2.5514**	1.183	-2.158	0.031	-4.869	-0.234
Industrial	0.1725**	0.051	3.393	0.001	0.073	0.272
Logistics	0.1120*	0.066	1.688	0.091	-0.018	0.242
Office	0.0235	0.045	0.525	0.599	-0.064	0.111
Retail	0.0856	0.056	1.532	0.126	-0.024	0.195
Other	-0.0875	0.074	-1.188	0.235	-0.232	0.057

Note: Statistical significance is indicated by *, **, and *** at the 10%, 5%, and 1% levels, respectively.

Omnibus:	5.042	**Durbin-Watson:**	2.260
Prob (Omnibus):	0.080	**Jarque-Bera (JB):**	7.104
Skew:	0.037	**Prob (JB):**	0.0287
Kurtosis:	3.937	**Cond. No.**	1.27e+03

Appendix 5

Event dates - policy rate announcement dates

Policy rate rise 1: 2022-04-28

Policy rate rise 2: 2022-06-30

Policy rate rise 3: 2022-09-20

Policy rate rise 4: 2022-11-24

Policy rate rise 5: 2023-02-09

Policy rate rise 6: 2023-04-26

Policy rate rise 7: 2023-06-29

Policy rate rise 8: 2023-09-21

Appendix 6

Use of AI

In accordance with the AI & Copyright Policy and in the interest of full transparency, we disclose the use of artificial intelligence (AI) tools during the research and writing process of this thesis.

AI-based tools were used at various stages of this project to support our work. This includes the following applications: writing assistance such as proofreading, grammar correction, and language refinement; technical and programming support and the identification of potentially relevant prior research, including the discovery of related literature and existing studies. In all cases, AI tools were used as assistive instruments to support our work, and not as a substitute for original thought or academic judgement. By automating or accelerating certain routine and technical tasks, the use of AI tools contributed to a more efficient workflow, allowing us to dedicate greater time and attention to the core academic work of this thesis, including critical analysis, interpretation of results, and the development of our own arguments and conclusions.

All research questions, hypotheses, methodologies, and interpretations presented in this thesis were formulated and evaluated by us. The conclusions drawn are our own, and all data collection, experimental design, and analytical reasoning were conducted independently. Where AI tools were used to surface potential sources or prior research, all references were verified, critically assessed, and consulted directly by us before inclusion.

We acknowledge that AI tools, while useful, may introduce unintended errors or inconsistencies, and that we remain fully responsible for the accuracy and validity of the content of this thesis.