Inalienable Customer Capital, Corporate Liquidity, and Stock Returns

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作者信息

WINSTON WEI DOU(通讯作者)于2016年加入沃顿商学院，担任金融学助理教授。此前，他在麻省理工学院(MIT)学习金融经济学。2010年，他还获得了耶鲁大学(Yale University)的另一个统计学博士学位。他在中国北京大学获得数学学士学位和经济学学士学位。他的研究重点是金融、宏观经济学和计量经济学的交叉，特别是经济不确定性的影响、市场不完善和不完整的作用、国际资产价格和资本流动的相互作用及其在理解全球失衡中的作用。

David J. Reibstein沃顿商学院教授,研究主要集中在品牌、营销指标、产品线决策和竞争营销策略等方面。最近，Reibstein教授对产品线延伸的研究——一个公司是应该在现有品牌名称下引入延伸产品还是使用一个新品牌。

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文章结构

1 摘要

2 简易模型

A. BasicEnvironment
B. Inalienability of Customer Capital (ICC)
C. Liquidity-Driven Turnover
D. Firm Optimality and Model Solutions

3 测量 ICC

4 实验结果

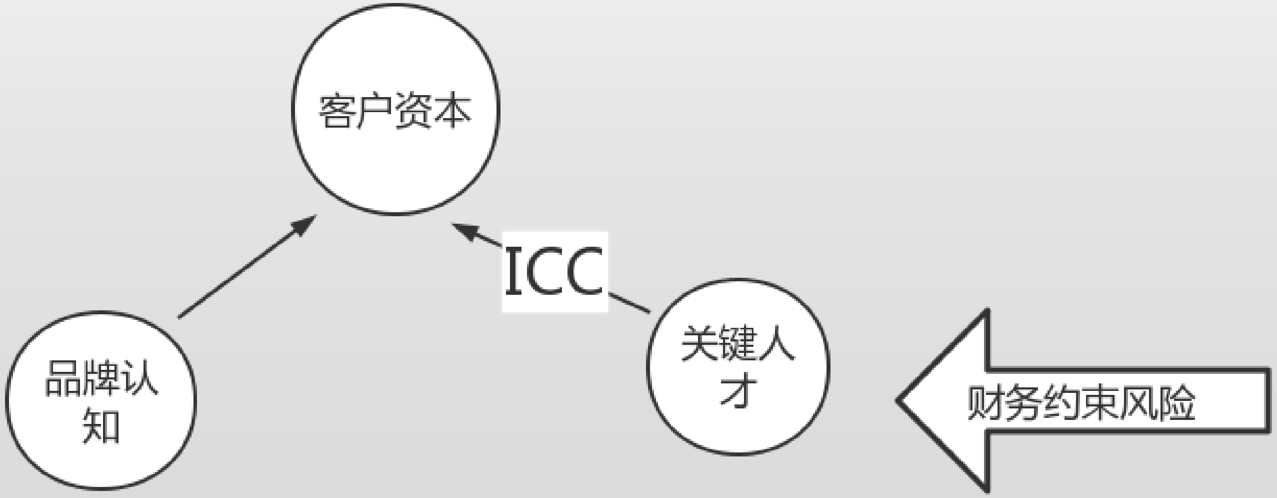
5 定量分析

6 结论

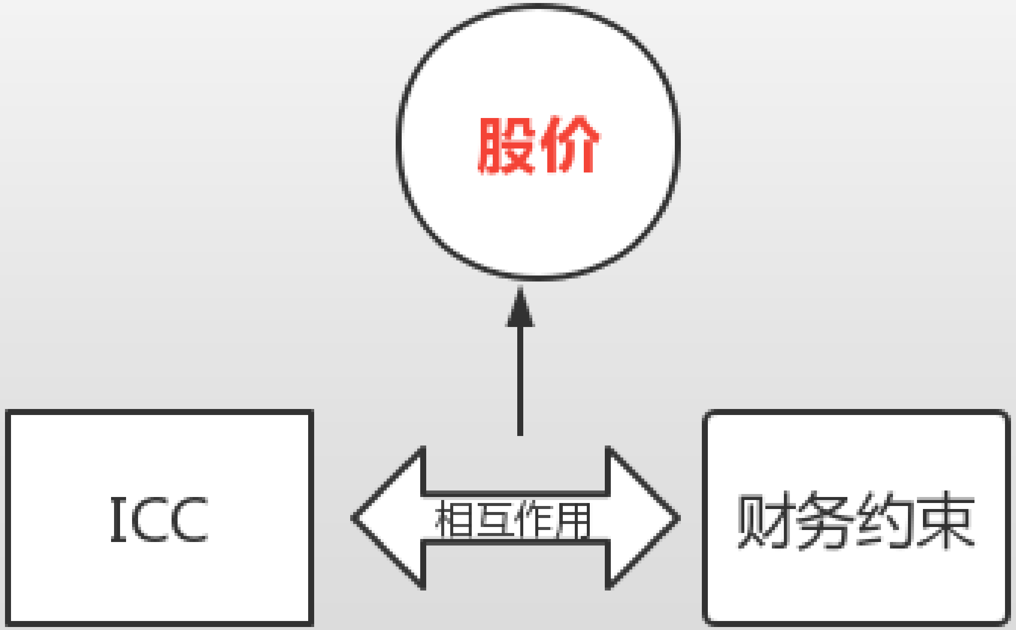
摘要

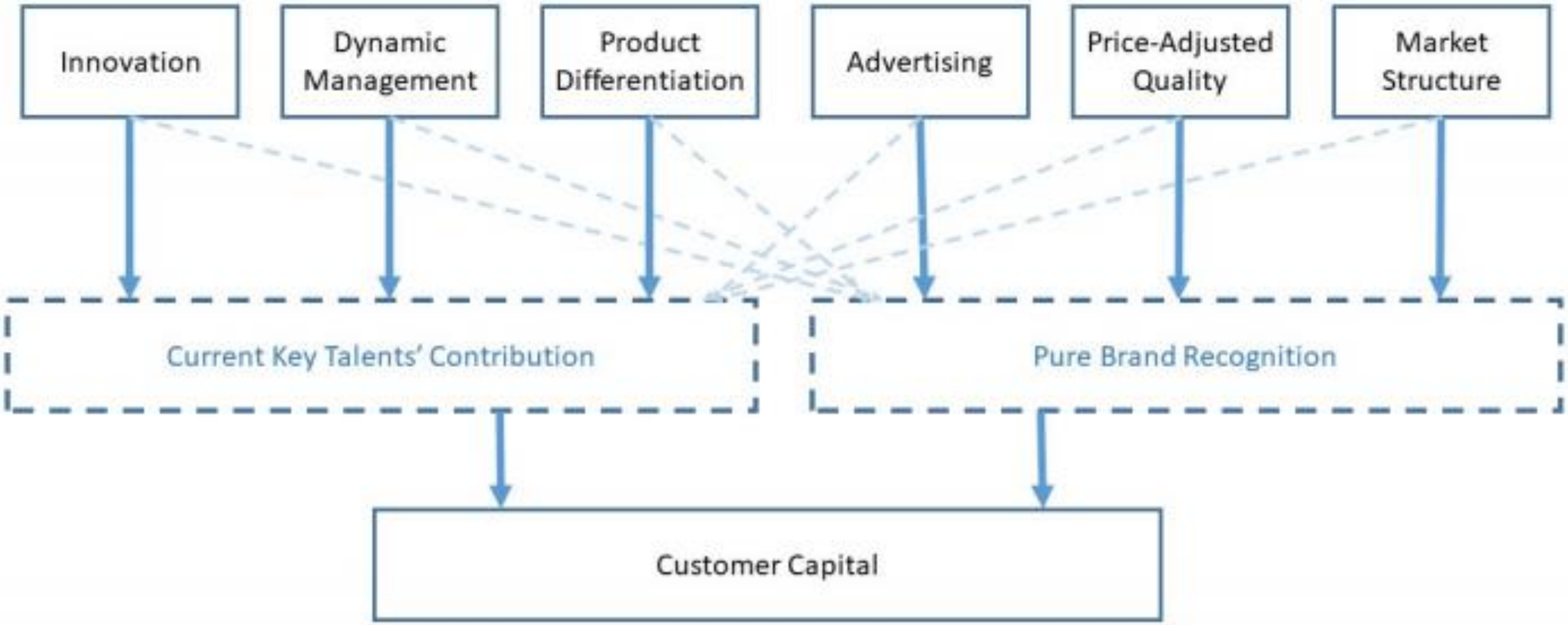
We develop a model in which customer capital depends on key talents' contribution and pure brand recognition. Customer capital guarantees stable demand but is fragile to financial constraints risk if retained mainly by talents, who tend to quit financially constrained firms, damaging customer capital.

Firms with higher ICC have higher average returns, higher talent turnover, and more precautionary financial policies.



In this paper, we study the asset pricing implications of the interaction between financial constraints and the inalienability of customer capital (ICC)





Note: The solid arrows represent primary channels, whereas the dashed arrows represent secondary channels.

Figure 1. Different channels of developing and maintaining customer capital.

During periods of heightened financial constraints risk, firms whose customer capital is more talent-dependent (ICC)suffer more:

(i) they are more likely to experience key talent turnover due to higher operating leverage

(ii) they tend to lose a larger fraction of customer capital upon the departure of key talents due to the greater dependence of customer capital on key talents.

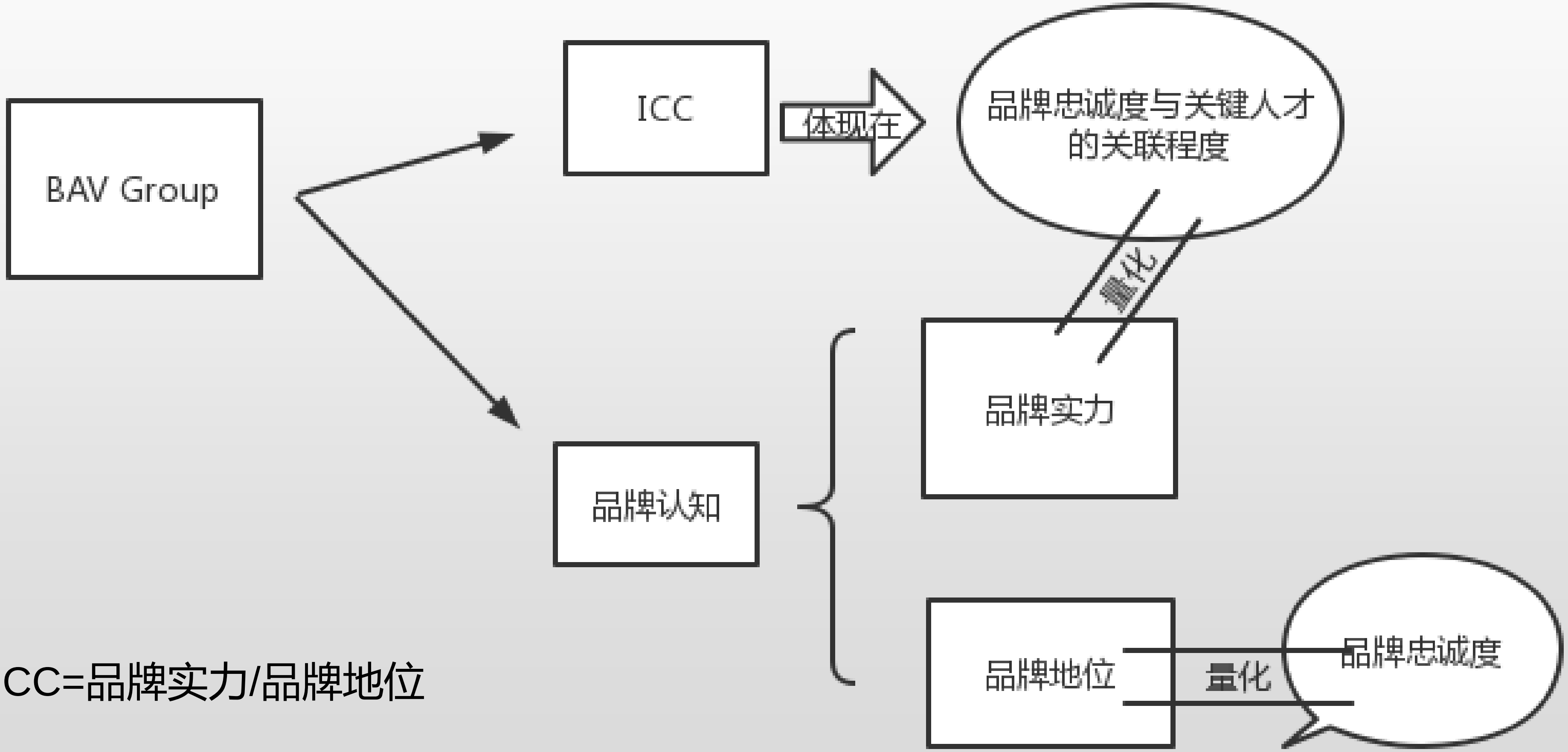
key underlying mechanism

1. A firm’ s external financing is costly, which motivates retained earnings and imposes financial constraints risk on the firm. The marginal value of its internal funds is determined jointly by the endogenous level of firm-specific cash holdings, the endogenous level of the ICC,and the exogenous level of financial constraints risk.

2. maintaining talent-dependent customer capital requires that the firm compensates such talents, which increases the firm’s operating leverage.

3.key talents go if retaining them becomes too costly. Thus, heterogeneous levels of the ICC lead to different exposures to aggregate financial constraints shocks, which leads in turn to spreads in both (risk-adjusted) average stock returns and talent turnover rates.

The main empirical challenge lies in finding high-quality data on consumers’ brand loyalty and talent dependence that are measured in a consistent way across firms.



ICC=品牌实力/品牌地位

ICC measure can capture three major properties:

(i) firms whose talents play a more important role have a higher ICC,
(ii) firms with a higher ICC tend to lose a larger fraction of customer capital upon talent turnover,
(iii) firms′ customer capital becomes less talent-dependent (i.e., the ICC declines) upon talent turnover

Empirical results

1. we show that firms with a higher ICC have higher average (risk-adjusted) excess returns

2. we show that firms with a higher ICC are associated with a higher talent turnover rate, a finding that holds for both executives and innovators.

简易模型

A. Basic Environment

Supply and Demand.

All firms have the same AK production technology with productivity e^{a} and produce a flow of goods over [t, t + dt] with intensity. $\gamma_t = e^{a} K_t$

demand capacity **Btdt** over [t, t + dt] depends on the firm's customer capital Bt

The amount of goods sold by the firm is **Stdt** over [t, t + dt].

$$S_t = \min(Y_t, B_t). \quad (1)$$

we assume that firms rent physical capital Kt from a capital rental market at competitive rental rate r + δK, where r is the risk-free rate and δK isthe rate of physical capital depreciation

Customer Capital Growth.

The firm hires it sales representatives to build new customer capital at convex costs φ(it)Btdt over [t, t + dt], with the adjustment cost function being

$$\phi(i_t) = \alpha i_t^{\eta}, \quad \alpha > 0, \eta > 1. \tag{2}$$

The evolution of customer capital Bt is given by

$$dB_t = (\psi i_t - \delta_B) B_t dt, \tag{3}$$

δB is the rate of depreciation of customer capital

Cash Flow Shock.

$$dC_t = \underbrace{\sigma_c B_t dZ_{c,t}}_{\text{Brownian shocks}} - \underbrace{f B_t dM_t,}_{\text{jump shocks}} \tag{4}$$

Financial Constraints Shock.

We assume that the firm has access to the equity market but not the corporate debt market

The financing cost includes a fixed cost γt that is proportional

to firm size and a variable cost ϕ proportional to the amount of equity issued.

$$\Phi_t(W; B) \equiv \underbrace{\gamma_t B}_{\text{fixed cost}} + \underbrace{\varphi W.}_{\text{variable cost}} \tag{5}$$

- In particular, we assume that the financing cost γ_t follows a two-state Markov process on $\{\gamma_L, \gamma_H\}$, where $0 \leq \gamma_L < \gamma_H$.

The law of motion for γ_t can be described as

$$d\gamma_t = \sum_{x:\gamma_x=\gamma_t} (\gamma_{-x} - \gamma_x) dN_{x,t}, \qquad (6)$$

where the notation "$-x$" represents the state different from "x" in $\{H, L\}$.

Pricing Kernel.

We assume that financial constraints shocks carry a negative market price of risk,We therefore assume that the representative agent' s state-price density Λt evolves according to

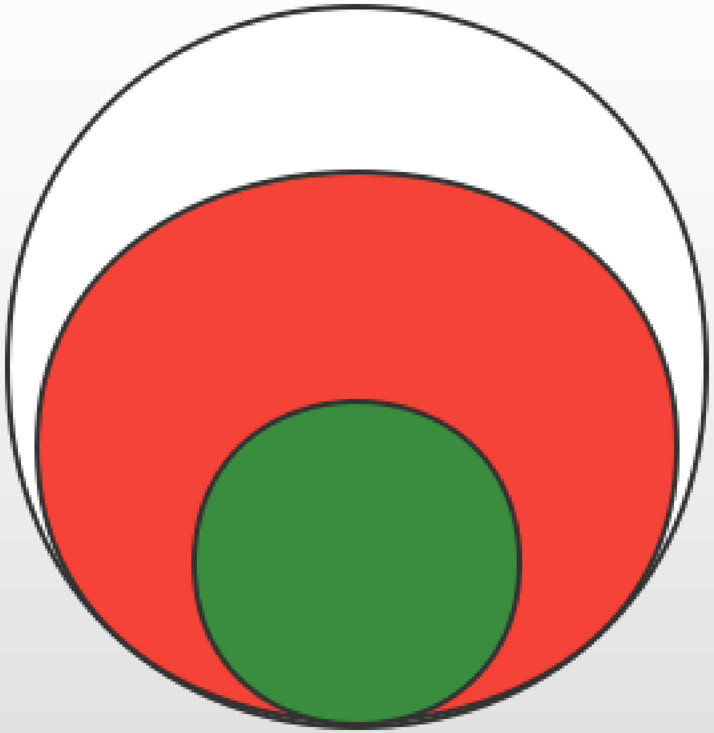
$$\frac{d\Lambda_t}{\Lambda_t} = -r dt + \sum_{x:\gamma_x=\gamma_t} \underbrace{\left(e^{-\kappa_x} - 1\right)}_{\text{market price of risk}} \underbrace{\left(dN_{x,t} - q_x dt\right)}_{\text{financial shock}}. \tag{7}$$

The market price of risk for financial constraints shocks is constant and specified exogenously, and is captured by κx, where x ∈ {H, L}. We assume that κL < 0 and κH > 0 which imply that an increase in financing costs raises the state-price density and thus financial constraints shocks are negatively priced.

●Firms and Agents.

- A continuum of firms and agents exists in the economy. Agents purchase goods as consumers and fund firms by holding equity as shareholders. Some agents also act as talents who manage firms. We assume that agents can trade a complete set of contingent claims on consumption, and that a representative agent owns the equity and consumes the goods of all firms. The representative agent is exposed only to aggregate shocks. We omit firm subscripts for simplicity.

B. Inalienability of Customer Capital (ICC)



$m \in (0, 1)$ captures the damage rate of talent-dependent customer capital due to turnover

τ_t captures the degree to which customer capital depends on key talents

$$(1 - m\tau_t)B_t = B_t - m\tau_t B_t$$

$$(1 - m)\tau_t B_t = \tau_t B_t - m\tau_t B_t$$

Thus, τ_t jumps to $(1 - m)\tau_t/(1 - m\tau_t)$

$$d\ln\tau_t = \mu_\tau(\ln\tau_t - \ln\bar{\tau})dt + \underbrace{[\ln(1-m) - \ln(1-m\tau_t)]\,dJ_t,}_{\text{endogenous turnover} < 0} \quad (8)$$

dJt represents the talent turnover event ,the process Jt jumps up by one (dJt = 1) over [t, t + dt] if talent turnover occurs during this period

C. Liquidity-Driven Turnover

Upon exiting a firm, key talents create a new firm with customer capital

$$B_t^{\text{new}} = (m + \ell)\tau_t B_t, \tag{9}$$

The new firm needs cash to operate, and thus it issues equity to diffused shareholders. the new firm' s valuation, which determines the value of outside options for key talents, is based on the state-price density Λt of all diffused shareholders.

Let V(Wt, Bt, τt, γt) denote a generic firm's value with firm-specific cash holdings Wt,customer capital Bt, and ICC τt in aggregate state γt

.

new firm

$$V_{\text{new}}(B_t,\tau_t,\gamma_t)=\max_{W}\underbrace{\left[V(W,B_t^{\text{new}},\bar{\tau},\gamma_t)-W\right]}_{\text{enterprise value}}-\underbrace{\Phi_t(W;B_t^{\text{new}})}_{\text{deadweight loss}},\tag{10}$$

We assume that key talents do not bear financing costs and thus can gain the enterprise value of the optimally financed firm $V+\phi$

The value of the outside option for key talents is

$$V^{O}(B_t,\tau_t,\gamma_t)=V(W^*,B_t^{\text{new}},\bar{\tau},\gamma_t)-W^*.\tag{11}$$

the promised utility, denoted by U(Bt, τt, γt), equals the value of outside options for key talents VO(Bt, τt, γt)

$$U(B_t,\tau_t,\gamma_t) = V^O(B_t,\tau_t,\gamma_t), \text{ for all } B_t,\tau_t,\gamma_t. \tag{12}$$

$$U(B_t,\tau_t,\gamma_t) = \underbrace{\mathbb{E}_t\left[\int_t^{\bar{t}} \frac{\Lambda_s}{\Lambda_t}\Gamma_s ds\right]}_{\text{present value of compensation}} + \underbrace{\mathbb{E}_t\left[\frac{\Lambda_{\bar{t}}}{\Lambda_t} V^O(B_{\bar{t}},\tau_{\bar{t}},\gamma_{\bar{t}})\right]}_{\text{option value of starting a new firm}}, \tag{13}$$

(12)+(13)

$$U(B_t,\tau_t,\gamma_t) = \mathbb{E}_t\left[\int_t^{\infty} \frac{\Lambda_s}{\Lambda_t}\Gamma_s ds\right].$$

Talent Turnover and Financial Constraints.

$$\theta_t = \begin{cases} \theta_l \equiv 0, & \text{if shareholders decide to keep key talents over } [t, t+dt], \\ \theta_h > 0, & \text{if shareholders decide to replace key talents over } [t, t+dt]. \end{cases} \quad (16)$$

In our model,shareholders' choice of replacement intensity θt ∈ {θl, θh} depends crucially on the firm's current marginal value of internal funds. Intuitively, the firm is more likely to replace key talents when it is financially constrained, because the required compensation becomes more costly when the marginal value of the firm's internal funds is high

Key talents can extract additional rents when firms are financially distressed and external financing/restructuring is needed $\lambda U(B_t, \tau_t, \gamma_t)$

D. Firm Optimality and Model Solutions

the firm’ s operating profit over the period [t, t + dt] is given by

$$dO_t = \underbrace{[p\min(B_t, e^a K_t) - (r+\delta_K)K_t]\,dt}_{\text{production profits}} - \underbrace{[\phi(i_t)B_t + \Gamma_t]\,dt}_{\text{hiring costs}} + \underbrace{dC_t}_{\text{shocks}}, \quad (17)$$

The firm’ s cash holdings evolve according to

$$dW_t = dO_t + (r-\rho)W_t dt + dE_t - dD_t, \quad (18)$$

where (r − ρ)Wtdt is the interest income net of cash-carrying cost ρ, and Et and Dt are cumulative equity issuance and cumulative payout up to t, respectively.

Optimization Problem

maximizing shareholder value defined as

$$V(W_t, B_t, \tau_t, \gamma_t) = \max_{K_s, i_s, \theta_s, dD_s, dE_s} \mathbb{E}_t \left[\int_t^{\infty} \frac{\Lambda_s}{\Lambda_t} (dD_s - dE_s - dX_s) \right], \quad (19)$$

The firm pays total financing cost $dX_t = [\Phi_t(dE_t; B_t) + \lambda U(B_t, \tau_t, \gamma_t)]$

Illustration of Model Solutions.

Simplify company value

$$V(W_t, B_t, \tau_t, \gamma_t) \equiv v(w_t, \tau_t, \gamma_t) B_t, \quad \text{with } w_t = W_t / B_t. \quad (20)$$

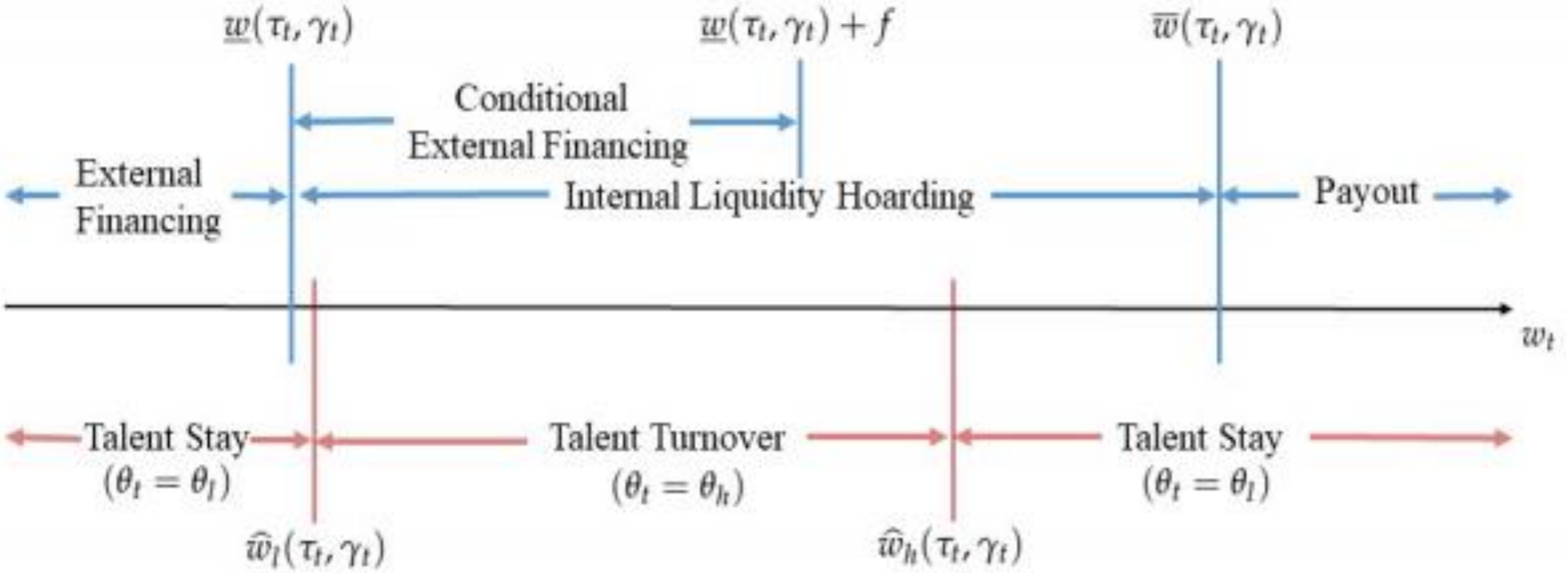


Figure 2. Decision boundaries and regions.

Measuring the ICC

Table I

The ICC Measure and Measures of Intangible Assets

	$\ln(\text{ICC})_t$				
	(1)	(2)	(3)	(4)	(5)
$\ln(\text{administrative expenses/sales})_{t-3:t-1}$	0.13***				
	[2.97]				
$\ln(\text{R\&D/sales})_{t-3:t-1}$		0.26***			
		[5.76]			
$\ln(\text{executive compensation/sales})_{t-3:t-1}$			0.25***		
			[6.47]		
$\ln(\text{advertising expenditures/asset})_{t-3:t-1}$				−0.09**	
				[−2.48]	
$\ln(\text{OC/asset})_{t-3:t-1}$					−0.04
					[−1.31]
Firm controls	Yes	Yes	Yes	Yes	Yes
Industry FEs & Year FEs	Yes	Yes	Yes	Yes	Yes
Observations	5,300	2,695	5,086	4,329	5,594
R^2	0.386	0.468	0.411	0.413	0.382

Table II

The ICC Measure and Changes in Customer Capital Following Talent Turnover

	$Stature\_gr_{t:t+2}$		$Sales\_gr_{t:t+2}$		$Asset\_gr_{t:t+2}$		$\Delta ICC_{t:t+2}$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\ln(ICC)_{t-1} \times Turnover_t$	−0.04*	−0.05**	−0.04**	−0.03*	−0.07**	−0.06**		
	[−1.80]	[−1.98]	[−2.40]	[−1.79]	[−2.32]	[−2.30]		
$Turnover_t$	−0.01	−0.02	−0.07***	−0.06***	−0.11***	−0.10***	−0.18***	−0.16**
	[−0.63]	[−1.01]	[−3.65]	[−3.30]	[−4.51]	[−3.68]	[−2.70]	[−2.40]
$\ln(ICC)_{t-1}$	0.14***	0.15***	0.07***	0.03***	0.07***	0.03*		
	[17.60]	[17.02]	[5.92]	[3.01]	[3.89]	[1.75]		
Firm controls	No	Yes	No	Yes	No	Yes	No	Yes
Industry FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,709	3,525	4,523	4,285	4,523	4,285	4,059	3,855
R^2	0.440	0.443	0.170	0.233	0.135	0.211	0.099	0.108

Empirical Results

1.We show that firms with higher ICC have higher average and risk-adjusted returns.

2.We show that the ICC is positively related to the turnover rates of executives and innovators.

Table III
Excess Returns and Alphas of Portfolios Sorted on the ICC

	Equal weighted			Value weighted		
ICC quintile	1 (Low)	5 (High)	5 − 1	1 (Low)	5 (High)	5 − 1
Average excess returns (%)	10.20**	16.18***	5.98**	4.94	11.62***	6.68*
	[2.53]	[3.46]	[2.14]	[1.56]	[2.65]	[1.94]
CAPM α (%)	1.87	6.02**	4.15**	−1.66*	2.47	4.13**
	[1.41]	[2.45]	[1.99]	[−1.65]	[1.09]	[2.01]
Fama-French three-factor α (%)	−0.42	5.50**	5.92**	−2.53*	4.25*	6.77**
(Fama and French (1993))	[−0.23]	[2.44]	[2.44]	[−1.71]	[1.92]	[2.35]
Carhart four-factor α (%)	1.81	8.00***	6.19**	−2.09	4.83**	6.92**
(Carhart (1997))	[1.08]	[3.89]	[2.51]	[−1.41]	[2.17]	[2.37]

Table VI
The ICC and Talent Turnover.

	Executives		Innovators			
	$Turnover_t \times 100$		$LnLeavers_t$		$LnNewHires_t$	
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(ICC)_{t-1}$	1.653***	1.546***	0.163**	0.170**	0.156**	0.158**
	[3.621]	[3.232]	[2.198]	[2.299]	[2.097]	[2.113]
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes
Executive controls	Yes	Yes	n/a	n/a	n/a	n/a
Industry FEs	No	Yes	No	Yes	No	Yes
Year FEs	Yes	Yes	Yes	Yes	Yes	Yes
Observations	24,329	24,329	1,780	1,774	1,780	1,774
R^2	0.023	0.032	0.381	0.596	0.385	0.601

Contribution

1.Our major contribution lies in examining how the ICC interacts with fifinancial constraints and investigating the asset pricing implications of this interaction.

2. As our main theoretical contribution, we show that firms’

exposure to financial constraints shocks is simultaneously reflected in two cross sections: firms have higher liquidity-driven talent turnover and higher average returns

3.As our main empirical contribution, we introduce a measure of the ICC