Debt Composition, Institutional Demand, and Corporate Investment: Evidence from Thailand

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ABSTRACT

This paper studies commercial paper in Thailand. We follow 187 firms from first commercial paper issuance and examine debt composition, institutional holding, investment, and bridge-financing risk. Among firms with no bond outstanding at first issuance, 41.7% acquire one within eight quarters, compared with 4.6% of matched non-entrants, and debt-instrument concentration falls after entry. From 2021, mutual funds hold roughly 75% to 85% of outstanding commercial paper, concentrated in larger and better-rated issuers, with short-term bond funds holding the largest share. Fund-category growth is associated with issuance, but the available designs provide no robust evidence that fund demand determines which firms issue. First commercial paper issuance is not associated with an increase in capital expenditure, while liquid assets rise by 1.70 percentage points of assets and account for most of the accompanying asset growth. The median entrant termed out commercial paper usage, but most firms that eventually issue bonds continue using commercial papers. The evidence suggests that commercial paper can widen access to longer-term capital markets while concentrating rollover exposure among firms with fewer alternatives.

Keywords: Commercial paper, Debt composition, Market access, Institutional investors, Rollover risk

JEL codes: G23, G32, G28

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The previously circulated version of this manuscript contained a data construction error, which changes some key results. The sample has also been extended to 2025Q3, with the mutual fund holdings data extended by a further year, and the estimation has been updated to use difference-in-differences estimators that are robust to staggered treatment timing. Kanis acknowledges financial support from the Puey Ungphakorn Institute for Economic Research (PIER) Grant.

1. Introduction

In the United States, commercial paper has historically been described as short-term debt issued by large corporations and regarded as safe because of its short maturity and high credit ratings (Kacperczyk & Schnabl, 2010). Access is nevertheless selective: high observable credit quality is an important condition for entry (Calomiris et al., 1995). The Thai market has not always worked that way. Firms with no observed issuer rating have issued, as have firms with no bond outstanding. Commercial paper could also be sold through routine public and high-net-worth channels until a 2018 rule closed those channels to non-financial issuers. This difference makes Thailand useful for a question the standard setting rarely permits: what does short-term market debt do for a firm that has no prior bond-market access?

The question presents a development-versus-stability trade-off. Commercial paper can widen access to market finance, but its short maturity creates a recurring refinancing obligation. Research on firms already able to issue commercial paper shows that they use the instrument alongside bank credit and often refinance it with long-term bonds (Kahl et al., 2015). It provides less evidence on whether first issuance opens a path to longer-term public debt for firms initially outside the bond market, or instead leaves them persistently exposed to rollover risk.

The paper connects three strands of evidence that are usually studied separately. Large rated firms tend to diversify across debt types, whereas smaller unrated firms specialize in fewer instruments (Colla et al., 2013). In the United States, the long-run decline in secured borrowing is concentrated among high-quality firms that value financial flexibility (Benmelech et al., 2024), while the shortening of debt maturity is concentrated among smaller firms, firms with greater information asymmetry, and newly listed firms (Custódio et al, 2013). On the investor side, shocks to money-market funds can reduce short-term financing for the borrowers that depend on them (Chernenko & Sunderam, 2014). These findings show why debt composition and investor structure matter, but they do not establish what happens when an unrated firm without a bond first enters a short-term debt market.

Answering that question requires separating three mechanisms that are often conflated. First, first issuance may precede a transition into the bond market, or it may simply add a short-term funding line. Second, mutual-fund ownership identifies the investor base bearing commercial-paper exposure, but high ownership does not establish that fund demand causes firms to issue. Third, entry can broaden access while concentrating refinancing pressure among firms with few alternative sources of market finance. Short maturity trades financing flexibility

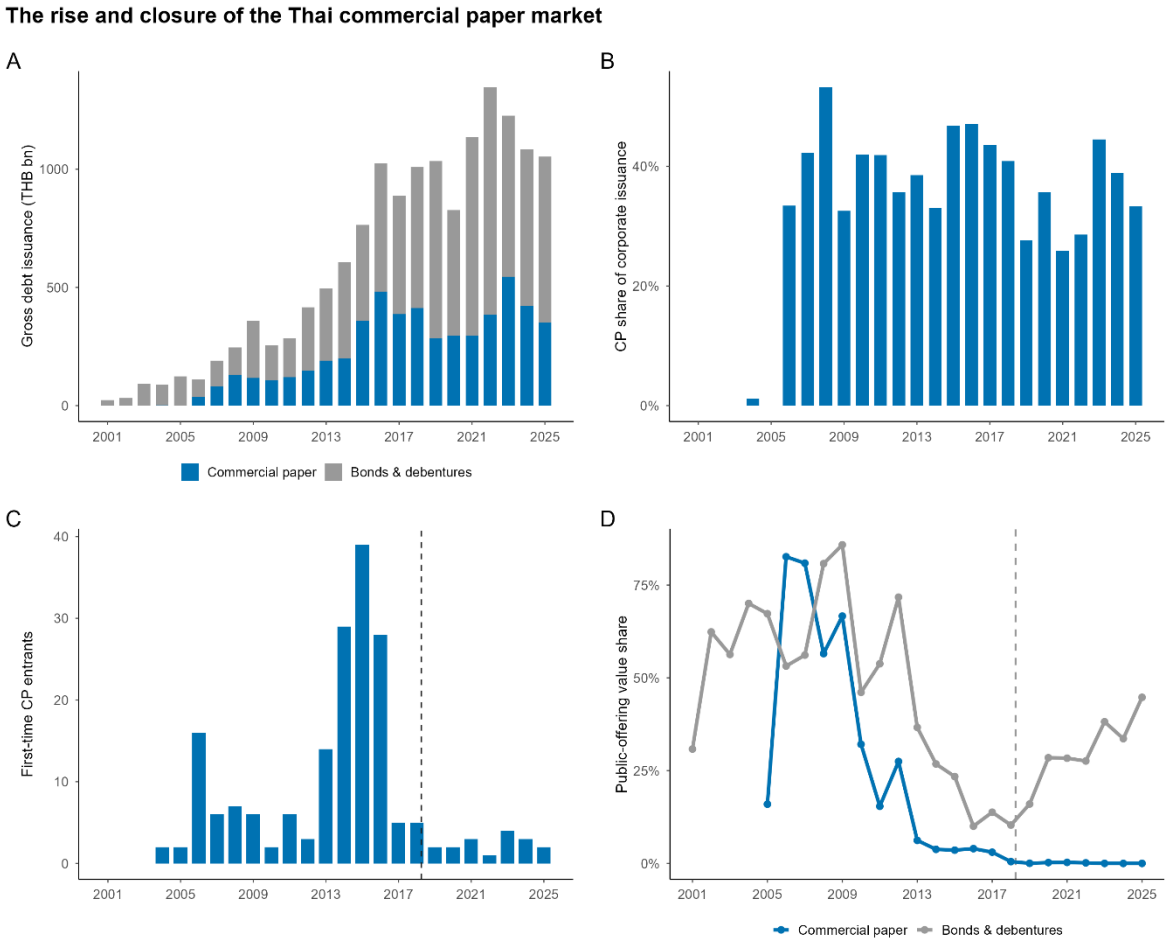
against liquidity risk (Diamond, 1991). Commercial paper can provide flexible bridge financing (Kahl et al., 2015), whereas frequently renewed debt exposes issuers to market freezes and to the interaction between market liquidity and credit risk (Acharya et al., 2011; He & Xiong, 2012).

Thailand provides a useful setting in which to study this trade-off. Our transaction and issuer records identify entrants with no observed issuer rating and entrants without a prior bond. This institutional setting complements evidence that regional initiatives, market depth, liquidity, and rating infrastructure influenced corporate-bond development in Asia (Mizen & Tsoukas, 2014; Shim, 2012). It also permits first commercial-paper issuance to be treated as a discrete entry event rather than as a financing choice available only to firms already established in public debt markets. We study 187 listed non-financial firms from their first commercial-paper issuance between 2001Q1 and 2025Q3. The analysis combines Thai Bond Market Association issuance and redemption records with firm financial statements and, for the contemporary holder market, SEC mutual-fund holdings and Morningstar fund data. To assess access and debt composition, we compare first-time issuers with matched firms that never issue commercial paper and estimate group-time average treatment effects and interaction-weighted event studies designed for staggered treatment timing (Callaway & Sant'Anna, 2021; Sun & Abraham, 2021). The holder data begin in 2021Q3, so they characterize the contemporary investor base and test bounded demand-channel hypotheses rather than infer the ownership structure of the earlier entry cohort.

Figure 1 places the analysis in the market's longer arc. ThaiBMA's contemporaneous account describes regulatory changes beginning in 2012 as lowering barriers to short-term debt issuance: short-term instruments could remain unregistered with ThaiBMA, and private placements to institutional and high-net-worth investors could be made without a credit rating. ThaiBMA also reports that unregistered short-term issuance and the number of unregistered issuers subsequently expanded (Thai Bond Market Association, 2015). Commercial-paper issuance in our data grows from the mid-2000s, first-time entry surges between 2013 and 2016, the issuer base contracts sharply after the 2016 to 2017 default episode, and routine public and high-net-worth offering channels for non-financial issuers end in 2018.

Figure 1: Capital market debt issuance in Thailand

This figure traces the Thai corporate debt market for non-financial issuers in four panels. Panel A reports annual gross issuance of commercial paper and bonds and debentures in billions of baht. Panel B reports commercial paper as a share of corporate debt issuance. Panel A covers all issuers. Panel C reports the number of first-time commercial paper issuers. Panel D reports the public-offering share of issuance value for commercial paper and for bonds and debentures, with the 2018 rule change marked. The panels share a calendar-year axis but use separate y-axes in billions of baht, %, count, and %, respectively.



The evidence is consistent with commercial paper functioning as an on-ramp to the bond market for firms that enter without a bond. Among firms with no bond outstanding before their first commercial paper issuance, 41.7% have a bond outstanding within eight quarters, compared with 4.6% of matched non-entrants. In the access-restricted difference-in-differences design, first issuance is associated with a 24.3-percentage-point increase in the probability of having a bond outstanding. Debt composition also becomes more diversified: the debt-instrument Herfindahl index falls by 0.254. Total leverage rises by 4.37 percentage points of assets, but leverage excluding commercial paper does not rise overall, and bonds increase while other non-commercial-paper debt falls by a similar amount. The interpretation is therefore an expanded financing set, not a one-for-one increase in all forms of borrowing. The access and

leverage results are consistent with evidence that access to public debt markets is associated with greater leverage (Faulkender & Petersen, 2006), while the decline in concentration extends research showing that debt heterogeneity and specialization vary with issuer quality and market access (Rauh & Sufi, 2010; Colla, Ippolito, & Li, 2013).

The contemporary holder evidence identifies an important role for mutual funds. They hold roughly 75% to 85% of outstanding non-financial corporate commercial paper in the observed period. Short-term bond funds hold roughly 52% to 59% of the market. Money-market funds hold 8.0% to 19.3% across the full range and roughly 12% to 19% in a typical quarter. Fund-held paper is concentrated among larger and better-rated issuers. Quarterly growth in short-term-bond-fund assets is positively associated with issuance, whereas money-market-fund growth has the opposite sign. However, these aggregate time-series regressions cannot include calendar-quarter fixed effects, and designs closer to a demand-pull test do not robustly corroborate the association. Unlike issuer-specific designs that use the composition or flows of a firm's existing bondholders (Massa et al., 2013; Zhu, 2021), our fund-category regressions use aggregate quarterly variation. We therefore treat fund ownership and the short-term-bond-fund correlation as descriptive evidence, not proof that fund appetite determines issuance.

The financing consequences are similarly qualified. First commercial paper issuance does not lead to increased capital expenditure under the primary staggered-adoption estimator. However, total assets rise by about 2 percentage points and liquid assets by 1.70 percentage points, accounting for 83.9% of the asset increase. The front-loaded liquid-asset response is consistent with evidence that firms retain more cash when refinancing risk is greater (Harford et al., 2014). By contrast, Biguri (2023) finds that a negative shock to unsecured-debt availability reduces investment, but our design is in a different setting.

Commercial paper is nevertheless termed out for the median entrant: by eight quarters, 54.2% of observable entrants have no paper outstanding, a pattern resembling the bridge financing documented by Kahl et al. (2015). Among firms that reach the bond market, 57.8% retain commercial paper alongside bonds, similar to Hempel et al. (2024) evidence of bidirectional substitution in net issuance. Risk remains concentrated in the firms that depend on commercial paper and had not issued a bond at first commercial paper issuance, comprising 77 firms that enter without a bond and use commercial paper intensively. At its 2016Q3 peak, this group had 81.6 billion baht, or 26.9% of market-wide commercial paper outstanding,

across 64 firms. When firms without bond access cease issuing, the paper they retire is larger relative to assets than for firms that entered with a bond. These balances create potential rollover exposure because frequently renewed debt can become fragile when market liquidity deteriorates (Acharya et al., 2011; He & Xiong, 2012).

Our contribution is threefold: we observe the transition into longer-term market debt directly, distinguish fund ownership from a causal capital-supply mechanism, and show how the same market openness that expands access can concentrate rollover exposure among firms with fewer alternatives. Section 2 reviews the literature and develops the hypotheses. Section 3 describes the data and design. Sections 4 through 6 examine access and debt composition, holders and investment, and bridge-financing risk, respectively. Section 7 concludes.

2. Literature Review and Hypothesis Development

2.1 Debt Maturity, Composition and Rollover Risk

Capital structure decisions extend beyond the amount of leverage to include debt maturity and type. In models with asymmetric information, firms with favorable private information tend to prefer short-term debt to signal their asset quality (Diamond, 1991; Flannery, 1986; O'Hara, 1993). In these settings, short-term lenders can also exert stronger monitoring pressure. Empirically, Goyal and Wang (2013) demonstrate that a higher share of short-term debt is associated with a lower default probability, and Dang et al. (2018) find that firms with more short-term debt exhibit lower future stock price crash risk, consistent with the notion of enhanced discipline. The maturity, however, can introduce asset-liability mismatch risk (Myers, 1977). Stohs and Mauer (1996) introduce the composition-weighted asset-maturity measure, and Geelen et al. (2024) show that asset maturity is close to time-invariant within firm.

On composition, Colla et al. (2013) show that debt specialization concentrates among unrated firms, while diversification correlates with size, age, profitability, and holding a rating, and their survey update (Colla et al., 2020) reports the same pattern on a looser cluster measure. Rauh and Sufi (2010) find that most rated firm-years use two or more debt types, with lower credit quality accompanied by more tiers of debt rather than fewer. A rated firm adding a second and third debt type as it matures is therefore the documented majority pattern, not an anomaly requiring a special mechanism. During periods of low debt market liquidity, correlated default risk can increase (Javadi & Mollagholamali, 2018). When there is a sudden

credit market freeze, refinancing is difficult even when collateralized by assets with little credit risk.

Short maturity carries its own risk. Custódio et al. (2013) document a secular shortening of US debt maturity over three decades. Acharya et al. (2011) show that short-term claims can force asset sales into a frozen market, and Brunnermeier and Oehmke (2013) model a maturity rat race in which borrowers unable to commit to a maturity structure end up financed inefficiently short. Gopalan et al. (2014) find that rollover exposure predicts lower subsequent credit quality, and He and Xiong (2012) show that rollover risk becomes credit risk directly, with default rather than investment as the transmission variable. The four literature strands that follow build on these foundations.

2.2 Market Access and Debt Capacity

Do firms with commercial papers use more leverage? Faulkender and Petersen (2006) establish that access to public debt markets raises leverage independent of a firm's underlying demand for debt, with access proxied by whether the firm holds a public debt rating. Denis and Mihov (2003) provide the complementary evidence that credit quality sorts firms across bank debt, non-bank private debt, and public debt.

The cross-country literature adds that institutions matter as much as firm characteristics. Fan et al. (2012) find that institutional environments drive leverage and maturity choice internationally, and Demirguc-Kunt and Maksimovic (1999) attribute shortages of term finance mainly to institutional differences. Mizen and Tsoukas (2014) describe local rating agencies and widened investor access as deliberate policy levers in Thai debt-market development, and Shim (2012) shows that unrated and locally rated issuance, not internationally rated issuance, is the dominant mode by volume in emerging Asia's corporate bond markets.

Having a rating is not a prerequisite for issuing capital market debt, but the effect of access can be observed at the moment it is gained.

Hypothesis 1. Access to a wider set of debt instruments raises leverage and reduces debt concentration.

2.3 Institutional Demand and Credit Allocation

A demand channel from institutional investors to corporate issuance is documented in several forms. Zhu (2021) finds that funds holding a firm's existing bonds have a high propensity to absorb its new issues. Massa et al. (2013) show that supply uncertainty in a firm's

bond investor base lowers its leverage. Badoer and James (2016) find gap-filling behavior, in which an investor base pulls firms toward particular maturities and not only particular volumes.

The holders of short-term paper carry their own fragility. Kacperczyk and Schnabl (2010) show that money market funds bought increasingly risky paper in the run-up to 2008 without commensurate compensation, and Schmidt et al. (2016) find that the 2008 money-fund outflows concentrated among a minority of vulnerable funds. Cipriani and La Spada (2021) show that fund clienteles respond measurably to regulatory structure, using the 2014 US money fund reform, which is relevant to Thailand's 2018 rule shift in who can hold the instrument. For corporate bond funds, Goldstein et al. (2017) document a concave flow-performance relation, with outflows more sensitive to bad performance than inflows are to good performance, and Falato et al. (2021) document the resulting outflows in March 2020. Chen et al. (2010) show that fragility tracks the illiquidity of a fund's assets rather than its category label, and Ma et al. (2022) and Jiang et al. (2021) show that funds meet redemptions by selling their most liquid holdings first, which exposes short-dated paper to redemption-driven selling before less liquid positions. Worasak et al. (2022) provide Thai evidence that low interest rates are associated with reaching for yield, with individuals and money market funds the investor types showing the bias.

Funds hold most of the commercial paper issued in Thailand, and issue-level holdings matched to fund allow the channel from appetite to issuance to be tested directly in our study.

Hypothesis 2. Institutional demand from mutual funds shapes which firms issue commercial paper.

2.4 Short-Term Debt, Investment, and Precautionary Liquidity

Do firms with commercial papers behave differently? A more flexible capital structure may enhance investment capacity. Biguri (2023) provides evidence that firms with greater access to unsecured debt – such as commercial papers – invest more, even controlling for cash flow. This finding is related to Gilchrist and Himmelberg (1995) and Almeida and Campello (2007), who demonstrate that access to external finance, particularly flexible short-term debt, influences investment sensitivity to cash flow. This aligns with the notion that capital market access can alleviate financial constraints, allowing firms to finance both long-term capital expenditures and short-term liquidity needs.

On the other hand, the use of short-term financing also increases the rollover exposure. Almeida et al. (2012) find that firms whose long-term debt matured shortly after the 2007 credit

crisis cut investment substantially more than otherwise similar firms, demonstrating that rollover exposure can depress investment. Duchin et al. (2010) find the same pattern following the same shock, concentrated among firms with low cash reserves and high net short-term debt, and concludes on a precautionary savings motive for seemingly excess cash, which Jensen (1986) views as prone to wasteful investment.

The precautionary strand provides the alternative view to Jensen's perdiction. Harford et al. (2014) show that firms with shorter-maturity debt face refinancing risk and hold larger cash reserves to mitigate it, insurance rather than idle surplus awaiting a spending decision. Bates et al. (2009) document the secular rise in US corporate cash holdings, consistent with the earlier observations by Opler et al. (1999) that excess cash accumulates without a matching spending or payout response and the precautionary theoretical model of Almeida et al. (2004).

Our question is whether short-term market access finances real activity, or is held back by rollover risk. Biguri's firms are US issuers with a rating and an existing bond, and most of the commercial paper entrants studied here have neither, so the collateral constraint may not be the constraint that binds them.

Hypothesis 3. Commercial paper issuance raises corporate investment.

2.5 Commercial Paper as Bridge Financing

Do firms use commercial paper as permanent financing? Kahl et al. (2015) show that a specific commercial paper borrowing raised to finance an acquisition is refinanced by long-term debt within months. Hempel et al. (2024) test the commercial-paper-to-bond transition directly and find it bidirectional, strongest among the highest-rated issuers, so graduation into bonds is not a terminal, one-way event. On the other hand, Kacperczyk and Schnabl (2010) show that US money market funds were willing to buy increasingly risky paper in the run-up to 2008 without commensurate compensation, so institutional investors can provide the channel to support the continuous rollover. In Thailand, 75-85% of outstanding commercial paper are held by mutual funds, so the mechanism to support the rollover exists.

Hypothesis 4. Commercial paper is a persistent, actively managed funding tool rather than a one-time bridge.

3. Data and Methodology

3.1 Data Sources, Sample and Treatment

We construct a firm-quarter panel dataset of Thai listed companies from 2001Q1 to 2025Q3 by merging corporate debt issuance records from the Thai Bond Market Association (ThaiBMA) with financial statement data from SETSMART. The bond-level data are manually cleaned and consolidated across issuers to account for corporate name changes, mergers, and subsidiary roll-ups. Issuances are matched to redemptions to create consistent outstanding balances over time. We classify instruments into four debt types: commercial papers (CPs), short-term bonds (with an original maturity of no more than 3 years), long-term bonds (with an original maturity of more than 3 years), and perpetual bonds (capped at 15 years).

The firm-level panel includes 908 non-financial, non-property fund firms listed on the Stock Exchange of Thailand. We exclude financial firms (I_SECTOR codes 2, 11, 16, 66) and property funds (I_SECTOR code 33), consistent with prior literature. Financial variables are obtained from SETSMART.

To analyze the role of institutional investors, we merge firm-level debt data with quarterly mutual fund holdings data obtained from the Securities and Exchange Commission (SEC) public API. This dataset covers the period from 2021Q3 to 2025Q3 and enables us to determine the share of each firm's CP and bond holdings held by mutual funds, with a particular focus on money market funds.

3.2 Key Variables

We construct the following primary variables for analysis:

Treatment

A firm is treated if it issues commercial paper at any point in the sample, and its treatment date is the quarter of its first issuance $c_i = \min\{ t: \text{CPIssued}_{it} > 0 \}$, where c_i is the treatment cohort of firm i and CPIssued_{it} is the value of commercial paper issued by firm i in quarter t. Control firms never issue commercial paper.

Treatment is absorbing and staggered. Firms enter at 47 distinct quarters, and 23 of those cohorts contain a single firm. Event time is $e = t - c_i$, the analysis window is $e \in [-8, +8]$, and $e = -1$ is the omitted reference period throughout.

Debt Structure

Debt shares are calculated as the proportion of CPs, short-term bonds, long-term bonds, perpetual bonds, and residual "other debt" in total interest-bearing debt. To measure the

concentration of a firm's debt portfolio, we compute a normalized Herfindahl-Hirschman Index (HHI) based on the firm's shares of different debt types. This normalization ensures comparability across firms by adjusting for the number of debt categories (Colla et al., 2013, 2020). Let $s_{j,it}$ denote the share of debt type $j \in \{CP, STB, LTB, PERP, Oth\}$ in total debt from firm i in quarter t. The unadjusted HHI is given by:

$$HHI_{it}^{unadj} = \sum_{j=1}^{5} s_{j,it}^2 \tag{1}$$

Since HHI is sensitive to the number of categories, we normalize it as:

$$HHI_{it} = \frac{HHI_{it}^{unadj} - 1/5}{1 - 1/5} \tag{2}$$

The index ranges from 0 (fully diversified across five debt types) to 1 (all debt concentrated in a single type). Firms without capital market debt have an HHI of 1 by construction.

Investment

Investment is the change in fixed assets plus depreciation, scaled by lagged assets. Leverage is total interest-bearing debt over assets, and leverage excluding commercial paper omits the instrument from the numerator.

The event-study controls are lagged Tobin's q, size, ROA, and tangibility, and the panel regressions add cash flow, leverage, and the Kaplan and Zingales (1997) index. All ratios are winsorized at the 1st and 99th percentiles by quarter. Table 1 reports summary statistics for every variable that enters any regression below.

Controls include variables often used in the leverage and investment literature (Almeida & Campello, 2007; Booth et al., 2001; Chen & Chen, 2012).The event-study controls are lagged Tobin's q (calculated as the book value of long-term debt plus market capitalization divided by total assets), size, ROA, and tangibility, and the panel regressions add cash flow, leverage, and the Kaplan and Zingales (1997) index as implemented by Lamont et al. (2001). All ratios are winsorized at the 1st and 99th percentiles by quarter. Table 1 reports summary statistics for every variable that enters any regression below.

Table 1: Summary Statistics and Covariate Balance

Panel A reports selected summary statistics for the firm-quarter panel of Thai listed non-financial firms from 2001Q1 to 2025Q3. The full panel contains 45,504 firm-quarter observations; the debt Herfindahl index is available for 45,502 observations. Investment, total-asset growth, leverage, leverage ex-CP, the change in liquid assets, and the lagged controls are winsorized by calendar quarter at the 1st and 99th percentiles. CP outstanding/assets, bond debt/assets, the non-CP non-bond residual, the bond indicator, and the debt Herfindahl index are not winsorized. Investment equals the change in net fixed assets plus depreciation, scaled by lagged assets, so it may be negative when disposals and write-downs exceed additions. Panel B reports balance before and after propensity-score matching. Before matching, the sample contains 187 treated and 721 control firms; after matching it contains 130 treated and 152 control firms. SMD denotes the standardized mean difference, and the variance ratio compares treated and control variances after matching. Matching is nearest-neighbor with up to three controls, exact on entry quarter and industry, within a caliper of 0.20 propensity-score standard deviations.

Panel A: Summary Statistics

Variable	Mean	SD	P25	Median	P75
Outcomes					
Has any bond outstanding (0/1)	0.1772	0.3818	0.0000	0.0000	0.0000
Leverage (total interest-bearing debt / assets)	0.2818	0.2407	0.0901	0.2579	0.4267
Leverage ex-CP (interest-bearing debt net of CP / assets)	0.2785	0.2390	0.0893	0.2546	0.4198
CP outstanding / assets	0.0033	0.0190	0.0000	0.0000	0.0000
Bond debt / assets	0.0315	0.0834	0.0000	0.0000	0.0000
Non-CP, non-bond debt / assets (residual)	0.2536	0.3517	0.0740	0.2113	0.3667
Debt Herfindahl (HHI)	0.8903	0.2444	1.0000	1.0000	1.0000
Investment (Δfixed assets + depreciation / lag assets)	0.0049	0.0365	-0.0057	-0.0003	0.0080
Total assets growth (Δat / lag at)	0.0168	0.0944	-0.0222	0.0060	0.0412
Δ Liquid assets (cash + investment securities) / lag assets	0.0023	0.0724	-0.0150	-0.0000	0.0156
Controls					
Tobin's Q (t-1)	1.2633	1.1047	0.6931	0.9386	1.4014
Firm size (t-1)	15.2228	1.5579	14.0625	14.9931	16.1267
ROA (t-1)	0.0312	0.1188	-0.0016	0.0381	0.0818
Tangibility (t-1)	0.3546	0.2370	0.1519	0.3327	0.5308
Cash flow / assets (t-1)	0.0620	0.1071	0.0046	0.0622	0.1241
Leverage (t-1)	0.2815	0.2416	0.0895	0.2578	0.4264
KZ index (t-1)	2.8825	2.5370	1.4551	2.3868	3.5116

Panel B: Covariate balance, matched event-study sample

Covariate	Treated mean (before)	Control mean (before)	SMD (before)	Treated mean (after)	Control mean (after)	SMD (after)	Variance ratio (after)
Tobin's Q (t-1)	1.5763	1.2983	0.2593	1.4672	1.4189	0.0451	0.3786
Firm size (t-1)	15.8429	14.8894	0.6375	15.4558	15.5158	-0.0401	0.9405
ROA (t-1)	0.0481	0.0324	0.2369	0.0431	0.0441	-0.0150	0.5391
Leverage (t-1)	0.3362	0.2465	0.5221	0.3018	0.2738	0.1632	0.6652

3.3 Propensity Score Matching

Each treated firm is matched, at its own entry quarter, to non-issuing firms on a propensity score from a logit of treatment on lagged Tobin's q, size, ROA, and leverage. Matching is nearest-neighbour with up to three controls per treated firm, exact on calendar quarter and industry, within a caliper of 0.20 propensity-score standard deviations. Matched controls inherit the event date of the treated firm.

The caliper was chosen on two criteria. Dropping it roughly doubles the worst covariate imbalance, from a maximum absolute standardized mean difference of 0.163 to 0.318, and fails the joint pre-trend test. Tightening it to 0.10 raises imbalance to 0.187 and cuts the treated sample to 104 firms, so the 0.20 window dominates on both criteria and retains 130 of 187 treated issuers. Residual imbalance is concentrated in lagged leverage, at 0.163 after matching against 0.522 before, within the conventional 0.25 tolerance but above the stricter 0.10 threshold (Table 1, Panel B).

3.4 Difference-in-Differences Estimators

Under staggered adoption, the conventional two-way fixed-effects estimator uses already-treated units as controls for later-treated units. These forbidden comparisons bias the estimate when treatment effects differ across cohorts or evolve over event time, so we estimate four specifications of increasing robustness, which the tables report as Columns (1) through (4). Column (1) is a pooled difference-in-differences with no fixed effects. Column (2) adds firm and calendar-quarter fixed effects:

$$y_{it} = \delta\,(\text{Treated}_i \times \text{Post}_{it}) + X'_{i,t-1}\gamma + \alpha_i + \lambda_t + \varepsilon_{it} \qquad (3)$$

where y_{it} is the outcome, Treated_i indicates a firm that ever issues commercial paper, $\text{Post}_{it} = \mathbf{1}\{e_{it} \geq 0\}$ indicates the quarters from entry onward, $X_{i,t-1}$ collects the lagged event-study controls, and α_i and λ_t are firm and calendar-quarter fixed effects.

Column (3) is the interaction-weighted estimator of Sun and Abraham (2021), our primary specification, which fits a fully saturated set of cohort-by-relative-period interactions:

$$y_{it} = \sum_{c} \sum_{e \neq -1} \delta_{c,e} \; \mathbf{1}\{C_i = c\} \, \mathbf{1}\{t - c = e\} + X'_{i,t-1}\gamma + \alpha_i + \lambda_t + \varepsilon_{it} \tag{4}$$

where C_i is firm i's cohort and the $e = -1$ term is omitted as the reference period. Never-treated firms are assigned a cohort value outside the sample range so that they contribute only as comparisons. The cohort-specific effects are aggregated into an average post-treatment effect $\widehat{\text{ATT}} = \sum_{e \geq 0} \omega_e \sum_c \pi_c \; \hat{\delta}_{c,e}$, where π_c is the share of treated units in cohort c and ω_e weights relative periods within the post-treatment window. Because each $\hat{\delta}_{c,e}$ is identified only against not-yet-treated and never-treated units, no already-treated unit serves as a control.

Column (4) is the doubly robust estimator of Callaway and Sant'Anna (2021), which computes group-time average treatment effects against the never-treated comparison group with a universal base period. The estimator is semiparametric, so it yields no control coefficients and no adjusted R^2, and its standard errors come from a multiplier bootstrap with 999 resamples clustered by firm.

Parallel trends is assessed two ways. For the two-way fixed-effects specification we test the joint hypothesis that all pre-treatment leads are zero with a Wald test . For Sun and Abraham, we examine the individual lead coefficients and the smallest of their p-values, a minimum over seven uncorrected tests and therefore a diagnostic, not a hypothesis test.

4. Debt Composition and the On-Ramp

4.1 Bond-Market Access After First Issuance

First, we examine whether a firm's first commercial paper issuance opens access to the bond market. Table 2 reports difference-in-differences estimates of the probability of having a bond outstanding in the quarters surrounding first issuance, estimated on the matched panel described in Section 3.3. The outcome is an indicator for having any bond outstanding, and the window for the difference-in-differences analysis is eight quarters either side of entry.

We define analysis samples in two ways: Panel A restricts the sample to firms with no bond outstanding in the quarter before entry, and Panel B pools all matched firms. The restriction in Panel A removes the mechanical possibility that the estimate reflects access a

firm already had, since a firm holding a bond at entry will likely have bonds outstanding several quarters on, and an estimate on the pooled sample mixes new access with reissuance. Among firms with no bond before entry, 41.7% have a bond outstanding (thus, issue a bond) within eight quarters of first issuance, against 4.6% of matched firms that did not enter. Without the restriction, the corresponding rates are 55.3% for treated firms and 9.3% for controls.

Table 2: Bond-Market Access After First Commercial Paper Issuance

This table reports difference-in-differences estimates of the probability that a firm has any bond outstanding around its first commercial paper issuance. Panel A restricts the matched sample to firms with no bond outstanding in the quarter before entry, isolating new access rather than continued use of existing access; Panel B uses the full matched sample. Column (1) is pooled difference-in-differences without fixed effects, column (2) adds firm and calendar-quarter fixed effects, column (3) is the interaction-weighted estimator of Sun and Abraham (2021), and column (4) is the doubly robust estimator of Callaway and Sant'Anna (2021). The event window is eight quarters before through eight quarters after first issuance, with t = -1 omitted. The primary specification is Panel A, column (3). Standard errors are clustered by firm and are reported in parentheses. Callaway-Sant'Anna standard errors use a multiplier bootstrap with 999 resamples clustered by firm. Stars correspond to the statistical significance level, with *, **, and *** representing 10%, 5%, and 1%, respectively.

Panel A: No bond outstanding at first CP issuance

	(1) DiD, no FE	(2) DiD + TWFE	(3) Sun-Abraham	(4) Callaway-Sant'Anna
CP issuance (Treated × Post)	0.233***	0.187***	0.243***	0.217***
	(0.038)	(0.036)	(0.034)	(0.043)
Treated group	-0.005			
	(0.008)			
Post-issuance	0.010			
	(0.009)			
Tobin's Q (t-1)	0.003	0.008	0.003	
	(0.005)	(0.006)	(0.004)	
Firm size (t-1)	0.040***	0.095***	0.062*	
	(0.010)	(0.033)	(0.032)	
ROA (t-1)	-0.061	0.064	0.046	
	(0.053)	(0.068)	(0.072)	
Tangibility (t-1)	0.005	0.155	0.067	
	(0.035)	(0.144)	(0.137)	
Firm FE	No	Yes	Yes	Not Applicable
Quarter FE	No	Yes	Yes	Not Applicable
SE clustering	Firm	Firm	Firm	Firm
Observations	3,495	3,495	3,494	3,495
Number of firms	215	215	215	215
Adjusted R-squared	0.216	0.484	0.620	Not Applicable

Panel B: All first-time CP issuances

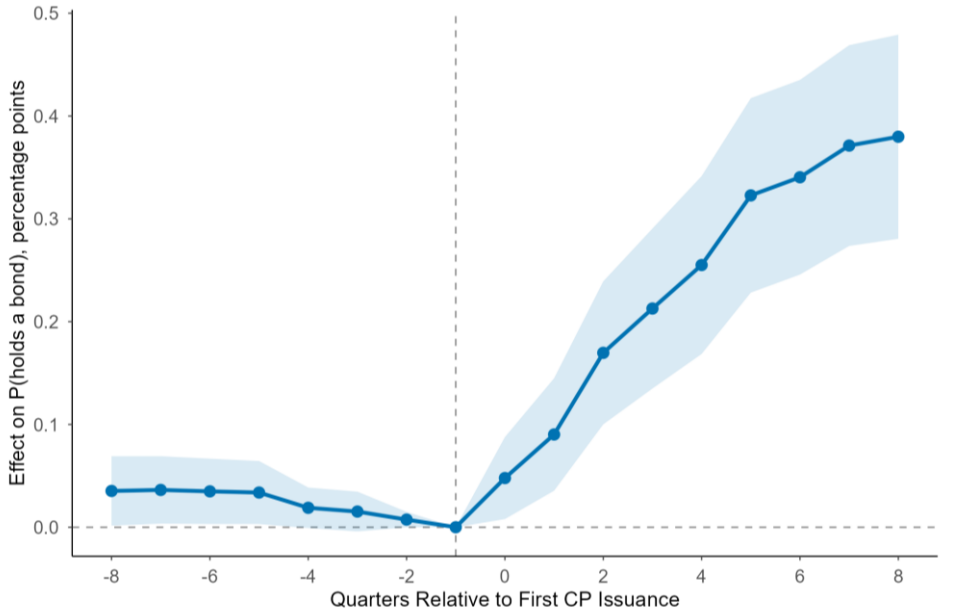
	(1) DiD, no FE	(2) DiD + TWFE	(3) Sun-Abraham	(4) Callaway-Sant'Anna
CP issuance (Treated × Post)	0.211***	0.174***	0.160***	0.119***
	(0.035)	(0.031)	(0.030)	(0.041)
Treated group	0.098***			
	(0.035)			
Post-issuance	0.013			
	(0.012)			
Tobin's Q (t-1)	0.015	0.006	0.002	
	(0.011)	(0.007)	(0.005)	
Firm size (t-1)	0.111***	0.110***	0.082**	
	(0.016)	(0.033)	(0.036)	
ROA (t-1)	-0.112	-0.023	-0.030	
	(0.095)	(0.073)	(0.081)	
Tangibility (t-1)	0.028	0.048	-0.017	
	(0.068)	(0.124)	(0.127)	
Firm FE	No	Yes	Yes	Not Applicable
Quarter FE	No	Yes	Yes	Not Applicable
SE clustering	Firm	Firm	Firm	Firm
Observations	4,432	4,432	4,427	4,432
Number of firms	282	282	282	282
Adjusted R-squared	0.297	0.745	0.779	Not Applicable

In Column 3 of Table 2 Panel A, the interaction-weighted estimator of Sun and Abraham (2021) (our primary specification), commercial paper issuers are 24.3% more likely to have bonds outstanding after first commercial paper issuance, statistically significant at the 1% level. The treatment effect is robust under alternative econometric specifications. There are two qualifications to the access-restricted panel. Test statistic of the pre-trend is significant, and Figure 2 shows the pre-period path drifting toward zero rather than flat. We therefore interpret the post-entry rise as qualified by the pre-trend evidence.

We plot the quarterly event-time path in Figure 2, and the effect is 4.8 percentage points in the quarter of entry, rising monotonically across the window to 38.0% eight quarters after. Set against a matched-control rate of 4.6%, the shape of the path suggests a significant change in market access.

Figure 2. Bond-market access after first commercial paper issuance

This figure plots the Sun-Abraham event-study path for the probability that a firm has a bond outstanding, in percentage points relative to t = -1. The sample is restricted to matched firms with no bond outstanding before first commercial paper issuance. Event time is measured in quarters from first issuance, and the shaded area is the 95% confidence interval.



Turning to the pooled sample (Panel B), the difference-in-differences coefficients are also positive and robust across all specifications. However, it is important to note that the bond-outstanding among treated firms rises from 14.3% eight quarters before entry to 27.7% in the quarter before entry and to 54.8% eight quarters after, while the control rate stays roughly flat over the same window. But the treated trajectory accelerates at entry, from roughly 1.4% per quarter beforehand to roughly 3.8% per quarter afterward. Firms that go on to enter commercial paper are on a rising trajectory toward bond access before their first issuance. Because the pooled specification suggests a pre-trend, we interpret the result as corroborating the finding in Panel A.

Across both panels, the control coefficients tell a consistent story. Firm size is positive and significant in every column, so larger firms are more likely to have bonds outstanding. Tobin's q, profitability, and tangibility are insignificant throughout, which is itself informative, since none of the standard cross-sectional predictors of bond-market presence separates the firms that issue a bond from those that do not once firm and quarter fixed effects are in place.

Diversification accompanies the new access. In Table 3, we replace the indicator variable with the Herfindahl-Hirschman index of debt-instrument concentration computed from Equation 2. The coefficient of the Sun-Abraham specification shows that HHI falls by

0.254 after entry, and the effect is statistically significant at 1% level and robust across all specifications. This finding is consistent with Colla et al. (2013) and Rauh and Sufi (2010), who document diversification across debt types. Our finding suggests that commercial paper is the instrument for financing diversification.

Table 3: Debt-Instrument Concentration After First Commercial Paper Issuance

This table reports difference-in-differences estimates for the normalized Herfindahl-Hirschman index of debt-instrument concentration computed from Equation 2. The index is constructed from the shares of commercial paper, short-term bonds, long-term bonds, perpetual securities, and other interest-bearing debt. Lower values indicate greater diversification. The matched event-study sample, event window, controls, and four estimators are the same as in Table 2. Column (3), the Sun-Abraham interaction-weighted estimate, is the primary specification. Standard errors are clustered by firm and appear in parentheses. Callaway-Sant'Anna standard errors use a multiplier bootstrap with 999 resamples clustered by firm. Stars correspond to the statistical significance level, with *, **, and *** representing 10%, 5%, and 1%, respectively.

	(1) DiD, no FE	(2) DiD + TWFE	(3) Sun-Abraham	(4) Callaway-Sant'Anna
CP issuance (Treated × Post)	-0.277***	-0.279***	-0.254***	-0.229***
	(0.022)	(0.020)	(0.020)	(0.026)
Treated group	-0.064***			
	(0.020)			
Post-issuance	-0.004			
	(0.006)			
Tobin's Q (t-1)	-0.010	-0.005	-0.004	
	(0.007)	(0.004)	(0.003)	
Firm size (t-1)	-0.053***	-0.041*	-0.039*	
	(0.009)	(0.021)	(0.021)	
ROA (t-1)	0.029	0.042	0.027	
	(0.051)	(0.045)	(0.041)	
Tangibility (t-1)	0.019	0.035	0.095	
	(0.039)	(0.086)	(0.076)	
Firm FE	No	Yes	Yes	Not Applicable
Quarter FE	No	Yes	Yes	Not Applicable
SE clustering	Firm	Firm	Firm	Firm
Observations	4,430	4,430	4,425	4,430
Number of firms	282	282	282	282
Adjusted R-squared	0.455	0.775	0.809	Not Applicable

4.2 Leverage and Debt Composition

Next, we examine leverage. Table 4 reports difference-in-differences estimates in two panels, total leverage and leverage excluding commercial paper. In the first panel, total leverage rises by 4.37% after entry in Column (3), our primary specification, and the estimate remains significant under the alternative estimators in the remaining columns. A leverage

response to market access is the level effect that Faulkender and Petersen (2006) document for firms gaining access to public bond markets.

To investigate whether commercial paper is additive or substitutive, Panel B uses leverage excluding commercial paper. The treatment effect is insignificant under both the two-way fixed-effects and staggered treatment (Sun-Abraham and Callaway-Sant'Anna) specifications. The expansion in total borrowing is therefore not attributable to debt beyond the new instrument itself, and the question becomes what happens to the rest of the debt structure.

Table 4: Leverage After First Commercial Paper Issuance

This table reports difference-in-differences estimates for total interest-bearing debt over assets in Panel A and interest-bearing debt net of commercial paper over assets in Panel B. The total-leverage result is partly mechanical because the treatment is first commercial paper issuance and commercial paper enters the numerator. Panel B is the non-mechanical counterpart. The matched event-study sample, event window, controls, and estimator columns are the same as in Table 2. Column (3), the Sun-Abraham interaction-weighted estimate, is the primary specification. Standard errors are clustered by firm and are reported in parentheses. Callaway-Sant'Anna standard errors use a multiplier bootstrap with 999 resamples clustered by firm. Stars correspond to the statistical significance level, with *, **, and *** representing 10%, 5%, and 1%, respectively.

Panel A: Leverage

	(1) DiD, no FE	(2) DiD + TWFE	(3) Sun-Abraham	(4) Callaway-Sant'Anna
CP issuance (Treated × Post)	0.074***	0.042***	0.044***	0.070***
	(0.016)	(0.011)	(0.011)	(0.016)
Treated group	0.038*			
	(0.020)			
Post-issuance	-0.033***			
	(0.011)			
Tobin's Q (t-1)	-0.013*	0.008	0.006	
	(0.007)	(0.006)	(0.007)	
Firm size (t-1)	0.011	0.136***	0.131***	
	(0.007)	(0.017)	(0.019)	
ROA (t-1)	-0.432***	-0.311***	-0.324***	
	(0.099)	(0.080)	(0.088)	
Tangibility (t-1)	0.097**	0.082	0.063	
	(0.038)	(0.066)	(0.085)	
Firm FE	No	Yes	Yes	Not Applicable
Quarter FE	No	Yes	Yes	Not Applicable
SE clustering	Firm	Firm	Firm	Firm
Observations	4,432	4,432	4,427	4,432
Number of firms	282	282	282	282
Adjusted R-squared	0.150	0.794	0.779	Not Applicable

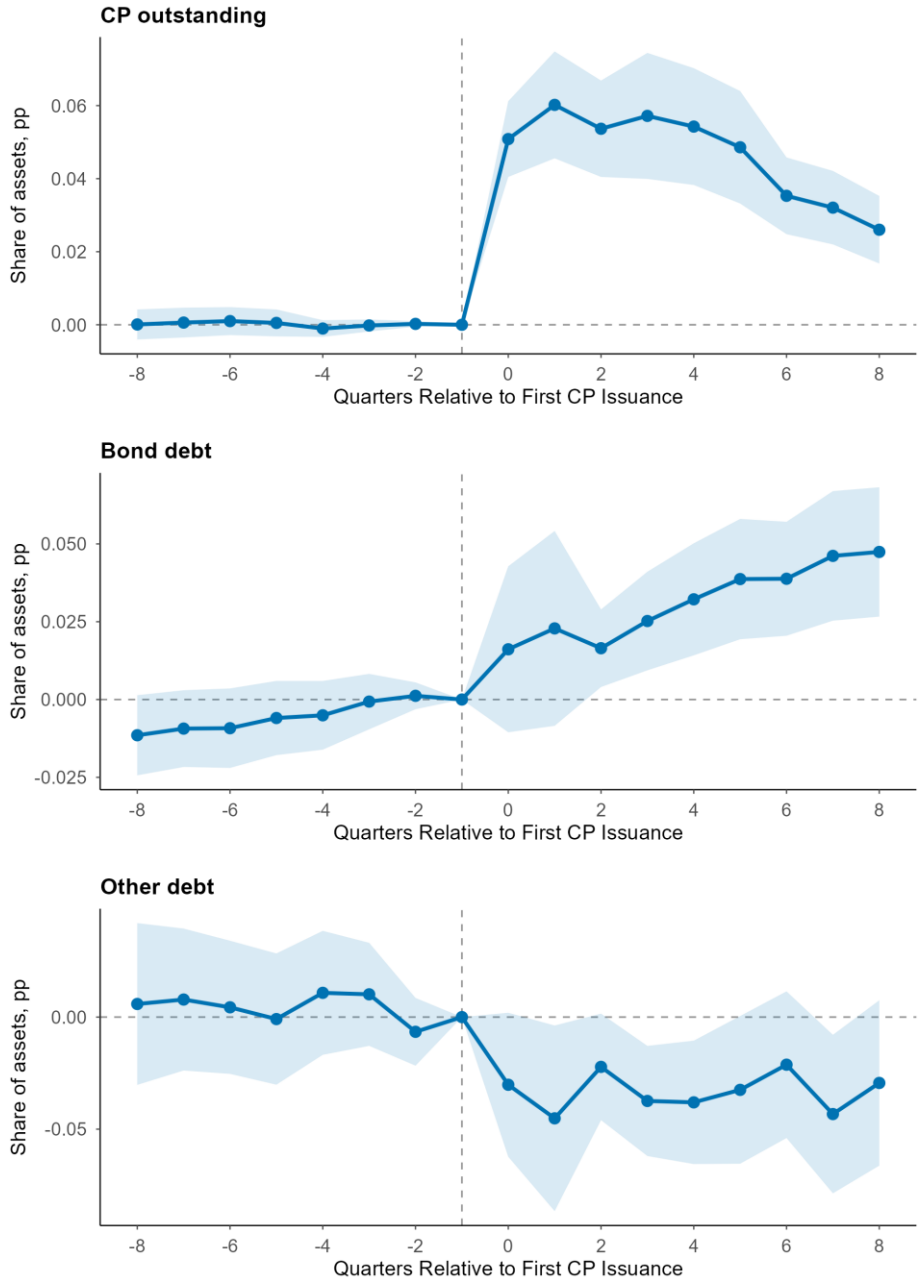
Panel B: Leverage excluding commercial papers

	(1) DiD, no FE	(2) DiD + TWFE	(3) Sun-Abraham	(4) Callaway-Sant'Anna
CP issuance (Treated × Post)	0.029*	-0.005	-0.001	0.025
	(0.016)	(0.012)	(0.011)	(0.016)
Treated group	0.037*			
	(0.020)			
Post-issuance	-0.033***			
	(0.010)			
Tobin's Q (t-1)	-0.014**	0.009	0.006	
	(0.007)	(0.005)	(0.007)	
Firm size (t-1)	0.013*	0.133***	0.125***	
	(0.007)	(0.017)	(0.019)	
ROA (t-1)	-0.423***	-0.292***	-0.306***	
	(0.100)	(0.080)	(0.089)	
Tangibility (t-1)	0.100***	0.097	0.074	
	(0.038)	(0.066)	(0.086)	
Firm FE	No	Yes	Yes	Not Applicable
Quarter FE	No	Yes	Yes	Not Applicable
SE clustering	Firm	Firm	Firm	Firm
Observations	4,432	4,432	4,427	4,432
Number of firms	282	282	282	282
Adjusted R-squared	0.118	0.782	0.769	Not Applicable

Overall, the results support Hypothesis 1 with two qualifications. Debt-instrument concentration falls and total leverage rises after first commercial paper issuance, consistent with the market-access mechanism in Faulkender and Petersen (2006). However, the leverage estimate partly reflects the instrument entering total debt mechanically, leverage ex-CP is insignificant overall, and the HHI result carries a non-flat pre-period diagnostic. The interpretation is therefore that entry expands and diversifies the financing set, not that it independently raises all non-CP borrowing.

Figure 3: Commercial paper, bond debt, and other debt around entry

This figure plots Sun-Abraham event-study paths for commercial paper outstanding, bond debt, and non-CP non-bond debt around first commercial paper issuance. Each outcome is scaled by total assets and reported in percentage points relative to t = -1. Event time is measured in quarters from first issuance, and shaded areas are 95% confidence intervals. The panels share an event-time axis but use separate y-axes, all in percentage points of assets. Other debt is the residual interest-bearing debt category and should not be interpreted as bank debt alone.



5. Institutional Demand and Corporate Investment

5.1 Who Holds Commercial Paper

We now examine who holds this paper and whether their demand shapes which firms issue. Figure 4 plots commercial paper outstanding by holder category, with bonds as the comparison. Mutual funds hold 75 to 85% of outstanding commercial paper by value. Within the fund-held total, short-term bond funds hold 52 to 59% of the market, and money market funds hold 12 to 19% in a typical quarter. Roughly three-quarters of the fund-held total are in open-ended vehicles offering daily redemption.

Figure 4: Mutual fund holdings of commercial paper and bonds

This figure reports quarter-end mutual-fund holdings as a share of outstanding face value. The left panel decomposes non-financial corporate commercial paper by fund category: short-term bond funds, money-market funds, other categorized funds, and uncategorized funds. The right panel reports bonds held by all mutual funds combined. The SEC holdings data are available from 2021Q3 but the displayed series begins in 2021Q4 for legibility.

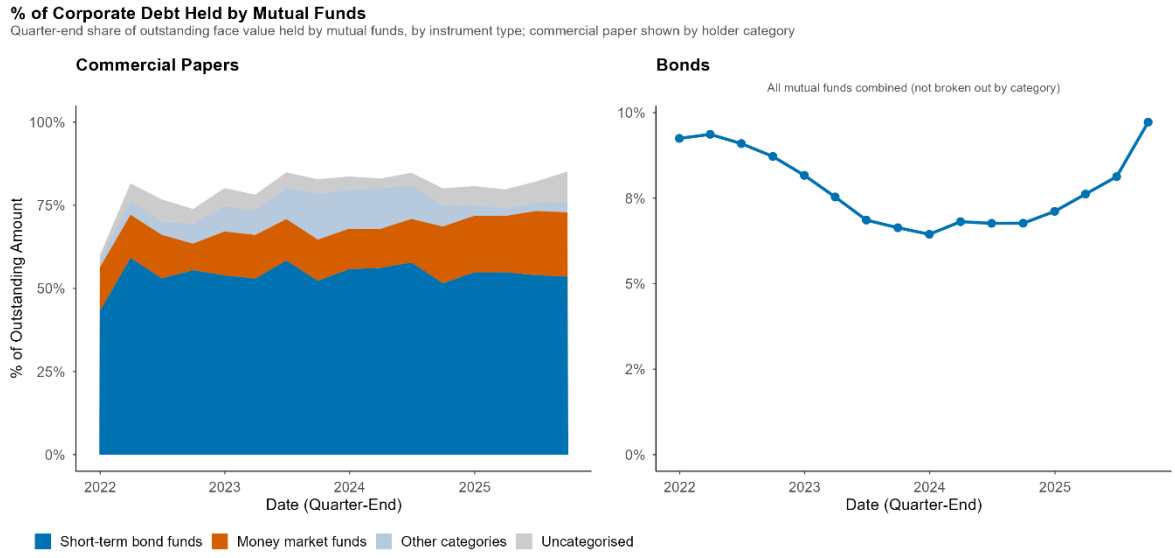


Table 5 compares issuers whose paper funds hold with issuers whose paper they do not, over 2021Q3 to 2025Q3. Funds concentrate in larger, better-rated issuers, and only rarely do they hold commercial paper from unrated issuers. The fund holding data shows that money market funds hold 81.4% in government and central bank paper, 88.2% once bank deposits are included, leaving roughly a tenth of the book structurally reachable by any corporate issuer at all. For short-term bond funds, the proportion invested in corporate issuers is around 25%.

In unreported analysis, we also find that while a fund typically does not investment too much of its asset under management in a single issuer (a fund's median position in a commercial paper issue is 3.5% of its own net asset value), asset management companies as a

whole can hold a substantial portion of the issuer's outstanding commercial paper (a median commercial paper issuer has 87.4% of its outstanding commercial paper held by funds).

Table 5: Characteristics of Fund-Held and Not-Fund-Held Commercial Paper Issuers

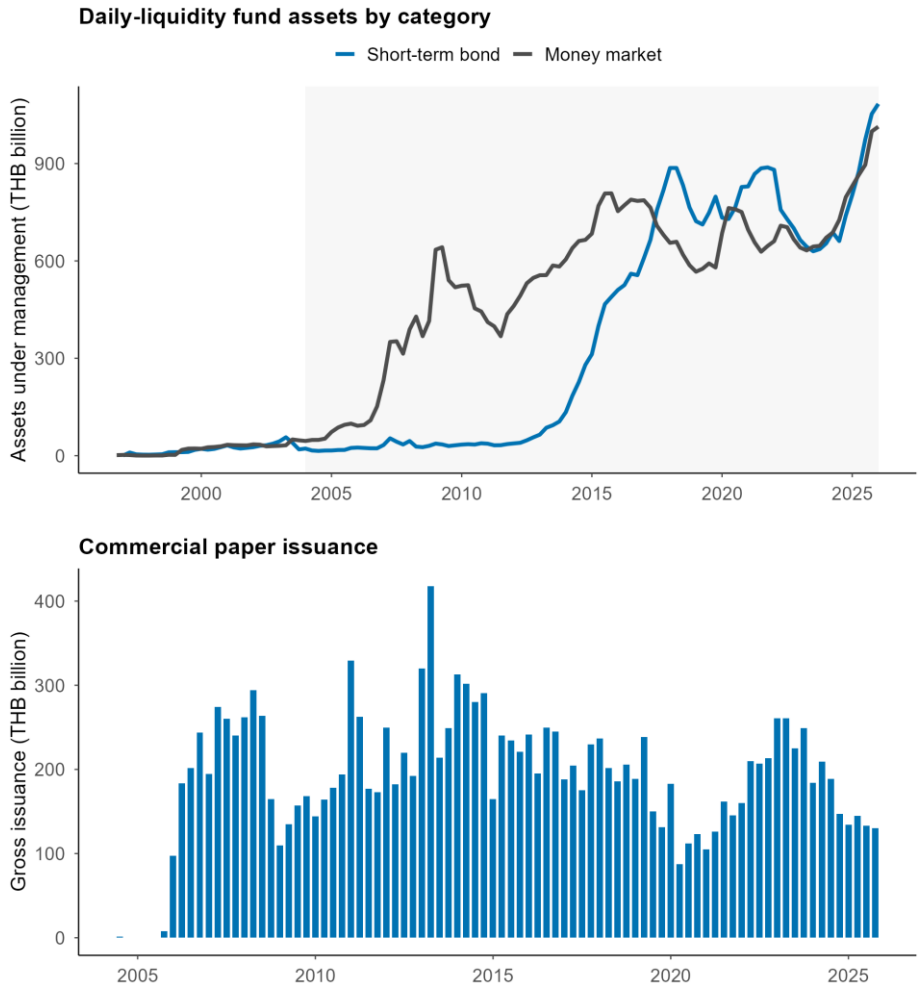
This table compares firm-quarter characteristics of issuers with commercial paper outstanding whose paper is held by mutual funds with those whose paper is not fund-held. The sample is restricted to the SEC fund-holdings window, 2021Q3 to 2025Q3. The fund-held group contains 383 firm-quarters and 42 distinct firms; the not-fund-held group contains 45 firm-quarters and 26 distinct firms. Entries are group means, and the p-value is from a two-sample test of the difference in means. Size is log total assets. Leverage is total interest-bearing debt/assets. The rating variables use the issuer-level rating series, wheret e numeric rating scale is increasing in credit quality. Commercial paper outstanding is in millions of baht, and HHI is the debt-instrument concentration measure used elsewhere in the paper. This table describes contemporary holder selection and is not used to characterize or explain the earlier first-entry cohort. Only 11 of the 187 first-time entrants fall within the holdings window.

Variable	Fund-held	NOT fund-held	p-value
Size (log assets)	18.259	17.062	0.000
Leverage	0.470	0.476	0.734
Tobin's Q	0.989	1.017	0.729
ROA	0.038	0.035	0.584
Tangibility	0.232	0.206	0.456
Unrated (share)	0.013	0.311	0.000
Investment grade (share)	0.554	0.222	0.000
Speculative grade (share)	0.433	0.467	0.677
Avg rating (num, high=better)	15.769	9.811	0.000
CP outstanding (M)	5,626.81	713.32	0.000
CP share of debt	0.078	0.047	0.000
Debt concentration (HHI)	0.265	0.366	0.013
Real estate developer (share)	0.504	0.578	0.352

Figure 5 plots money market fund and short-term bond fund assets under management separately against commercial paper issuance using data from Morningstar. We will use this information to investigate whether the increased popularity of money market fund and short-term bond fund is related to commercial paper issuance, given their extensive participation illustrated by Figure 4.

Figure 5: Fund assets and commercial paper issuance

This figure plots assets under management for daily-liquidity money-market funds and short-term bond funds separately, in billions of baht, against gross commercial paper issuance, also in billions of baht. The shaded area marks the regression window beginning in 2004Q1. The panels use separate y-axes. The two fund categories are not summed because their associations with issuance have opposite signs in Table 6.



5.2 Tests of a Demand Channel

Next, we test whether fund demand determines which firms issue. We regress the probability of issuance on aggregate fund-category assets:

$$\mathbf{1}\{\text{CPIssued}_{it} > 0\} = \beta\, \Delta\log F_t^k + Z'_{i,t-1}\gamma + \alpha_i + \varepsilon_{it} \qquad (5)$$

where F_t^k is aggregate assets under management of fund category k, $Z_{i,t-1}$ include firm size, Tobin's q, ROA and α_i are firm fixed effects. This linear probability model does not include time fixed effects, since fund assets under management growth varies only by quarter,

a calendar-quarter effect would absorb the aggregate regressor. Standard errors are clustered by quarter, the level at which the identifying regressor varies.

Table 6 reports linear probability models of quarterly commercial paper issuance on growth in aggregate fund assets. The two fund clienteles are entered separately. The correlation in log differences between the two series is 0.42 with a variance inflation factor of 1.22, so the two are separately identified.

Table 6: Fund-Category Asset Growth and Commercial Paper Issuance

This table reports linear probability models in which the dependent variable equals one when a firm issues commercial paper in the quarter. Money-market-fund and short-term-bond-fund assets under management enter as quarterly log differences and are included together. Column (1) uses all firms with firm fixed effects, column (2) adds lagged firm size, Tobin's Q, and ROA, and column (3) restricts the sample to firms that issue commercial paper at some point. Calendar-quarter fixed effects are not included because the fund-growth regressors vary only by quarter and would be absorbed. Standard errors are clustered by quarter, the level at which the regressors vary, and are reporeted in parentheses. The two fund-growth series have a correlation of 0.42 in log differences and a variance inflation factor of 1.22. Stars correspond to the statistical significance level, with *, **, and *** representing 10%, 5%, and 1%, respectively.

	(1) All firms	(2) + firm controls	(3) Ever-CP firms
Money-market fund AUM growth	-0.0715***	-0.0346*	-0.2399***
	(0.0234)	(0.0195)	(0.0764)
Short-term bond fund AUM growth	0.0708***	0.0618***	0.2387***
	(0.0209)	(0.0188)	(0.0687)
Firm size (t-1)		0.0470***	
		(0.0048)	
Tobin's Q (t-1)		0.0097***	
		(0.0015)	
ROA (t-1)		-0.0162**	
		(0.0069)	
Firm FE	Yes	Yes	Yes
Quarter FE	No	No	No
Standard errors	Quarter	Quarter	Quarter
Observations	45,504	45,504	13,304
Number of firms	908	908	187
Adjusted R-squared	0.363	0.376	0.268

The coefficients are sharply different across the two clienteles. Money-market-fund growth is negatively associated with CP issuance, with coefficients of -0.072 for the full sample, -0.035 after adding firm controls, and -0.240 among firms that ever issue CP. By contrast, short-term bond-fund growth is positively associated with issuance, with corresponding coefficients of 0.071, 0.062, and 0.239. The signs are consistent with the holder composition in Figure 4, since short-term bond funds hold most fund-owned commercial paper

and money-market funds allocate most of their portfolios to government and central-bank instruments.

These estimates do not identify a demand-pull mechanism. The fund-growth variables vary only by quarter, so calendar-quarter fixed effects would absorb them and common macroeconomic conditions remain unexcluded. The larger coefficients among firms that ever issue commercial paper may also reflect program persistence and scale rather than a stronger causal response to fund appetite.

Supplementary designs ask whether the aggregate association survives tests closer to the proposed mechanism. A firm-level relation between lagged fund ownership and subsequent issuance becomes insignificant after controlling for program scale, and a two-quarter lag is close to zero. The aggregate cumulative relation and the exposure interaction are also insignificant but underpowered. The evidence therefore does not robustly establish that fund demand determines which firms issue.

Overall, the results do not support Hypothesis 2. Mutual funds are dominant and selective holders, and short-term-bond-fund growth is positively associated with issuance, but the available research designs do not separate that association from common market conditions or program persistence. Unlike the issuer-specific capital-supply effects in Massa, Yasuda, and Zhang (2013) and Zhu (2021), our findings do not point toward the demand channel. The results are instead consistent with ex-ante screening and subsequent programme persistence rather than demand-driven allocation.

5.3 Commercial Paper and Investment

We now examine whether commercial paper issuance raises corporate investment. First, we use the difference-in-differences estimates for first-time commercial paper issuance like previous analyses. Table 7 reports the difference-in-differences estimates for investment.

While the estimates in Column 1 and 2 are positive and statistically significant, the estimate in Column 3, our primary specification, is not. Capital expenditure does not increase as firms start issuing commercial paper. As with the leverage result, there is a small pre-trend. In supplementary analyses, we also find that net working capital and accounts receivable (proxies for shorter-term investments) are also insignificant.

Table 7: Investment, Asset Growth, and Liquid Assets After First Commercial Paper Issuance

This table reports difference-in-differences estimates around first commercial paper issuance. Panel A reports capital expenditure, defined as the change in net fixed assets plus depreciation scaled by lagged assets. Panel B reports total-asset growth. Panel C reports the change in cash plus investment securities scaled by lagged assets. The matched event-study sample, event window, controls, and estimator columns are the same as in Table 2. Column (3), the Sun-Abraham interaction-weighted estimate, is the primary specification. Standard errors are clustered by firm and are repoerted in parentheses. Callaway-Sant'Anna standard errors use a multiplier bootstrap with 999 resamples clustered by firm. Stars correspond to the statistical significance level, with *, **, and *** representing 10%, 5%, and 1%, respectively.

Panel A: Investment

	(1) DiD, no FE	(2) DiD + TWFE	(3) Sun-Abraham	(4) Callaway-Sant'Anna
CP issuance (Treated × Post)	0.006**	0.006***	0.004	0.005
	(0.003)	(0.002)	(0.003)	(0.006)
Treated group	0.005*			
	(0.003)			
Post-issuance	-0.004***			
	(0.001)			
Tobin's Q (t-1)	0.002*	0.002*	0.002*	
	(0.001)	(0.001)	(0.001)	
Firm size (t-1)	-0.000	-0.009*	-0.008	
	(0.001)	(0.005)	(0.005)	
ROA (t-1)	0.024***	0.042***	0.042***	
	(0.009)	(0.012)	(0.012)	
Tangibility (t-1)	-0.008**	-0.012	-0.012	
	(0.004)	(0.009)	(0.010)	
Firm FE	No	Yes	Yes	Not Applicable
Quarter FE	No	Yes	Yes	Not Applicable
SE clustering	Firm	Firm	Firm	Firm
Observations	4,432	4,432	4,427	4,432
Number of firms	282	282	282	282
Adjusted R-squared	0.023	0.152	0.181	Not Applicable

Panel B: Total asset growth

	(1) DiD, no FE	(2) DiD + TWFE	(3) Sun-Abraham	(4) Callaway-Sant'Anna
CP issuance (Treated × Post)	0.014*	0.032***	0.020**	0.001
	(0.008)	(0.008)	(0.010)	(0.013)
Treated group	0.016**			
	(0.007)			
Post-issuance	-0.013***			
	(0.005)			
Tobin's Q (t-1)	0.017***	0.016***	0.016***	
	(0.004)	(0.005)	(0.005)	

	(1) DiD, no FE	(2) DiD + TWFE	(3) Sun-Abraham	(4) Callaway-Sant'Anna
Firm size (t-1)	-0.003*	-0.112***	-0.108***	
	(0.002)	(0.021)	(0.021)	
ROA (t-1)	0.056*	0.155***	0.159***	
	(0.032)	(0.035)	(0.041)	
Tangibility (t-1)	-0.007	0.014	0.058	
	(0.009)	(0.048)	(0.051)	
Firm FE	No	Yes	Yes	Not Applicable
Quarter FE	No	Yes	Yes	Not Applicable
SE clustering	Firm	Firm	Firm	Firm
Observations	4,432	4,432	4,427	4,432
Number of firms	282	282	282	282
Adjusted R-squared	0.049	0.172	0.162	Not Applicable

Panel C: Change in liquid assets

	(1) DiD, no FE	(2) DiD + TWFE	(3) Sun-Abraham	(4) Callaway-Sant'Anna
CP issuance (Treated × Post)	0.011***	0.017***	0.017***	0.011
	(0.004)	(0.004)	(0.006)	(0.008)
Treated group	-0.002			
	(0.003)			
Post-issuance	-0.006*			
	(0.003)			
Tobin's Q (t-1)	0.008**	0.010*	0.012*	
	(0.003)	(0.006)	(0.007)	
Firm size (t-1)	-0.002**	-0.041***	-0.036***	
	(0.001)	(0.011)	(0.010)	
ROA (t-1)	-0.013	0.000	-0.015	
	(0.020)	(0.025)	(0.027)	
Tangibility (t-1)	0.005	0.091***	0.091***	
	(0.003)	(0.022)	(0.024)	
Firm FE	No	Yes	Yes	Not Applicable
Quarter FE	No	Yes	Yes	Not Applicable
SE clustering	Firm	Firm	Firm	Firm
Observations	4,432	4,432	4,427	4,432
Number of firms	282	282	282	282
Adjusted R-squared	0.015	0.008	-0.017	Not Applicable

The finding contrasts with what the literature find, where firms exposed to maturing debt at the 2007 credit crisis cut investment (Almeida et al., 2012; Duchin et al., 2010). While Saengchote (2024) found that at the start of the COVID-19 crisis, Thai developers with

maturing bonds faced a greater risk of fire sales, that episode was industry specific and our data does not establish that Thai entrants ever faced a comparably binding shock.

Table 7 estimates the effect of first entry into the commercial paper market. Table 8 asks a different question: whether investment is associated with the lagged stock of commercial paper that a firm carries after absorbing firm and calendar-quarter effects. The first design compares entrants with matched non-entrants around a treatment event; the second uses quarter-to-quarter variation within firms and is not identified as causal. We estimate the association between debt shares and investment on the full firm-quarter panel:

$$\text{Invest}_{it} = \beta\, \text{ShrCP}_{it} + \theta\, \text{ShrBond}_{it} + Z'_{i,t-1}\gamma + \alpha_i + \lambda_t + \varepsilon_{it} \qquad (6)$$

where $\text{Invest}_{it} = (\text{PPE}_{it} - \text{PPE}_{i,t-1} + \text{Dep}_{it})/\text{Assets}_{i,t-1}$, ShrCP_{it} is commercial paper as a share of total debt, ShrBond_{it} is the bond-plus-perpetual share, and $Z_{i,t-1}$ include Tobin's q, cash flow over assets, size, ROA, leverage, and the Kaplan-Zingales index lagged one quarter. We note that this is an association, not a causal design, unlike Biguri (2023). The panel is formed based on the same matched firms as Table 7, but we follow these firms for the entire sample rather than the 8 quarters before and after the first commercial paper issuance.

Table 8: Commercial Paper Reliance and Investment: A Panel Association

This table reports firm and calendar-quarter fixed-effects regressions of investment on lagged commercial paper and bond debt, each scaled by total assets, in the propensity-matched panel used by the event-study analysis. Column (1) includes commercial paper alone, column (2) includes bond debt alone, and column (3) includes both. The regressions add lagged Tobin's Q, cash flow/assets, firm size, ROA, leverage, and the Kaplan-Zingales index. Standard errors are clustered by firm and appear in parentheses. The table contains 20,234 firm-quarter observations from 282 firms. The coefficients are within-firm panel associations, not treatment effects of first commercial paper issuance. Firm fixed effects absorb time-invariant firm quality and calendar-quarter fixed effects absorb common shocks, but growth opportunities may still drive both commercial paper use and investment. Significance: * p < 0.10, ** p < 0.05, *** p < 0.01.

	(1) CP alone	(2) Bonds alone	(3) CP vs bonds
CP / total assets (t-1)	0.0802***		0.0790***
	(0.0243)		(0.0246)
Bond debt / total assets (t-1)		0.0068	0.0040
		(0.0063)	(0.0060)
Tobin's Q (t-1)	0.0036***	0.0036***	0.0036***
	(0.0008)	(0.0008)	(0.0008)
Cash flow / assets (t-1)	-0.0049	-0.0055	-0.0049
	(0.0036)	(0.0036)	(0.0036)
Firm size (t-1)	-0.0010	-0.0011	-0.0011
	(0.0011)	(0.0011)	(0.0011)

	(1) CP alone	(2) Bonds alone	(3) CP vs bonds
ROA (t-1)	0.0169***	0.0170***	0.0169***
	(0.0055)	(0.0055)	(0.0055)
Leverage (t-1)	-0.0132***	-0.0130***	-0.0135***
	(0.0032)	(0.0033)	(0.0033)
KZ index (t-1)	-0.0003	-0.0003	-0.0003
	(0.0002)	(0.0002)	(0.0002)
Firm FE	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes
Standard errors	Firm	Firm	Firm
Observations	20,234	20,234	20,234
Number of firms	282	282	282
Adjusted R-squared	0.053	0.051	0.053

Notably, the stock measure is positively associated with investment even though the first-entry event is not. Lagged commercial paper over assets has a coefficient of 0.0802, significant at the 1% level, in the event-study matched sample. A one-standard-deviation increase in CP reliance is associated with approximately a 0.19-percentage-point increase in investment/assets. In a related firm-level specification, firms whose commercial paper is held by mutual funds exhibit approximately 0.5 percentage points higher same-quarter investment/assets. That association is not separable from carrying listed debt at all. A firm whose paper funds hold must have paper, and adding indicators for commercial paper and bonds outstanding reduces the estimate to 0.21 percentage points. These results are directionally consistent with Biguri (2023), who shows that a negative shock to the availability of unsecured debt reduces investment. However, Biguri's design identifies a causal effect, whereas our regression estimates are associational and remain vulnerable to endogeneity. For example, unobserved growth opportunities could increase both a firm's reliance on commercial paper and its investment.

The difference-in-differences results provide a different perspective. Using the Sun-Abraham estimator, first CP issuance is associated with an approximately 2.0-percentage-point increase in total assets (Panel B). Most of this increase – approximately 1.7 percentage points, or 84% – comes from liquid assets, defined as cash and investment securities (Panel C). The evidence therefore indicates that CP proceeds are held primarily in liquid form rather than immediately converted into fixed investment.

One interpretation is precautionary liquidity, consistent with Duchin et al. (2010), Harford et al. (2014), and Opler et al. (1999). However, treated firms remain below their

matched controls in cash holdings throughout the event window. The post-entry increase therefore appears to close a pre-existing liquidity gap rather than create an exceptional cash surplus.

Overall, the primary first-entry estimate does not support Hypothesis 3. Capital expenditure does not increase on average after entry, while liquid assets account for most of the accompanying asset growth. The positive Table 8 coefficient shows that firms invest more in quarters following greater commercial paper reliance, but growth opportunities may drive both the financing choice and investment. The evidence is more consistent with precautionary cash accumulation under refinancing risk (Harford, Klasa, & Maxwell, 2014) than with the investment response to broader unsecured-debt access documented by Biguri (2023), while leaving open a smaller, non-causal association between ongoing commercial paper use and investment.

6. Bridge-Financing

The on-ramp result establishes a development function, not the absence of refinancing risk. Short-term claims can force refinancing or asset sales into an illiquid market, and rollover pressure can become credit risk even without a deterioration in fundamentals (Acharya, Gale, & Yorulmazer, 2011; He & Xiong, 2012). We therefore assess bridge-financing risk as the product of three terms: the amount of commercial paper exposed to renewal, whether firms term it out into other debt, and whether they can repay if refinancing is unavailable. The taxonomy and repayment analysis use all 187 entrants, whereas the difference-in-differences estimates in Sections 4 and 5 use the 130 treated firms retained by matching.

6.1 Entrant Taxonomy and Term-Out

We first classify entrants by bond access in the quarter of first commercial paper issuance, by issuance intensity over the next eight quarters, and by the reliance on commercial paper. Bond access at entry equals one if the firm has a bond outstanding in its entry quarter, and intensity equals one if the firm issues commercial paper in at least four of the nine quarters $e \in [0,8]$. Reliance is summed commercial paper over summed commercial paper plus bond debt across the window, defined only for firms whose summed market debt is at least THB 100 million (176 of 187). If the share of commercial paper issuance is greater than 50%, the firm is classified as CP-reliant. Figure 6 and report the resulting grids of the two classifications.

Of the 187 entrants in Panel A, 77 have no bond access and issue commercial paper intensively (constrained at entry), 45 have no bond access and issue occasionally, 35 have bond access and issue intensively, and 30 have bond access and issue occasionally. At the 2016Q3 peak, the constrained at entry group account for 26.9% of market-wide commercial paper outstanding, drawn from 64 contributing firms with the largest contributing firm accounting for 16% of the group. By the final quarter of the sample, the number in the original group drops to four firms, accounting for 6% of the market.

Figure 6. Bond access at entry and commercial paper intensity

This figure plots bond access at entry against commercial paper intensity over the [0, 8] entry window for the 187 first-time entrantsBond access is measured at entry, not acquired during the window, so the classification is pre-determined with respect to outcomes measured inside the window.

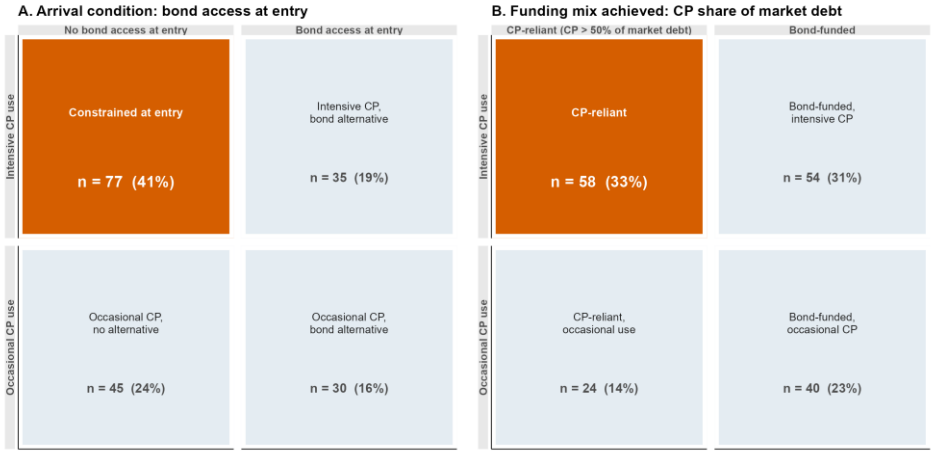


Figure 7. Commercial reliance after commercial paper issuance

The upper panel plots the mean ratio of commercial paper to commercial paper plus bonds by quarter since first issuance, separately for firms with and without a bond outstanding at entry. Solid lines use all firms observed in each event quarter; dashed lines restrict the sample to firms observed at entry and twenty quarters later. The dotted horizontal line marks the 50% CP-reliance threshold. The lower panel reports the number of firms contributing to each all-observed mean. Event time is measured in quarters since first commercial paper issuance. The dashed series holds the sample fixed at firms observed over the full twenty quarters, so the fall is not an artefact of attrition.

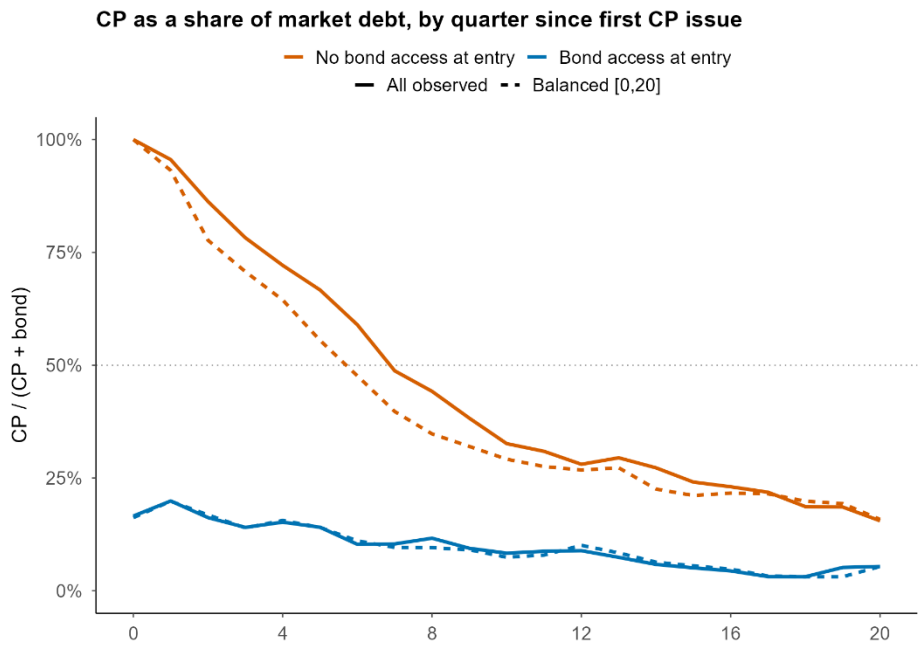


Figure 7 plots commercial paper as share of capital market debt after issuance. Commercial paper reliance falls after entry. By four quarters after entry, 41.2% of observable entrants have no paper outstanding, by eight quarters the share is 54.2%, and by twelve quarters it is 67.6%. The median entrant therefore retires the instrument within the event window.

On surface, the evidence seems to be closer to the bridge-financing episode documented by Kahl et al. (2015) than to the general persistence prediction in Hypothesis 4. However, persistence remains important among firms that reach the bond market. Of 102 observable firms who graduate to issuing bonds, 59 continue to carry commercial paper alongside their new bonds. These results describe different populations. Most entrants eventually stop using the instrument, while a majority of graduates retain it as one component of a diversified debt structure, so for some firms, their behavior is more consistent with Hempel et al. (2024) evidence that firms substitute between short- and long-term market debt in both directions.

The decline among constrained firms is driven primarily by the addition of bond debt. In the balanced panel of 51 constrained-at-entry firms, bond debt rises for 49 and falls for none, with a median increase of approximately 3 billion baht, while the median commercial paper change is only -50 million baht. The term-out mechanism is therefore growth in the non-CP denominator rather than a one-for-one retirement of paper at the moment bond access arrives.

6.2 Repayment Capacity

Repayment capacity cannot be reliably measured from the available data. Only 10.6% of commercial paper issues carry an issue-level rating, and the offering regime, accessible rating criteria, disclosure practice, and observed default cases reveal no general committed-backstop requirement. This contrasts with the committed backup lines described for the US commercial paper market by Kacperczyk and Schnabl (2010). Thai financial statements do not separate committed from uncommitted undrawn bank facilities, so no firm-level backup-liquidity variable can be constructed.

Observed commercial paper retirement provides a lower bound on the obligation. We can observe 162 of the 187 entrants beyond their last commercial paper issuance. Every observable balance reaches zero, with a median of two quarters and none remaining beyond three quarters. However, we cannot accurately determine whether commercial paper retirement came from cash, replacement borrowing, restructuring, or another source.

In any case, the retired amounts are material. In all, 124 entrants retire at least 1% of assets without rolling the balance. The burden is largest for firms with fewer alternatives. Entrants without bond access retire a median 3.85% of assets, compared with 1.71% among firms entering with a bond. Absolute program size comparison is in the opposite direction because firms without bond access are smaller, with median programs of 200 million baht compared with 300 million baht for those with access.

Overall, the results do not support Hypothesis 4 as written. Commercial paper is termed out for the median entrant rather than maintained permanently. Persistence characterizes a majority of firms that reach the bond market, where the instrument remains one funding line among several. The refinancing obligation is most material relative to assets among firms that entered without a bond-market alternative, and their repayment capacity cannot be observed directly.

6.3 Contemporary Market: 2024-25

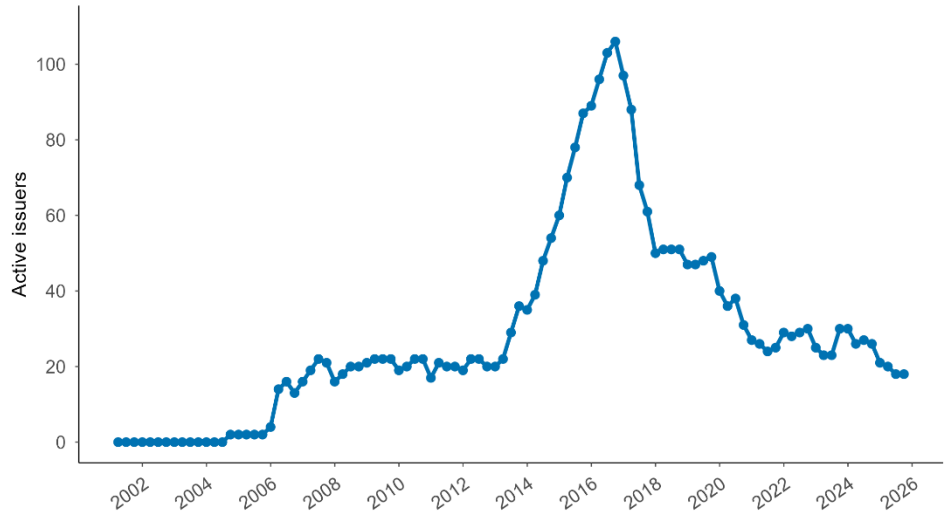
The risk has changed with the market. In the early entry period, the relevant concern was whether firms without a bond-market alternative could retire a short-maturity obligation when commercial-paper issuance stopped. The constrained-at-entry group looks at that margin: firms entered without a bond and carried the largest retired balances relative to assets. Figure 7 shows that commercial-paper reliance subsequently declines, especially among firms entering without bond access. Among all observed no-bond entrants, mean commercial paper

as a share of CP-plus-bond debt falls from 1.00 at entry to 0.44 after eight quarters and 0.16 after twenty. The balanced sample reaches the same endpoint, so the decline is not explained solely by the changing composition of observable firms.

The contemporary market presents a different exposure. By 2025Q3, all 18 active listed non-financial issuers in the holdings sample also had bonds outstanding, and none funded a majority of capital market debt with commercial paper. Despite the decline in issuer count, listed non-financial commercial paper outstanding remained approximately THB 145 billion. Issuance has also become more concentrated: the five largest listed non-financial issuers accounted for 58.3% of total Thai commercial paper outstanding in 2025Q3, or 79.5% of the listed non-financial sample. Mutual funds held 83.8% of the sample's commercial paper, and short-term bond funds held 45.6% of that fund-held amount, equivalent to 38.3% of total sample commercial paper. These holdings provide a direct measure of buyer-base exposure and are relevant because investor composition and fund flows can affect financing conditions (Massa et al., 2013; Goldstein et al., 2017; Zhu, 2021).

Figure 8. Firms actively issuing commercial paper

The figure plots the number of SET-listed non-financial firms with positive commercial paper outstanding at each quarter-end in the full corrected study panel. The series does not measure the number of all Thai commercial-paper issuers and does not use mutual-fund holdings data.



The evidence nevertheless does not establish a causal fund-demand channel, and the 18 active issuers all had bonds outstanding. While Worasak et al. (2022) find that low interest rates were associated with the issuance of lower-rated, longer-maturity Thai corporate bonds

and report weak evidence of reach-for-yield among individuals and money market funds, that result cannot be projected onto contemporary commercial paper. Among non-financial commercial paper issued during calendar 2024-2025, issuers with an investment-grade company rating accounted for 98.6% of issues and 98.2% of issuance value. These are company ratings rather than issue-specific short-term ratings, but they indicate that contemporary issuance is concentrated among stronger, bond-accessed firms.

Refinancing risk has therefore shifted rather than disappeared. In the early entry period, the principal exposure arose from firms' limited access to replacement market finance. In the contemporary market, the relevant contingency is whether a small number of issuers could replace maturing commercial paper if their dominant fund buyers retrenched at the same time. The order of that retrenchment matters. Funds meeting redemptions sell their most liquid holdings first (Ma et al., 2022; Jiang et al., 2021), so short-dated commercial paper would be among the first exposures reduced under stress rather than among the last. Investment-grade ratings and outstanding bonds reduce concern about commercial-paper-only dependence, but neither establishes that bond financing or backup liquidity would remain available under stress.

The most direct policy implication is to incorporate commercial-paper refinancing exposure into existing corporate balance-sheet surveillance rather than create a separate regulatory regime for the instrument. The historical results identify the relevant indicators: commercial paper relative to assets and market debt, the amount maturing within the instrument's 270-day maximum term, liquid assets relative to near-term maturities, leverage and interest coverage, operating cash flow, and access to bonds or other replacement finance. These measures would identify firms for which a change in refinancing conditions could become a balance-sheet constraint. They would also complement the Bank of Thailand's existing monitoring of corporate debt serviceability, leverage, and bond-market fundraising conditions (Bank of Thailand, 2024).

For monetary-policy and financial-stability analysis, these indicators could be evaluated under scenarios combining higher short-term funding costs or refinancing spreads with weaker earnings and reduced market access. Because commercial paper must be renewed frequently, it provides a direct measure of the refinancing channel through which monetary and financial conditions can affect corporate liquidity and investment. The purpose is not to make the policy rate respond mechanically to commercial-paper conditions, but to assess whether monetary-policy transmission could be amplified by pockets of short-term debt and weak

repayment capacity. Corporate interest-rate exposure is relevant to both monetary-policy transmission and financial stability because it affects debt-service burdens, creditworthiness, and firms' investment responses (Committee on the Global Financial System, 2024).

7. Conclusion

Thailand's commercial paper market shows how short-term market debt can affect firms without prior bond-market access. We examine whether first issuance changes market access and debt composition, who holds the paper, how corporate balance sheets respond, and where refinancing risk remains.

Among firms entering during the 2013-2016 expansion without a prior bond, bond-market access increases relative to matched non-entrants and debt-instrument concentration falls. Total leverage also rises, partly because commercial paper enters the measure mechanically; leverage excluding commercial paper does not. Bond debt increases while other debt falls by a similar amount, suggesting that commercial paper adds a financing line and changes the debt mix rather than expanding every form of borrowing.

Mutual funds – especially short-term bond funds – hold most commercial paper and favor larger, better-rated issuers. Although short-term-bond-fund growth is positively associated with issuance at the aggregate level, designs closer to the proposed mechanism do not corroborate a causal demand channel. First issuance likewise does not lead to an increase in capital expenditure. Liquid assets rise instead, consistent with precautionary liquidity, while the positive association between ongoing commercial-paper use and investment remains descriptive.

Commercial paper is termed out for the median entrant, although most firms reaching the bond market retain it alongside bonds. The evidence therefore combines the bridge-financing role documented by Kahl et al. (2015) with the coexistence of short- and long-term market debt studied by Hempel et al. (2024). Because commercial paper matures within 270 days, firms that stop issuing must refinance or retire the balance quickly. This burden is largest relative to assets among firms that entered without bond access.

The primary policy implication is corporate balance-sheet surveillance. Existing monitoring could incorporate commercial paper relative to assets and market debt, maturities within 270 days, liquid assets relative to those maturities, leverage, interest coverage, operating cash flow, and access to replacement finance. These indicators extend the Bank of Thailand's

existing monitoring of corporate debt serviceability, leverage, and bond-market funding conditions (Bank of Thailand, 2024).

For monetary-policy and financial-stability analysis, the indicators could be evaluated under scenarios combining higher short-term funding costs or refinancing spreads with weaker earnings and reduced market access. Such analysis would assess whether short-term debt amplifies the transmission of financial conditions to corporate liquidity and investment; it would not imply a mechanical policy-rate response to commercial-paper conditions (Committee on the Global Financial System, 2024).

References

Acharya, V. V., Gale, D., & Yorulmazer, T. (2011). Rollover risk and market freezes. *Journal of Finance*, *66*(4), 1177-1209.

Almeida, H., & Campello, M. (2007). Financial constraints, asset tangibility, and corporate investment. *Review of Financial Studies*, 20(5), 1429-1460.

Almeida, H., Campello, M., & Weisbach, M. S. (2004). The cash flow sensitivity of cash. *Journal of Finance*, *59*(4), 1777-1804.

Almeida, H., Campello, M., Laranjeira, B., & Weisbenner, S. (2012). Corporate debt maturity and the real effects of the 2007 credit crisis. *Critical Finance Review*, *1*(1), 3-58.

Bank of Thailand. (2024). Financial Stability Review 2024.

Badoer, D. C., & James, C. M. (2016). The determinants of long-term corporate debt issuances. *Journal of Finance*, *71*(1), 457-492.

Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do US firms hold so much more cash than they used to? *Journal of Finance*, *64*(5), 1985-2021.

Benmelech, E., Kumar, N., & Rajan, R. (2024). The decline of secured debt. *Journal of Finance*, 79(1), 35-93.

Biguri, K. (2023). How does access to the unsecured debt market affect investment? *Journal of Banking & Finance*, *152*, 106856.

Booth, L., Aivazian, V., Demirguc-Kunt, A., & Maksimovic, V. (2001). Capital structures in developing countries. *Journal of Finance*, 56(1), 87-130.

Brunnermeier, M. K., & Oehmke, M. (2013). The maturity rat race. *Journal of Finance*, *68*(2), 483-521.

Callaway, B., & Sant'Anna, P. H. C. (2021). Difference-in-differences with multiple time periods. *Journal of Econometrics*, *225*(2), 200-230.

Calomiris, C. W., Himmelberg, C. P., & Wachtel, P. (1995). Commercial paper, corporate finance, and the business cycle: A microeconomic perspective. *Carnegie-Rochester Conference Series on Public Policy*, 42, 203-250.

Chen, Q., Goldstein, I., & Jiang, W. (2010). Payoff complementarities and financial fragility: Evidence from mutual fund outflows. *Journal of Financial Economics*, *97*(2), 239-262.

Chernenko, S., & Sunderam, A. (2014). Frictions in shadow banking: Evidence from the lending behavior of money market mutual funds. *Review of Financial Studies*, 27(6), 1717-1750.

Committee on the Global Financial System. (2024). Interest rate risk exposures of non-financial corporates and households: Implications for monetary policy transmission and financial stability. CGFS Papers No. 70. Bank for International Settlements.

Cipriani, M., & La Spada, G. (2021). Investors' appetite for money-like assets: The money market fund industry after the 2014 regulatory reform. *Journal of Financial Economics*, *140*(1), 250-269.

Colla, P., Ippolito, F., & Li, K. (2013). Debt specialization. *Journal of Finance*, *68*(5), 2117-2141.

Colla, P., Ippolito, F., & Li, K. (2020). Debt structure. *Annual Review of Financial Economics*, *12*,

193-215.
Custódio, C., Ferreira, M. A., & Laureano, L. (2013). Why are US firms using more short-term debt? *Journal of Financial Economics*, *108*(1), 182-212.
Dang, V. A., Lee, E., Liu, Y., & Zeng, C. (2018). Corporate debt maturity and stock price crash risk. *European Financial Management*, 24(3), 451-484.
Demirguc-Kunt, A., & Maksimovic, V. (1999). Institutions, financial markets, and firm debt maturity. *Journal of Financial Economics*, *54*(3), 295-336.
Denis, D. J., & Mihov, V. T. (2003). The choice among bank debt, non-bank private debt, and public debt: Evidence from new corporate borrowings. *Journal of Financial Economics*, *70*(1), 3-28.
Diamond, D. W. (1991). Debt maturity structure and liquidity risk. *The Quarterly Journal of Economics*, *106*(3), 709-737.
Duchin, R., Ozbas, O., & Sensoy, B. A. (2010). Costly external finance, corporate investment, and the subprime mortgage credit crisis. *Journal of Financial Economics*, *97*(3), 418-435.
Falato, A., Goldstein, I., & Hortacsu, A. (2021). Financial fragility in the COVID-19 crisis: The case of investment funds in corporate bond markets. *Journal of Monetary Economics*, *123*, 35-52.
Fan, J. P. H., Titman, S., & Twite, G. (2012). An international comparison of capital structure and debt maturity choices. *Journal of Financial and Quantitative Analysis*, *47*(1), 23-56.
Faulkender, M., & Petersen, M. A. (2006). Does the source of capital affect capital structure? *Review of Financial Studies*, *19*(1), 45-79.
Flannery, M. J. (1986). Asymmetric Information and Risky Debt Maturity Choice. *Journal of Finance*, *41*(1), 19-37.
Gilchrist, S., & Himmelberg, C. P. (1995). Evidence on the role of cash flow for investment. *Journal of Monetary Economics*, *36*(3), 541-572.
Geelen, T., Hajda, J., Morellec, E., & Winegar, A. (2024). Asset life, leverage, and debt maturity matching. *Journal of Financial Economics*.
Goldstein, I., Jiang, H., & Ng, D. T. (2017). Investor flows and fragility in corporate bond funds. *Journal of Financial Economics*, *126*(3), 592-613.
Gopalan, R., Song, F., & Yerramilli, V. (2014). Debt maturity structure and credit quality. *Journal of Financial and Quantitative Analysis*, *49*(4), 817-842.
Goyal, V. K., & Wang, W. (2013). Debt Maturity and Asymmetric Information: Evidence from Default Risk Changes. *Journal of Financial and Quantitative Analysis*, 48(3), 789-817.
Harford, J., Klasa, S., & Maxwell, W. F. (2014). Refinancing risk and cash holdings. *Journal of Finance*, *69*(3), 975-1012.
He, Z., & Xiong, W. (2012). Rollover risk and credit risk. *Journal of Finance*, *67*(2), 391-430.
Hempel, S., Li, Y., & Tibay, S. (2024). Firms' financing choice between short-term and long-term debts: Are they substitutes? *FEDS Notes*. Board of Governors of the Federal Reserve System, May 3, 2024.
Javadi, S., & Mollagholamali, M. (2018). Debt market illiquidity and correlated default risk. *Finance Research Letters*, 26, 266-273.
Jensen, M. C. (1986). Agency costs of free cash flow, corporate finance, and takeovers. *American Economic Review*, *76*(2), 323-329.
Jiang, H., Li, D., & Wang, A. (2021). Dynamic liquidity management by corporate bond mutual funds. *Journal of Financial and Quantitative Analysis*, *56*(5), 1622-1652.
Kacperczyk, M., & Schnabl, P. (2010). When safe proved risky: Commercial paper during the financial crisis of 2007-2009. *Journal of Economic Perspectives*, *24*(1), 29-50.
Kahl, M., Shivdasani, A., & Wang, Y. (2015). Short-term debt as bridge financing: Evidence from the commercial paper market. *Journal of Finance*, *70*(1), 211-255.
Kaplan, S. N., & Zingales, L. (1997). Do investment-cash flow sensitivities provide useful measures of financing constraints? *The Quarterly Journal of Economics*, *112*(1), 169-215.
Lamont, O., Polk, C., & Saá-Requejo, J. (2001). Financial constraints and stock returns. *Review of Financial Studies*, 14(2), 529-554.
Ma, Y., Xiao, K., & Zeng, Y. (2022). Mutual fund liquidity transformation and reverse flight to liquidity. *The Review of Financial Studies*, *35*(10), 4674-4711.
Massa, M., Yasuda, A., & Zhang, L. (2013). Supply uncertainty of the bond investor base and the leverage of the firm. *Journal of Financial Economics*, *110*(1), 185-214.

Mizen, P., & Tsoukas, S. (2014). What promotes greater use of the corporate bond market? A study of the issuance behaviour of firms in Asia. *Oxford Economic Papers*, *66*(1), 227-253.
Myers, S. C. (1977). Determinants of corporate borrowing. *Journal of Financial Economics*, *5*(2), 147-175.
Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, *52*(1), 3-46.
O'Hara, M. (1993). Real bills revisited: Market value accounting and loan maturity. *Journal of Financial Intermediation*, *3*(1), 51-76.
Rauh, J. D., & Sufi, A. (2010). Capital structure and debt structure. *Review of Financial Studies*, *23*(12), 4242-4280.
Saengchote, K. (2024). Developers' leverage, capital market financing, and fire sale externalities. *Finance Research Letters*, *63*, 105335.
Schmidt, L., Timmermann, A., & Wermers, R. (2016). Runs on money market mutual funds. *American Economic Review*, *106*(9), 2625-2657.
Shim, I. (2012). Development of Asia-Pacific corporate bond and securitisation markets. *BIS Papers*, No. 63, 5-14. Bank for International Settlements.
Stohs, M. H., & Mauer, D. C. (1996). The determinants of corporate debt maturity structure. *The Journal of Business*, *69*(3), 279-312.
Sun, L., & Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. *Journal of Econometrics*, *225*(2), 175-199.
Thai Bond Market Association. (2015). Trends and development of the corporate bond market, Part 2: Short-term corporate debt (commercial paper)
Worasak, W., Nookhwun, N., & Amatyakul, P. (2022). Monetary policy and risk-taking: Evidence from Thai corporate bond markets. Bank of Thailand, August 15, 2022. PIER Discussion Paper No. 186.
Zhu, Q. (2021). Capital supply and corporate bond issuances: Evidence from mutual fund flows. *Journal of Financial Economics*, *141*(2), 551-572.