Customer Capital and Financing Policies*

Florian Perusset†

July 28, 2026

Abstract

Recent research shows that firms invest heavily in building long-term relationships with their customers–referred to as customer capital. This paper investigates how customer capital shapes firms' financing policies. Empirically, I find that customer capital is positively associated with cash holdings and negatively associated with leverage and equity issuance. I rationalize these findings using a dynamic investment and financing model in which firms invest in customer capital due to product-market frictions. Customer capital is valuable but not pledgeable as collateral. Hence, under financing frictions, firms optimally hold more cash and limit leverage to preserve debt capacity and avoid costly equity issuance. Quantitatively, product-market frictions are central to explaining these financing choices: in their absence, firms' average net leverage would be about 25%, compared to -3% in the calibrated model. These findings underscore the importance of considering product-market frictions in explaining financing policies and may help rationalize several puzzles, such as the low-leverage puzzle and the fact that firms hold large cash reserves.

Keywords: Product market, Customer capital, Intangibles, Financing frictions, Capital structure.

JEL Classification: G31, G32.

---

*I am grateful to Erwan Morellec, Boris Nikolov, and Federica Zeni for valuable discussions and comments. I also thank Ernst Maug, Nino Iannolo, and participants at the SFI Research Days 2026 in Gerzensee and at the EPFL/HEC Lausanne PhD workshop for helpful comments and feedback. I am also grateful to Amir Sufi for having generously shared his data on customer capital. All errors are my own.

†EPF Lausanne and Swiss Finance Institute. E-mail: florian.perusset@epfl.ch

1 Introduction

Firms invest heavily in marketing and sales to build valuable, long-term relationships with their customers–what is often referred to as customer capital. Recent research shows that customer capital represents a major component of firms' intangible capital value. Investment in customer capital is of the same order as investment in capital expenditures and even larger than investment in R&D, as shown by He, Mostrom, and Sufi (2024). Investment in customer capital can be rationalized by the presence of product-market frictions, in which case firms can extract rents from existing customers, thereby incentivizing them to invest in customer capital to develop their customer base (see, e.g., Gourio and Rudanko (2014)).

While product-market frictions and customer capital accumulation have attracted growing attention in macroeconomics (Bronnenberg, Dubé, and Gentzkow (2012), Gourio and Rudanko (2014), Gilchrist, Schoenle, Sim, and Zakrajšek (2017), Morlacco and Zeke (2021), Sedlacek and Ignaszak (2021)), corporate finance models generally abstract from these frictions. Like other intangibles, investments in customer capital—such as marketing or price reductions aimed at expanding the customer base—enhance firms' long-term value but also exacerbate financing constraints by reducing collateralizable assets. Consequently, firms' financing and liquidity policies are directly shaped by their customer-capital investment decisions. As emphasized by He et al. (2024), understanding how firms optimally finance these investments remains an open and important question for future research.

This paper aims to fill this gap by documenting how product-market frictions and customer capital accumulation affect firms' financing policies. To do so, I start by providing novel empirical evidence relating customer capital to firms' financing policies. Empirically, I show that firms' customer capital is positively associated with firms' cash-to-assets ratio and negatively associated with firms' (net) leverage ratio, as well as firms' equity issuance size and frequency. This is consistent with the idea that, like other intangible assets, customer capital generates long-term value but has limited pledgeability as collateral. Hence, in the presence of real-world financing frictions, firms invest in customer capital to create valuable long-term customer relationships; however, as customer capital is not easily pledgeable, this restricts firms' debt capacity and increases their reliance on internal liquidity. As a result,

firms optimally accumulate cash reserves to finance future investment opportunities while maintaining financial flexibility by preserving debt capacity, resulting in lower leverage ratios. As customer capital creates value in the long run, firms with more customer capital also tend to issue less equity and do so less often. These findings provide a natural connection between product-market frictions, customer capital accumulation, and firms' financing policies.

I further show that these findings are unique to customer capital and do not generalize to other forms of intangible capital, such as knowledge or organizational capital. While other intangibles (defined as total intangibles excluding customer capital) are also positively associated with cash holdings, they display a markedly different relationship with financing policies. Specifically, other intangibles are generally unrelated to (net) leverage and are positively associated with equity issuance, whereas customer capital is negatively associated with both leverage and equity issuance. These results highlight the importance of distinguishing among different types of intangible assets and indicate that customer capital plays a distinct role in shaping firms' financing decisions.

I rationalize these findings in a dynamic investment and financing model in which firms face both product-market and financing frictions to quantify the impact of product-market frictions and customer capital accumulation on firms' financing policies. I show that product-market frictions are critical to explaining firms' financing decisions. As firms face product-market frictions, customer capital and profitability increase as firms optimally decide to invest more in customer capital to extract rents from existing customers, in turn making them more profitable. On the financing side, a higher degree of frictions also translates into higher cash holdings and lower (net) leverage and equity issuance. Hence, the model can recover the positive association between customer capital and cash holdings and the negative association between customer capital and firms' leverage and equity issuance, in line with the available empirical evidence on customer capital and firms' financing policies.

In the counterfactual scenario where firms do not face any product-market frictions, customer capital, profitability, and cash holdings are lower, leverage ratios are higher, and firms issue more equity as they are also less profitable. Moreover, the distortions on financing

policies created by product-market frictions are quantitatively important. In the absence of friction, calibrations reveal that firms' average net leverage ratio is about 25%, while in the calibrated version of the model incorporating frictions, the average net leverage ratio is about -3%, close to what is found in the data. Moreover, the model can match reasonably well moments in the distribution of firms' investment and financing policies, such as cash, (net) leverage, and equity issuance.

These findings may help to explain why firms seem to adopt conservative financing policies, despite the large benefit from the tax shield (Graham (2000)) or hold so much cash (Bates, Kahle, and Stulz (2009), Falato, Kadyrzhanova, Sim, and Steri (2022)). Furthermore, I provide a natural connection between product markets, customer capital, and firms' financing policies that has not been made yet. In particular, I rationalize firms' investment in customer capital by product-market frictions and show that these frictions are critical in explaining firms' financing policies both qualitatively and quantitatively.

Related Literature. This paper contributes to several strands of the literature. First, I contribute to the growing literature on customer capital (Bronnenberg et al. (2012), Gourio and Rudanko (2014), Sedlacek and Ignaszak (2021), Dou and Ji (2021), Dou, Ji, Reibstein, and Wu (2021), Warusawitharana and Zucchi (2022), He et al. (2024)). Gourio and Rudanko (2014) develops a search-theoretical model of firm dynamics and shows that firms accumulate customer capital due to frictions in the product market. They show that this, in turn, affects firms' investment decisions and helps to explain the relation between Tobin's Q and investment. On the empirical side, He et al. (2024) use generative AI to develop a novel measure of customer capital and show that customer capital constitutes an important part of firms' intangible assets and helps to explain the empirical relationship between investment and Tobin's Q. However, papers in this literature typically abstract from financing. Notable exceptions are Dou et al. (2021) and Dou and Ji (2021). Dou et al. (2021) study the link between inalienable customer capital–a specific form of customer capital– and stock returns in the presence of financing constraints, while Dou and Ji (2021) develop an industry equilibrium model to understand the relation between markups and customer capital in the presence of financing frictions. Unlike Dou et al. (2021), which is a purely theoretical study,

I investigate the impact of product-market frictions and customer capital on firms' financing policies both empirically and theoretically. I build a structural model showing that product-market frictions are quantitatively important in explaining firms' financing policies due to the non-pledgeability of customer capital. Moreover, I provide novel reduced-form empirical evidence consistent with these mechanisms.

Second, I contribute to the large body of research that uses dynamic models to explain firms' financing decisions (Hennessy and Whited (2005), Hennessy and Whited (2007), Bolton, Chen, and Wang (2011), Morellec, Nikolov, and Schürhoff (2012), Hugonnier, Malamud, and Morellec (2015)). I contribute to this literature by incorporating product-market frictions in a dynamic investment and financing model, which incentivizes firms to accumulate customer capital and feeds back into their financing decisions. I show that product-market frictions are critical to explaining firms' financing policies.

Third, I also contribute to the broader literature on finance and intangible capital (Corrado, Hulten, and Sichel (2009), Eisfeldt and Papanikolaou (2013), Peters and Taylor (2017), Sun and Xiaolan (2019), Falato et al. (2022), Crouzet and Eberly (2023), He (2023), Li (2025), Maug (2025), Eisfeldt, Hartman-Glaser, Kim, and Lee (2026)). Sun and Xiaolan (2019) show that firms use employee deferred compensation to finance investment in intangible capital. Closer to my paper, Falato et al. (2022) show that, due to their limited pledgeability, the rising share of intangible capital explains a large portion of the secular increase in corporate cash holdings since the 1980s. My paper differs along several dimensions. First, I focus on the impact of product-market frictions and customer capital—a specific form of intangible capital—on firms' financing policies, while Falato et al. (2022) primarily study the impact of the rising share of intangible capital on corporate cash holdings in the time series. Second, I provide novel empirical evidence on the relation between customer capital and firms' financing decisions, including cash holdings, leverage, and equity issuance, using the recently developed measure of customer capital by He et al. (2024). Most importantly, I show that customer capital affects firms' financing policies differently from other forms of intangible capital, such as knowledge capital or organizational capital. In contrast to customer capital, which is negatively associated with leverage and equity issuance, these other forms of

intangible capital are generally unrelated to leverage and positively associated with equity issuance. These findings highlight the importance of distinguishing between different forms of intangible capital when studying the relation between intangibles and firms' financing policies. Third, I rationalize these empirical findings within a quantitative framework that connects product-market frictions, firms' endogenous investment in customer capital, and the feedback effects on financing policies.

Fourth, I also add to the literature on finance and product market (Fresard (2010), Valta (2012), Hoberg, Phillips, and Prabhala (2014), Morellec, Nikolov, and Zucchi (2013), Morellec and Zhdanov (2019), Hajda and Nikolov (2022)). Hajda and Nikolov (2022) show that product life cycle feeds back into firms' investment and financing decisions. However, they abstract from product-market frictions. I contribute to this literature by incorporating product-market frictions and customer capital into a dynamic investment and financing model.

2 Empirical evidence

2.1 Data and variables

I consider a sample of US public firms from 1997 to 2022. First, I use a new measure of firm-level customer capital from He et al. (2024). He et al. (2024) develops a new measure of investment in customer capital from Capital IQ sales and marketing expenses, salaries paid to workers in sales and marketing, and text extracted from SEC 10-K filings. In particular, they use Gemini to extract sales and marketing expenses from the 10-K filings in case the Capital IQ sales and marketing expenses are missing, as this variable is missing for many firm-year observations. Then, to construct a measure of customer capital, they capitalize the resulting sales and marketing expenses using a depreciation rate that corresponds to the useful life of customer-related intangibles from the PPA transaction, which varies at the two-digit NAICS code level.[1] In the rest of the paper, I generally consider customer capital as the measure of customer capital constructed by He et al. (2024) scaled by net assets, as it is common in the

[1]More details on the construction of this variable are available in their paper.

literature on intangible capital (see Peters and Taylor (2017), Falato et al. (2022)).

I merge customer capital data with Compustat annual data to gather information on firms' investment and financing structures. I use a standard sample selection procedure. In particular, I exclude financial firms (SIC codes 6000-6999), utilities (SIC codes 4900-4999), and government agencies (SIC codes 9000 or greater). I also exclude firms with missing values on one of the main variables (book assets, revenue, share price, operating income, or customer capital). The sample spans 1997-2022, as I have customer capital data for this period. Finally, I winsorize all the variables at 1% and 99% to mitigate the impact of outliers. My final sample comprises 55,352 firm-year observations and 5,138 unique firms. Table A1 provides variable definitions, while descriptive statistics are provided in Table 1.

Table 1: Descriptive Statistics

Variable	N	Mean	SD	P25	Median	P75
Panel A: Main variables						
Customer capital	55,352	0.766	1.401	0.033	0.213	0.860
Book leverage	55,109	0.200	0.195	0.010	0.158	0.334
Market leverage	55,061	0.187	0.218	0.005	0.105	0.297
Net book leverage	55,109	-0.029	0.367	-0.275	0.011	0.248
Net market leverage	55,061	0.027	0.337	-0.134	0.006	0.216
Secured book leverage	38,497	0.084	0.139	0.000	0.003	0.121
Unsecured book leverage	38,404	0.132	0.155	0.001	0.064	0.229
Secured market leverage	38,376	0.084	0.151	0.000	0.002	0.104
Unsecured market leverage	38,376	0.119	0.159	0.001	0.046	0.185
Debt/EBITDA	41,113	2.833	5.067	0.209	1.512	3.386
Net debt/EBITDA	41,113	0.270	6.467	-1.178	0.611	2.535
Secured debt/EBITDA	38,484	0.946	1.880	0.000	0.029	1.078
Unsecured debt/EBITDA	38,404	1.584	3.290	0.008	0.525	1.946
Equity issuance	50,152	0.056	0.180	0.000	0.000	0.000
Frequency of equity issuance	50,152	0.153	0.360	0.000	0.000	0.000
Panel B: Firm characteristics						
Residual intangible capital	55,352	0.880	2.396	0.067	0.343	0.755
Profitability	55,352	0.042	0.208	-0.003	0.093	0.154
Size	55,352	5.422	2.474	3.747	5.506	7.182
Market-to-book	55,275	2.270	2.175	1.131	1.592	2.552
R&D	55,352	0.464	2.983	0.000	0.005	0.118
Tangibility	55,317	0.234	0.228	0.062	0.150	0.332
Cash flow volatility	55,025	0.081	0.142	0.017	0.036	0.083
Cash/assets	55,352	0.229	0.238	0.041	0.140	0.349
Log assets	55,352	5.702	2.256	4.021	5.654	7.294
Cash flow/assets	50,408	0.004	0.193	-0.017	0.059	0.104
Acquisition	53,365	0.024	0.062	0.000	0.000	0.009
Capital expenditures	55,102	0.048	0.057	0.014	0.029	0.059
Industry risk	55,349	1.982	2.631	0.245	0.904	2.523
Net working capital	54,522	0.050	0.181	-0.057	0.032	0.155
Dividend	55,248	0.280	0.449	0.000	0.000	1.000

This table reports descriptive statistics for the variables used in the analysis. The sample covers 1997–2022. All continuous variables are winsorized at the 1st and 99th percentiles.

2.2 Stylized facts

In this section, I document several novel stylized facts about the relation between customer capital and firms' financing policies. I consider the impact of customer capital on firms' cash holdings, (net) leverage, as well as firms' equity issuance. I explain these findings in section 3, where I develop a dynamic investment and financing model where firms invest in customer capital due to product-market frictions. More specifically, the empirical analysis presented in this section documents the following stylized facts regarding customer capital and firms' financing policies:

1. There is a positive association between firms' customer capital and firms' cash-to-asset ratio.

2. There is a negative association between firms' customer capital and firms' (net) book and market leverage ratios.

3. There is a negative association between firms' customer capital and firms' equity issuance size and frequency.

The intuition for these results is as follows: customer capital is valuable, but its pledgeability as collateral is limited, thereby reducing firms' debt capacity. Hence, in the presence of financing frictions, firms optimally choose to hold more cash to avoid costly equity issuance and preserve debt capacity for future investment needs, translating into a positive association between cash holdings and customer capital and a negative association between (net) leverage and customer capital. Moreover, since customer capital is valuable and improves firms' profitability, equity issuance decreases, leading to a negative association between customer capital and equity issuance. Moreover, as shown in Table 6, the findings do not hold when I consider other forms of intangible assets besides customer capital, indicating that customer capital generates unique financing patterns.

Cash holdings. Figure 1 shows the average cash–to–asset ratio as a function of the average customer capital per industry, where industries are defined based on two-digit SIC code. First, the figure shows that the level of customer capital is largely heterogeneous across industries. More importantly, it also shows that industries with higher customer

capital have, on average, higher cash-to-assets ratios. This suggests that customer capital is positively related to cash-to-assets ratios in the cross-section.

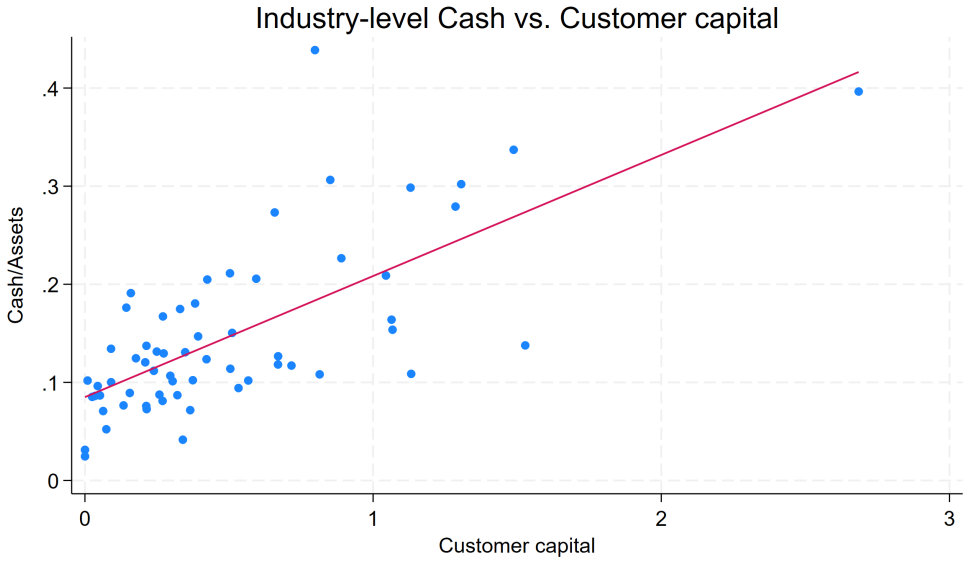


Figure 1: This figure shows the relation between cash-to-asset ratio and customer capital at the industry level, where each industry is defined by its two-digit SIC code. Each dot represents an industry. The sample period is 1997 to 2022.

I confirm this finding using regression analysis. Namely, I regress cash-to-assets on customer capital and a set of controls typically used in the literature on cash holdings (see Bates et al. (2009) for instance). I estimate the following specification:

$$\text{Cash}_{i,j,t+1} = \beta_1 \text{Customer capital}_{i,j,t} + \beta_2 X_{i,j,t} + \delta_i + \delta_j + \delta_{t+1} + \epsilon_{i,j,t+1} \tag{1}$$

where $\text{Cash}_{i,j,t+1}$ is the cash-to-assets ratio, $\text{Customer capital}_{i,j,t}$ is the customer capital scaled by net assets (defined as total assets minus cash), i, j and t represent firm, industry and year, and δ_i, δ_j, and δ_t represents firm, industry and year fixed-effects respectively. $X_{i,j,t}$ represents a set of control variables presented in Table 2. I cluster standard errors at the firm level.

The results show a strong positive association between firms' customer capital and cash-to-asset ratios, even after accounting for standard controls from the literature on cash holdings. Moreover, the results hold both across firms within an industry and within firms. In column (3), where I account for firm fixed effects, we can see that a one standard deviation

increase in customer capital leads to a 3.3 percentage point increase in the cash-to-assets ratio, which represents an increase of about 15% relative to its mean. Hence, the results are both economically and statistically significant.

Table 2: Cash holdings and customer capital. This table presents the estimates of the regression of the cash-to-asset ratio on customer capital and a set of controls. Each explanatory variable is standardized by its full-sample standard deviation. All regressions include year fixed-effects and either firm or industry fixed-effects. Standard errors (in parentheses) are clustered at the firm level.

	(1)	(2)	(3)
	Cash/Assets	Cash/Assets	Cash/Assets
Customer capital	0.046***	0.033***	0.033***
	(0.003)	(0.003)	(0.003)
Market-to-Book		0.034***	0.012***
		(0.002)	(0.002)
log(Assets)		0.001	-0.030***
		(0.003)	(0.006)
Cash-flow/Assets		-0.028***	-0.007***
		(0.002)	(0.002)
Net working capital		-0.052***	-0.015***
		(0.002)	(0.002)
Book Leverage		-0.067***	-0.030***
		(0.002)	(0.002)
Dividend		-0.021***	-0.000
		(0.002)	(0.002)
Industry risk		-0.000	-0.002
		(0.001)	(0.001)
R&D		0.032***	0.007***
		(0.002)	(0.002)
Acquisition		-0.015***	-0.008***
		(0.001)	(0.001)
Capex		-0.025***	-0.016***
		(0.002)	(0.001)
Firm FE	Yes	No	Yes
Industry FE	No	Yes	No
Year FE	Yes	Yes	Yes
Adj. R^2	0.768	0.505	0.790
N. obs.	48,612	41,972	41,618

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

(Net) Leverage. Figure 2 shows a negative relation between the average book and market (net) leverage and the average customer capital across industries. These findings reveal that industries with a high level of customer capital also exhibit lower (net) leverage ratios.

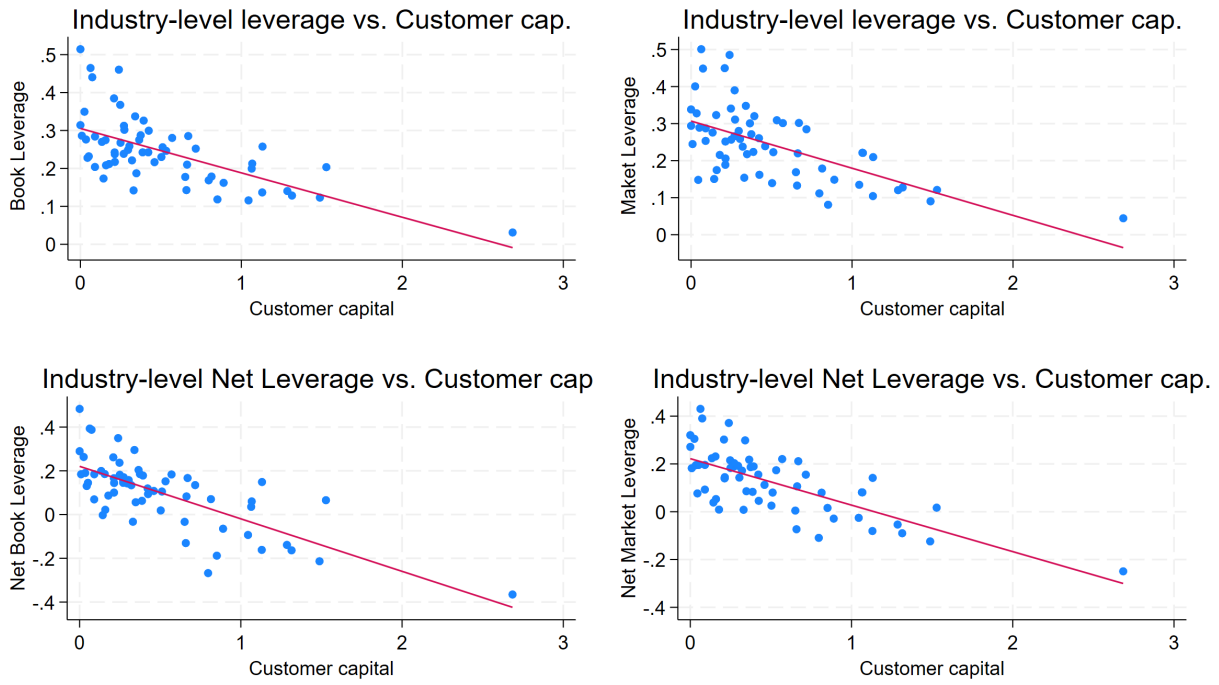


Figure 2: This figure shows the relation between (net) leverage and customer capital at the industry-level, for both book and market leverage, where each industry is defined by its two-digit SIC code. Each dot represents an industry. The sample period is 1997 to 2022.

I confirm these findings using regression analysis at the firm level. I estimate similar specifications as (1), where I use (Net) market and (net) book leverage as dependent variables and a set of controls that are standard determinants of leverage (see Lemmon, Roberts, and Zender (2008) or Geelen, Hajda, Morellec, and Winegar (2024)). Moreover, I also control for firm, year, and industry fixed effects. The results shown in Tables 3 and 4 confirm a negative association between customer capital and (net) leverage in the cross-section, even after accounting for standard determinants of leverage. The results hold both across firms within an industry and within a firm. Within firms, column (3) of Table 3 and 4 reveal that a

one-standard deviation increase in customer capital leads to a 1.2 percentage point reduction (4.7 percentage point reduction) in book leverage (net book leverage), which corresponds to a reduction of about 5% and 160% relative to their mean, respectively. Similarly, column (6) of Table 3 and 4 reveal that a one-standard deviation increase in customer capital leads to a 1.1 percentage point reduction (1.9 percentage point reduction) in market leverage (net market leverage), which corresponds to a reduction of about 6% and 70% relative to their mean, respectively. Hence, the results are both statistically significant and economically important, in particular for the net leverage. Furthermore, I also use an alternative measure of (net) leverage based on the ratio of (net) debt over EBITDA as recently used in the literature (see Geelen et al. (2024)). The results are shown in Table A2 and confirm the previous findings that customer capital is negatively associated with (net) leverage. The results are also both statistically and economically significant.

I argue that the negative association between customer capital and leverage is driven by the limited pledgeability of customer capital. As a robustness check, I also estimate similar regressions using separately secured leverage and unsecured leverage as dependent variables.[2] As secured debt is explicitly collateralized against specific assets, the negative association between customer capital and secured leverage should be stronger than for unsecured leverage. Indeed, if firms' debt capacity is constrained by physical assets, then firms with more customer capital and fewer physical assets should be more constrained in borrowing through secured debt than through unsecured debt.

The results in Table A3 show that customer capital is negatively associated with both secured and unsecured leverage; however, the results are clearly stronger for secured leverage.[3] A one standard-deviation increase in customer capital is associated with a decrease in secured leverage of 1.2 to 1.4 percentage points, corresponding to about 15% of the average

[2] As in Rampini and Viswanathan (2025), I defined secured debt using the Compustat variable *Debt – Mortgage and Other Secured*, which includes "all long-term debt secured or collateralized by a mortgage, property, receivable, stock, or other assets".

[3] This is consistent with the findings of Rampini and Viswanathan (2025) who show that both secured and unsecured debt are collateralized by firms' assets but that secured debt is explicitly collateralized against specific assets while unsecured debt is implicitly collateralized, backed by unencumbered assets.

secured leverage, while for unsecured leverage, a one standard-deviation increase in customer capital is associated with a reduction in unsecured leverage of 0.3 to 0.8 percentage points, corresponding to about 2 to 6% of the average unsecured leverage.

Table 3: Leverage and Customer capital. This table presents the estimates of the regression of leverage (book or market leverage) on customer capital and a set of controls. Each explanatory variable is standardized by its full-sample standard deviation. All regressions include year fixed-effects and either firm or industry fixed-effects. Standard errors (in parentheses) are clustered at the firm level.

	(1)	(2)	(3)	(4)	(5)	(6)
	Book Leverage			Market Leverage		
Customer capital	-0.016***	-0.021***	-0.012***	-0.016***	-0.021***	-0.011***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Profitability		-0.021***	-0.023***		-0.027***	-0.030***
		(0.002)	(0.002)		(0.002)	(0.002)
Size		0.046***	0.055***		0.030***	0.067***
		(0.003)	(0.006)		(0.003)	(0.006)
Market-to-Book		-0.019***	-0.009***		-0.055***	-0.024***
		(0.001)	(0.001)		(0.002)	(0.001)
R&D		-0.003**	0.003*		-0.006***	0.005***
		(0.001)	(0.002)		(0.001)	(0.001)
Tangibilitity		0.043***	0.041***		0.048***	0.044***
		(0.003)	(0.004)		(0.003)	(0.004)
Cash flow volatility		-0.000	-0.000		-0.002*	0.000
		(0.001)	(0.001)		(0.001)	(0.001)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	No	Yes	Yes	No	Yes
Industry FE	No	Yes	No	No	Yes	No
Adj. R^2	0.662	0.272	0.677	0.651	0.309	0.672
N. obs.	48,392	48,329	48,046	48,357	48,308	48,023

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Net Leverage and Customer capital. This table presents the estimates of the regression of net leverage (net book or net market leverage) on customer capital and a set of controls. Each explanatory variable is standardized by its full-sample standard deviation. All regressions include year fixed-effects and either firm or industry fixed-effects. Standard errors (in parentheses) are clustered at the firm level.

	(1)	(2)	(3)	(4)	(5)	(6)
	Net Book Leverage			Net Market Leverage		
Customer capital	-0.062***	-0.064***	-0.047***	-0.030***	-0.051***	-0.019***
	(0.004)	(0.003)	(0.004)	(0.005)	(0.003)	(0.005)
Profitability		0.008**	-0.024***		-0.000	-0.015***
		(0.004)	(0.003)		(0.003)	(0.003)
Size		0.075***	0.132***		0.060***	0.100***
		(0.005)	(0.009)		(0.005)	(0.010)
Market-to-Book		-0.061***	-0.019***		-0.013***	0.007***
		(0.003)	(0.002)		(0.002)	(0.002)
R&D		-0.035***	0.003		-0.018***	0.005
		(0.003)	(0.002)		(0.003)	(0.004)
Tangibilitity		0.101***	0.093***		0.094***	0.089***
		(0.005)	(0.005)		(0.005)	(0.006)
Cash flow volatility		-0.006**	-0.006***		-0.011***	-0.006**
		(0.003)	(0.002)		(0.003)	(0.003)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	No	Yes	Yes	No	Yes
Industry FE	No	Yes	No	No	Yes	No
Adj. R^2	0.763	0.433	0.782	0.654	0.293	0.667
N. obs.	48,392	48,329	48,046	48,357	48,308	48,023

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Equity issuance. Next, I test how customer capital affects firm equity issuance size and frequency. I estimate a similar specification to specification (1), where I use as dependent variable either equity issuance or a dummy variable that takes the value of 1 if the firm has positive equity issuance during a given year and 0 otherwise. Moreover, I control for a set of variables that plausibly affect firms' equity issues (see Morellec et al. (2013)). The results are reported in Table 5 and show that equity issuance is negatively related to customer capital. All coefficients are statistically significant. In columns (1) and (2), we have that a one-standard-deviation increase in customer capital is associated with a decline of 0.5 percentage point in equity issuance, corresponding to a 9% decrease relative to its mean. Hence, the results are economically important. Column (3) also shows that equity issuance frequency is negatively related to the level of customer capital. This shows that customer capital affects both the size and the frequency of equity issuance. Firms with more customer capital tend to issue equity less often and also in smaller quantities.

Table 5: Equity issuance and Customer capital. This table presents the estimates of the regression of equity issuance on customer capital and a set of controls. The dependent variable is the amount of equity issuance in columns (1) and (2), and a dummy equal to 1 if the firm issues equity during a given year (and 0 otherwise) in column (3). Each explanatory variable is standardized by its full-sample standard deviation. All regressions include year fixed-effects and either firm or industry fixed-effects. Standard errors (in parentheses) are clustered at the firm level.

	(1)	(2)	(3)
	Equity Issuance/Assets	Equity Issuance/Assets	Equity Issuance > 0
Customer capital	-0.005***	-0.005**	-0.011**
	(0.001)	(0.002)	(0.004)
Market-to-Book	0.026***	0.023***	0.049***
	(0.002)	(0.002)	(0.004)
log(Assets)	-0.013***	-0.071***	-0.175***
	(0.001)	(0.004)	(0.011)
Cash-flow/Assets	-0.059***	-0.027***	-0.052***
	(0.002)	(0.002)	(0.004)
Book Leverage	0.003***	0.013***	0.036***
	(0.001)	(0.001)	(0.003)
Tangibilitity	-0.002*	0.002	0.007
	(0.001)	(0.002)	(0.006)
Acquisition	0.002***	0.001***	0.006***
	(0.000)	(0.000)	(0.002)
Capex	0.008***	0.001	0.007**
	(0.001)	(0.001)	(0.003)
Year FE	Yes	Yes	Yes
Firm FE	No	Yes	Yes
Industry FE	Yes	No	No
Adj. R^2	0.300	0.452	0.364
N. obs.	38,967	38,546	38,546

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Other intangibles. Finally, I re-estimate the same regressions using the residual component of intangible assets, defined as total intangible capital excluding customer capital, based on the measures of He et al. (2024), who use the perpetual inventory method to estimate the stock of intangible capital.[4] The results are reported in Table 6. Overall, the findings suggest that the previous results do not extend to other forms of intangible capital beyond customer capital. While the coefficients on cash remain positive and statistically significant, the results are generally not robust for the other financing variables of interest. In particular, the coefficients on leverage and net leverage lose significance across specifications. The only consistent result concerns net book leverage, for which the coefficient remains negative and statistically significant. For equity issuance, the residual component of intangible capital is positively associated with issuance size, consistent with the findings of Falato et al. (2022), who document a positive association between intangibles and cash-to-assets and equity issuance. This contrasts with the previous results showing that customer capital is negatively associated with equity issuance size. In addition, the coefficients for equity issuance frequency are not statistically different from zero. Taken together, these findings suggest that customer capital is associated with distinct financing patterns that differ from those related to other forms of intangible assets, such as knowledge capital or organizational capital. This also highlights the importance of distinguishing between different forms of intangible capital when studying the relation between intangibles and firms' financing policies.

[4]In unreported tests, I obtain similar results when using the intangible capital measure of Peters and Taylor (2017), residualized with respect to customer capital from He et al. (2024), to construct the residual share of intangibles.

Table 6: Other intangibles. This table presents the estimates of the regression of firm financing policies on the residual share of intangibles, defined as total intangibles minus customer capital (using the measure from He et al. (2024)), and a set of controls. Each explanatory variable is standardized by its full-sample standard deviation. All regressions include firm and year fixed-effects. Standard errors (in parentheses) are clustered at the firm level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Cash/Assets	Book Leverage	Market Leverage	Net Book Leverage	Net Market Leverage	Debt/EBITDA	Net Debt/EBITDA	Equity Issuance/Assets	Equity Issuance > 0
Residual of intangible capital	0.025***	-0.002	0.002	-0.026***	0.004	-0.126	-0.414	0.015***	-0.001
	(0.002)	(0.002)	(0.001)	(0.003)	(0.004)	(0.170)	(0.317)	(0.003)	(0.004)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.789	0.676	0.672	0.779	0.666	0.339	0.475	0.480	0.462
N. obs.	41,603	48,028	48,004	48,028	48,004	36,732	36,732	41,483	41,483

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

3 The Model

In this section, I embed the novel empirical findings from the previous section in a dynamic investment and financing model, where firms face both product-market frictions and financing frictions to quantify the impact of product-market frictions and customer capital on firms' financing decisions.

3.1 Setup

Consider a dynamic investment and financing model where a representative firm makes both optimal financing and liquidity decisions, as well as decisions to invest in physical capital and customer capital. Due to frictions in the product market, the firm invests in customer capital and faces a dynamic demand (see Gourio and Rudanko (2014)). Moreover, the firm is also subject to financing frictions, which implies that raising equity is costly. For simplicity, I drop all time indices and denote the next-period variable by $'$.

Demand. Each firm sells a differentiated product and faces a dynamic demand due to the presence of customer capital. At time t, the demand q of the firm is given by

$$q = b^{\eta} p^{-\alpha} \tag{2}$$

where p is the price, b is the customer base or customer capital, $\eta \in [0, 1)$ and $\alpha > 1$ measure the elasticity to price and customer capital. Hence, customer capital acts as a demand shifter: for a given price, a higher level of customer capital increases demand. When $\eta = 0$, the demand function given by (2) is not affected anymore by the stock of customer capital, and becomes a standard demand function where pricing decisions are static. Hence, the case $\eta = 0$ corresponds to a frictionless product market. Therefore, we can interpret η as the degree of frictions in the product market, where product-market frictions increase as η increases.

Customer capital evolves according to:

$$b' = (1 - \delta_b)(b + p \cdot q) \tag{3}$$

where $\delta_b \in [0, 1)$ is the depreciation rate of customers. Hence, customer capital increases with the firm's sales and depreciates at a rate δ_b. Consequently, a firm can invest in customer

capital by lowering its price, thereby boosting its sales. This lowers current profits but increases future customer capital, and therefore future demand and profits. This specification is consistent with the search-matching model of Gourio and Rudanko (2014) where firms attract new customers using price discounts.

Technology. Firms' production technology is given by

$$y = zk^{\theta}l^{1-\theta} \tag{4}$$

where z is a productivity shock, k is the stock of capital, l is the quantity of labor, and $\theta \in (0,1)$ represents the share of capital in the production. The productivity shock follows an AR(1) process in logs

$$\log z' = \rho \log z + \sigma_z \epsilon_z' \tag{5}$$

where $\epsilon_z \sim N(0,1)$.

Physical capital follows the law of motion

$$k' = (1-\delta_k)k + i \tag{6}$$

where $\delta_k \in [0,1]$ is the depreciation rate of physical capital and i is the investment in physical capital. Adjustment in physical capital entails a quadratic adjustment cost given by

$$\Psi(k,k') = \psi \frac{(k' - (1-\delta_k)k)^2}{2k} \tag{7}$$

where $\psi > 0$ is a parameter.

Financing. Profits are taxed at a rate $\tau \in (0,1)$, which incentivizes the firm to issue debt to benefit from tax shields. The firm can issue one-period debt subject to a collateral constraint. Most importantly, only physical capital can serve as collateral. Specifically, denoting the net debt by d, we have that

$$d' \leq \omega(1-\delta_k)k' \tag{8}$$

where $\omega \in (0,1]$ is the collateral constraint parameter. Moreover, since debt is issued at no cost, the firm will never decide to hold debt and cash simultaneously. Hence, the relevant state variable is net debt d, where $d > 0$ means that the firm is issuing debt and $d < 0$

means that the firm is hoarding cash. This assumption, common in this type of model, is widely adopted in the literature (see Hennessy and Whited (2005), DeAngelo, DeAngelo, and Whited (2011), or Hajda and Nikolov (2022)) and greatly simplifies the solution of the model. The firm faces costly equity issuance modeled as

$$\Lambda(E) = \lambda E \mathbb{1}_{\{E<0\}}, \tag{9}$$

similar to Hennessy and Whited (2005) for example, where E denotes the firm operating cash-flow. Hence, the firm could also hoard cash to avoid costly equity issuance or to preserve debt capacity.

3.2 Solution

Operating income is given by

$$\pi = py - wl \tag{10}$$

where, in equilibrium, production output has to be equalized to firm demand and hence $y = q$, by the market-clearing condition. We can characterize the operating income as follows. First, plugging (2) into (3) and isolating p we get

$$p = \left[\frac{b' - (1-\delta_b)b}{(1-\delta_b)b^\eta}\right]^{\frac{1}{1-\alpha}}$$

and plugging back the last equation into (2), we get

$$q = b^\eta \left[\frac{b' - (1-\delta_b)b}{(1-\delta_b)b^\eta}\right]^{-\frac{\alpha}{1-\alpha}}$$

for the demand. Then, from the production technology, we can solve for the quantity of labor

$$l = \left(\frac{y}{zk^\theta}\right)^{\frac{1}{1-\theta}}$$

Finally, since in equilibrium we have that $q = y$ and from (10) operating income becomes

$$\begin{aligned}\pi &= \frac{b' - (1-\delta_b)b}{1-\delta_b} - w\left(\frac{b^\eta \left[\frac{b'-(1-\delta_b)b}{(1-\delta_b)b^\eta}\right]^{-\frac{\alpha}{1-\alpha}}}{zk^\theta}\right)^{\frac{1}{1-\theta}} \\ &= \pi(z,k,b,b')\end{aligned}$$

Cash flows are given by

$$E = \underbrace{(1-\tau)\pi(z,k,b,b')}_{\text{Operating cash-flows}} + \underbrace{\tau\delta_k k}_{\text{Tax shields from depreciation}} - \underbrace{(k'-(1-\delta_k)k)}_{\text{Investment}} - \underbrace{\psi\frac{(k'-(1-\delta_k)k)^2}{2k}}_{\text{capital adjustment cost}}$$
$$+ \underbrace{d'-d[1+r(1-\tau)]}_{\text{Net debt issuance less interest expense}}$$
$$= E(z,k,k',b,b',d,d') \tag{11}$$

and are discounted at $\beta = \frac{1}{1+r}$ where r is the risk-free rate. The first term of (11) is the operating after-tax cash flow, the second term is the tax shield coming from depreciation of physical capital, the third term is the investment in physical capital, the fourth term is the adjustment cost in physical capital, and the fifth term is the amount of net debt issuance minus the interest rates.

The firm chooses its investment, pricing, and financing policies by choosing (k', b', d') to maximize the expected discounted value of its future cash flows. The problem of the firm is characterized by the following Bellman equation

$$V(z,k,b,d) = \max_{\{k',b',d'\}} \left\{ E(z,k,k',b,b',d,d') + \lambda E \mathbb{1}_{\{E<0\}} + \beta \mathbb{E}_{z'|z}\left[V(z',k',b',d')\right] \right\} \tag{12}$$

subject to $d' \leq \omega(1-\delta_k)k'$.

The model does not admit a closed-form solution and is solved numerically by value function iteration. The following proposition demonstrates that this problem admits a unique solution.

Proposition 1. *Let the state space be $X = \mathcal{Z} \times \mathcal{K} \times \mathcal{B} \times \mathcal{D}$, where $\mathcal{Z}$ is finite, and $\mathcal{K}$, $\mathcal{B}$, and $\mathcal{D}$ are bounded grids. For each $x = (z,k,b,d) \in X$, let the feasible correspondence $\Gamma(x) \subseteq \mathcal{K} \times \mathcal{B} \times \mathcal{D}$ be nonempty. Assume that the per-period return function $u(x;k',b',d')$ is bounded, and that $0 < \beta < 1$. Let $P(z,z')$ be a transition probability on $\mathcal{Z}$. Then the Bellman operator*

$$(TV)(x) = \max_{(k',b',d') \in \Gamma(x)} \left\{ u(x;k',b',d') + \beta \sum_{z' \in \mathcal{Z}} P(z,z') V(z',k',b',d') \right\}$$

is a contraction on $(B(X), \|\cdot\|_\infty)$ *with modulus* β*. In particular, there exists a unique bounded value function* V^* *such that* $V^* = TV^*$*.*

Proof: See Appendix B.1

4 Quantitative analysis

4.1 Calibration

The model solution depends on the following 13 parameters $\{r, \tau, \theta, w, \rho, \sigma_z, \delta_k, \psi, \lambda, \omega, \eta, \alpha, \delta_b\}$. Table 7 presents the value of the calibrated parameters. The following parameters are calibrated externally. The risk-free rate r is set to 2% and the tax rate τ is set to 20%, close to the US corporate tax rate. The autocorrelation of productivity ρ and the cost of equity issuance λ are taken to be close to DeAngelo et al. (2011). The share of capital θ and the volatility σ_z are taken to be close to Hajda and Nikolov (2022), while the investment adjustment cost ψ is taken to be close to Nikolov, Schmid, and Steri (2019). The price elasticity α is close to Moreira (2016).

The remaining 5 parameters, that is, the depreciation of physical capital δ_k, the collateral constraint parameter ω, the wage w, the elasticity of customer capital η, and the customer capital depreciation rate δ_b, are chosen to match the following five moments: average customer capital, average net leverage, average investment, average profitability, and average equity issuance. After having solved the model, I simulate the model solution for a panel of 2,000 firms and 120 periods, burning the first 100 periods to mitigate the impact of initial conditions. I compute the moments on the resulting panel.

The parameters are identified as follows. The elasticity of customer capital η and the depreciation of customer capital δ_b are primarily identified by the average customer capital and the average net leverage. The wage w is primarily identified by the average profitability. The depreciation rate of physical capital δ_k is identified by the average investment. The collateral parameter ω is identified by the average leverage and the average equity issuance. The calibration results are reported in Table 7. Overall, the model matches the targeted moments reasonably well.

Figure 3 illustrates the relationship between the targeted moments and the internally calibrated parameters. The figure shows that the moments display steep and monotonic relationships with the corresponding parameters, supporting the identification strategy. Average customer capital increases with the elasticity of customer capital η and decreases with the depreciation rate of customer capital δ_b. As η increases, firms accumulate more customer capital, while as δ_b increases, customer capital drops as it is more depreciated. When the firm relies more on customer capital, its debt capacity decreases, and therefore the average net leverage decreases with η and increases with δ_b. Average profitability decreases with the wage parameter w, whereas average investment increases with the depreciation rate of physical capital δ_k. Finally, both average net leverage and average equity issuance increase with the collateral parameter ω. As ω increases, debt capacity increases, which implies that net leverage increases. Moreover, we can see that average equity issuance also tends to increase. Higher ω relaxes financing constraints, which induces firms to scale up investment and customer-capital accumulation. This increases the overall demand for external finance.

Table 7: Estimated Parameters and Moments. This table presents the calibrated parameters and the moments that are matched.

Externally calibrated parameters	Symbol	Value
Risk-free rate	r	0.02
Tax rate	τ	0.20
Share of capital	θ	0.60
Persistence productivity shock	ρ	0.75
Volatility (productivity shock)	σ_z	0.30
Adjustment cost	ψ	5.40
Equity issuance cost	λ	0.15
Price elasticity	α	1.50
Internally calibrated parameters	Symbol	Value
Elasticity of customer capital	η	0.90
Customer capital depreciation	δ_b	0.30
Wage	w	100
Physical capital depreciation	δ_k	0.06
Collateral parameter	ω	0.275
Moments	Data	Model
Average customer capital	0.7660	0.6462
Average net leverage	-0.0288	-0.0324
Average investment	0.0480	0.0547
Average profitability	0.0414	0.0381
Average equity issuance	0.0735	0.0762

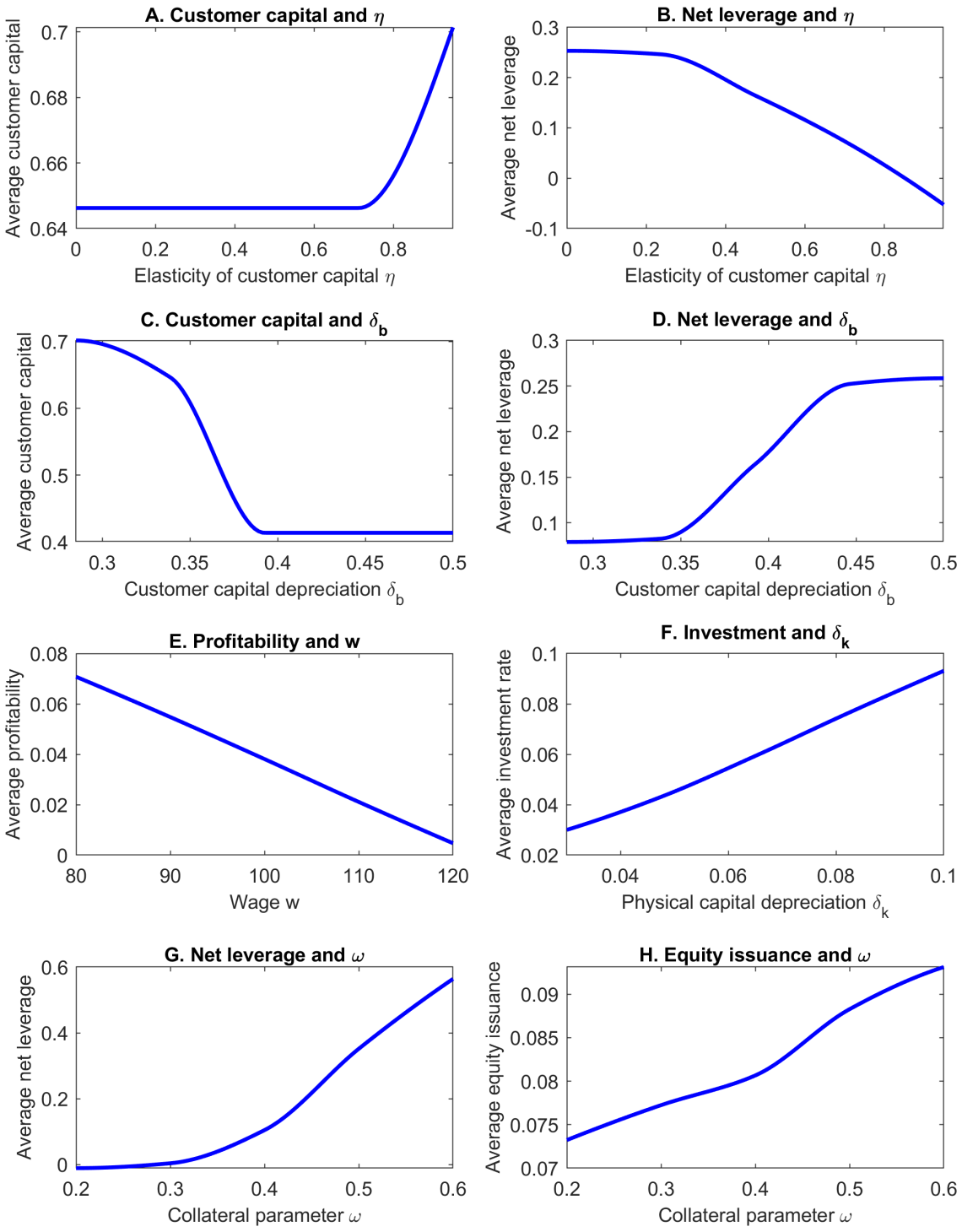


Figure 3: Identification. This figure shows comparative statics of the model-implied moments with respect to the parameters, primarily identifying them in the calibration procedure. Each panel is constructed by varying one parameter while holding all other parameters fixed at their baseline calibrated values.

4.2 Comparative statics

In this section, I use the parameters from the calibration of the previous section to investigate the model's implications for customer capital and firms' financing policies. Firms invest in customer capital due to the presence of frictions in the product market. In the model, two parameters drive the degree of product-market frictions: the elasticity of customer capital η and the depreciation rate of customer capital δ_b. I provide comparative statics for these two parameters.

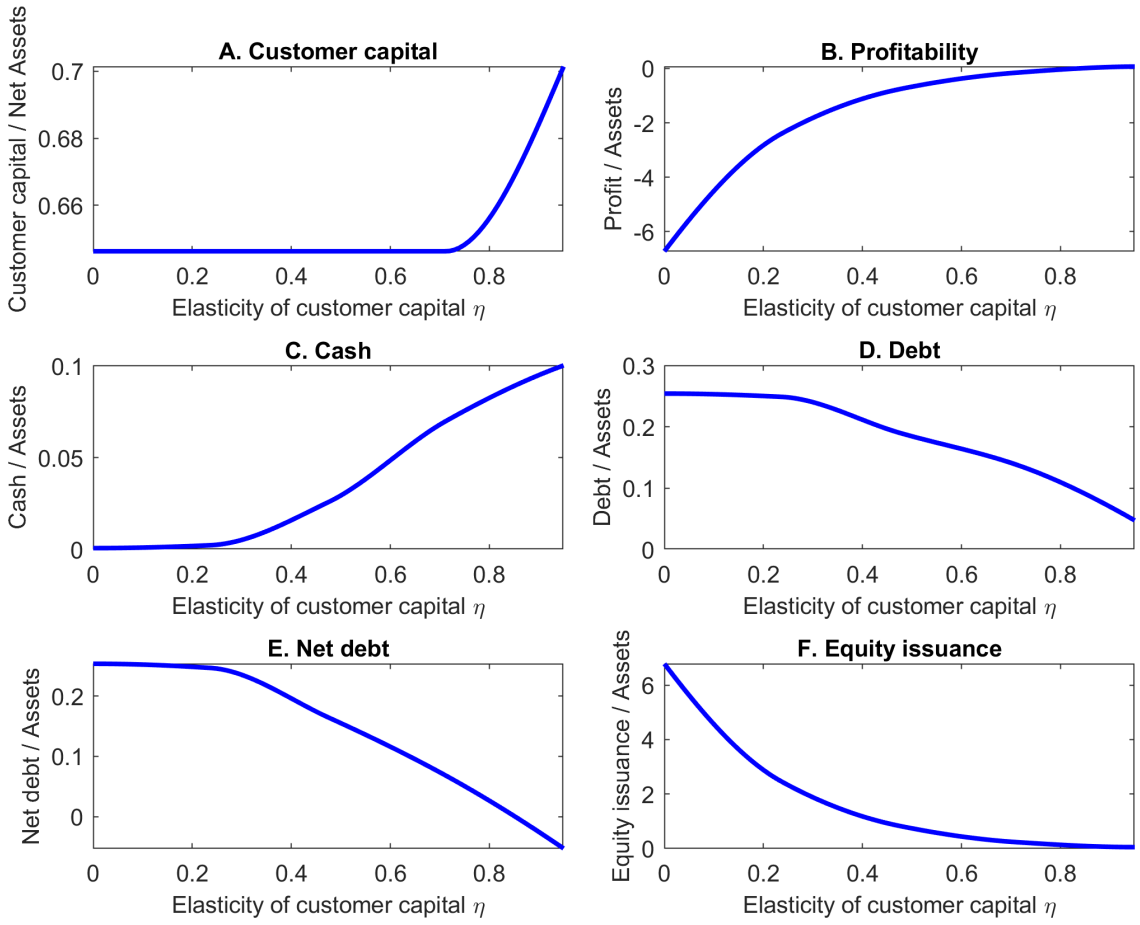


Figure 4: Elasticity of customer capital. This figure shows comparative statics with respect to the elasticity of customer capital η for the average customer capital, the average profitability, the average cash-to-asset ratio, the average leverage, the average net leverage, and the average equity issuance.

Figure 4 shows the impact of a change in the elasticity of customer capital η on firms'

policies. Recall that η relates to the degree of frictions in the product market, and from equation (2), that in the case where $\eta = 0$, customer capital does not affect demand, which corresponds to a frictionless product market. Panels A and B show that as the elasticity of demand to the customer capital η increases, customer capital and profitability increase. As firms face more frictions from the product market, the elasticity of customer capital η increases, which implies that firms have more incentives to accumulate customer capital and also become more profitable. Indeed, as customer capital shifts the demand curves, a higher η means that the effect of customer capital on demand becomes stronger, in turn improving profitability. Panels C to F show the effect of this increase on the firm's financing policies. Consistent with what is observed in the data, we can see that following the increase in customer capital (caused by the increase in η in Panel A), the cash-to-assets ratio increases (Panel C), the leverage ratio decreases (Panel D and E), and equity issuance decreases (Panel F). Hence, the model can recover the positive association between customer capital and cash holdings, and the negative association between customer capital and (net) leverage and equity issuance observed in the data. More importantly, the effects are quantitatively important.

Counterfactual analysis reveals that in the case where $\eta = 0$, that is, when there are no frictions in the product market, the average net leverage ratio is around 25%, while under the baseline calibration, the model predicts an average net leverage ratio of around -3%, which corresponds to the average net leverage ratio observed in the data. This shows that product-market frictions are critical and quantitatively important in explaining firms' financing decisions. Moreover, the effects on cash, leverage, and equity issuance are also quantitatively important, as they can be directly inferred from the figure. In the absence of product-market frictions, firms hold significantly less cash and issue significantly more debt and equity. Hence, this may also help to rationalize several corporate finance puzzles, such as the low leverage puzzle, that is, the fact that firms choose low leverage ratios despite large benefits from tax shields or the fact that firms hold large cash reserves (see Bates et al. (2009), Falato et al. (2022)).

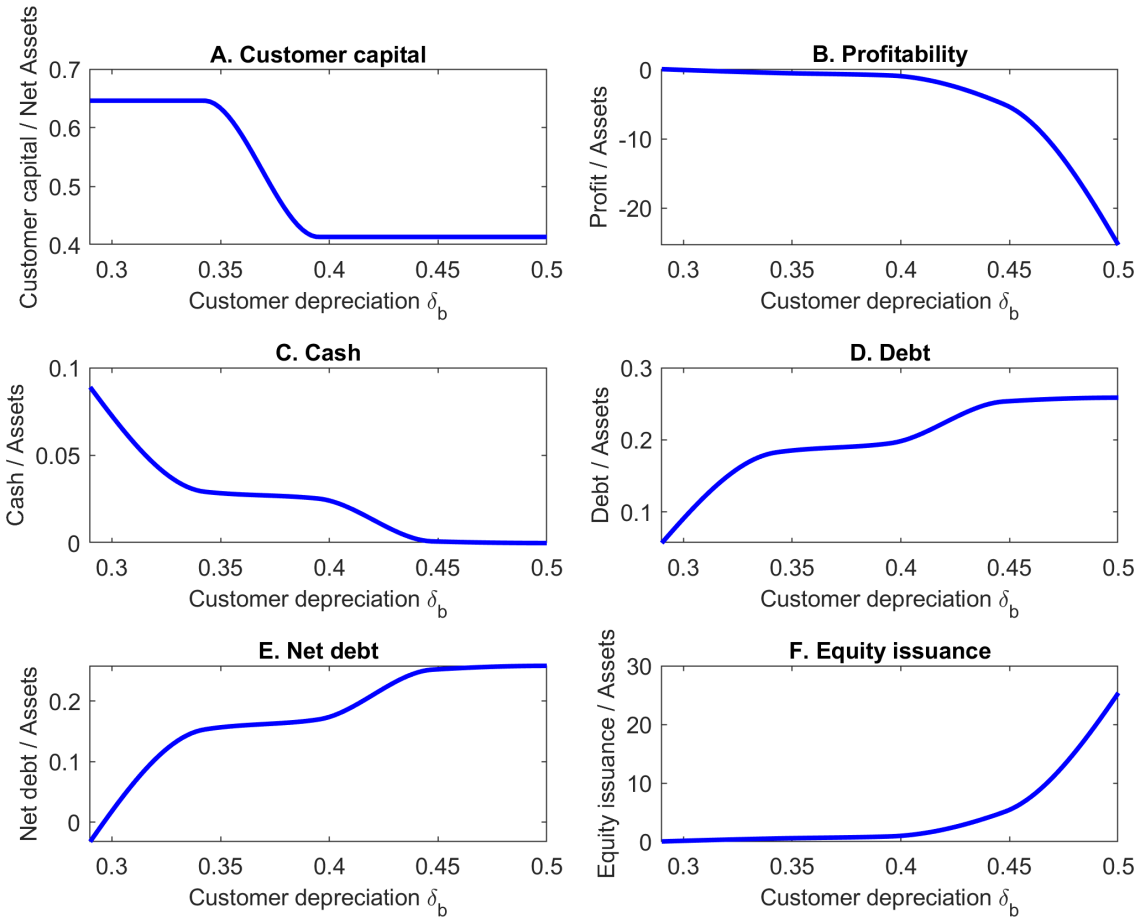


Figure 5: Customer capital depreciation. This figure shows comparative statics with respect to the customer capital depreciation rate δ_b for average customer capital, the average profitability, the average cash-to-asset ratio, the average leverage, the average net leverage, and the average equity issuance.

Now, we turn to the implications of the second key novel parameter driving the degree of product-market frictions, the depreciation rate of customer capital δ_b. Figure 5 shows the impact of a change in the depreciation of customer capital δ_b on firms' policies. Panels A and B show that as δ_b increases, customer capital and profitability decrease. As the depreciation rate of customer capital increases, firms' incentives to accumulate customer capital decrease, and as a consequence, profitability declines. Panels C to F show the effect of the increase in the depreciation rate of customer capital δ_b on the firm's financing policies. Consistent with the empirical evidence, we can see that following the decrease in customer capital, the cash-to-assets ratio decreases (Panel C), the leverage ratio increases (Panels D and E), and

equity issuance increases (Panel F). That is, the model can recover the positive association between customer capital and cash holdings, and the negative association between customer capital and (net) leverage and equity issuance observed in the data. Moreover, the effects are also quantitatively important.

Compared to the baseline scenario where δ_b is 0.3, when δ_b increases to 0.5, net leverage increases from about -3% to about 25-30%. We can observe that the effects on cash, leverage, and equity issuance are also quantitatively important. This shows that product-market frictions are critical for explaining variation in firms' financing policies, both qualitatively and quantitatively.

5 Conclusion

Due to frictions in the product-market, firms spend substantial resources on customer capital, which constitutes a major form of their intangible assets. In this paper, I investigate how this form of intangible asset impacts firms' financing policies. Using a recently developed measure of customer capital by He et al. (2024), I start by showing that, empirically, customer capital is positively related to cash holdings, negatively related to (net) leverage and equity issuance size and frequency. I rationalize these findings in a dynamic investment and financing model in which firms face both product-market and financing frictions and make optimal financing decisions, as well as optimal investment in physical capital and customer capital. In the model, only physical capital can be pledged as collateral.

I show that product-market frictions and customer capital are critical to explaining firms' financing decisions. Higher product-market frictions make firms more profitable as they can extract more rents from their customers, and incentivize them to accumulate more customer capital. However, since customer capital is not pledgeable, this naturally reduces firms' debt capacity. Hence, in the presence of financing frictions, firms optimally choose to hold more cash to avoid costly equity issuance and preserve debt capacity for future investment needs, translating into higher cash holdings. This also results in lower leverage and lower equity issuance as firms become more profitable. Hence, the model provides a

natural connection between product-market frictions, customer capital, and firms' financing policies. In particular, it recovers the positive association between customer capital and cash holdings, and the negative association between customer capital and leverage and equity issuance observed in the data.

Moreover, calibrations reveal that product market frictions are quantitatively important in explaining variation in financing policies. Counterfactual analysis reveals that in the absence of product market frictions, the average net leverage ratio is around 25%, while in the calibrated version of the model with product-market frictions, it is around -3%, close to its empirical counterpart. These findings may help to reconcile well-known empirical puzzles, such as the low-leverage puzzle, the fact that firms choose low leverage despite the large benefit from tax shields, or the fact that firms seem to hold large reserves of cash. Furthermore, it underscores the importance of considering product market frictions–and more generally demand-side frictions–to explain corporate policies. Future research should tackle these issues more carefully.

References

Bates, T. W., Kahle, K. M., & Stulz, R. M. (2009). Why do us firms hold so much more cash than they used to? *The journal of finance*, *64*(5), 1985–2021.

Bolton, P., Chen, H., & Wang, N. (2011). A unified theory of tobin's q, corporate investment, financing, and risk management. *The journal of Finance*, *66*(5), 1545–1578.

Bronnenberg, B. J., Dubé, J.-P. H., & Gentzkow, M. (2012). The evolution of brand preferences: Evidence from consumer migration. *American Economic Review*, *102*(6), 2472–2508.

Corrado, C., Hulten, C., & Sichel, D. (2009). Intangible capital and us economic growth. *Review of income and wealth*, *55*(3), 661–685.

Crouzet, N., & Eberly, J. (2023). Rents and intangible capital: A q+ framework. *The Journal of Finance*, *78*(4), 1873–1916.

DeAngelo, H., DeAngelo, L., & Whited, T. M. (2011). Capital structure dynamics and transitory debt. *Journal of financial economics*, *99*(2), 235–261.

Dou, W. W., & Ji, Y. (2021). External financing and customer capital: a financial theory of markups. *Management Science*, *67*(9), 5569–5585.

Dou, W. W., Ji, Y., Reibstein, D., & Wu, W. (2021). Inalienable customer capital, corporate liquidity, and stock returns. *The Journal of Finance*, *76*(1), 211–265.

Eisfeldt, A. L., Hartman-Glaser, B., Kim, E. T., & Lee, K. B. (2026). *Intangible intensity* (Tech. Rep.). National Bureau of Economic Research.

Eisfeldt, A. L., & Papanikolaou, D. (2013). Organization capital and the cross-section of expected returns. *The Journal of Finance*, *68*(4), 1365–1406.

Falato, A., Kadyrzhanova, D., Sim, J., & Steri, R. (2022). Rising intangible capital, shrinking debt capacity, and the us corporate savings glut. *The Journal of Finance*, *77*(5), 2799–2852.

Fresard, L. (2010). Financial strength and product market behavior: The real effects of corporate cash holdings. *The Journal of finance*, *65*(3), 1097–1122.

Geelen, T., Hajda, J., Morellec, E., & Winegar, A. (2024). Asset life, leverage, and debt maturity matching. *Journal of Financial Economics*, *154*, 103796.

Gilchrist, S., Schoenle, R., Sim, J., & Zakrajšek, E. (2017). Inflation dynamics during the

financial crisis. *American Economic Review*, *107*(3), 785–823.

Gourio, F., & Rudanko, L. (2014). Customer capital. *Review of Economic Studies*, *81*(3), 1102–1136.

Graham, J. R. (2000). How big are the tax benefits of debt? *The journal of finance*, *55*(5), 1901–1941.

Hajda, J., & Nikolov, B. (2022). Product market strategy and corporate policies. *Journal of Financial Economics*, *146*(3), 932–964.

He, B. (2023). Financing intangibles. *Available at SSRN 4692149*.

He, B., Mostrom, L. I., & Sufi, A. (2024). *Investing in customer capital* (Tech. Rep.). National Bureau of Economic Research.

Hennessy, C. A., & Whited, T. M. (2005). Debt dynamics. *The journal of finance*, *60*(3), 1129–1165.

Hennessy, C. A., & Whited, T. M. (2007). How costly is external financing? evidence from a structural estimation. *The Journal of Finance*, *62*(4), 1705–1745.

Hoberg, G., Phillips, G., & Prabhala, N. (2014). Product market threats, payouts, and financial flexibility. *The Journal of Finance*, *69*(1), 293–324.

Hugonnier, J., Malamud, S., & Morellec, E. (2015). Capital supply uncertainty, cash holdings, and investment. *The Review of Financial Studies*, *28*(2), 391–445.

Lemmon, M. L., Roberts, M. R., & Zender, J. F. (2008). Back to the beginning: persistence and the cross-section of corporate capital structure. *The journal of finance*, *63*(4), 1575–1608.

Li, Y. (2025). Fragile new economy: intangible capital, corporate savings glut, and financial instability. *American Economic Review*, *115*(4), 1100–1141.

Maug, E. G. (2025). Financing human capital: A survey and synthesis. *European Corporate Governance Institute–Finance Working Paper*(1073).

Moreira, S. (2016). Firm dynamics, persistent effects of entry conditions, and business cycles. *Persistent Effects of Entry Conditions, and Business Cycles (October 1, 2016)*.

Morellec, E., Nikolov, B., & Schürhoff, N. (2012). Corporate governance and capital structure dynamics. *The journal of finance*, *67*(3), 803–848.

Morellec, E., Nikolov, B., & Zucchi, F. (2013). *Competition, cash holdings, and financing*

decisions. Swiss Finance Inst.

Morellec, E., & Zhdanov, A. (2019). Product market competition and option prices. *The Review of Financial Studies*, *32*(11), 4343–4386.

Morlacco, M., & Zeke, D. (2021). Monetary policy, customer capital, and market power. *Journal of Monetary Economics*, *121*, 116–134. doi: 10.1016/j.jmoneco.2021.04.010

Nikolov, B., Schmid, L., & Steri, R. (2019). Dynamic corporate liquidity. *Journal of Financial Economics*, *132*(1), 76–102.

Peters, R. H., & Taylor, L. A. (2017). Intangible capital and the investment-q relation. *Journal of Financial Economics*, *123*(2), 251–272. doi: 10.1016/j.jfineco.2016.03.011

Rampini, A. A., & Viswanathan, S. (2025). *Collateral and secured debt* (Tech. Rep.). National Bureau of Economic Research.

Sedlacek, P., & Ignaszak, M. (2021). Productivity, profitability and growth.

Stokey, N. L., & Lucas Jr, R. E. (1989). *Recursive methods in economic dynamics*. Harvard University Press.

Sun, Q., & Xiaolan, M. Z. (2019). Financing intangible capital. *Journal of Financial Economics*, *133*(3), 564–588.

Valta, P. (2012). Competition and the cost of debt. *Journal of financial economics*, *105*(3), 661–682.

Warusawitharana, M., & Zucchi, F. (2022). The monetization of innovation.

Appendix

A Empirics

A.1 Variables Definitions

Table A1: Variable Descriptions and Sources

Variable	Description	Source
Customer capital	Stock of customer capital constructed by capitalizing sales and marketing expenditures, scaled by net assets, defined as total assets minus cash and short-term investments `(at - che)`.	He et al. (2024); Compustat
Book leverage	Ratio of total debt, defined as debt in current liabilities plus long-term debt, to total assets: `(dlc + dltt)/at`.	Compustat
Market leverage	Ratio of total debt to the sum of total debt and the market value of equity: `(dlc + dltt)/(dlc + dltt + prcc_f*csho)`.	Compustat
Secured book leverage	Ratio of secured debt to total assets: `dm/at`. Secured debt is measured using Compustat's debt-mortgage and other secured-debt variable.	Compustat
Unsecured book leverage	Ratio of unsecured debt to total assets, where unsecured debt is defined as total debt minus secured debt: `(dlc + dltt - dm)/at`.	Compustat
Secured market leverage	Ratio of secured debt to the sum of total debt and the market value of equity: `dm/(dlc + dltt + prcc_f*csho)`.	Compustat

Continued from previous page

Variable	**Description**	**Source**
Unsecured market leverage	Ratio of unsecured debt to the sum of total debt and the market value of equity: `(dlc + dltt - dm)/(dlc + dltt + prcc_f*csho)`.	Compustat
Net book leverage	Ratio of total debt minus cash and short-term investments to total assets: `(dlc + dltt - che)/at`.	Compustat
Net market leverage	Ratio of total debt minus cash and short-term investments to the sum of total debt and the market value of equity: `(dlc + dltt - che)/(dlc + dltt + prcc_f*csho)`.	Compustat
Equity issuance	Net equity issuance conditional on issuance exceeding 5% of total assets. Net equity issuance is defined as the sale of common and preferred stock minus purchases of common and preferred stock, scaled by total assets: `(sstk - prstkc)/at`. The variable equals net equity issuance when this ratio exceeds 0.05 and zero otherwise.	Compustat
Frequency of equity issuance	Indicator variable equal to one when net equity issuance, defined as `(sstk - prstkc)/at`, exceeds 5% of total assets, and zero otherwise.	Compustat
Debt/EBITDA	Ratio of total debt to earnings before interest, taxes, depreciation, and amortization: `(dlc + dltt)/ebitda`. The variable is set to missing when EBITDA is non-positive.	Compustat

Continued from previous page

Variable	Description	Source
Net debt/EBITDA	Ratio of total debt minus cash and short-term investments to EBITDA: `(dlc + dltt - che)/ebitda`. The variable is set to missing when EBITDA is non-positive.	Compustat
Secured debt/EBITDA	Ratio of secured debt to EBITDA: `dm/ebitda`. The variable is set to missing when EBITDA is non-positive or secured debt exceeds total debt.	Compustat
Unsecured debt/EBITDA	Ratio of unsecured debt, defined as total debt minus secured debt, to EBITDA: `(dlc + dltt - dm)/ebitda`. The variable is set to missing when EBITDA is non-positive or secured debt exceeds total debt.	Compustat
Residual intangible capital	Residual component of intangible capital after excluding customer capital, scaled by net assets.	He et al. (2024); Compustat
Profitability	Operating income before depreciation divided by total assets: `oibdp/at`.	Compustat
Size	Natural logarithm of sales: log(`sale`).	Compustat
Market-to-book	Ratio of the market value of equity plus the book value of assets minus the book value of equity to total assets: `(prcc_f*csho + at - ceq)/at`.	Compustat
R&D	Research and development expenditures scaled by sales: `xrd/sale`. Missing research and development expenditures are set to zero.	Compustat

Continued from previous page

Variable	**Description**	**Source**
Tangibility	Ratio of net property, plant, and equipment to total assets: `ppent/at`.	Compustat
Cash flow volatility	Rolling three-year standard deviation of profitability, where profitability is defined as operating income before depreciation divided by total assets. The rolling window includes the current year and the preceding two years.	Compustat
Cash/assets	Ratio of cash and short-term investments to total assets: `che/at`.	Compustat
Log(assets)	Natural logarithm of total assets: log(`at`).	Compustat
Cash flow/assets	Cash flow scaled by total assets, where cash flow is measured as operating income before depreciation, net of interest expense, taxes, and common dividends: `(oibdp - xint - txt - dvc)/at`.	Compustat
Acquisition	Acquisition expenditures divided by total assets: `aqc/at`.	Compustat
Capital expenditures	Capital expenditures divided by total assets: `capx/at`.	Compustat
Industry risk	Industry-level cash-flow risk. Firm-level cash-flow risk is first measured as the standard deviation of cash flow/assets over the preceding ten years, excluding the current year and requiring at least three observations. Industry risk is then computed as the annual average of firm-level cash-flow risk within each two-digit SIC industry.	Compustat

Continued from previous page

Variable	**Description**	**Source**
Net working capital	Working capital net of cash and short-term investments, scaled by total assets: `(wcap - che)/at`.	Compustat
Dividend	Indicator variable equal to one when the firm reports positive common dividends (`dvc` $>$ 0), and zero otherwise.	Compustat

Table A2: Robustness – Leverage and Customer Capital. This table presents estimates from regressions of (net) leverage, measured by (net) debt over EBITDA, on customer capital and a set of controls. Each explanatory variable is standardized by its full-sample standard deviation. All regressions include year fixed effects and either firm or industry fixed effects. Standard errors (in parentheses) are clustered at the firm level.

	(1)	(2)	(3)	(4)	(5)	(6)
	Debt/EBITDA			Net Debt/EBITDA		
Customer capital	-0.408***	-0.425***	-0.444***	-1.178***	-0.946***	-0.946***
	(0.073)	(0.048)	(0.077)	(0.166)	(0.168)	(0.168)
Profitability		-2.620***	-1.762***		0.046	0.046
		(0.107)	(0.104)		(0.128)	(0.128)
Size		0.016	0.354		1.814***	1.814***
		(0.054)	(0.228)		(0.293)	(0.293)
Market-to-Book		-0.128*	-0.199***		-0.070	-0.070
		(0.068)	(0.042)		(0.069)	(0.069)
R&D		-1.550***	-0.619***		-0.440	-0.440
		(0.325)	(0.200)		(0.802)	(0.802)
Tangibilitity		0.513***	0.631***		1.237***	1.237***
		(0.067)	(0.117)		(0.127)	(0.127)
Cash flow volatility		-0.094	-0.011		-0.019	-0.019
		(0.063)	(0.069)		(0.094)	(0.094)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	No	Yes	Yes	Yes	Yes
Industry FE	No	Yes	No	No	No	No
Adj. R^2	0.319	0.120	0.340	0.468	0.475	0.475
N. obs.	36,941	37,105	36,739	36,941	36,739	36,739

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: Robustness – Secured vs Unsecured debt and Customer Capital. This table presents the estimates of the regression of secured/unsecured leverage on the customer capital, and a set of controls. Each explanatory variable is standardized by its full-sample standard deviation. All regressions include firm and year fixed-effects. Standard errors (in parentheses) are clustered at the firm level.

	(1)	(2)	(3)	(4)	(5)	(6)
	Book Leverage		Market Leverage		Debt/EBITDA	
	Secured	Unsecured	Secured	Unsecured	Secured	Unsecured
Customer capital	-0.014***	-0.008***	-0.012***	-0.003	-0.169***	-0.205***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.032)	(0.047)
Mean dependent variable	0.081	0.133	0.083	0.120	0.924	1.578
SD dependent variable	0.135	0.154	0.149	0.159	1.854	3.220
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Adj. R^2	0.636	0.626	0.618	0.607	0.499	0.352
N. obs.	34,437	34,355	34,343	34,343	34,428	34,355

Standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

B Theory

B.1 Proof of Proposition 1

Since the state and choice sets are finite, $\Gamma(x)$ is finite for all $x \in X$. Moreover, it is nonempty. Indeed, for any $b \in \mathcal{B}$, since $\delta_b > 0$ and $b \leq B_{\max}$, we have $(1-\delta_b)b < B_{\max}$, so $b' = B_{\max}$ is feasible. Similarly, by construction of the debt grid, there always exists d' satisfying the collateral constraint. Hence $\Gamma(x) \neq \varnothing$ for all $x \in X$. Since $\Gamma(x)$ is finite, the maximum is attained. Because the return function is bounded and the feasible set is finite, the operator T maps bounded functions into bounded functions. Let $V, W \in B(X)$. For any $x \in X$, define

$$f(k', b', d') = u(x; k', b', d') + \beta \sum_{z'} P(z, z') V(z', k', b', d'),$$

$$g(k', b', d') = u(x; k', b', d') + \beta \sum_{z'} P(z, z') W(z', k', b', d').$$

Using the inequality $|\max f - \max g| \leq \max |f - g|$, we obtain

$$|(TV)(x) - (TW)(x)| \leq \beta \max_{(k', b', d') \in \Gamma(x)} \left| \sum_{z'} P(z, z')(V(z', k', b', d') - W(z', k', b', d')) \right|.$$

Since $P(z, z')$ is a probability distribution,

$$\left| \sum_{z'} P(z, z')(V - W) \right| \leq \sum_{z'} P(z, z') |V - W| \leq \|V - W\|_\infty.$$

Hence

$$|(TV)(x) - (TW)(x)| \leq \beta \|V - W\|_\infty,$$

and taking the supremum over x yields

$$\|TV - TW\|_\infty \leq \beta \|V - W\|_\infty.$$

Thus, T is a contraction. By the contraction mapping theorem from Stokey and Lucas Jr (1989), a unique fixed-point V^* exists.