More Investors, Not Bigger Deals: How Public Money Can Increase the Number of Venture Capital-Backed Startups When Founders Become Investors

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Abstract

To increase the number of venture capital-backed startups when successful founders become investors, should government spend on creating non-founder investor slots (non-founder-slot policy) or scaling capital per deal (bigger-deal policy)? In a calibrated search and bargaining model, founders seek investor slots as workers seek jobs; each slot can back one startup and is filled or vacant. Some founders exit successfully by selling or listing startups, pass the accredited-investor wealth test, and open vacancies. Mainly through this recycling loop, each added vacancy multiplies into 2.11 vacancies, counting itself. The model predicts that, at equal spending, the non-founder-slot policy raises founder welfare (certainty equivalent of searching) more than the bigger-deal policy. First, it directly adds vacancies, which multiply and strengthen founders' bargaining, unlike the bigger-deal policy's higher average exit value. Second, most startups fail, so risk aversion caps a representative founder's equity value at 11% of expected payoff. 5% more non-founder slots raise founder welfare by 2.90% (51% through recycling) and participation by 3.84%; equal bigger-deal spending raises them by 0.40% (46% through recycling) and 0.19%. Per dollar spent at these policy sizes, the non-founder-slot policy raises exit value by \$1.48, the bigger-deal policy by \$0.63. Restoring the wealth test's real value at its 1982 adoption would cut founder-investors by two-thirds and founder welfare by a third.

JEL codes: G24, L26, D83, G18, H81.
Keywords: venture capital; venture capital policy; accredited investors; search and matching; entrepreneurial risk; supply multiplier.

1 Introduction

Venture capital finances few new firms, but these firms contribute disproportionately to stock market value and innovation. Between 1981 and 2001, about 0.1% of new US firms raised venture capital [Puri and Zarutskie, 2008]. Yet among US firms founded after 1980 that went public between 1995 and 2018, 56% were venture capital-backed, and these firms held 76% of the group's stock market value and 89% of its research and development spending [Lerner and Nanda, 2020].

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This gives governments an incentive to spend public money on increasing the number of venture capital-backed startups, and this paper asks how that money is best spent.

I focus on two types of policy to increase the supply of venture capital. The first pays for more investors. In the US, the American Rescue Plan Act of 2021 reauthorized the State Small Business Credit Initiative at nearly $10 billion; states expect to put as much as $3 billion of it into venture-capital programs, committing it to privately managed funds or investing it directly, with the aim, among others, of backing new fund managers [U.S. Department of the Treasury, 2024]. In the model, this money adds investor slots held by investors who are not former founders, where a slot is an investor's capacity to back one more startup; I call this the non-founder-slot policy. The second type pays for bigger deals. The European Investment Fund's European Angels Fund invests alongside each selected angel, an individual who invests her own money in startups, typically one euro for each euro the angel invests [Gvetadze et al., 2020]. The European Tech Champions Initiative, a fund of funds with initial commitments of 3.75 billion euros, backs companies in their late growth stage [European Investment Fund, 2023], where Draghi [2024] locates Europe's venture-capital gap. The model has one financing round, so this money raises capital per deal, the capital each funded startup receives; I call this the bigger-deal policy.[1]

The model adds a channel that comparisons of these policies have often left out: founders of past startups fund the next ones, both as angels and through venture firms they start. Peter Thiel, a cofounder of PayPal, which raised venture capital from Sequoia Capital and Nokia Ventures before eBay bought it in 2002 [PayPal, Inc., 2002], made the first outside investment in Facebook in 2004 [Founders Fund, 2026, Pepitone and Cowley, 2012]. A year later, the venture firm Accel Partners invested in Facebook alongside him [Fortune, 2011].[2] More than half of US angel investors once founded or ran a startup [Huang et al., 2017]. A founder can invest her own money once her exit, the sale or stock listing of her startup, makes her rich enough to qualify as an accredited investor, one allowed to buy equities in startups that are not listed on a stock exchange. In the model, former founders are the only individuals who become accredited investors; the other investors are institutions, the non-founder investors. Because founders who exit become investors, startup financing feeds itself; I call this loop the *recycling loop*. A policy that finances more startups today therefore adds investors later, and the two policies differ in how much of their effect runs through this loop.

Data back each step of the loop. Startups make their founders rich: the share of the Forbes 400 who founded their own firm rose from 40% in 1982 to 69% by 2011 [Kaplan and Rauh, 2013]. Among the top 100 of the 2025 Forbes 400, I classify 73 as self-made; 65 of them founded their firm, and 13 of these, a fifth, raised venture capital before exit, compared with about 0.1% of all new US firms. This fifth is a lower bound, because I count only venture equity from institutions raised before the firm went public or was sold.[3] Wealthy individuals in turn fund startups: they supply a small share of early-stage financing, but the share of the money that US early-stage startups raise

[1] Section 5.1 gives the full mapping and its limits. Rule changes that spend no public money also changed the supply of venture capital: the 1979 clarification of the prudent-man rule under ERISA let pension funds invest in venture capital [Kortum and Lerner, 2000], and NSMIA let firms raise larger private rounds before exit [Ewens and Farre-Mensa, 2020]. The paper does not model them as policies.

[2] Paul Graham's startup Viaweb was financed by angels and bought by Yahoo in 1998; in 2005 he and three partners started Y Combinator, which invests small amounts in new startups [Metz, 2012]. Mike Maples Jr., a founder of Motive Communications, which raised venture capital from Austin Ventures before its 2004 listing [Motive, Inc., 2003], invests through Floodgate, a venture firm he describes as one of the first seed funds; its investments include Twitter [Floodgate, 2026].

[3] Self-made adapts the classification of Kaplan and Rauh [2013] by who created the fortune: founders, and heirs who built a small inherited business into a much larger one. Venture backing excludes corporate venture capital, growth equity and buyouts.

from them tripled, from about 2% to 6%, between 2004 and 2022 [Gocmen et al., 2025]. Their money affects how many businesses start. When the Dodd–Frank Act of 2010 stopped counting home equity toward the net worth an individual needs to qualify as an accredited investor, states where more households lost that status saw fewer new businesses [Lindsey and Stein, 2026].[4]

I build a general-equilibrium search and bargaining model of the venture-capital market. Founders are risk-averse and differ in the quality of their ideas; a founder develops her idea when searching for an investor is worth more than a safe occupation. Investors hold slots. The non-founder investors hold a stock of slots, which the non-founder-slot policy enlarges, and each founder whose exit clears the *accredited-investor wealth test*, can add slots of her own when investing pays her more than her next-best use of the money. A *vacancy* is a slot not yet matched with a founder. Finding an investor takes time; when they meet, founder and investor bargain over how to split the equity. A venture either fails or pays off, and its payoffs have a heavy right tail: the most common outcome returns almost nothing to the founder [Hall and Woodward, 2010], while a few investments earn about half of venture capital's gross return [Kerr et al., 2014]. The bigger-deal policy scales these payoffs up without changing the shape of their distribution. *Founder welfare* is the certainty-equivalent value of searching for funding, the sure amount a founder values as highly as her risky search, summed over all founders who search.

In every calibration I solve in which accredited investors are scarce, meaning that investing in a slot pays a former founder more than her next-best use of the money, a dollar spent on the non-founder-slot policy does more for founders' welfare than a dollar spent on the bigger-deal policy. Three features of the model explain this lead. Without the recycling loop, the lead shrinks but survives (Section 5.3). The first is a supply multiplier. Suppose a policy adds one vacancy. Founders then find an investor sooner and keep a larger equity share, so more of them search for funding and more startups are financed. Some of these startups exit at values large enough to make their founders accredited investors, who add slots of their own. One new vacancy thus brings back λ more vacancies, nearly all of them through recycling; those bring back λ^2 more, and so on, so the policy adds $1/(1-\lambda)$ vacancies in all. I call $1/(1-\lambda)$ the *supply multiplier*. The non-founder-slot policy's gain works entirely through vacancies, so the channel just described multiplies all of it. The loop runs only when accredited investors are scarce. Otherwise newly accredited founders add no slots.

The second feature is how far a policy dollar reaches. A vacancy is shared: one more vacancy raises the chance of a match for every founder who searches. Extra capital per deal is private: it enlarges only the deal it goes into, so the government must pay it on every deal. The more deals are made, the more a given increase in capital per deal costs, while a slot costs the same however many founders search. A dollar spent on a slot thus reaches every founder who searches; a dollar spent on a bigger deal reaches one founder (Section 3.7).

The third feature is a *risk ceiling*. Only part of the bigger-deal policy's gain works through vacancies, the part the multiplier scales. The rest comes directly from a larger average payoff with the number of vacancies held fixed, and a risk-averse founder values that payoff at less than its average. Each founder holds an equity share in a single venture, her stake, and most ventures fail. She therefore values her stake at no more than a fixed dollar amount, set by the failure probability and her risk aversion, however large the stake. In theory, without risk, the lead is not guaranteed: when stakes are small enough that risk barely matters, costs and the average payoff alone decide, and a cheap enough bigger deal raises founder welfare more per dollar.

I know of no calibrated comparison that ranks the non-founder-slot and bigger-deal policies by

[4]The model applies to any startup that needs outside equity to grow, so an investor is a fund or an accredited individual such as an angel. The calibration takes its exit-size distributions, the number of deals in an investor's portfolio, and fees from venture-capital data, so its numbers describe the venture capital-backed part of that market.

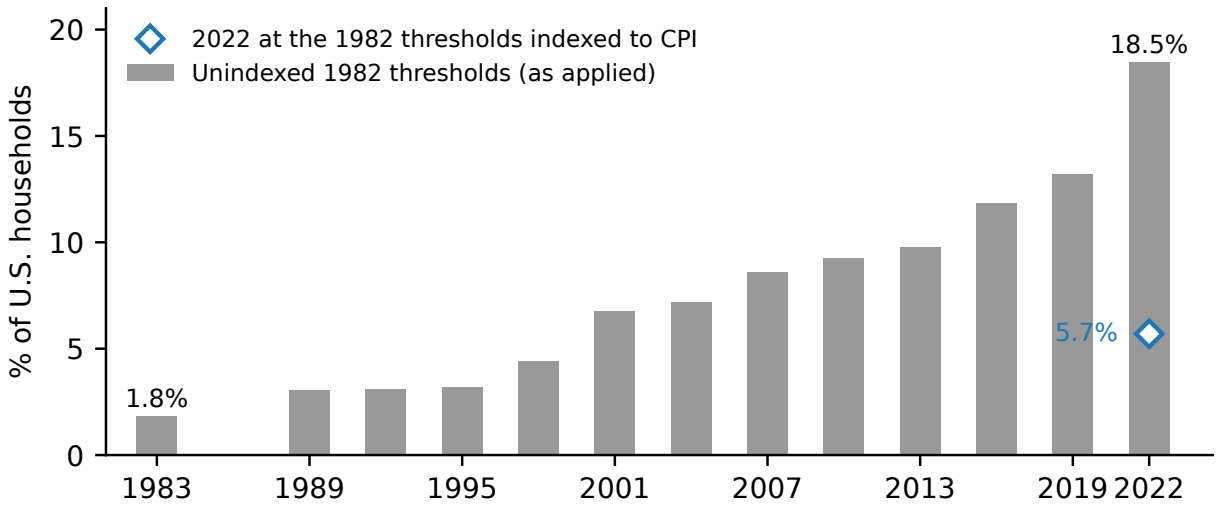


Figure 1: Share of U.S. households that meet the accredited-investor income or net-worth test, 1983 and each Survey of Consumer Finances wave 1989–2022 [U.S. Securities and Exchange Commission, 2025, 2023]. The diamond is the 2022 share had the 1982 thresholds been indexed to the CPI. In 2022, 24.3 million households qualified. The SEC counts include home equity before 2022, although the Dodd–Frank Act excluded it from the net-worth test in 2010.

founder welfare per dollar of government spending when part of the supply of venture capital comes from founders' exits and the founder bears the risk of failure. The paper's main contribution is to provide one and to quantify the supply multiplier. At the calibrated exit sizes, it is 2.11: one vacancy a policy adds becomes 2.11 vacancies in all. A 5% increase in non-founder slots raises founder welfare by 2.90% and draws 3.84% more founders into search. The same spending can finance only a 0.48% increase in capital per deal, which raises founder welfare by 0.40% and draws 0.19% more founders (Table 7). For a marginal change, with a new slot priced at the management fee a fund charges for it, \$1 spent on the non-founder-slot policy raises founder welfare as much as about \$7.34 spent on the bigger-deal policy (Table 3). The non-founder-slot policy also relies more on the multiplier: recycling, its source, supplies 51.2% of its welfare gain against 45.9% of the bigger-deal policy's. Of the bigger-deal policy's effect, 48% comes directly from the larger average payoff, and risk aversion caps a representative founder's value of her stake at 11% of its expected payoff.

Exit value, the yearly value of startup sales and stock listings, shows a smaller lead. The same changes raise it by 1.28% under the non-founder-slot policy and by 0.55% under the bigger-deal policy, with the recycling loop supplying 50.9% and 15.1% of these gains (Table 7). Exit value counts each deal at its full size, so it ignores the risk ceiling, and it misses the larger equity share the non-founder-slot policy gives founders who were already searching. Partly offsetting these two omissions, each founder the non-founder-slot policy draws into search adds a whole deal to exit value but, being nearly indifferent, almost nothing to welfare (Section 5.3). Of the two policies, only the non-founder-slot policy creates more exit value than it costs: in steady state, with slots priced at the management fee, each dollar spent on it a year adds \$1.48 of exit value a year, against \$0.63 for the bigger-deal policy (Table 7).

The strength of the recycling loop depends on the wealth test. Regulation D, adopted in 1982, lets firms and funds raise money without registering the offering. Under Rule 506, its main

exemption, they may sell to any number of accredited investors but to no more than 35 who are not, and nearly all their investors are accredited [Bauguess et al., 2018, U.S. Securities and Exchange Commission, 2023]. Accredited investors are institutions, or individuals who pass an income test or a net-worth test; the model keeps only the net-worth test. A third policy, the lower-threshold policy, lowers the wealth test. It costs the government nothing. The dollar thresholds of both tests were set in 1982 and never indexed to inflation, so the share of U.S. households that pass either test rose from 1.8% in 1983 to 18.5% in 2022. Had the thresholds been indexed to the CPI, 5.7% would have qualified in 2022 (Figure 1). The SEC considered a one-time inflation adjustment in 2020 [U.S. Securities and Exchange Commission, 2023].

In a counterfactual that restores the wealth test's 1982 real value, the founder-investor pool, the former founders who are accredited investors, shrinks by two-thirds, and the supply multiplier falls from 2.11 to 1.42. The number of founders who search for funding falls by 39.8%, and founder welfare by a third (Table 8).

The paper's second contribution is theoretical. Under constant absolute risk aversion (CARA), every value in the model is a certainty equivalent that does not depend on wealth, the reduction that Acemoglu and Shimer [1999] use to remove wealth effects from equilibrium search; exit wealth matters only through the wealth test. Founder welfare is therefore a sum of certainty equivalents, one object on which a bigger deal and an extra slot can be compared. The two policies reach the founder through different channels in these certainty equivalents. At a fixed equity share, a bigger deal raises the certainty equivalent of her undiversified venture [Miao and Wang, 2007, Chen et al., 2010], but never above a risk ceiling set by the failure probability and her risk aversion alone. More vacancies instead raise her value of search toward the value of a match by shortening her search. The ceiling needs only utility bounded above and a failure state. An added slot also feeds back on itself: the recycling feedback of Hellmann and Thiele [2019] becomes a supply multiplier $1/(1-\lambda)$ that runs only where accredited investors are scarce. Elsewhere, a non-founder slot displaces private capital. The recycling part of λ is the founder-investor share of vacancies times the elasticity of qualifying exits with respect to vacancies, both measurable in principle. To first order, the ranking per dollar reduces to one inequality: what founders value of a bigger deal after risk, against the multiplied vacancies a dollar buys. The theory does not sign it; the calibration does.

Related literature. The closest papers ask how start-up finance should be allocated. Hellmann and Thiele [2019] study a similar loop, in which successful founders become the next generation's angel investors (the entrepreneurial recycling of Mason and Harrison [2006]). They ask whether a small fixed government budget should lower founders' cost of entry or subsidize angel investment. Where many successful entrepreneurs fund the next generation, subsidizing angel investment produces more entrepreneurial activity than lowering the cost of entry: it raises valuations, so successful founders keep larger stakes and bring more wealth to the next generation. Without the loop, the two subsidies raise entry equally. Their model is an overlapping-generations theory without a calibration, in which founders are not risk-averse and any successful founder may invest, at a cost, with no wealth test. Here every policy is a way of supplying venture capital, so the question is which kind of supply to fund: the bigger-deal policy, the non-founder-slot policy, or the lower-threshold policy. Institutional supply also rises with returns: a general partner raises a larger next fund after a stronger previous fund [Kaplan and Schoar, 2005]. The model leaves this out: the number of non-founder slots changes only when policy changes it. Adding the response would likely shrink the multiplier and help the bigger-deal policy, because more slots lower a slot's return; I do not solve that variant. Parry [2026] and Aragoneses and Saxena [2025] instead study how venture capital is split between early and late stages. In Parry's model investors are risk-neutral, and total venture

investment and the number of investors are fixed; shifting capital to the late stage, toward the firms that show early promise, then raises total surplus. Aragoneses and Saxena take the government's venture budget as given. With relatively mild financial frictions, shifting it toward early stages raises aggregate productivity as much as doubling spending; with stronger frictions, some later-stage focus raises productivity more. In neither model does a founder's exit wealth affect the supply of venture capital. Here that wealth is not itself invested, but an exit that passes the wealth test adds a founder-investor.

The ranking also depends on how a founder values a match that may fail, which links the paper to models of entrepreneurship under risk aversion [Kihlstrom and Laffont, 1979, Vereshchagina and Hopenhayn, 2009]. Azevedo et al. [2025] also rank policies by what a risk-averse founder gains. In their data on U.S. venture deals, founders with no or moderate risk aversion prefer today's tax on realized capital gains, while more risk-averse founders prefer a tax on accrued gains when its credits are refunded to failed ventures. Their founder payoffs are the exit distribution I calibrate to; I ask instead which way of supplying venture capital raises founder welfare most per dollar.

Other models of venture capital include Silveira and Wright [2016], Sørensen [2007], Greenwood et al. [2022], Opp [2019] and Wong [2026]. As here, the equilibrium price of venture capital in Michelacci and Suarez [2004] and Jovanovic and Szentes [2013] is a scarcity rent: it is high because venture capital is scarce. In Michelacci and Suarez [2004] a company's public listing also frees a monitor, drawn from a fixed stock, to back a new firm, so recycling speeds the turnover of existing investors. Exits in this model instead create new investors, so the slots supplied by founder-investors can compound. In Inderst and Müller [2004] more capital raises valuations by improving the founder's outside option. Akcigit et al. [2022] embed the matching of entrepreneurs with venture capitalists in a growth model. Lerner and Nanda [2020] list the concentration of venture supply, a small number of investors shaping a substantial fraction of the capital deployed, as one of three limitations of venture finance. The concentration they document is among institutional firms; the founder-investor pool concerns a different question, how much supply comes from former founders. Evaluations of VC policy ask whether a policy changed the supply of venture capital or the outcomes of the firms it reached [Lerner, 2009, Howell, 2017, Denes et al., 2023, Brander et al., 2015, Cumming and MacIntosh, 2006].

Section 2 sets up the model. Section 3 solves it under CARA, derives the risk ceiling and the supply multiplier, and shows that one inequality ranks the two policies by their first-order effect on founder welfare per dollar. Section 4 calibrates the model to founders' payoffs and solves it. Section 5 reports the main results. Section 5.2 shows how the risk ceiling and the multiplier shape the non-founder-slot policy's lead at the margin. Section 5.3 measures what the recycling loop contributes, then turns to other measures of welfare and to removing the founder-investor pool. Section 5.4 compares the two policies at the same cost to the government for finite changes. Section 5.5 restores the wealth test's real value at its 1982 adoption, and Section 5.6 checks the ranking under a second slot price and other calibrated values. Section 6 concludes. Proofs are in the appendix.

2 Model

The economy is a continuous-time search market for venture capital. Risk-averse founders with ideas of different quality search for investors (a VC partner acting for a fund, or an individual angel). A match produces a right-skewed payoff, specific to the startup, that arrives at a random date. Founders whose exits are large enough to make them accredited investors can take investor slots and fund later founders; I call this recycling. The model rests on three choices: *(i)* CARA

preferences, which remove wealth effects from individual decisions and reduce the value of a match to a certainty equivalent (the sure amount the founder values as highly as the risky stake); *(ii)* a single risky lottery, resolved at a Poisson time, so that the wait for a match and the wait for resolution enter values only through discount factors set by their Poisson rates; and *(iii)* recycling by count: the number of former founders who qualify as accredited investors, not their wealth, enters VC supply (Section 2.3). Each person takes that number as given, so individual problems stay simple. Recycling by count still delivers the general-equilibrium supply multiplier: a slot (one investor's capacity to back one more startup) added by policy can end up as more than one slot, because the exits it funds make new accredited investors, who add slots of their own.

2.1 Environment, Preferences, and Technology

Time is continuous and the horizon is infinite. There is a risk-free asset with return r, and agents discount at rate ρ. The baseline sets $\rho = r$, the standard normalization that makes the CARA value functions stationary (Section 3.1).[5]

Preferences. All founders have constant-absolute-risk-aversion (CARA) preferences over consumption with coefficient of absolute risk aversion $\gamma > 0$,

$$u(c) \;=\; -\frac{1}{\gamma}\, e^{-\gamma c}. \tag{1}$$

The defining property I exploit is that (1) has *no wealth effects*: the certainty equivalent of an independent lottery added to wealth is independent of the level of wealth. Because of this property, a match reduces to one number, its certainty-equivalent value, whatever the founder's or investor's outside wealth. Both participation decisions are then binary and free of outside wealth: a founder searches if the idea clears a cutoff, and an accredited investor posts a slot if the value of a vacant slot clears the investor's outside option. I adopt CARA to focus on the recycling created purely through the founder's equity share: its proceeds decide who qualifies, and supply then grows with the number who qualify, not their fortunes.[6]

Founders and ideas. A unit flow of potential founders enters each instant.[7] Each founder is born with an idea of quality $z \in \mathcal{Z} \subseteq \mathbb{R}_+$, drawn from a distribution G. Idea quality is fixed over the founder's life and sets the *scale* of the eventual payoff. Founders differ in nothing else before they start. After drawing z, a founder searches if and only if the value of searching for an investor, $h_S(z;\theta,\iota)$, is at least the value of the outside option, a safe occupation. This condition defines the participation cutoff z^* (Section 3.5): founders with ideas above z^* search for an investor, and the rest take the safe occupation. This is the only participation decision in the model. Policy acts on the two arguments. The first, θ, is market tightness: the number of vacant investor slots (slots not

[5] $\rho = r$ is a convenience, not a substantive restriction: with $\rho \neq r$ the CARA value functions acquire a deterministic consumption-growth trend but the certainty-equivalent recursions below are unchanged in form.

[6] Three results use the exponential form itself: the reduction of a match to one certainty-equivalent number (Lemma 1); the closed-form certainty equivalent, the risk ceiling, and the tilt (the mean payoff shock under marginal-utility weights; Lemma 2, Theorem 1); and recycling by count (Proposition 6). The risk ceiling is the most a risk-averse founder can value one startup, whatever its size; the failure probability and risk aversion set it. The statements that follow need only risk aversion and a failure state (the ceiling also needs a utility bounded above). Scaling up a risky payoff attenuates its certainty-equivalent value (risk takes away part of each extra dollar of expected payoff). Faster matching suffers no such attenuation. A positive failure probability bounds the value of any single startup when utility is bounded above (Remark 1). The heavy right tail sets how large the attenuation is at a given stake.

[7] A flow formulation keeps the stationary distribution of founders well defined.

yet matched with a founder) per searching founder (Section 2.2). The non-founder-slot policy and the lower-threshold policy (Section 2.3) move it. The second, ι, is the capital per deal, which the bigger-deal policy raises (Section 2.3).

The payoff: failure and a heavy tail. Developing an idea at scale requires an investor (Section 2.2). A matched startup is resolved, by an exit (a sale or listing) or by failure, at a constant Poisson rate $\tau > 0$, the resolution rate, at which point it pays a single idiosyncratic lottery

$$X(z;\iota) \;=\; m(z;\iota)\,\xi, \qquad \xi \sim F_\xi, \quad \mathbb{E}[\xi] = 1, \tag{2}$$

where $m(z;\iota) > 0$ is a deterministic *scale* that rises with idea quality z and with capital per deal ι (Section 2.3). The shock ξ has mean one, a *failure state* and a Pareto right tail:

$$\xi = \begin{cases} 0 & \text{with prob. } \pi_0 \in (0,1), \\ \xi_P & \text{with prob. } 1-\pi_0, \end{cases} \qquad \mathbb{P}(\xi_P > x) = \left(\frac{x}{\underline{\xi}}\right)^{-\alpha}, \quad x \geq \underline{\xi}, \quad \underline{\xi} = \frac{\alpha - 1}{\alpha\,(1-\pi_0)}, \tag{3}$$

in which the unit-mean normalization $\mathbb{E}[\xi] = (1-\pi_0)\,\alpha\underline{\xi}/(\alpha-1) = 1$ pins the lower support $\underline{\xi}$. Failure is the most common outcome for a startup: the modal startup returns (approximately) nothing to the founder [Hall and Woodward, 2010, Azevedo et al., 2025]. The failure state therefore pays exactly zero,[8] and π_0 is calibrated to the share of resolutions with near-zero founder proceeds. The tail index $\alpha > 1$ guarantees a finite mean. A smaller α means a heavier tail and a wider gap between the mean and the certainty equivalent (Section 3). In the baseline capital per deal scales the payoff without changing its shape: ι enters only through the mean $m(z;\iota)$, $m_\iota > 0$, and leaves π_0 and α unchanged (Assumption 1). Equations (2)–(3) are the structural source of the attenuation of the bigger-deal policy (more capital per deal). Attenuation means that risk takes away part of each extra dollar of expected payoff that a bigger deal creates.

The equity share, bargained. Of the realized payoff X, the founder keeps an equity share $s \in (0,1)$ and the investor keeps $1-s$. The equity share is *not* fixed: at each meeting the founder and the investor set s by generalized Nash bargaining with investor weight $\beta \in (0,1)$ (Section 3.3). The model represents each investor, whether a partner acting for a fund or an angel, as one risk-averse agent (Section 2.3) with the same CARA preferences, so it values its stake $(1-s)X$ by its certainty equivalent. Each side's threat point is its value of staying unmatched: the founder's searching value $h_S(z;\theta,\iota)$ and the investor's *vacancy value* $V_{\text{vac}}(\theta,\iota)$. Both threat points move with market tightness. When vacant slots are plentiful relative to searching founders, the founder matches faster and the vacancy value falls. The equilibrium equity share therefore depends on tightness, through the rate at which each side meets a partner (the meeting rates of Section 2.2; Proposition 3). The founder values the lottery $s\,X(z;\iota)$ at the equilibrium equity share $s = s^*(z;\theta,\iota)$. Policy reaches the equity share through its two arguments, ι and θ. It sets ι directly; the number of non-founder investor slots M_v^0 (slots that institutions hold and that policy can add directly) and the accredited-investor wealth test $\bar{w}$ (Section 2.3) act through tightness θ. Below I write $s^*(z)$, $h_S(z)$ and V_{vac}, and show θ and ι only where policy acts on them.

Asset markets and accreditation. Asset access is *segmented*. A non-accredited agent may hold only the risk-free asset at rate r. An agent becomes an *accredited investor* once an exit delivers

[8] With a small positive floor $\xi_f > 0$ the risk ceiling bounds the value of the risky *excess* over the floor: the certainty equivalent is $s\,m\,\xi_f$ plus at most the ceiling. As the founder's stake grows, the slope of the certainty equivalent in the expected payoff falls to ξ_f rather than to zero (Theorem 1 and Appendix A.3).

realized proceeds at or above the legal wealth test $\bar{w}$. Accreditation gives access to a second asset: slots that back VC-funded startups. Concretely, a founder of type z whose startup exits with realized founder proceeds $s^*(z)X(z;\iota) = s^*(z)\,m(z;\iota)\,\xi \geq \bar{w}$ becomes accredited. Because ξ is random, accreditation occurs, conditional on resolution, with probability $(1-\pi_0)\,\bar{F}_{\xi_P}\big(\bar{w}/(s^*(z)\,m(z;\iota))\big)$, where $\bar{F}_{\xi_P}$ is the survival function of the *Pareto branch* of the payoff shock (3). The failure state never accredits, so the accreditation probability carries the factor $1-\pi_0$. Even a wealth test so low that every exit clears it gives a probability of $1-\pi_0$, not one. Accreditation has private value. Where accredited investors are scarce, so that their number limits VC supply (Section 3.4), a qualifying exit also gives the scarcity rent $\varpi > 0$ (the excess of the vacancy value over the investor's risk-free outside option) to the new investor for each of the n slots it supplies (every new investor supplies the same number n; footnote 12). The chance of this rent, the accreditation option, is left out of the founder's problem: the closed forms and the quantitative model assume that founders do not count its value in the value of a match (footnote 15). The wealth test $\bar{w}$ is a *policy* (Section 5): it is the model counterpart of the Reg D accredited-investor definition.[9] Accreditation is triggered by the realized exit proceeds, not by accumulated net worth. This proceeds rule simplifies Reg D's net-worth test. It understates accreditation, since savers and high earners who pass the test without an exit are not counted. It also makes the right to invest in VC independent of the wealth distribution, so the allocation and the multiplier are solved without tracking that distribution. A net-worth test would bring wealth effects back through accreditation, even under CARA.

2.2 Search and Matching

A founder who chooses to pursue VC enters a search pool. Let u denote the measure of searching founders and M_v the measure of investor slots. Each slot is either *vacant* (searching for a founder) or *matched* (committed to one startup until its resolution). Only vacant slots search. Let n_F be the matched-slot stock and v the vacant stock. A constant-returns Cobb–Douglas matching function $\mathcal{M}(u,v) = A_m\,u^{\eta}v^{1-\eta}$, $\eta \in (0,1)$, with matching efficiency $A_m > 0$, generates meetings. With market tightness $\theta \equiv v/u$, the Poisson meeting rates are

$$p(\theta) = A_m\,\theta^{1-\eta}\ \text{(founder)}, \qquad q(\theta) = A_m\,\theta^{-\eta}\ \text{(investor)}, \qquad p(\theta) = \theta\,q(\theta). \tag{4}$$

Searchers leave the pool only by matching. Every meeting with a participating type ends in a deal, because both sides benefit from the match (both match surpluses are positive) for every $z \geq z^*$, a condition maintained in Proposition 5. In steady state the match flow equals the participation inflow $[1-G(z^*)]$ (the share of the unit inflow with types above the participation cutoff z^* of Section 3.5), so

$$n_F = \frac{1-G(z^*)}{\tau}, \qquad v = M_v - n_F > 0, \qquad q(\theta)\,v = p(\theta)\,u = [1-G(z^*)] = \tau\,n_F, \tag{5}$$

where the first equality in the chain is the matching-function identity, the second the steady state of the searcher pool, and the last the balance of the matched stock.[10] p is increasing in θ and hence in the vacant stock v (at a given searcher stock): a larger vacancy stock raises the rate at which a searching founder meets an investor. While searching, a founder pays a flow cost $\kappa > 0$

[9] Lindsey and Stein [2026] find that the net-worth test binds. Dodd–Frank (2010) removed primary-residence equity from the net-worth test, which shrank the pool of potential investors more in some states than in others. In their difference-in-differences, states with a larger reduction in that pool saw less firm entry and lower employment at small entrants.

[10] Interiority (some slots are always vacant), $M_v > [1-G(z^*)]/\tau$, holds at the solved equilibrium.

(in consumption units).[11] The outside option, a safe occupation, has certainty-equivalent value h_0, normalized to $h_0 = 0$ unless stated otherwise. Symmetrically, an investor pays a flow vacancy cost $c > 0$ per vacant slot while the slot searches for a founder to fund; this cost, with the investor's meeting rate $q(\theta)$, determines the vacancy value V_{vac} (Section 3.4).

2.3 VC Supply: Institutions, Founder-Investors and Market Clearing

The measure of investor slots M_v has two sources. The exogenous component M_v^0, the non-founder investor slots, is institutional capital: pension funds, endowments and other institutions that invest through VC funds. Their access does not depend on any founder's exit, and policy can add these slots directly. The second component is slots supplied by founder-investors, the former founders whose exits passed the wealth test $\bar{w}$ and who now supply VC as accredited investors. There are three policies, which work in two ways:

- **More investors: the vacancy stock v (equivalently the slot measure M_v).** The vacant stock sets tightness $\theta = v/u$ and hence the meeting rate $p(\theta)$ (4). Two policies raise it. One, the non-founder-slot policy, adds to the exogenous stock M_v^0 (e.g. the 1979 clarification of the prudent-man rule of the Employee Retirement Income Security Act (ERISA), which opened VC to pension funds). The other, the lower-threshold policy, lowers the wealth test $\bar{w}$ (e.g. the Reg D accredited-investor definition), so that more exits create founder-investors.
- **The bigger-deal policy: capital per deal ι.** The model has a single financing round, so ι is all the capital committed to a startup between match and resolution. It scales the mean payoff through $m(z;\iota)$, $m_\iota > 0$ (more capital raises the expected payoff), and in the baseline leaves the shape of the payoff law unchanged. Its policy counterpart is access to late-stage capital. A late round reaches only startups that have already matched, so it raises capital per startup without directly changing how many are funded. One example is the National Securities Markets Improvement Act (NSMIA) of 1996, after which late-stage startups' ability to raise large rounds rose relative to early-stage startups [Ewens and Farre-Mensa, 2020]. That evidence concerns capital raised, not exit values, so the model assumes rather than measures that more capital raises the expected payoff ($m_\iota > 0$; Section 5.1 reads NSMIA as a move in capital per deal). The quantitative model takes the expected payoff to be linear in capital, $m(z;\iota) = z\,\iota$.

Assumption 1 (Payoff law and policy)**.** The payoff shock follows (3) with $\pi_0 \in (0,1)$ and $\alpha > 1$. No policy changes the shape of the payoff law: π_0 and α do not move with the non-founder slots M_v^0, the wealth test $\bar{w}$ or the capital per deal ι.

The investor is a partially diversified CARA agent. A successful founder who passes the wealth test $\bar{w}$ becomes an accredited investor and may supply VC through *slots*. Each slot is a capacity to back one startup: it searches for a founder and, once matched, holds the investor's claim $(1-s)X$ to that startup's payoff.[12] All of the founder's stake sits in one startup. The investor

[11] A flow cost is the natural continuous-time object and yields the compact value in (16); a one-time search cost is an alternative. With a cost κ_0 paid on entering the pool, the last term of (16) becomes $-\kappa_0$, which no longer depends on $p(\theta)$. This holds exactly, not only to leading order (that is, not only after linearizing the brackets in (13) that price uncertainty about the timing of the match and of the exit), since under CARA a sure payment lowers the certainty equivalent one for one. Adding investors then works only through the matching factor of (16), the factor that depends on the meeting rate, and the gradient (18) of the value of searching loses the κ term. The quantitative results use the flow cost.

[12] Each founder-investor deploys n slots (Section 4 sets n). This is an assumption about capacity (monitoring and attention), not a consequence of CARA.

spreads an exposure equal to one claim over a *book*: it values a slot's claim as an equal $1/n_D$ share in each of $n_D \geq 1$ independent startups with the same payoff law, so that the whole book has the same expected payoff as one claim. The number of positions n_D, the book's *breadth*, is a primitive of the supply side. The certainty equivalent of this book is

$$\mathrm{CE}_F^{\mathrm{div}}(z, s; \iota) \;=\; -\frac{n_D}{\gamma r}\,\log \mathcal{L}_\xi\Big(\frac{\gamma r\,(1-s)\,m(z;\iota)}{n_D}\Big), \tag{6}$$

where $\mathcal{L}_\xi(b) \equiv \mathbb{E}[e^{-b\xi}]$ is the Laplace transform of the payoff shock (Section 3). Its argument is the investor's *effective stake* in each startup of its book. The effective stake of a claim to the share s of one startup is

$$b(z, s; \iota) \;\equiv\; \gamma\, r\, s\, m(z;\iota), \tag{7}$$

the risk-adjusted exposure a claimant carries to a single startup: the founder's stake is $b = \gamma r s\, m(z;\iota)$, evaluated in equilibrium at $s = s^*(z)$, and the investor's stake in each startup of its book is $\gamma r(1-s)m(z;\iota)/n_D$, the argument in (6). Risk aversion enters every valuation in the paper only through the effective stake and the dollar scale $1/(\gamma r)$. Section 3 shows that the certainty equivalent, its risk discount and its tilt are all closed-form functions of (b, α, π_0) alone.

Breadth helps the investor by shrinking its stake in each startup, not by multiplying its claims. Under CARA the certainty equivalents of independent claims add, so n_D whole claims would each carry the full discount. A $1/n_D$ share of each of n_D startups instead cuts the effective stake to $\gamma r(1-s)m(z;\iota)/n_D$.[13] Equation (6) therefore equals the certainty equivalent of the single claim $(1-s)X$ at $n_D = 1$ and rises strictly toward the mean $(1-s)\,m(z;\iota)$ as $n_D \to \infty$ (Proposition 4). With the heavy tails measured for startup exits, (6) rises toward that mean slowly: its discount below the mean shrinks more slowly than $1/n_D$. At realistic breadth the investor's risk discount (the supply-side discount) therefore shrinks but survives. Founders hold their stake in one startup (the $n_D = 1$ case), so the founders' side of the market (the demand side) is unchanged. In particular, the risk ceiling $\bar{C}$ (the bound the failure state places on the certainty equivalent of one startup's claim, whatever its scale) and Theorem 1 apply to founders unchanged.

The founder-investor pool. New accreditations arrive at the rate of qualifying exits. Type-z startups are matched and resolve at the steady-state flow $g(z)$ for $z \geq z^*$ (g is the density of the idea distribution G; in steady state each participating type resolves as fast as it enters, Section 3.5) and accredit with probability $(1-\pi_0)\,\bar{F}_{\xi_P}(\bar{w}/(s^*(z)\,m(z;\iota)))$, so the accreditation *flow* is

$$\Phi_{\mathrm{acc}}(v, \iota, \bar{w}) \;=\; (1-\pi_0)\int_{z^*}^{\infty} g(z)\,\bar{F}_{\xi_P}\Big(\frac{\bar{w}}{s^*(z;\theta(v),\iota)\,m(z;\iota)}\Big)\,dz, \tag{8}$$

a *count* of qualifying investors, not a dollar value. This is consistent with CARA: a larger exit does not buy more supply per investor. A matched investor stays until the startup its slot backs resolves (Section 2.2). An unmatched investor either posts a vacant slot or stays idle, holding its wealth risk-free; it can switch at no cost and leaves the market at rate δ_I in both cases. The analytic results set $n = 1$; Section 4 sets n, which rescales the pool, counted in slots. Match formations and resolutions net out in steady state. The stock of unmatched accredited investors is therefore

[13] The book holds a fixed total exposure equal to one claim, spread over n_D independent startups through co-investment (a fund or syndicate). The claim itself cannot be sold or hedged, since the asset menu is {risk-free, VC}. The discount below the mean falls like $1/n_D$ when $\alpha > 2$ but only like $n_D^{-(\alpha-1)}$ when $1 < \alpha < 2$, because much of the mean sits in rare, very large exits that a book of realistic breadth seldom contains. The failure state bounds the book: $\mathcal{L}_\xi \geq \pi_0$, so $\mathrm{CE}_F^{\mathrm{div}} \leq n_D\,\bar{C}$ (Proposition 4).

exactly $\Phi_{\text{acc}}/\delta_I$. This stock is the founder-investor pool: the *supply* that founder-investors bring to the market for VC capital. The stock v^R of vacant slots posted by founder-investors is the part of that pool that posts a slot, $0 \le v^R \le \Phi_{\text{acc}}/\delta_I$, and Section 3.4 determines how large a part.[14]

Deployment. An unmatched accredited investor has two choices. It can post a vacant slot, worth V_{vac}, the value of a vacant slot (Section 3.4), which I call the **price of VC capital**. Or it can take its *outside option*: keep its wealth risk-free and remain idle but eligible. The asset menu is exactly {risk-free, VC}, so the outside option is the risk-free asset; call its certainty-equivalent value the reservation R. Under $r = \rho$ a unit of wealth held risk-free is worth exactly the unit (its flow r discounted at ρ). CARA removes wealth effects, so the outside option is worth the unit itself and nothing more. A slot is a capacity to back one startup, not a sum of the investor's own money. The capital a deal deploys is the capital per deal ι, which raises the expected payoff $m(z;\iota)$, and is costed per deal as c_ι (Section 4), a cost the government bears when it raises ι, not a cost of the slot. This per-deal cost differs from the flow cost c of keeping a slot vacant. V_{vac} therefore prices the slot alone. Measured relative to this risk-free baseline, as h_0 is, the reservation is $R = 0$. Each investor's choice is binary: it posts if $V_{\text{vac}} > R$, stays idle if $V_{\text{vac}} < R$, and is indifferent at equality. Non-founder slots are posted whatever their return. The price V_{vac} therefore does double duty. It is the investor's threat point in bargaining. It is also the price that decides *whether* each accredited investor deploys, and hence the size of the deployed stock. Because more posted slots lower V_{vac}, this choice clears the market for VC capital. Section 3.4 states the market-clearing condition once the equity share and the cutoff that determine V_{vac} are characterized.

3 Characterization

One inequality (Proposition 7) ranks the two policies by the effect on founder welfare per dollar of government spending: the bigger-deal policy (more capital per deal) and the non-founder-slot policy (more non-founder investor slots). Founder welfare is the certainty-equivalent value of searching, summed over all founders who search. Risk makes each dollar that a bigger deal adds to a founder's expected payoff worth less than a dollar to her. Where accredited investors are scarce, so that their number limits supply, the supply multiplier $1/(1-\lambda)$ scales the vacancy part of both policies: the part of each policy's welfare effect that comes through the number of vacant slots (slots not yet matched with a founder). One slot added by policy ends up as $1/(1-\lambda)$ slots, because the startups it funds produce exits that make new accredited investors, who add slots of their own; λ, the loop gain, is the number of further slots one new slot generates in equilibrium in the first round; later rounds add λ^2, λ^3, and so on.

3.1 The CARA Reduction

With CARA utility and a riskless asset, each agent's problem reduces to one number, a certainty-equivalent value: the sure amount the agent values as highly as the risky position.

Lemma 1 (Separability)**.** *Suppose preferences are CARA (1), $\rho = r$, and agents can store and borrow risklessly at rate r. Then the value function of an agent in any state ς takes the form*

$$V_\varsigma(w) \;=\; -\frac{1}{\gamma r}\,\exp\big[-\gamma r\,(w + h_\varsigma)\big], \tag{9}$$

[14] This is stock–flow accounting in counts: Φ_{acc} new suppliers arrive per unit time and each spends $1/\delta_I$ units of time unmatched over its life on average, so the standing pool is a count, never a dollar amount.

where w is financial wealth and $h_\varsigma \in \mathbb{R}$ is a number, the "certainty-equivalent value" of being in state ς, that does not depend on w. Hence an independent lottery L with $\mathbb{E}[e^{-\gamma r L}] < \infty$ (automatic for $L \geq 0$, the only case used), received and added to wealth, raises the agent's certainty-equivalent value by exactly $\mathrm{CE}(L) \equiv -\frac{1}{\gamma r} \log \mathbb{E}\big[e^{-\gamma r L}\big]$*, whatever w is.*

Lemma 1 is standard [Shimer and Werning, 2008]; Azevedo et al. [2025, Lemma A.1] prove the discrete-time analogue. It lets me drop wealth as a state variable and work with the numbers h_ς alone. The risky payoff enters *only* through its certainty equivalent $\mathrm{CE}(\cdot)$. Because h_ς does not depend on wealth, a founder of type z searches if and only if $h_S(z) \geq h_0$, whatever the founder's wealth. This condition defines the participation cutoff z^*.

3.2 The Value of a Match and of Search

A founder who cannot diversify values her startup below its expected payoff, and the gap grows with her stake. The bigger-deal policy has diminishing returns because of risk (Proposition 1), and the non-founder-slot policy, which adds investors, has them because of search frictions (Proposition 2). Because startups fail, neither policy can raise the founder's value of a startup above the risk ceiling (Theorem 1).

What a startup is worth to its founder. A matched founder of type z owns an equity share of the risky payoff, $s\,X(z;\iota) = s\,m(z;\iota)\,\xi$, paid when the startup resolves. By Lemma 1 its certainty-equivalent value is

$$\mathrm{CE}(z;\iota) \;=\; -\frac{1}{\gamma r}\,\log \mathbb{E}\big[e^{-\gamma r\, s\, m(z;\iota)\,\xi}\big] \;=\; -\frac{1}{\gamma r}\,\log \mathcal{L}_\xi\big(\gamma r\, s\, m(z;\iota)\big), \tag{10}$$

where $\mathcal{L}_\xi(b) \equiv \mathbb{E}[e^{-b\xi}]$ is the Laplace transform of ξ, finite because $\xi \geq 0$. Its argument is the effective stake $b = \gamma r s m$ (7), so the deal enters CE, and with it the matched value h_M (14), only through b. CE splits into the expected payoff of the stake and a nonnegative risk discount,

$$\mathrm{CE}(z;\iota) \;=\; \underbrace{s\,m(z;\iota)}_{\text{mean stake}} \;-\; \underbrace{\Pi(z;\iota)}_{\text{risk discount}}, \qquad \Pi(z;\iota) \;=\; \frac{1}{\gamma r}\,\log \mathbb{E}\big[e^{-\gamma r\, s\, m(z;\iota)\,(\xi-1)}\big] \;\geq\; 0, \tag{11}$$

where the risk discount Π is the Jensen gap. It is zero only for a riskless payoff, and it rises strictly with risk aversion and with the heaviness of the payoff's right tail (a lower α; Appendix A.1). Hence, for every stake and every $\alpha > 1$

$$\frac{\partial\,\mathrm{CE}}{\partial \alpha} = -\frac{\partial \Pi}{\partial \alpha} > 0. \tag{12}$$

From one startup to the value of search. By Lemma 1 the certainty-equivalent values solve a problem with two states, matched and searching, and random (Poisson) transitions between them. A matched startup resolves at rate τ, the resolution rate, and pays the payoff lottery, valued at its certainty equivalent $\mathrm{CE}(z;\iota)$;[15] a searching founder meets an investor at rate $p(\theta)$ and pays the

[15] Where accredited investors are scarce, a large enough exit also makes the founder an accredited investor with n slots, the number of slots each accredited investor can deploy. Each slot is worth the scarcity rent $\varpi = V_{\mathrm{vac}} - R$: the value of a vacant slot (one not yet matched with a founder) net of the investor's outside option R (Section 3.4). Valued when the startup resolves, this option, the chance of becoming an accredited investor, adds $\Delta\,\mathrm{CE} = -(\gamma r)^{-1} \log\big[1 - Q_{\mathrm{acc}}(z)\,(1 - e^{-\gamma r n \varpi})\big] \geq 0$ to the certainty equivalent $\mathrm{CE}(z;\iota)$. Here $Q_{\mathrm{acc}}(z)$ is the probability that a type-z exit passes the accredited-investor wealth test $\bar{w}$, with each outcome weighted by the founder's marginal utility. The

flow cost κ while she searches. Write $\Delta_M \equiv \mathrm{CE}(z;\iota) - h_M(z)$ for the rise in value at resolution (after resolution her continuation value is her outside option, the safe occupation, whose value is normalized to $h_0 = 0$) and $\Delta_S \equiv h_M(z) - h_S(z)$ for the rise in value from a match. The *exact* CARA recursions are

$$h_M(z) = \frac{\tau}{\gamma r^2}\Big[1 - e^{-\gamma r\,\Delta_M}\Big], \qquad h_S(z) = \frac{p(\theta)}{\gamma r^2}\Big[1 - e^{-\gamma r\,\Delta_S}\Big] - \frac{\kappa}{r} \tag{13}$$

in which the bracket $[1 - e^{-\gamma r \Delta}]$ prices the agent's dislike of uncertainty about the *timing* of the match and of resolution. This timing risk comes on top of the payoff risk, which CE prices exactly.

Replacing each bracket in (13) by its first-order term $\gamma r \Delta$ gives a linear approximation ($\rho = r$), which I use throughout; *to leading order* refers to it:[16]

$$\rho\, h_M(z) \;=\; \tau\,\big[\,\mathrm{CE}(z;\iota) - h_M(z)\big] \quad\Longrightarrow\quad h_M(z) \;=\; \frac{\tau}{\rho+\tau}\,\mathrm{CE}(z;\iota), \tag{14}$$

$$\rho\, h_S(z) \;=\; -\kappa + p(\theta)\,\big[h_M(z) - h_S(z)\big] \quad\Longrightarrow\quad h_S(z) \;=\; \frac{p(\theta)}{\rho+p(\theta)}\,h_M(z) \;-\; \frac{\kappa}{\rho+p(\theta)}. \tag{15}$$

Combining (14)–(15) gives the compact leading-order value of searching:

$$h_S(z) \;=\; \underbrace{\frac{p(\theta)}{\rho+p(\theta)}}_{\text{meeting (more investors)}} \cdot \underbrace{\frac{\tau}{\rho+\tau}}_{\text{resolution speed}} \cdot \underbrace{\mathrm{CE}(z;\iota)}_{\text{mean vs. risk (capital per deal)}} - \underbrace{\frac{\kappa}{\rho+p(\theta)}}_{\text{search cost (more investors)}}. \tag{16}$$

Hold the equity share s and the number of searching founders fixed, and call the result the direct effect: the bigger-deal policy then acts only on the certainty equivalent, more investors only on the discounted probability of matching $p/(\rho+p)$ and the search-cost term. Both also move the equity share (Section 3.3).

The bigger-deal policy: diminishing returns from risk at a fixed equity share. Each dollar that a bigger deal adds to the founder's expected payoff is worth less than a dollar to her. Raise the capital per deal ι, which raises the mean exit scale m, and hold the equity share s fixed (Section 3.3 adds the share response). Differentiating (10),

$$\frac{\partial\,\mathrm{CE}}{\partial m}\Big|_s \;=\; s\,\mathbb{E}^Q[\xi] \;<\; s \;=\; \frac{\partial(sm)}{\partial m}\Big|_s, \qquad \mathbb{E}^Q[\xi] \equiv \frac{\mathbb{E}[\xi\, e^{-\gamma r s m\,\xi}]}{\mathbb{E}[e^{-\gamma r s m\,\xi}]} \in (0,1), \tag{17}$$

where Q is the exponentially tilted measure $dQ \propto e^{-\gamma r s m\,\xi}\,dF_\xi$. It weights each outcome by the founder's marginal utility and so *down-weights the right tail.* I call $\mathbb{E}^Q[\xi]$ the *tilt*, and $1 - \mathbb{E}^Q[\xi]$ the *attenuation*: the share of a marginal dollar of expected payoff that risk takes away.

Lemma 2 (*Mixture certainty equivalent in closed form; proof in Appendix A.1*). *For ξ following*

closed forms below and the quantitative model assume that founders do not value this option, so $\Delta\,\mathrm{CE} = 0$ and (13)–(16) hold as stated. This understates the founder's value of a match. I do not compute its effect on the ranking per dollar of government spending or on the multiplier.

[16] The ceiling needs no approximation; the bargaining equations, Definition 1 and the rest of Theorem 1 use the approximation. Appendix A.3 gives the exact version of each of the theorem's statements and bounds the error, which the ceiling keeps finite at any capital per deal.

(3) *and effective stake* $b = \gamma r s m > 0$*, the Laplace transform*

$$\mathcal{L}_\xi(b) = \pi_0 + (1-\pi_0)\,\alpha(\underline{\xi}b)^\alpha\,\Gamma(-\alpha, \underline{\xi}b)$$

has a closed form in terms of the upper incomplete gamma function $\Gamma(\nu, x) = \int_x^\infty u^{\nu-1}e^{-u}\,du$*, and so do* $\mathrm{CE} = -\log \mathcal{L}_\xi(b)/(\gamma r)$ *and the tilt* $\mathbb{E}^Q[\xi] = -\partial_b \log \mathcal{L}_\xi(b)$*. The tilt*

(i) falls strictly with the effective stake: $\partial_b \mathbb{E}^Q[\xi] = -\operatorname{Var}^Q(\xi) < 0$*;*

(ii) vanishes exponentially as the effective stake grows: $\mathbb{E}^Q[\xi] \sim \frac{(1-\pi_0)\alpha}{\pi_0}\,\frac{e^{-\underline{\xi}b}}{b}$ *as* $b \to \infty$*.*

Proposition 1 (Risk attenuates the effect of bigger deals)**.** *Hold the equity share* s *fixed. Raising the founder's expected payoff* sm *by one dollar raises her certainty equivalent by only* $\mathbb{E}^Q[\xi] \in (0,1)$*, so* $\partial\,\mathrm{CE}/\partial m = s\,\mathbb{E}^Q[\xi] < s$*. The tilt* $\mathbb{E}^Q[\xi]$ *depends on the deal only through the effective stake* $b = \gamma r s m$*. It falls strictly as the effective stake grows (Lemma 2), tends to one as* $b \to 0$ *and, because startups fail (*$\pi_0 > 0$*), tends to zero as* $b \to \infty$*. The bigger the deal, the less a further dollar of expected payoff is worth to the founder; in the limit, it is worth nothing.*

The failure state is what lets risk take away the whole marginal dollar. Without it ($\pi_0 = 0$) every outcome pays at least the Pareto floor $\underline{\xi} = (\alpha-1)/\alpha$, so the tilt never falls below $(\alpha-1)/\alpha$: the attenuation never exceeds $1/\alpha$, at any effective stake.

More investors: diminishing returns from friction. More investors raise the discounted probability that a founder matches, and that probability cannot exceed one. Raise the stock of vacant slots v, either through the non-founder-slot policy (adding government-funded non-founder investor slots, which institutions hold) or by widening the inflow of founder-investors (founders whose own startup exits made them accredited investors). This raises tightness $\theta = v/u$, the number of vacant slots per searching founder, and with it the meeting rate $p(\theta)$. To leading order (16), with the equity share and the number of searching founders held fixed,

$$\frac{\partial h_S}{\partial p}\Big|_{s,m} = \frac{\rho\, h_M(z) + \kappa}{(\rho+p)^2} > 0. \tag{18}$$

Equation (18) holds the equity share fixed. A faster meeting rate also raises the equity share (Section 3.3). That second effect raises her expected payoff sm, so the tilt attenuates it, and the ranking (Proposition 7) counts it.

Proposition 2 (The value of more investors)**.** *Take any type that searches. Fix the equity share* $s^*(z)$*, and with it the effective stake* b*, and fix the number of searching founders* u *(the direct effect). Then* $h_S(z)$ *rises strictly with the stock of vacant slots* v*, through the meeting rate, by two channels:*

(i) a higher discounted probability of matching, $p/(\rho+p)$*, which also shortens the expected time during which the founder's risk is unresolved,* $\mathbb{E}[T] = 1/p + 1/\tau$*;*

(ii) a search cost κ *paid over a shorter expected search,* $\kappa/(\rho+p)$*.*

At a fixed meeting rate and risk aversion, (18) rises strictly with the effective stake, because h_M does, while the tilt falls (Proposition 1).

Theorem 1 (The risk ceiling: a bound on what either policy can deliver)**.** *Let* $\pi_0 > 0$ *and let the failure state pay nothing (*$\xi_f = 0$*). The certainty-equivalent value of any claim on a single startup is*

bounded by a risk ceiling *that depends only on the failure probability and the effective risk aversion* γr *(the absolute risk aversion* γ *times the risk-free rate* r*),*

$$\boxed{\mathrm{CE}(z;\iota) \;<\; \bar{C} \;=\; \frac{1}{\gamma r}\log\frac{1}{\pi_0} \;<\; \infty \qquad (\pi_0 > 0),} \tag{19}$$

a bound that is strict at every finite effective stake and depends on none of the equity share s*, the exit scale* m*, the capital per deal* ι *or the tail index* α*. The certainty equivalent approaches the ceiling from below as the effective stake grows: the gap* $\gamma r(\bar{C} - \mathrm{CE})$ *equals the area under the tilt, viewed as a function of the effective stake, from the current effective stake upward, so it closes at the rate of Lemma 2(ii). At* $\pi_0 = 0$ *there is no ceiling. Through the matched value, the ceiling also bounds the value of search. From here on, to leading order (14)–(15),*

$$h_S \underset{\substack{\text{search friction}\\ \text{and search cost}}}{<} h_M \;=\; \frac{\tau}{\rho+\tau}\,\mathrm{CE} \underset{\text{risk ceiling}}{<} \frac{\tau}{\rho+\tau}\,\bar{C}.$$

The first gap, $(\rho h_M + \kappa)/(\rho + p) > 0$*, closes as* $p \to \infty$*; the second closes as* $b \to \infty$*.*

(i) ***The bigger-deal policy*** *(equity share and meeting rate fixed). A dollar of expected payoff* sm *raises the search value by*

$$\frac{\partial h_S}{\partial(sm)}\Big|_{s,p} \;=\; \frac{p}{\rho+p}\,\frac{\tau}{\rho+\tau}\,\mathbb{E}^Q[\xi].$$

The tilt $\mathbb{E}^Q[\xi] \to 0$ *as the effective stake grows (Proposition 1), so the gradient vanishes, and* h_S *rises only toward its value at* $\mathrm{CE} = \bar{C}$*,* $\frac{p}{\rho+p}\frac{\tau}{\rho+\tau}\bar{C} - \frac{\kappa}{\rho+p}$*, a supremum it never attains.*

(ii) ***More investors*** *(equity share and capital per deal fixed). The gradient*

$$\frac{\partial h_S}{\partial p}\Big|_{s,m} \;=\; \frac{\rho h_M + \kappa}{(\rho+p)^2} \;>\; 0$$

is (18). It carries no tilt and stays positive at every effective stake; it vanishes only as the search friction does. h_S *rises strictly with* p*, with*

$$\sup_p h_S \;=\; \lim_{p\to\infty} h_S \;=\; h_M \;=\; \frac{\tau}{\rho+\tau}\,\mathrm{CE}(z;\iota) \;<\; \frac{\tau}{\rho+\tau}\,\bar{C}, \tag{20}$$

the matched value at the given deal.

The supremum of h_S *over both policies,* $\frac{\tau}{\rho+\tau}\bar{C}$*, is approached only as the effective stake and the meeting rate grow together. The proof, and the exact-recursion version of each statement, are in Appendix A.3.*

The theorem's display has two gaps. The first, between h_S and h_M, is the price of searching: the wait for a match and the flow cost κ paid meanwhile. The second, between h_M and $\frac{\tau}{\rho+\tau}\bar{C}$, comes from the risk ceiling. The ceiling does not need a fixed equity share: CE depends on s only through the effective stake, and (19) holds at every effective stake, so it holds at the equity share $s^*(z)$ set by bargaining in Proposition 3.

The size of the ceiling. At the calibration ($\pi_0 = 0.84$) the ceiling is $\bar{C} = \log(1/\pi_0)/(\gamma r) = 0.174/(\gamma r)$. Because $\mathbb{E}[\xi] = 1$, the founder's expected payoff is $sm = b/(\gamma r)$, so the ceiling as a

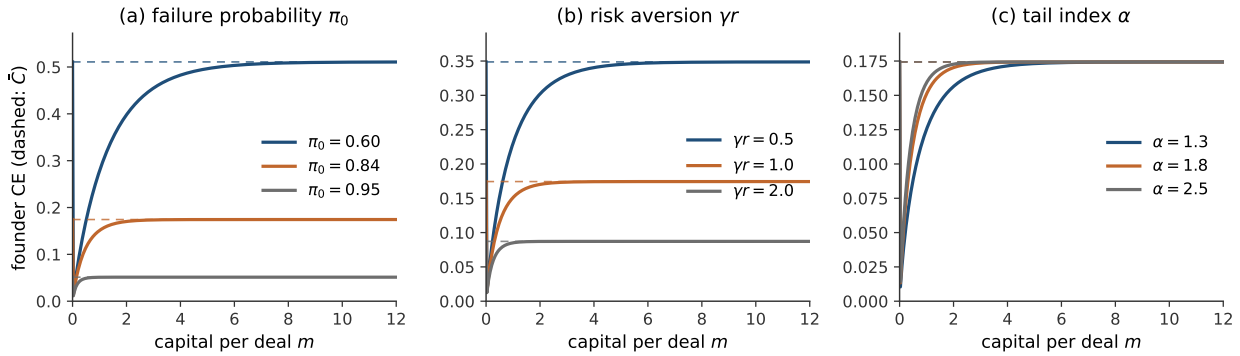


Figure 2: What moves the risk ceiling. Each panel plots the founder's certainty equivalent against the mean stake sm, with the ceiling $\bar{C}$ dashed, and varies one parameter around an illustrative point (the risk aversion, the tail index and the equity share there are not calibrated values). Rarer failure or lower risk aversion raises the ceiling. A thinner tail raises the value at every effective stake and leaves the ceiling unchanged (Theorem 1, (12)).

share of it is $\bar{C}/(sm) = \log(1/\pi_0)/b$, in which γr cancels. This share bounds what a founder's expected payoff is worth to her at every effective stake. For a representative founder, at the mean equity share and mean exit scale among founders who search, $b = 1.57$, so the ceiling share is $0.174/1.57 \approx 11\%$[17], and a bigger deal only lowers it. An investor's certainty equivalent of one position in her book is bounded by the book ceiling $n_D\bar{C}$, n_D times the founder's ceiling $\bar{C}$ (Proposition 4).

What the ceilings imply for the ranking. The two policies face different ceilings: $\bar{C}$ for the deal, h_M for slots. The bigger-deal policy stops at the search value at $\bar{C}$, the non-founder-slot policy at the matched value at the given deal. $\bar{C}$ depends only on the failure probability and the effective risk aversion γr, so neither the capital per deal nor the number of investors raises it, while h_M rises with anything that raises the certainty equivalent of the match. In the solved model, most of the founder-welfare gain from one more vacant slot comes through the equity share's response to more vacancies, which the tilt attenuates (Table 7). The ceilings alone do not decide the ranking. The comparison in Section 3.7 is per dollar of government spending, and each policy also moves the equity share, the price of VC capital (the value of a vacant slot) and the slots supplied by founder-investors (Sections 3.3–3.6).

Remark 1 (The ceiling beyond CARA). The ceiling needs only a utility bounded above and a failure state. With outside wealth $w_0 > 0$, a claim $X \geq 0$ that pays zero with probability $\pi_0 > 0$, and any strictly increasing u with $\bar{u} \equiv \sup u < \infty$, $\mathbb{E}\,u(w_0 + X) < \pi_0\,u(w_0) + (1 - \pi_0)\,\bar{u} < \bar{u}$, so the certainty equivalent is bounded whatever the scale of X. Under CRRA with relative risk aversion $\gamma_R > 1$ the bound, $\mathrm{CE} < w_0\big(\pi_0^{-1/(\gamma_R - 1)} - 1\big)$, is proportional to outside wealth; for $\gamma_R \leq 1$ there is no ceiling. Under CARA, $\bar{C}$ is the same amount for every founder.

3.3 Bargaining and the Endogenous Equity Share

The founder's equity share is a price, and it moves with the market. Nash bargaining divides the surplus from a match relative to two threat points: the founder's value of searching and the in-

[17] The ceiling share is $\log(1/\pi_0)/b$, with b equal to γr times the mean equity share times the mean exit scale, both means taken over founders who search.

vestor's value of a vacant slot. Both threat points depend on market tightness. When a founder and an investor meet, they set the equity share s by generalized Nash bargaining, with bargaining weight β for the investor and $1-\beta$ for the founder. The matched values are $h_M(z;s) = \frac{\tau}{\rho+\tau}\,\mathrm{CE}(sX(z))$ for the founder and, for the investor, whose slot becomes vacant again when the startup resolves,

$$h_M^F(z;s) = \frac{\tau\big(\,\mathrm{CE}_F^{\mathrm{div}}(z,s) + V_{\mathrm{vac}}\big)}{\rho+\tau}, \tag{21}$$

where $\mathrm{CE}_F^{\mathrm{div}}(z,s)$ (6) is the investor's certainty equivalent of her stake $(1-s)X$, per position in her partially diversified book; it reduces to the undiversified CARA value $\mathrm{CE}((1-s)X)$ at book breadth $n_D = 1$. The threat points are $h_S(z)$ (keep searching) and V_{vac} (keep the slot vacant). The equity share solves

$$s^*(z) = \arg\max_{s\in[0,1]} \big[h_M(z;s) - h_S(z)\big]^{1-\beta}\big[h_M^F(z;s) - V_{\mathrm{vac}}\big]^{\beta}, \tag{22}$$

whenever both surpluses can be made nonnegative; otherwise no match forms. Since CE is concave (and h_M stays concave in s, Appendix A.2, Step 0) and $\partial_s h_M > 0 > \partial_s h_M^F$, the objective is single-peaked and the first-order condition is the surplus-sharing rule

$$(1-\beta)\,\frac{\partial_s h_M(z;s^*)}{h_M(z;s^*) - h_S(z)} \;=\; \beta\,\frac{-\,\partial_s h_M^F(z;s^*)}{h_M^F(z;s^*) - V_{\mathrm{vac}}}. \tag{23}$$

The investor's threat point V_{vac} is the value of a vacant slot, the price of VC capital, defined in Section 3.4.

Proposition 3 (The meeting rate moves the equity share)**.** *For each type z, with the set of searching types (the participation cutoff z^*) held fixed, the equity share $s^*(z)$ rises with market tightness θ. More VC slots raise the founder's meeting rate $p(\theta)$, which lifts her threat point $h_S(z)$. They also lower the investor's meeting rate $q(\theta)$, which lowers the vacancy value V_{vac}. By (23), both raise the equity share ($\partial s^*/\partial h_S > 0$, $\partial s^*/\partial V_{\mathrm{vac}} < 0$). More vacant slots therefore raise the equity share* endogenously*. This is a third channel, alongside the two of Proposition 2, through which more investors benefit founders.*

Bargaining therefore prices the equity share. More vacant slots raise it, and with a higher equity share more exits pass the wealth test. This is one of the two channels through which the exit wealth that creates founder-investors responds to VC supply (equation (26)).

3.4 The Market for VC Capital

The risk ceiling of Section 3.2 reaches the supply side: its version for an investor's book bounds the value of a vacant slot, the price of VC capital, from above (Proposition 4). The market for VC capital clears through the scarcity rent, the gap between that price and an investor's outside option. Where accredited investors are scarce, so that their number limits supply, supply feeds on itself.

The value of a vacant slot. A vacant slot pays the flow cost c. It meets a searching founder at rate $q(\theta) = A_m\,\theta^{-\eta}$, where tightness θ is the number of vacant slots per searching founder, and it is lost at rate δ_I if its holder leaves. Search is random: every searching type meets an investor at the same rate, and every meeting with a participating type ends in a deal. The type a vacant slot

meets therefore has the truncated density $g(z)/[1-G(z^*)]$. The vacancy value solves

$$(\rho+\delta_I)\,V_{\text{vac}} \;=\; -c \;+\; q(\theta)\int_{z^*}^{\infty}\left[h_M^F(z;s^*(z))-V_{\text{vac}}\right]\frac{g(z)\,dz}{1-G(z^*)}, \tag{24}$$

with h_M^F the investor's matched value (21). An investor who leaves gives up the slot for the outside option, worth $R=0$ (Section 2.3). Non-founder investor slots are slots that institutions hold and that policy can add directly ("publicly funded slots"); M_v^0 is their number. Each non-founder slot is run by an investor, its operator, and is valued, and bargains, in the same way. An operator who leaves is replaced at once, so the number of non-founder slots that are vacant is $v^0(\theta)=M_v^0\tau/(q(\theta)+\tau)$.

Proposition 4 (*Supply-side attenuation, through the price; proof in Appendix A.1*). *Hold the equity share, participation cutoff and tightness fixed. The price of VC capital V_{vac} is then below the value (24) gives when the matched value (21) uses the investor's mean payoff $(1-s)m$ in place of her certainty equivalent CE_F^{div}. At every equity share, cutoff, tightness and deal scale, $V_{\text{vac}}<(\tau/\rho)\,n_D\bar{C}$.*

Proposition 4 gives two upper bounds on V_{vac}. Both come from CE_F^{div} (6). It lies below the mean payoff, so risk lowers the price at every deal scale. Because each startup can fail (Theorem 1), it never exceeds $n_D\bar{C}$, which unlike the mean does not grow with the deal, so the price stays bounded however large deals get. A broader book relaxes the second bound but never removes it while the book is finite.

Market clearing. The market for VC capital clears through the number of vacant slots, and its price signal is the **scarcity rent** $\varpi\equiv V_{\text{vac}}-R$, the price of VC capital net of the outside option. Every unmatched accredited investor posts a slot when $\varpi>0$, none posts when $\varpi<0$, and investors are indifferent when $\varpi=0$, so supply counts investors, not dollars. The vacant slots supplied by founder-investors (accredited investors whose wealth came from their own startup exits) therefore satisfy

$$\boxed{0\;\le\;v^R\;\le\;\frac{\Phi_{\text{acc}}}{\delta_I},\qquad \varpi>0\;\Rightarrow\;v^R=\frac{\Phi_{\text{acc}}}{\delta_I},\qquad \varpi<0\;\Rightarrow\;v^R=0,} \tag{25}$$

with total vacancies $v=v^0(\theta)+v^R$. The associated slot count is $M_v=v\,(1+q(\theta)/\tau)$. The analytic results give each investor one slot ($n=1$) and let investors leave only while their slot is vacant. The quantitative model of Section 4 lets each investor deploy n slots and leave mid-deal. This rescales the pool and adds a term for matched spells to the loop gain defined below.

Two feedback loops. The first is the recycling loop: a founder succeeds, becomes an accredited investor and funds the next founder. Where accredited investors are scarce ($\varpi>0$), so that their number limits supply, every founder-investor posts. By (25) the vacancy stock is then a fixed point of the vacancy map T. The slope of that map is the *loop gain* λ, the further vacant slots that one new vacant slot generates in equilibrium:

$$\begin{aligned} v=T(v)\equiv\frac{M_v^0\tau}{q(\theta(v))+\tau}+\frac{\Phi_{\text{acc}}(v,\iota,\bar{w})}{\delta_I},\qquad \lambda\equiv T'(v)=\lambda_{\text{rec}}+\lambda_0,\\ \lambda_{\text{rec}}=\frac{\partial_v\Phi_{\text{acc}}}{\delta_I}>0,\qquad \lambda_0=\frac{M_v^0\tau\,|q'(\theta)|\,\theta'(v)}{(q+\tau)^2}\ge 0, \end{aligned} \tag{26}$$

where $\theta(v)$ is the tightness that flow balance (5) and the participation cutoff assign to the vacancy stock. The first term of T is the number of vacant non-founder slots $v^0(\theta)$. The signs of λ_{rec} and λ_0 hold under the inner-loop condition $\Lambda_{\text{loop}} < 1$ of Proposition 5(ii), defined below, which makes tightness rise with the stock (the condition fails at the broadest books of Table A.1, where $\Lambda_{\text{loop}} > 1$). Its recycling part λ_{rec} runs through the accreditation flow. One more vacancy raises tightness, which raises the founder's equity share s^* (Proposition 3) and lowers the participation cutoff z^* (Appendix A.2). More exits then clear the wealth test, the wealth needed to qualify as an accredited investor, and more founders become investors.

Its other part λ_0 is mechanical: when matching slows, more non-founder slots sit vacant. This part vanishes when meeting rates do not respond to tightness.

Inside the recycling loop runs a second, inner loop: selection of which founders search. A fall in the price V_{vac} lowers the investor's threat point, so the equity share rises (Proposition 3) and the cutoff z^* falls. The entrants are the lowest types (Lemma 4), so the matched value a vacant slot expects falls and V_{vac} falls again. At a given tightness, write $Z(V_{\text{vac}})$ for the cutoff at price V_{vac} and $V_{vac}^{\text{fp}}(z^*)$ for the price the vacancy equation (24) assigns at cutoff z^*; the *inner-loop gain* $\Lambda_{\text{loop}} \equiv (dV_{vac}^{\text{fp}}/dz^*)(dZ/dV_{\text{vac}}) > 0$ is the second fall in the price per unit of the first ((33), Appendix A.2). With $\Lambda_{\text{loop}} < 1$ at every cutoff and tightness the echoes die out, and the cutoff, the price and tightness are unique at each vacancy stock. An equilibrium exists without it, but with $\Lambda_{\text{loop}} \geq 1$ a selective pool of founders at a high price and a diluted pool at a low price could each confirm itself.

The loop gain λ governs quantities (Section 3.6 turns it into the supply multiplier $1/(1-\lambda)$) and the inner-loop gain Λ_{loop} governs the price; Proposition 5(ii) asks both to be below one.

Lemma 3 (The price of VC capital falls with the vacancy stock)**.** *Under an inner-loop gain $\Lambda_{\text{loop}} < 1$ at every vacancy stock (defined above; Proposition 5), V_{vac} is continuous and strictly decreasing in the vacancy stock v. Proof in Appendix A.4.*

The scarcity rent ϖ falls with v (Lemma 3), while the vacancy map T rises with v less than one for one (the loop gain $\lambda < 1$, the stability condition of Proposition 5(ii)). Condition (25) therefore picks exactly one of three configurations (Table 1).

Table 1: The three configurations of the market for VC capital.

Configuration	Scarcity rent ϖ	Founder-investor vacancies v^R	Non-founder-slot policy dv/dM_v^0	Lower-threshold policy $dv/d\bar{w}$
Investors scarce	> 0	$\Phi_{\text{acc}}/\delta_I$	$\dfrac{\tau/(q+\tau)}{1-\lambda}$	$\dfrac{\partial_{\bar{w}}\Phi_{\text{acc}}/\delta_I}{1-\lambda} < 0$
Interior free entry	$= 0$	in $(0, \Phi_{\text{acc}}/\delta_I)$	0	0
Non-founder-only corner	< 0	0	$\dfrac{\tau/(q+\tau)}{1-\lambda_0}$	0

Notes. $\lambda = \lambda_{\text{rec}} + \lambda_0$ is the loop gain (26), the response of the vacancy stock to itself through recycling (λ_{rec}) and through the non-founder slots' vacant share (λ_0, the part of the loop gain by which slower matching leaves more non-founder slots vacant); the policy entries are derived in Appendix A.4. Only the configuration where accredited investors are scarce has $\lambda_{\text{rec}} > 0$, so only there does recycling amplify the non-founder-slot and lower-threshold policies.

The sign of the rent decides what adding investors does. Where $\varpi > 0$ (*accredited investors scarce*) the number of accredited investors limits supply: one more rich founder is one more

investor. Both the non-founder-slot and the lower-threshold policies are then amplified by the supply multiplier $1/(1-\lambda)$ (Proposition 6). Where $\varpi = 0$ (*interior price-binding*: investors are indifferent and only some of them post, the row "interior free entry" of Table 1) the price limits supply. The vacancy stock is pinned by $V_{\text{vac}}(v) = R$, a non-founder slot displaces private capital, and the lower-threshold policy only adds idle money. Neither of these two policies then moves the vacancy stock, while the bigger-deal policy (more capital per deal) still raises V_{vac} and draws entry. Where $\varpi < 0$ no founder-investor capital is deployed. A non-founder slot then adds an investor, scaled by the vacant share $\tau/(q+\tau)$, the fraction of non-founder slots that are vacant at any time, and is amplified only through λ_0.

3.5 Equilibrium

Equilibrium exists without any stability condition. An equilibrium at which each feedback loop's gain is below one is locally unique (Proposition 5): no other equilibrium lies nearby, though one at a distant vacancy stock v or participation cutoff z^* is not ruled out.

Definition 1 (Stationary search equilibrium)**.** Given policy $(M_v^0, \iota, \bar{w})$, a stationary equilibrium is a participation cutoff z^*, an equity-share function $s^*(\cdot)$, a vacancy value V_{vac}, tightness θ, and stocks (u, n_F, v, M_v) — searchers, matched investors, vacancies, and slots — such that:

(i) **Bargaining:** $s^*(z)$ solves the surplus-sharing rule (23), with matched values (21), and V_{vac} solves (24), given θ and z^*.

(ii) **Participation:** $z^* = \inf\{z : h_S(z) \geq h_0\}$, with h_S evaluated at the equity share s^*; types $z \geq z^*$ search, and they form an interval: the value of search $h_S(z)$, evaluated at the equity share, is strictly increasing in z from any participating type upward (Lemma 4).

(iii) **Flow balance / tightness:** the stocks satisfy (5): $u = [1 - G(z^*)]/p(\theta)$, $n_F = [1 - G(z^*)]/\tau$, $v = M_v - n_F > 0$, and $\theta = v/u$, so that $\theta^\eta = A_m\, v/[1 - G(z^*)]$.

(iv) **VC-capital market clearing:** the vacant slots supplied by founder-investors, $v^R = v - v^0(\theta)$, satisfy the supply condition (25), with the scarcity rent $\varpi = V_{\text{vac}} - R$ from (24) and the accreditation flow Φ_{acc} from (8) on the matched measure $\mu_M(z) = g(z)\mathbf{1}\{z \geq z^*\}/\tau$ (inflow $g(z)\mathbf{1}\{z \geq z^*\}$ matched per unit time, resolving at rate τ).

Proposition 5 (Existence and uniqueness of stationary equilibrium)**.** *Fix a policy $(M_v^0, \iota, \bar{w})$ and maintain the regularity conditions R1–R3 of Appendix A.2 (a type density positive on a support unbounded above; a deal scale $m(z;\iota)$ continuously differentiable and unbounded above in z, with $m_z > 0$; a non-founder-slot floor, under which the non-founder slots alone keep some slots vacant; and a finite participation cutoff with a positive investor surplus). Then:*

(i) ***Existence.*** *A stationary search equilibrium (Definition 1) exists. No stability condition is required.*

(ii) ***Uniqueness.*** *An equilibrium at which the inner-loop gain (33) (Appendix A.2) satisfies $\Lambda_{\text{loop}} < 1$ and the loop gain of (26) satisfies $\lambda < 1$ is locally unique, whichever configuration of (25) it is in; it is globally unique if $\Lambda_{\text{loop}} < 1$ and $\lambda < 1$ hold at every cutoff and tightness the fixed-point argument visits (Appendix A.2).*[18]

[18] I check uniqueness numerically, on the vacancy map T (26). An equilibrium is a stock with $T(v) = v$. A second equilibrium would need the loop gain $\lambda = T'$ to reach one at some stock, or an inner-loop gain of at least one, so that a high and a low V_{vac} could each confirm itself at one stock. At the baseline of Section 4, I find no second equilibrium over a wide range of stocks and starting prices: $T(v) = v$ at one stock only. At the solved equilibrium of every other row of Tables 4, 7 and 8, both loop gains are below one, so it is locally unique.

3.6 The Supply Multiplier

Recycling multiplies the vacancy part of the effect of supply policy where accredited investors are scarce. Suppose a policy adds one vacancy. It raises tightness, which raises the founder's equity share and lowers the participation cutoff. More founders then exit with proceeds above the wealth test, each becomes an investor, and the one vacancy brings back λ more. Those bring back λ^2, and so on. The policy's total effect on the vacancy stock is $1 + \lambda + \lambda^2 + \cdots = 1/(1-\lambda)$, the *supply multiplier*. Freezing the pool $\Phi_{\text{acc}}/\delta_I$ at its baseline size sets $\lambda_{\text{rec}} = 0$ and the deal's accreditation response $\partial_\iota \Phi_{\text{acc}}/\delta_I$ to zero, so the multiplier falls to $1/(1-\lambda_0)$. Recycling widens the lead of the non-founder-slot policy only modestly: the ratio of its welfare effect per dollar to that of the bigger-deal policy rises from 6.54 with the pool frozen to 7.34 at the calibrated exit sizes (Section 5.3).

Proposition 6 (Supply multiplier, the lower-threshold policy, and the free-entry margin)**.** *Where accredited investors are scarce ($\varpi > 0$), the vacancy stock is the fixed point of the vacancy map T in (26), with loop gain $\lambda = \lambda_{\text{rec}} + \lambda_0 \in (0,1)$ (the upper bound is the stability condition of Proposition 5(ii)).*[19] *Then*

$$\underbrace{\frac{dv}{dM_v^0} = \frac{\tau/(q+\tau)}{1-\lambda} > 0}_{\text{non-founder-slot policy (more investors)}} \quad , \quad \underbrace{\frac{dv}{d\bar{w}} = \frac{\partial_{\bar{w}}\Phi_{\text{acc}}/\delta_I}{1-\lambda} < 0}_{\text{lower-threshold policy (more investors)}} \quad , \quad \underbrace{\frac{dv}{d\iota} = \frac{\partial_\iota \Phi_{\text{acc}}/\delta_I + v_\theta^0\, \theta_\iota|_v}{1-\lambda}}_{\text{bigger-deal policy}}, \tag{27}$$

with $\partial_{\bar{w}}\Phi_{\text{acc}} < 0$ whenever the wealth test binds for at least one participating type, $\bar{w} > \underline{\xi} s^*(z) m(z;\iota)$.

The recycling part of the loop gain is the product of two quantities with a plain reading,

$$\boxed{\lambda_{\text{rec}} = \frac{\partial_v \Phi_{\text{acc}}}{\delta_I} = \varrho \cdot \varepsilon_v,} \tag{28}$$

the share of vacant slots that founder-investors can supply, $\varrho \equiv (\Phi_{\text{acc}}/\delta_I)/v$ (here equal to the share they do supply, v^R/v), and the elasticity of the accreditation flow, the flow of exits large enough to make the founder an accredited investor, to the vacancy stock, $\varepsilon_v \equiv \partial \log \Phi_{\text{acc}}/\partial \log v$. Where accredited investors are not scarce, $\lambda_{\text{rec}} = 0$, and the non-founder-slot and lower-threshold policies take the values in Table 1. Proof in Appendix A.4.

Each policy's effect on the vacancy stock is its first-round effect times the same $1/(1-\lambda)$. For a non-founder slot, the first round is the slot itself, scaled by $\tau/(q+\tau) < 1$ because a non-founder slot raises meeting rates only while vacant. For the lower-threshold policy, it is the extra exiters a lower $\bar{w}$ accredits. For a bigger deal, it is the deal's *accreditation response* $\partial_\iota \Phi_{\text{acc}}/\delta_I$, the change in the accreditation flow, plus the change in vacant non-founder slots through the deal's effect on tightness.

By (28), the multiplier is large in two cases. The first is where founder-investors can supply a large share of vacant slots, so that ϱ is high. The second is where an extra vacancy adds many qualifying exits, so that ε_v is high. An extra vacancy adds them in two ways: it draws in founders at the participation cutoff, and, through a higher equity share, it lifts winners just below the wealth test over it. In principle, the recycling part of the multiplier could thus be read from two observables: the founder-investor share of vacant VC slots, and the response of qualifying exits to a vacancy shock such as a non-founder-slot program.

[19] The recycling elasticity ε_v of (28) is taken with respect to the vacant stock v. A policy statement in terms of the slot measure $M_v = v + n_F$, $n_F = [1 - G(z^*)]/\tau$ (Definition 1), differs by the matched-investor stock n_F, itself a function of the vacancy stock, and measures the same recycling effect.

Which policy the multiplier helps more. A dollar's welfare effect works partly through the vacancy stock: the new vacancies it creates, times the multiplier, times the welfare value of a vacancy, which is the same for the non-founder-slot and bigger-deal policies. So the multiplier adds more to the welfare effect of whichever policy creates more new vacancies per dollar. That is the non-founder-slot policy when a dollar spent on it buys more vacant slots than a dollar spent on the bigger-deal policy adds by accrediting investors (30). The non-founder-slot and lower-threshold policies work only through vacancies, so their whole welfare effect is multiplied. A bigger deal helps founders partly directly, through the tilt and the equity share, which the multiplier does not scale.

A bigger deal may not even add vacancies: by (27), $dv/d\iota$ has the sign of $\partial_\iota \Phi_{\text{acc}}/\delta_I + v_\theta^0 \theta_\iota|_v$. It lifts more winners over the wealth test, until every winner already clears it (Appendix A.5). At a fixed v it also moves the price of VC capital. Where $dV_{\text{vac}}/d\iota|_v > 0$, this lowers s^*, and where that outweighs the deal's direct effect at the marginal founder, $dz^*/d\iota|_v > 0$ and fewer founders enter and exit.

3.7 Non-Founder-Slot or Bigger-Deal Policy?

This subsection asks which policy buys more founder welfare per dollar of government spending: the non-founder-slot policy, which adds non-founder investor slots, or the bigger-deal policy. Welfare means founder welfare unless I say otherwise: $W = \int_{z^*}^{\infty} h_S(z)\, dG(z)$, the certainty-equivalent value of searching summed over all founders who search. Exit value means aggregate realized exit value, $V_{\text{exit}} = \int_{z^*}^{\infty} \frac{p}{\rho+p} \frac{\tau}{\rho+\tau}\, m(z;\iota)\, dG(z)$, the present value of the same founders' exits, each counted at the whole startup's expected payoff. To first order, the answer comes down to one inequality (Proposition 7) with a tilt side and a vacancy side. A bigger deal pays in risky payoff dollars, which founders value below their mean, so its effect is weighted by the *average tilt*. The non-founder-slot policy pays in vacancies, and the multiplier of Section 3.6 scales how many vacancies each non-founder slot adds.

What a dollar buys. I compare policies per dollar of government spending, measured in present value. A permanent increase $d\iota$ in capital per deal costs $c_\iota[1-G(z^*)]/r$ per unit, and a maintained non-founder slot costs ψ_E. Write $\mathfrak{g}_E = (dW/dM_v^0)/\psi_E$ and $\mathfrak{g}_I = r\,(dW/d\iota)/(c_\iota[1-G(z^*)])$ for the two policies' welfare effects per present-value dollar.

A non-founder slot's effect. The non-founder-slot policy moves welfare only through the vacancy stock. Let $\partial W/\partial v$ be the welfare value of one more vacancy, which lets founders match faster (18) and raises their equity share (Proposition 3). A non-founder slot adds $\tau/(q+\tau)$ vacancies in the first round and $1/(1-\lambda)$ times that in total (Proposition 6), so

$$\mathfrak{g}_E = \frac{\partial W/\partial v}{(1-\lambda)\psi_E} \frac{\tau}{q+\tau}.$$

The bigger deal's effect. A bigger deal has four effects.

Direct. Each founder who searches gets a larger exit, valued at her tilt (Theorem 1(i)). With the exit valued at its mean, the effect is

$$A_I \equiv \int_{z^*}^{\infty} \frac{p}{\rho+p} \frac{\tau}{\rho+\tau}\, s^*(z)\, m_\iota(z;\iota)\, dG(z) > 0.$$

Valued after risk, it is $\overline{\mathbb{E}^Q[\xi]}\,A_I$, where

$$\overline{\mathbb{E}^Q[\xi]} \;\equiv\; A_I^{-1}\int_{z^*}^{\infty}\frac{p}{\rho+p}\,\frac{\tau}{\rho+\tau}\,s^*(z)\,\mathbb{E}^Q[\xi](z)\,m_\iota(z;\iota)\,dG(z)$$

is the average tilt.

Equity share. A bigger pie is bargained over again. It dilutes both threat points, so the equity share moves, near risk neutrality toward the founder's Nash weight $1-\beta$. The equity share's response $\partial s^*/\partial\iota|_{\text{partial}}$ (36), with tightness, the cutoff and both threat points fixed, has welfare value

$$A_s \equiv \int_{z^*}^{\infty}\frac{p}{\rho+p}\,\frac{\tau}{\rho+\tau}\,m(z;\iota)\,\mathbb{E}^Q[\xi](z)\,\frac{\partial s^*}{\partial\iota}\Big|_{\text{partial}}(z)\,dG(z),$$

of either sign.

Price and congestion. With the vacancy stock held fixed, since the recycling effect below carries the response of the stock, a bigger deal raises the price of VC capital, which lowers the equity share, and moves tightness. The *price-and-congestion response* nets these effects:

$$A_P \equiv -\Big[\frac{\partial W}{\partial V_{\text{vac}}}\,\frac{dV_{\text{vac}}}{d\iota}\Big|_v + \frac{\partial W}{\partial\theta}\,\frac{d\theta}{d\iota}\Big|_v\Big].$$

Recycling. The deal's accreditation response $\partial_\iota\Phi_{\text{acc}}/\delta_I$ (Section 3.6) changes the vacancy stock, which the multiplier scales and $\partial W/\partial v$ values.

Summing the four (Lemma 5, Appendix A.5), the bigger deal's first-order effect per dollar is

$$\tilde{\mathfrak{g}}_I \equiv \frac{r}{c_\iota[1-G(z^*)]}\Big[\overline{\mathbb{E}^Q[\xi]}\,A_I + A_s - A_P + \frac{\partial W}{\partial v}\,\frac{\partial_\iota\Phi_{\text{acc}}/\delta_I}{1-\lambda}\Big].$$

Proposition 7 (The dominance condition: which policy per dollar of government spending)**.** *Let accredited investors be scarce in equilibrium, with $\lambda<1$. Then the non-founder-slot policy yields the larger first-order welfare effect per dollar of government spending, $\mathfrak{g}_E>\tilde{\mathfrak{g}}_I$, if and only if the average tilt $\overline{\mathbb{E}^Q[\xi]}$ of the bigger deal's effect lies below the vacancy side, the right side of*

$$\overline{\mathbb{E}^Q[\xi]} \;<\; \bar{\Xi}^* - \frac{A_s}{A_I} + \frac{A_P}{A_I}, \tag{29}$$

where the break-even tilt is

$$\bar{\Xi}^* \equiv \underbrace{\frac{\partial W/\partial v}{A_I}}_{\text{price of a vacancy}}\;\underbrace{\frac{1}{1-\lambda}}_{\text{multiplier}}\;\underbrace{\Big(\frac{\tau}{q+\tau}\,\frac{c_\iota[1-G(z^*)]}{r\,\psi_E} - \frac{\partial_\iota\Phi_{\text{acc}}}{\delta_I}\Big)}_{\text{net vacancy creation}}.$$

When the welfare value of one more vacancy is positive, $\partial W/\partial v>0$ (Appendix A.5), $\bar{\Xi}^*>0$ if and only if the cost-dominance condition holds:

$$\frac{\tau}{q+\tau}\cdot\frac{c_\iota\,[1-G(z^*)]}{r\,\psi_E} \;>\; \frac{\partial_\iota\Phi_{\text{acc}}}{\delta_I}. \tag{30}$$

The left side of (29), the tilt side, is the average tilt, between zero and one. The right side is the vacancy side. Its first term, the *break-even tilt* $\bar{\Xi}^*$, is a product of three objects. Net vacancy creation is what the same money does to vacancies before any feedback: the vacancies it buys through non-founder slots, minus those the bigger deal's own exits create. The multiplier $1/(1-\lambda)$

of (27) turns those vacancies into the total change in the stock. The price of a vacancy converts them into capital per deal: $\partial W/\partial v$ is what searching founders gain from one more vacancy, and A_I is what they gain from a larger deal with the exit valued at its mean. Their ratio is how much capital per deal at mean value gives the same welfare as one vacancy, which is why the product reads as a tilt. A large enough product lifts the right side above one, and the non-founder-slot policy then wins whatever the tilt. The ranking does not need (30), which only signs $\bar{\Xi}^*$. Condition (30) holds when the non-founder slots, not the bigger deal's exits, are the net vacancy creators, and only then does a larger multiplier favour the non-founder-slot policy (Section 3.6). The multiplier scales neither A_s and A_P nor the ratio $\mathfrak{g}_E/\tilde{\mathfrak{g}}_I$ one for one. The other two terms are the share and price responses at a fixed vacancy stock (Section 5.2). Proposition 7 names every first-order channel, drops two feedbacks (Section 5.2), but does not sign the ranking.

What moves net vacancy creation. A vacancy is shared: one more vacancy raises the meeting rate of every founder who searches. A deal dollar is private: it reaches one founder, so a bigger deal must be paid to every founder who searches. The first term of net vacancy creation is therefore proportional to $1 - G(z^*)$: more founders who search make each unit of capital per deal dearer, while a non-founder slot costs the same. A non-founder slot adds vacancies only while it is vacant, so the first term is also proportional to $\tau/(q+\tau)$, the share of time a slot stays vacant, which rises with tightness because a slot then meets founders more slowly. More founders searching at a fixed vacancy stock lower tightness and so work against this factor. G and the exit tail reach the first term only through the cutoff and tightness. The second term has no general sign. It subtracts the vacancies created where the deal lifts more winners over the wealth test, and it adds where the deal raises the cutoff enough that fewer founders exit (Section 3.6).

What moves the multiplier. The multiplier $1/(1-\lambda)$ scales how much supply responds to policy, not how much supply there is. At every solved row it rises as the exit tail thins, that is, as the largest exits become less extreme relative to the rest (Table 4). The reason is who supplies the slots. With the mean payoff normalized to one, a thinner tail moves probability from rare giant exits to moderate ones. More successful founders then clear the wealth test outright, so the founder-investor pool grows relative to the vacancy stock. The larger the share of vacant slots supplied by founder-investors, the more strongly vacant slots feed back on themselves, so the recycling part of the loop gain rises. The winners a bigger deal lifts over the wealth test cut both ways: they enlarge $\partial_\iota \Phi_{\text{acc}}$, which favours the deal, and they raise λ_{rec}, which favours the non-founder-slot policy when (30) holds. The price of a vacancy compares two sums over the same searching founders: $\partial W/\partial v$ moves with what one more vacancy does to matching speed and the equity share, and A_I with the exit-size response m_ι and the equity share. I do not sign how G or the tail moves any of the three objects; Section 5.2 reports them at every solved row. The tail also moves the left side, through the tilt.

Beyond the last dollar. Proposition 7 ranks the last dollar, not a program. With the equity share frozen, the two policies face different ceilings: $\bar{C}$ for the deal, h_M for slots (20). The risk ceiling of Theorem 1 bounds every startup's certainty equivalent, and h_M bounds the value of search however fast founders meet, so for a program of either policy whose cost grows without bound, the effect through its own ceiling goes to zero: the deal's direct effect and the slots' whole effect; only the deal's vacancy term need not vanish (Appendix A.5). Proposition 7 assumes scarce accredited investors and $\lambda < 1$, so it does not cover a program that ends the scarcity or drives λ to one. How the non-founder slots' effect per dollar and the investors a bigger deal's exits accredit change along

a program is computed in Section 5.3.

4 Calibration

Data and regulation set the payoff law, risk aversion, the search frictions, the fees and fund turnover. The model solves for everything else, chiefly the loop gain λ, tightness θ and the equity share s, hence the effective stake b.

The payoff law. The payoff law is the distribution of a startup's payoff. Its parameters (π_0, α) come from Azevedo et al. [2025], who reconstruct the ex-ante, after-tax payoff distribution of ∼180,000 U.S. founders (1987–2021). The failure probability $\pi_0 \approx 0.84$ is the share of founders with a zero payoff. The tail index $\alpha \approx 1.03$ is their maximum-likelihood Pareto slope of founder payoffs above \$100M (95% CI $[1.01, 1.04]$). Both are measured on founders' own payoffs, the wealth that in the model turns founders into investors. This payoff law defines the baseline, the founder calibration. Neither depends on the authors' assumptions about preferences. In the model α sets the tail of the payoff shock ξ in (2). Where the model departs from founder payoffs is their spread, not their tail (see the idea-quality dispersion below).[20]

The wealth unit and risk aversion. I choose the wealth unit U so that the expected payoff of the founder's stake in the model, failures included, equals \$7.2M, the mean after-tax founder payoff, zeros included, in Azevedo et al. [2025]. With the discount rate equal to the interest rate, $\rho = r$ (Lemma 1), the CARA coefficient γ enters the model only through the product γr, so I set that product. One rule sets risk aversion for founders and investors alike: each has relative risk aversion $\sigma = 1.5$, evaluated at what it holds in one deal. For the founder, that is W_E, the median payoff among founders with a positive payoff in Azevedo et al. [2025]. The model gives the founder no outside wealth, so $\gamma r = \sigma U / W_E$.[21] For an investor, a partner acting for a VC fund or an individual angel, it is W_F, the capital a VC fund commits to one deal: the median fund's committed capital divided by the twenty investments it expects to make [Metrick and Yasuda, 2010]. The larger holding means a lower absolute risk aversion, $\gamma r\, W_E / W_F$. This convention is implemented by the book breadth n_D of (6), the number of independent claims over which an investor spreads its risk, and gives $n_D = W_F / W_E = 3.91$ (Appendix A.10).[22] The alternative reading prices a deal's risk at the scale of a founder-investor, an accredited investor whose wealth came from her own startup exit. It is the concentrated case $n_D = 1$ of Table A.1.

The wealth test. The accredited-investor wealth test $\bar{w}$ is the Reg D net-worth test, \$1M excluding the primary residence (17 CFR § 230.501(a)(5)), divided by U. The test is written in nominal

[20] Two robustness checks vary the payoff law (Table 2). The founder atom band, a range for the failure probability $\pi_0 \in [0.74, 0.84]$, takes its lower end from the same paper's share of founding teams whose payoff is zero. The exit-tail frontier of Table 4 changes α alone, holding the failure probability at its founder value. It runs through the same paper's company-tail estimate $\alpha = 1.18$, the Pareto tail of whole-startup payoffs, to two values I chose thinner than any measured tail, $\alpha = 1.8$ and $\alpha = 2.1$.

[21] $\sigma = 1.5$ is the value of Cagetti and De Nardi [2006]; Chetty [2006] reports it as an upper bound for an income-weighted representative agent, with a mean estimate of one. W_E = \$5.558M is the median positive exit value of Azevedo et al. [2025], in 2025 USD. With U from Table 2, $\gamma r = 1.5\, U / \$5.558\text{M}$ gives the tabulated value.

[22] W_F = \$225M/20, the median fund's committed capital over its expected investments [Metrick and Yasuda, 2010], is \$11.25M in the assumed 1999 USD of the 1993–2006 vintages. Scaled to 2025 USD by the CPI-U ratio 321.9/166.6 and divided by W_E, it gives $n_D = 3.91$. Read as a count of independent positions in one partner's book, the value is plausible. The median fund expects five investments per partner, and "few VC funds expect to make more than ten investments per partner" [Metrick and Yasuda, 2010, p. 2309].

dollars and has never been indexed, so \$1M is also its value in 2025 USD. The model represents the net-worth route only, not the income route of § 230.501(a)(6), and a founder becomes an accredited investor when her payoff alone clears the test, so wealth she held before the exit counts as zero.

Fees. The two cost levels come from the fee data of Metrick and Yasuda [2010], in 2025 USD and units of U. The slot price ψ_E is what the government pays for a subsidized slot: the capitalized management fee on that slot. I apply the modal initial fee, $f = 2\%$ of committed capital, to W_F and capitalize it at ρ, so $\psi_E = fW_F/(\rho U)$. The per-deal capital cost c_ι, the cost of one unit of capital per deal ι, is the capital a deal receives net of lifetime fees. Lifetime fees are a share $L_F = 17.75\%$ of committed capital for the median VC fund [Metrick and Yasuda, 2010], so $c_\iota = (1 - L_F)W_F/U$. I ignore the establishment cost that the same paper also nets out. The cost ratio $\psi_E/c_\iota = f/(\rho(1 - L_F)) = 0.608$ does not depend on fund size, the deflator or U.[23] A vacant slot costs its full fee flow, $c = \rho\psi_E$, because the fee is charged on committed capital whether or not it is invested: throughout the fund's life for most VC funds, and during the investment period for all [Metrick and Yasuda, 2010].

As a check on the ratio, I replace f by $L_F/10$, the average annual fee of a ten-year fund, which lies below f because fees step down after the investment period. Over the interquartile range of L_F for VC funds, 14–21.25% [Metrick and Yasuda, 2010], the ratio then spans the *fee band* $\psi_E/c_\iota \in [0.41, 0.67]$. The baseline ratio sits just inside the top of the band, where the per-dollar factor (the dollars spent on the bigger-deal policy that buy the founder welfare one dollar spent on the non-founder-slot policy buys) is lowest. Counting only the first round, \$2.3M (median) to \$4.4M (mean) of first-round capital per startup [Ewens et al., 2018], puts the ratio in $[0.90, 2.60]$, a band that excludes the baseline ratio. I keep the whole-match reading, all the capital a deal receives and not only the first round, because the capital per deal ι scales the mean payoff of the whole match.

Turnover and the slot count. Two rates come from the same fund-life data. The resolution rate τ, the rate at which a startup resolves by exit or failure, is the reciprocal of the ten-year fund term [Metrick and Yasuda, 2010, Robinson and Sensoy, 2016]. The investor exit rate δ_I, the rate at which an investor leaves the VC market, is the reciprocal of the midpoint between that term and the term with its longest extension [Robinson and Sensoy, 2016].

The slot count $n = 2.893$ is the number of startups a newly accredited investor can finance at the same time. No data measure n directly. I set it to match how startup entry responds to the wealth test. Lindsey and Stein [2026] find that the 2010 redefinition, which removed about a fifth of accredited households, cut new-business entry by about 2%. In the working-paper version, Lindsey and Stein [2020] put angel-backed firms at a tenth or more of new employing businesses. At a tenth, the measured 2% implies a fall of a fifth in investor-backed entry, as large as the fall in the number of accredited investors. A larger share implies a smaller fall, so a fifth is an upper bound. I run the model's counterpart: I raise the wealth test $\bar{w}$ until the inflow of newly accredited investors, Φ_{acc}, falls by a fifth, and I re-solve the equilibrium. Investor-backed entry is $1 - G(z^*)$, the share of potential founders at or above the cutoff. I set n so that the elasticity of investor-backed entry to that inflow,

$$\varepsilon_{\text{acc}} \equiv \frac{\Delta[1 - G(z^*)] \,/\, [1 - G(z^*)]}{\Delta\Phi_{\text{acc}}/\Phi_{\text{acc}}},$$

[23] The fee is capitalized as a perpetuity because a non-founder investor slot that policy funds directly is maintained indefinitely. It is costed in present value, like the permanent increase in capital per deal it is compared with. Results, the per-dollar factor included, depend on the slot price only through the cost ratio ψ_E/c_ι, which it enters through its flow $\rho\psi_E$, the annual fee, so the capitalization convention cancels.

equals one. A smaller entry response would imply a smaller n and a weaker multiplier, so the multiplier reported below is the upper end of what this evidence admits. A second value of n also yields a fall of a fifth, but only because the cut carries the economy out of the regime in which accredited investors are scarce, and it misses the other targets; I take the first (Appendix A.10).

Non-founder slots. Their number M_v^0 is the stock of slots that institutions hold, that policy can add directly, and whose access does not depend on any founder's exit (Section 2.3). It has no data counterpart, so I set it to one. This level is an assumption, and it matters because the multiplier works through the share of vacant slots that founder-investors supply. At this level the non-founder slots alone could not house every match: the bound on primitives $M_v^0 > 1/\tau$ and the non-founder-slot floor of Proposition 5 both fail (Appendix A.2), so existence at the calibration is computed, not proved. The stock of vacant slots is positive at the solved equilibrium.

Search and bargaining. I set the matching efficiency A_m so that founders meet investors at the early-stage meeting rate of Parry [2026], who estimates that rate directly, not a matching function. In Parry's model, search carries no explicit cost. It is costly because a project can fail while it searches, at a hazard he estimates. I set the flow cost κ equal to the resulting expected loss for the average searcher, the hazard times $\mathbb{E}[h_S \mid z \geq z^*]$. The two costs agree on average but fall on different founders. A failure hazard costs each founder in proportion to her value, whereas a flow cost weighs most on the marginal founder, so the flow cost is what produces the cutoff z^*. The Nash weight $\beta = 0.5$ splits the surplus symmetrically, and I set the matching elasticity symmetric with it, $\eta = 0.5$. The idea-quality location $\mu_{\log z}$ and the baseline capital per deal ι_0 are normalizations.

How the quantitative model departs from Section 2.3. The analytic results of Section 3 are proved with one slot per founder-investor and investor exit only during vacancy; every number in Sections 4 and 5 is computed with two changes (Appendix A.10). Each founder-investor supplies n slots, and an investor can leave while its deal is open, which makes δ_I a calendar-time rate. The two regimes keep their definitions, and the values of λ reported below include the channel this adds through the meeting rate $q(\theta)$.

The idea-quality dispersion. One parameter, the dispersion $\sigma_{\log z}$ of log idea quality, is set to a target rather than to data (Table 2, block (i′)): the spread of positive founder claims, the ratio of their 90th percentile to their median, which I set 38.5% below the value in Azevedo et al. [2025]. The reason is uniqueness. Proposition 5(ii) certifies a locally unique equilibrium when both feedback gains, the inner-loop gain Λ_{loop} and the loop gain λ, are below one. The inner-loop gain rises with the dispersion (Table A.2), and the target keeps both loop gains below one.

An untargeted moment. No calibration target involves a certainty equivalent, so the founder's certainty equivalent is an untargeted moment. A founder whose claim has the mean size among founders who search values it at 4.9% of its expected payoff (her certainty equivalent). Most startups fail and pay nothing, and most of the expected value sits in rare large exits. Azevedo et al. [2025, Table 2] give a comparison. Their measure is the largest pay cut a founder accepts to start a startup, as a share of the expected yearly payoff; it also discounts for the random delay before an exit. In the case the authors discuss, with relative risk aversion 0.9 and a worker wage of \$367,212, that share is 16.7%. At relative risk aversion 2 and the same wage, it is 7.6%. Under CARA, relative risk aversion rises in proportion to the founder's claim. It equals $\sigma = 1.5$ at W_E by construction. The expected payoff of her stake exceeds W_E, and at a claim of that size relative risk

Table 2: Calibration.

Parameter	Symbol	Value	Source
(i) Pinned by data and regulation			
Failure probability	π_0	0.84	pinned by Azevedo et al. [2025]
Tail index	α	1.03	pinned by Azevedo et al. [2025]
Wealth unit	U	\$1.98M	set to match the \$7.2M mean founder claim, Azevedo et al. [2025]
Matching efficiency	A_m	3.295	set to match Parry [2026] early-stage meeting rate
Search cost	κ	0.0490	set to match Parry [2026] failure rate
Effective risk aversion	γr	0.535	pinned by Azevedo et al. [2025], Cagetti and De Nardi [2006], Chetty [2006]
Accreditation threshold	$\bar{w}$	0.5041	derived: \$1M/U; \$1M by 17 CFR § 230.501(a)
Slot price	ψ_E	5.480	pinned by Metrick and Yasuda [2010]
Per-deal capital cost	c_ι	9.014	pinned by Metrick and Yasuda [2010]
VC book breadth	n_D	3.91	pinned by Azevedo et al. [2025], Metrick and Yasuda [2010]
Investor exit rate	δ_I	0.087/yr	pinned by Robinson and Sensoy [2016]
Exit hazard (1/fund term)	τ	10.0%/yr	pinned by Metrick and Yasuda [2010], Robinson and Sensoy [2016]
Slots per founder-investor	n	2.893	set to match Lindsey and Stein [2026] elasticity = 1
as a dollar threshold	$\bar{w}U$	\$1M	pinned by 17 CFR § 230.501(a)
(i′) Set to a spread target (not to data)			
Idea-quality dispersion	$\sigma_{\log z}$	1.324	p90/median of founder claims; data value higher, Azevedo et al. [2025]; see §4
(ii) Normalizations			
Idea-quality location	$\mu_{\log z}$	0	normalization
Baseline deal size	ι_0	1	normalization
Public seed	M_v^0	1	normalization
cost ratio (both pinned)	ψ_E/c_ι	0.608	pinned by Metrick and Yasuda [2010]
Interest and discount rate	$r = \rho$	0.04/yr	convention
VC Nash weight	β	0.5	symmetric
Matching elasticity	η	0.5	symmetric
(iii) Robustness axes			
Financier flow cost	c	0.2192	§4
Financier failure atom	π_0^F	founder law	
Tail-index frontier	α	1.03 / 1.18 / 1.80 / 2.10	robustness axis
policy-response panels	α	1.03 / 1.18	robustness axis
Founder atom band	π_0	[0.74, 0.84]	robustness axis
Financier atom sweep	π_0^F	0.59 / 0.74 / 0.84	robustness axis

Dollar amounts in 2025 USD are CPI-U-deflated, not 2025 market levels. Sample windows: Metrick–Yasuda fund vintages 1993–2006 (USD year 1999 assumed; sample fund at the 80th percentile of its vintage); ENRK first rounds 2002–2010 (USD year 2006 assumed); Azevedo et al. founding cohorts 1987–2021 (deflated to 2025 by the authors).

Notes: Baseline values; the text gives sources and targets. No parameter is estimated: every solved object is an output. In block (iii), π_0^F is the failure probability in the payoff law the investor prices; "founder law" means $\pi_0^F = \pi_0$ (Section 2.3). ENRK is Ewens et al. [2018].

aversion is 1.9, so my founder sits near their second case. My certainty-equivalent share, 4.9%, is lower than their pay-cut share, 7.6%. That is the direction their table predicts for a founder with fewer resources, since at each risk aversion their share rises with the worker wage. At relative risk aversion 2 and the lowest worker wage among the scenarios of Hall and Woodward [2010, Table 3], which Azevedo et al. [2025] adopt, their share is 5.1%. Their founder has CRRA preferences, outside wealth and a wage; mine has CARA preferences, and the claim stands in for wealth.

5 Main Results

In every solved calibration in which accredited investors are scarce, a dollar of government spending buys founders more welfare through the non-founder-slot policy, which adds non-founder investor slots by backing new funds, than through the bigger-deal policy. At the calibrated exit sizes, \$1 spent on non-founder slots buys as much founder welfare as about \$7.34 spent on bigger deals. Risk decides the ranking. Startups fail, so a founder values one more dollar of expected payoff at only 0.018, far below the break-even tilt 0.179: these two terms of Proposition 7 alone already rank the policies, and because the break-even tilt is below one, a founder who valued payoff dollars at their mean would prefer bigger deals (Section 5.2). Recycling supplies 52% of the effect of a marginal dollar spent on non-founder slots and 46% of one spent on bigger deals; turning it off lowers the \$7.34 to \$6.54 but does not change the winner (Section 5.3). The lower-threshold and non-founder-slot policies raise exit value through the founders they draw into search and welfare through the equity share (Section 5.4). Undoing bracket creep would shrink the founder-investor pool by two-thirds (Section 5.5). The founders' ranking survives charging a slot the capital of its deals; total welfare, which also counts the matched investor, reverses it at that price (Section 5.6).

5.1 The Exercise

I change one policy at a time, re-solve the whole equilibrium and compare founder welfare per dollar of government spending. Founder welfare W is the certainty-equivalent value of searching, summed over all founders who search. Three objects are free to respond: the equity share s; the value of a vacant slot V_{vac}, which is the price of venture capital in the model; and tightness (vacant slots per searching founder). The payoff law, the distribution of startup payoffs set by the failure probability π_0 and the tail index α, stays fixed as capital per deal moves (Assumption 1).

The exercise moves three policies. Two cost the government money, and I compare them at equal cost; the third costs the government nothing.

The bigger-deal policy raises the capital per deal ι, holding the measure of non-founder investor slots M_v^0 fixed (Proposition 1). Public money works this way when it adds capital to a startup that already has an investor, without adding an investor. The European Investment Fund's European Angels Fund co-invests alongside each selected business angel, pari passu and typically one for one [Gvetadze et al., 2020]. The European Tech Champions Initiative commits public money, 3.75 billion euros initially, to funds that back late-stage growth companies [European Investment Fund, 2023]; with one financing round in the model, a larger late-stage round is a bigger deal. *The non-founder-slot policy* raises M_v^0 at a fixed ι, as public money committed to new venture funds does. Under the State Small Business Credit Initiative, states commit public money to privately managed venture funds, with the aim, among others, of backing new fund managers [U.S. Department of the Treasury, 2024]. Israel's Yozma program invested government money in new venture funds from 1993, 40% of the capital each raised, up to \$8 million [Avnimelech and Teubal, 2003]. The government pays ψ_E to maintain one slot, set to the management fee a fund charges for it, and $c_\iota[1-G(z^*)]/r$ for a permanent unit of capital per deal (Section 3.7). The mapping is approximate.

State programs also invest directly alongside private investors, which works like a bigger deal, and a fund of funds also adds funds, and so slots. Yozma's main incentive was an option for each fund to buy the government's share at cost, plus interest, within five years [Avnimelech and Teubal, 2003]; it raised private investors' upside, which the non-founder-slot policy does not include. Two programs fit neither policy: SBIR grants give small high-tech firms capital without adding an investor [Howell, 2017], and state angel tax credits subsidize each dollar an angel invests; they raise angel investment but have no effect on entrepreneurial activity [Denes et al., 2023]. Rule changes that spend no public money, the 1979 ERISA clarification [Kortum and Lerner, 2000] and NSMIA [Ewens and Farre-Mensa, 2020], also moved the supply of venture capital; they are not the policies compared here. *The lower-threshold policy* lowers the accredited-investor wealth test $\bar{w}$ and so lets more founders who exit become investors; its counterpart is the Reg D accredited-investor definition. The lower-threshold and non-founder-slot policies both work through Proposition 2. The non-founder-slot policy adds investors rather than enlarging their stakes. Right-skewed payoffs lower the price of venture capital V_{vac}, even after the diversification that book breadth n_D, the number of deals one investor holds at once, affords (Proposition 4).

Why slots and deals are separate policies. The two policies buy different inputs, face different ceilings ($\bar{C}$ for the deal, h_M for slots, (20)) and are paid for differently. Backing one startup means a seat in one portfolio startup: the monitoring that one more startup requires (footnote 12). One more slot lowers the price of venture capital. Every searching founder then bargains a larger equity share and meets an investor sooner, and the larger share carries almost all of the effect (Table 7). A bigger deal raises the payoff of a match already made, and failure risk bounds what that payoff is worth to the founder (the risk ceiling, Theorem 1). A slot is priced at the management fee per portfolio startup-year. Limited partners pay this fee for monitoring capacity, and it does not grow with the size of the startup's deal. A bigger deal is paid for in the capital it adds. The non-founder-slot policy's effect per dollar $\mathfrak{g}_E$ (Section 3.7) therefore divides its welfare effect by this fee. Pricing a slot at the fee apart from the capital its deals deploy is a convention, and Section 5.6 drops it. Charging each slot the capital its deals deploy as well lowers the lead of the non-founder-slot policy, the per-dollar factor $\mathfrak{g}_E/\mathfrak{g}_I$, the ratio of the founder-welfare effect per dollar from that policy to that from the bigger-deal policy, but does not reverse the founders' ranking.

The calibrations. A larger tail index α means a thinner tail: fewer very large exits. The exercise is the calibration of Section 4, at the founder exit-tail estimate $\alpha = 1.03$ of Azevedo et al. [2025]. To show what a thinner tail changes, and why, I compare it with $\alpha = 1.18$, that paper's tail estimate for whole-company payoffs, in Section 5.2; the tables report both. Tails thinner than any it measures, $\alpha = 1.8$ and 2.1, enter only the frontier of Table 4, which tests whether the lead depends on a fat tail.

5.2 The Marginal Dollar

At the calibrated ratio of a slot's cost to deal capital, \$1 spent on the non-founder-slot policy buys as much founder welfare as about \$7.34 spent on the bigger-deal policy, at the calibrated exit sizes (tail index $\alpha = 1.03$). It wins at both calibrations of Table 3. Both effects per dollar include the vacancy part and its multiplier.

All of the effect of a dollar spent on non-founder slots is its vacancy part, which the multiplier scales. At the calibrated exit sizes, 48% of a bigger deal's effect is direct, and failure risk bounds that part. Follow one dollar of government spending down each path. Spent on the non-founder-slot policy, it adds to the stock of vacant slots. That lowers the price of venture capital and raises

founders' equity share, and the multiplier $1/(1-\lambda)$ scales all of that effect. In the recycling loop, a founder who succeeds becomes an accredited investor and funds the next founder. One slot added by policy therefore ends up as $1/(1-\lambda)$ slots, where the loop gain λ is the number of further slots that one new slot generates in equilibrium in the first round. Spent on the bigger-deal policy, it raises the payoff of each match. The risk ceiling, the most a risk-averse founder can value one startup, whatever its size, set by the failure probability and her risk aversion, bounds what that payoff is worth to the founder, and the multiplier scales only the deal's vacancy part. With T the vacancy map (26) and $T_x \equiv \partial T/\partial x|_v$ a policy's vacancy shock, the numerator in (27),

$$\frac{dW}{dx} = \underbrace{\frac{\partial W}{\partial x}\Big|_v}_{\text{direct part}} + \underbrace{\frac{\partial W}{\partial v}\frac{T_x}{1-\lambda}}_{\text{vacancy part}}, \qquad T_{M_v^0} = \frac{\tau}{q+\tau}, \quad T_\iota = \frac{\partial_\iota \Phi_{\text{acc}}}{\delta_I} + v_\theta^0\, \theta_\iota|_v. \tag{31}$$

A dollar spent on non-founder slots has no direct part, because M_v^0 enters welfare only through the vacancy stock. A bigger deal has both parts. Its direct part is the larger payoff, valued at the founder's certainty equivalent, with the equity share, the price of VC capital and tightness re-solved at the given stock. Its vacancy part has two sources: the extra exits it lifts past the wealth test ($\partial_\iota \Phi_{\text{acc}} > 0$ at the calibrated rows), and its effect on tightness. Equations (31) and (29) do different jobs. (31) sizes each policy's effect and splits it into direct and vacancy parts. It therefore measures the lead $\mathfrak{g}_E/\mathfrak{g}_I$ (Table 3) and the share of each effect that recycling supplies (Table 5). (29) subtracts the two effects: it nets the deal's vacancy part against that of non-founder slots inside the break-even tilt $\bar{\Xi}^*$, the value a founder would have to place on one more dollar of expected payoff for the two policies to tie. It therefore decides the sign of the lead and names the force that decides it (Table 3).

Risk decides the ranking at the calibrated exit sizes. Dividing (31) by A_I, the direct welfare effect of a bigger deal with the exit valued at its mean, puts both policies in units of the tilt, and (29) compares them (Table 3). Start with the equity share, the price of venture capital and tightness fixed in the deal's direct part, at the given stock of vacant slots, so that $A_s = A_P = 0$. Because startups fail, a founder values one more dollar of expected payoff at only $\overline{\mathbb{E}^Q[\xi]} = 0.018$, and no capital per deal lifts a startup's certainty equivalent above $\bar{C}$ (Theorem 1). The break-even tilt is $\bar{\Xi}^* = 0.179$. Risk alone therefore puts the non-founder-slot policy ahead.

Now let the equity share and the price respond, to first order. With the price and tightness fixed, a bigger deal moves the equity share toward the founder (its share response $A_s > 0$), which works for the bigger-deal policy. Its price-and-congestion response A_P, which lets the price and tightness respond, is larger ($A_P > A_s$ at both calibrations) and works for the non-founder-slot policy: at a fixed stock of vacant slots, a bigger deal raises the price of venture capital, which lowers the equity share, and moves the search cutoff and tightness. In units of the tilt, re-solving the equity share adds A_s/A_I and raises the deal's direct effect from 0.018 to 0.037; the price-and-congestion response A_P/A_I then removes 67% of that 0.037 (neither number is a column of Table 3). That $A_P \geq 0$ holds at every solved equilibrium but is not proved. On net the two responses favor the non-founder-slot policy: they raise the right side of (29) slightly above $\bar{\Xi}^*$ at both calibrations, from the second column of Table 3 to the third. The equity share's response to the stock itself, which carries almost all of the non-founder-slot policy's effect (Table 7), is part of $\partial W/\partial v$ and so already sits in $\bar{\Xi}^*$ (Appendix A.5).

Last, re-solve every response. The total effect lies slightly below that right side, because (29) drops two feedbacks (Appendix A.5). Most of the gap comes from the first: a bigger deal also changes tightness at the given stock, and so the number of non-founder slots left vacant, $v_\theta^0 \theta_\iota|_v$ in

(31). In the second, the equity share responds to the founder's search value and that value to the equity share. The exact $\mathfrak{g}_I$ ranks the policies as (29) does at both calibrations of Table 3. The tilt stays far below all three thresholds (Table 3).

Table 3: The non-founder-slot policy buys more founder welfare per dollar than the bigger-deal policy at both calibrations: the founder's tilt lies far below the break-even tilt, the hurdle and the total effect.

Notes: Every threshold column is in units of the tilt, the share of an extra dollar of expected payoff that the founder values after risk. The first column is the average tilt $\overline{\mathbb{E}^Q[\xi]}$ of a bigger deal's effect. The second is the break-even tilt $\bar{\Xi}^*$, with the equity share, the price of venture capital and tightness fixed in the deal's direct part; their response to the stock of vacant slots enters this column through the vacancy part. The third is the hurdle: the right side of (29) (Section 5.2). The fourth is the total effect: the tilt at which the effects per dollar $\mathfrak{g}_E$ and $\mathfrak{g}_I$ tie, with every response re-solved. $\mathfrak{g}_E/\mathfrak{g}_I$ is the founder-welfare effect per present-value dollar from the non-founder-slot policy divided by that from the bigger-deal policy, with each slot priced at its management fee, at the calibrated cost ratio 0.608 (Section 5.6). It differs from the total effect over the tilt because the total effect subtracts the deal's responses and the vacancies its exits create from $\mathfrak{g}_E$, while $\mathfrak{g}_E/\mathfrak{g}_I$ counts them in $\mathfrak{g}_I$. Verdict: the policy that wins; the non-founder-slot policy wins if and only if the tilt lies below the total effect.

Calibration	tilt $\overline{\mathbb{E}^Q[\xi]}$	fixed s and V_{vac}: $\bar{\Xi}^*$	first order: $\bar{\Xi}^* - A_s/A_I + A_P/A_I$	total effect	$\mathfrak{g}_E/\mathfrak{g}_I$	verdict
$\alpha = 1.03$	0.018	0.179	0.185	0.182	7.34	more financiers
$\alpha = 1.18$	0.030	1.019	1.035	1.025	19.1	more financiers

A thinner tail widens the lead. The per-dollar factor $\mathfrak{g}_E/\mathfrak{g}_I$ is smallest at the calibrated exit sizes, 7.34, and rises as the tail thins (Table 4). The risk ceiling $\bar{C}$ does not move with α; the break-even tilt $\bar{\Xi}^*$ does, from 0.179 to 1.019 at $\alpha = 1.18$, above one: there the non-founder-slot policy would win even if founders valued payoff dollars at their mean. Net vacancy creation moves most, from 0.225 to 0.690: more founders search, so each unit of capital per deal costs more, and vacancies outgrow searching founders, so tightness rises and each slot stays vacant longer. The deal's accreditation response, the second term of net vacancy creation, is positive and far smaller than the first, the more so at the thinner tail, where more winners already pass the wealth test. The multiplier rises from 2.11 to 4.29, because a thinner tail lets more successful founders pass the wealth test; of the two ways the deal's own winners cut (Section 3.7), the multiplier wins (Appendix A.9). The price of a vacancy, $(\partial W/\partial v)/A_I$ in (29) and not the vacancy value V_{vac} of Table 4, falls slightly, from 0.377 to 0.344. A bigger deal's effect shifts toward its vacancy part: the direct part of (31) falls from 48% of the effect to 25%, mainly because the multiplier, which scales only the vacancy part, doubles. The tail thus moves the lead mainly through who searches and who passes the wealth test, the channels behind net vacancy creation and the multiplier. At every frontier row accredited investors are scarce and the non-founder-slot policy wins.

Recycling decides whether $\bar{\Xi}^*$ exceeds one at $\alpha = 1.18$. With the founder-investor pool $\Phi_{\text{acc}}/\delta_I$ held at its baseline size (frozen, Section 5.3), $\bar{\Xi}^*$ is 0.092 at the calibrated exit sizes and 0.255 at $\alpha = 1.18$. In the per-dollar factor, recycling is a minor force up to $\alpha = 1.18$: with the pool frozen the factor rises nearly as much, from 6.54 to 15.8 (Table 4). From $\alpha = 1.18$ to 1.8 recycling decides the rise: with the pool frozen the factor falls, from 15.8 to 13.8.

5.3 What Recycling Contributes

Against a frozen pool, recycling widens the non-founder-slot policy's lead. Recycling multiplies the vacancy part of (31) and leaves the direct part alone. Freezing the pool $\Phi_{\text{acc}}/\delta_I$ splits

Table 4: The non-founder-slot policy buys more founder welfare per dollar than the bigger-deal policy (per-dollar factor above one) at every tail index. Accredited investors are scarce at every index.

Notes: $\bar{s}_{\mathrm{p}}$ is the founder's equity share averaged over founders who search. Levels are in model wealth units. Upper panel: the Azevedo et al. [2025] tail estimates (1.03 is the founder estimate, 1.18 the estimate for whole-company payoffs); lower panel: hypothetical.

tail index α	vacancy value V_{vac}	multiplier $1/(1-\lambda)$	founder share $\bar{s}_{\mathrm{p}}$	per-dollar factor $\mathfrak{g}_E/\mathfrak{g}_I$	factor, founder-investor pool frozen
Measured tails					
1.03	0.243	2.11	0.416	7.34	6.54
1.18	0.460	4.29	0.428	19.1	15.8
Hypothetical thinner tails ($\alpha \geq 1.8$)					
1.80	0.597	6.52	0.418	35.7	13.8
2.10	0.619	6.75	0.411	37.5	12.6

each effect into three parts:

$$\frac{dW}{dx} = \underbrace{\frac{\partial W}{\partial x}\Big|_{v}}_{\text{direct part}} + \underbrace{\frac{\partial W}{\partial v}\frac{dv}{dx}\Big|_{\Phi_{\mathrm{acc}}\ \text{fixed}}}_{\text{vacancy part, pool frozen}} + \underbrace{\frac{\partial W}{\partial v}\Big(\frac{dv}{dx} - \frac{dv}{dx}\Big|_{\Phi_{\mathrm{acc}}\ \text{fixed}}\Big)}_{\text{recycling}}, \tag{32}$$

with $dv/dx|_{\Phi_{\mathrm{acc}}\ \text{fixed}}$ from (38). The second part is what remains with the pool frozen: the multiplier falls to $1/(1-\lambda_0)$, and the deal's shock keeps only its effect on tightness. The third is what recycling adds. Non-founder slots have no first part. The breakdown freezes the pool first, so the shares are nested. At the calibrated exit sizes and at the margin, recycling supplies 52% of the effect of a dollar spent on non-founder slots and 46% of the effect of a dollar spent on the bigger-deal policy (Table 5). The two shares are close for different reasons. For non-founder slots recycling only amplifies: the recycling loop scales their whole effect 2.07-fold (below the multiplier 2.11 because a frozen pool still keeps λ_0, the non-founder slots' part of the loop gain, Appendix A.9), so recycling supplies $1-1/2.07$, or 52%, of it. For a bigger deal recycling also adds a vacancy shock: larger exits lift more founders past the wealth test, which a frozen pool rules out. With the pool frozen, 89% of the deal's effect is direct and the rest runs through tightness. Recycling leaves the direct part alone and multiplies the rest 8.86-fold, the product of two factors: the recycling loop scales it 2.07-fold, as it scales non-founder slots, and the accreditation response adds 3.28 times the tightness shock, a factor $1+3.28$. The deal's whole effect therefore rises 1.84-fold, and recycling supplies $1-1/1.84$, or 46%, of it. Recycling therefore supplies a large share of each policy's effect in (31), but it does not change which policy wins. In (29) it enters only through $\bar{\Xi}^*$, as the multiplier on the non-founder slots' vacancies net of those the deal itself recycles ($\partial_\iota \Phi_{\mathrm{acc}}/\delta_I$). The deal's direct part lies below $\bar{\Xi}^*$ with or without recycling, so the verdict does not change. A policymaker who ignores recycling, holding $\Phi_{\mathrm{acc}}/\delta_I$ at its baseline, therefore understates the lead but picks the right policy at every tail index: at the calibrated exit sizes the per-dollar factor with the pool frozen is 6.54 against the true 7.34.

Counting the matched investor shrinks the lead.

Definition 2 (Total welfare)**.** Proposition 7 ranks the policies for *founder* welfare $W = \int_{z^*} h_S \, dG$. *Total* welfare is $W^{\mathrm{tot}} = \int_{z^*} (h_S + h_M^F) \, dG$: for each type of founder who searches, the searching

founder's value plus the matched investor's value, with the equity share at its bargained value s^*. It sums over founder types, valuing each founder when she searches and each investor when matched; it excludes the stock of vacant slots and the policy's own costs. The investor's matched value h_M^F includes part of the vacancy value V_{vac}, $\tau V_{\text{vac}}/(\rho+\tau)$; total welfare that counts only the investor's gain from the current deal leaves it out, $W^{\text{net}} = W^{\text{tot}} - \int_{z^*} \tau V_{\text{vac}}/(\rho+\tau)\, dG$, and W^{tot} is gross total welfare.

Adding the investor's value changes both policies' effects, so I compute the ranking for W^{tot} rather than derive it from Proposition 7. When the matched investor's value is counted as well (Definition 2), a check on whether founders' gains are a cross-subsidy from investors, the non-founder-slot policy still wins at the fee price, but its lead shrinks from 7.34 to 2.83 in gross total welfare, and to 3.97 when only the investor's gain from the current deal counts (Table 5). Unlike founder welfare, total welfare has no envelope property: the investor matched with a founder whom a policy draws into search is worth at least the vacancy value V_{vac}, so each such founder adds a whole matched value to W^{tot}, though nothing to W at first order. Non-founder slots lower V_{vac} (Lemma 3) and raise the equity share (Proposition 3); both take from the investors already matched, so what investors gain from the non-founder-slot policy comes through the founders it draws into search. The founder stakes the whole startup and values an extra dollar of expected payoff only at the tilt (Proposition 1); the investor holds a book of n_D startups and values its share $1-s$ of a bigger exit with less of that discount (6). A bigger deal also raises the price of venture capital V_{vac}, part of which enters the matched investor's value; that component is a far larger part of a bigger deal's total-welfare effect than of the non-founder slots', so the lead is larger when only the investor's gain from the current deal counts. Counting the investor therefore restores much of the value of a bigger deal that failure risk removes for the founder: the investor takes 81% of a bigger deal's total-welfare effect, against 51% of the effect of the non-founder-slot policy.

Other measures of welfare. Counted in founders who search, $1-G(z^*)$, the ranking holds: at the fee price, \$1 spent on the non-founder-slot policy draws about 20.6 times as many founders into search as \$1 spent on the bigger-deal policy. Exit value V_{exit} (Section 3.7), the measure practitioners report, makes the bigger-deal policy look better relative to the non-founder-slot policy than founder welfare does. It values each deal at its full size and ignores the risk ceiling $\bar{C}$, and it misses the larger equity share that the non-founder-slot policy gives founders already searching (Section 5.4). Welfare, not exit value, is the right measure for judging policy.

Table 5: Holding the founder-investor pool fixed understates the lead of the non-founder-slot policy at every row, and that policy also leads on total welfare.

Notes: Columns: the per-dollar factor $\mathfrak{g}_E/\mathfrak{g}_I$ with recycling and with the founder-investor pool $\Phi_{\text{acc}}/\delta_I$ frozen, at the fee-based slot price (Section 5.6); recycling's share of each policy's effect, the last term of (32) over dW/dx; the same factor for gross total welfare W^{tot} and for total welfare that counts only the investor's gain from the current deal (Definition 2). A factor above one favors the non-founder-slot policy.

	fee-priced factor $\mathfrak{g}_E/\mathfrak{g}_I$		recycling share of gain		total welfare	
Calibration	with recycling	recycling ignored (frozen pool)	more financiers	bigger deals	$\mathfrak{g}_E^{\text{tot}}/\mathfrak{g}_I^{\text{tot}}$	net of the carried rent $\mathfrak{g}_E^{\text{net}}/\mathfrak{g}_I^{\text{net}}$
$\alpha = 1.03$	7.34	6.54	52%	46%	2.83	3.97
$\alpha = 1.18$	19.1	15.8	76%	71%	4.28	7.28

Table 6: Removing the founder-investor pool lowers aggregate exit value by 31.4% and the level of founder welfare by 53.0% at the calibrated exit sizes, and by more at $\alpha = 1.18$.
Notes: Each calibration is re-solved with the founder-investor pool removed, so supply is the non-founder slots alone. Columns: the share of aggregate realized exit value lost, $1 - V^0_{\text{exit}}/V_{\text{exit}}$, the same share of founder welfare W, and the share of that welfare loss borne by founders who stop searching.

	share lost without recycling		
Calibration	exit value (V_{exit})	founder welfare (W)	welfare loss from founders who stop searching
$\alpha = 1.03$	31.4%	53.0%	60.9%
$\alpha = 1.18$	43.2%	76.6%	89.1%

Removing the founder-investor pool. Removing the pool $\Phi_{\text{acc}}/\delta_I$ limits supply to the exogenous non-founder slots, $v = v^0(\theta)$. It lowers exit value and founder welfare, and welfare by more (Table 6). The reason is that recycling works by adding investors, and exit value registers their effect only through the founders drawn into search. Founders who stop searching bear 60.9% of the welfare loss from removing the pool at the calibrated exit sizes (Table 6).

5.4 The Full Exercise

Per dollar of government spending, the non-founder-slot policy raises founder welfare by more than the bigger-deal policy. For the same percentage increase, though, the bigger-deal policy moves welfare and exit value most. I move each policy by 5% both ways and re-solve the equilibrium. A promoting change raises the number of founders who search and the exit value their startups create; a restricting change is its reverse. Section 5.2 ranks the marginal dollar; these finite changes also record exit value and the count of founders who search. The changes cost different amounts, so the responses describe each policy and the costs rank them.

Every change moves all three outcomes in the same direction. Every promoting change raises founder welfare, exit value and the count of founders who search, and every restricting change lowers all three. This holds at both tails, and no change takes the economy out of the investor-scarce regime, in which accredited investors are scarce (Table 7; the restricting changes are in Table A.4). For the same percentage change, the bigger-deal policy moves founder welfare and exit value most. This does not contradict the per-dollar ranking: a 5% rise in capital per deal costs the government far more than a 5% rise in non-founder slots (below). The risk ceiling limits how much of the bigger-deal policy's larger exits reaches founders as welfare.

The lower-threshold and non-founder-slot policies raise exit value through new entrants and welfare through the equity share. These policies raise exit value almost entirely by drawing founders into search, and raise welfare almost entirely for founders already searching (Table 7). Founders whom a change draws into search, or pushes out of it, account for 99.8% of the exit-value response to the lower-threshold policy and 99.8% of the response to the non-founder-slot policy at $\alpha = 1.03$. They account for 12.0% of the response to the bigger-deal policy, and for at most 6.6% of the welfare response to any single policy's 5% change (Table A.4). The marginal founder is nearly indifferent between searching and staying out. By the envelope theorem, drawing her in therefore adds a whole deal to exit value but almost nothing to welfare. Almost all of the welfare effect of these two policies reaches founders through a larger equity share s^*; the matching channel is very small next to it. A cheaper supply of venture capital raises the equity share on every

Table 7: The lower-threshold and non-founder-slot policies raise exit value by drawing founders into search and raise welfare through the equity share; the bigger-deal policy raises both mainly through capital per deal.

Notes: Each policy is moved by 5% in the promoting direction, which raises the number of founders who search and exit value, and the equilibrium is re-solved. The last row of each panel scales the bigger-deal policy to the cost to the government of the non-founder-slot policy, at baseline participation. ΔW, ΔV_{exit}, $\Delta(1-G(z^*))$: changes in founder welfare, aggregate exit value and the mass of founders who search, in % of their baseline values. New entrants: the share of ΔW or ΔV_{exit} that comes from founders whose search decision the change alters, valued where they search. Via s^* and via capital per deal: for founders who search in both equilibria, the shares of their welfare change that come from the equity share s^* and from capital per deal, changed one at a time after the meeting rate, whose share is the remainder. Recycling: the last term of (32) as a share of ΔW, and the same term for V_{exit} as a share of ΔV_{exit}. Panel headers give the multiplier before the change. Per $: exit value, or certainty-equivalent founder welfare, per year per dollar of government spending per year, in steady state, at the fee-based slot price; the lower-threshold policy costs the government nothing. Table A.4 reports the restricting changes and both slot prices (Section 5.6).

	what the change does			new entrants (% of)		recycling (% of)		searching founders' ΔW via (%)		per $ (fee)	
lever and change	ΔW (%)	ΔV_{exit} (%)	$\Delta(1-G(z^*))$ (%)	ΔW	ΔV_{exit}	ΔW	ΔV_{exit}	s^*	ι	exit value	welfare (CE $)
$\alpha = 1.03$ (multiplier $1/(1-\lambda) = 2.11$)											
accreditation bar, $\bar{w} - 5\%$	+2.01	+0.89	+2.65	2.6	99.8	100.0	100.0	98	0	—	—
seeded slots, $M_v^0 + 5\%$	+2.90	+1.28	+3.84	3.8	99.8	51.2	50.9	98	0	1.48	0.0531
capital per deal, $\iota + 5\%$	+4.15	+5.70	+1.93	0.7	12.0	46.8	15.5	22	71	0.629	0.00727
capital per deal, $\iota + 0.48\%$ (same cost as seeded slots)	+0.40	+0.55	+0.19	0.1	11.7	45.9	15.1	23	71	0.627	0.00731
$\alpha = 1.18$ (multiplier $1/(1-\lambda) = 4.29$)											
accreditation bar, $\bar{w} - 5\%$	+1.88	+0.53	+2.22	4.1	99.0	100.0	100.0	97	0	—	—
seeded slots, $M_v^0 + 5\%$	+2.94	+0.82	+3.46	6.2	99.0	75.4	75.0	97	0	1.14	0.176
capital per deal, $\iota + 5\%$	+2.96	+5.42	+1.60	1.5	7.4	70.7	11.3	39	56	0.388	0.00915
capital per deal, $\iota + 0.26\%$ (same cost as seeded slots)	+0.16	+0.28	+0.08	0.1	7.3	70.6	11.2	40	55	0.388	0.00931

deal, while faster matching only shortens a wait that is already short (Table 7). The bigger-deal policy works on founders already searching, mainly through capital per deal. Recycling carries part of every change's welfare effect, and all of the lower-threshold policy's, because the wealth test decides which exits turn founders into investors. Recycling carries 51.2% of the welfare effect of the 5% non-founder-slot policy and 46.8% of that from the bigger-deal policy at $\alpha = 1.03$. It scales both policies; it does not rank them (Section 5.3). It carries only 15.5% of the exit-value response to the bigger-deal policy. The envelope argument is local: removing the pool moves the search cutoff far enough that the founders who stop searching bear part of the welfare loss (Table 6).

Per dollar of government spending a year, the non-founder-slot policy raises founder welfare more. It does so at both slot prices, the management fee and the capital-inclusive price of Section 5.6 (Table A.4). At the fee price it also creates more exit value: 1.48 dollars a year against 0.627 for the bigger-deal policy at equal cost at $\alpha = 1.03$ (Table 7). At $\alpha = 1.18$ the non-founder-slot policy's welfare effect barely changes, 2.94% against 2.90%, while the bigger deal's falls, 2.96% against 4.15%, and more of it runs through recycling. Per dollar, both policies create less exit value, because more founders with smaller startups search: each founder a non-founder slot draws in brings a smaller deal, and a bigger deal is paid for every extra searcher. Both create more founder welfare per dollar, because a thinner tail lowers the risk discount (12) and leaves each deal's mean exit unchanged, since the payoff law has unit mean. At the cost to the government of the 5% non-founder-slot policy, the bigger-deal policy is a 0.48% increase in capital per deal and draws only 0.19% more founders into search, against 3.84% for the non-founder-slot policy (Table 7). Each dollar of government spending a year on non-founder slots therefore adds more than a dollar of exit value a year at the fee price. The lower-threshold policy costs the government nothing.

I compare each cohort's effect with each year's government spending, in steady state. Founder welfare W and exit value V_{exit} are measured per cohort of founders, one year's entering founders, while a permanent increase is paid for every year. Set against the increase's present-value cost, one cohort's effect would leave out every later cohort. It would understate each increase's effect per dollar by a factor equal to the discount rate. This choice leaves the ranking of the policies unchanged, but it decides whether an increase creates more than it costs. While the founder-investor pool builds up, the effect is smaller.

Responses are close to linear, and the non-founder-slot and lower-threshold policies reinforce each other. Restricting changes nearly mirror promoting ones, so the local responses are close to linear. At the cost of the 5% non-founder-slot policy, the bigger-deal policy raises founder welfare by 0.40%, against 2.90% for that policy, at $\alpha = 1.03$ (Table 7). That is 0.0531 certainty-equivalent dollars of founder welfare a year per dollar of annual government spending against 0.00731, close to the marginal factor 7.34 (Table 3); the same holds at $\alpha = 1.18$. At both tails a higher wealth test costs less welfare than a lower one adds, while fewer non-founder slots or smaller deals cost more welfare than the same promoting change adds (Table A.4). The non-founder-slot and lower-threshold policies together add slightly more founder welfare than the two add separately, because a lower wealth test raises the multiplier that scales the non-founder slots. For a 5% change in each, the extra effect is 0.038 percentage points of W at $\alpha = 1.03$.

5.5 Fewer Founder-Investors: Undoing Bracket Creep

Undoing bracket creep would shrink the founder-investor pool by two-thirds. The accreditation thresholds set in 1982 were never indexed to inflation. The wealth test $\bar{w}$ has therefore fallen in real terms for four decades, and the share of households that qualify as accredited investors has risen (Figure 1). This erosion of the fixed wealth test accounts for 77% of that rise from 1983 to 2022 [U.S. Securities and Exchange Commission, 2023]. Undoing the creep in the model means raising $\bar{w}$ to its CPI-indexed 1982 level, 3.34 times the statutory value. That is far outside the local 5% change of Table 7. Solved at the baseline calibration with nothing else re-set, the economy stays investor-scarce: accredited investors remain scarce. Fewer founders pass the higher wealth test, so fewer become investors. Relative to the baseline, the founder-investor pool changes by −65.7%, the multiplier $1/(1-\lambda)$ falls from 2.11 to 1.42, the mass of founders who search falls by 39.8%, and founder welfare changes by −32.6% (Table 8).

Holding founders' payoffs fixed, indexing cuts the inflow of newly accredited founders by 50%. Re-counting 2022 households at the indexed thresholds, U.S. Securities and Exchange Commission [2023] finds that the share who would qualify falls by 69%, from 18.5% to 5.7%. A smaller fall among founders is what one would expect if their payoffs sit further above the wealth test than household wealth does. In the steady state, where fewer founders also search, the model's fall in the inflow of newly accredited founders grows to 64.8%. The two counts cover different populations and horizons, and indexing may also change how fast households accumulate wealth. They therefore speak to the size of the response, not its exact value. Lindsey and Stein [2026] use Dodd–Frank's 2010 exclusion of home equity, which removed about a fifth of accredited households, as a one-time shock to the pool of accredited investors; the response of investor-backed entry it produced is the calibration target of Section 4. In the model, the counterpart is a rise in $\bar{w}$ of about half, which cuts the founders who search by about a fifth; there founder welfare falls by 13.8% and exit value by 6.6% (Table 8). Most households that bracket creep admits are not founders and lie outside the model. Inside the model, a lower real $\bar{w}$ lets founders with smaller exits qualify as accredited investors.

Table 8: Indexing the wealth test to inflation: a large change solved from the baseline calibration

Threshold	Regime	$1/(1-\lambda)$	Δv (%)	Δ pool (%)	$\Delta(1-G(z^*))$ (%)	ΔW (%)	ΔV_{exit} (%)	new entrants (%) of ΔW	of ΔV_{exit}
$1.00\,\bar{w}$	pool	2.11	+0.0	+0.0	+0.0	+0.0	+0.0	—	—
$1.50\,\bar{w}$	pool	1.80	−18.4	−29.4	−17.6	−13.8	−6.6	17.8	99.8
$2.00\,\bar{w}$	pool	1.63	−28.4	−45.2	−27.2	−21.7	−10.8	27.3	99.8
$2.50\,\bar{w}$	pool	1.53	−34.7	−55.2	−33.3	−26.9	−13.8	33.3	99.8
$3.34\,\bar{w}$ (CPI-indexed)	pool	1.42	−41.4	−65.7	−39.8	−32.6	−17.2	39.7	99.8

Changes are relative to the first row (the baseline calibration). Columns as in Table 7; v: stock of vacant slots; pool: vacant slots held by founder-investors; $1-G(z^*)$: mass of founders who search; regime "pool": accredited investors are scarce. In every row that scales $\bar{w}$ the supply response is all of ΔW, and all of it runs through recycling: with the stock v or the founder-investor pool held at the baseline, scaling $\bar{w}$ leaves W unchanged.

5.6 Robustness Checks

Section 5.2 ranks the policies by founder welfare and prices a slot at its management fee, which fee data determine (Section 4). This section checks the ranking under a second slot price, which also charges a slot the capital its deals deploy. Founders prefer the non-founder-slot policy at both slot prices; at the second, exit value and total welfare prefer the bigger-deal policy at the calibrated exit sizes. Last, I vary the calibrated values and locate where accredited investors stop being scarce.

Slot prices. Section 3.7 (Appendix A.5) sets each policy's welfare effect against its present-value cost. A non-founder slot costs ψ_E, and a permanent rise in capital per deal costs $c_\iota[1-G(z^*)]/r$, where c_ι is the capital each deal needs per unit of ι. The ratio of the two effects per dollar is therefore

$$\frac{\mathfrak{g}_E}{\mathfrak{g}_I} = \frac{dW/dM_v^0}{dW/d\iota} \cdot \frac{c_\iota[1-G(z^*)]}{r\,\psi_E}.$$

Capital has no claim on the exit value X and sits outside the bargaining, so c_ι enters no equilibrium condition. The fee enters only through the flow cost of a vacant slot, $c = \rho\psi_E$, which I hold at its calibrated value. The gradients and the cutoff z^* are therefore the same for every value of the cost ratio ψ_E/c_ι, and the per-dollar factor is inversely proportional to it. Fee data set the ratio to 0.608 [Metrick and Yasuda, 2010], shared by every solved row. At the top of the fee band (Section 4), 0.67, the factor is 6.6. Reading c_ι as first-round capital only raises the ratio, but the factor at the fee price stays above one.

The fee charges a non-founder slot for the seat, the manager's fee, but not for the capital invested in the startups the slot finances, while the bigger-deal policy is charged the capital it adds to every deal. The capital-inclusive price charges a slot the capital of its own deals: a slot finances one deal at a time, and a new one after each deal resolves, and each deal needs the baseline capital $c_\iota\iota_0$. Charging that stream of capital, discounted at r as the capital of the bigger-deal policy is, raises the slot price 5.0-fold and divides the per-dollar factor $\mathfrak{g}_E/\mathfrak{g}_I$ by the same multiple, to 1.46. The fee price and the capital-inclusive price charge none and all of the capital of the slot's own deals. The non-founder-slot policy still wins. With the founder-investor pool frozen the factor is 1.30, so ignoring recycling picks the same policy at either price. Counted in founders who search, \$1 spent on the non-founder-slot policy draws about 4.1 times as many founders into search as \$1 spent on the bigger-deal policy at this price. Exit value reverses the ranking: per dollar, the non-founder-slot policy creates 0.294 dollars of exit value a year, against 0.627 for the bigger-deal policy at equal cost (Table A.4). So does gross total welfare (Section 5.3): its per-dollar factor is 0.56,

and 0.79 when only the investor's gain from the current deal counts. With the founder-investor pool frozen, the gross factor is 0.33, so recycling narrows the reversal rather than creating it. At $\alpha = 1.18$ the gross factor is 0.86 (0.25 with the pool frozen), but 1.47 when only the investor's gain from the current deal counts, so there the non-founder-slot policy wins on that count. The case for the non-founder-slot policy rests on the founders' undiversified risk. It holds for a program judged by the welfare of the founders it finances. It reverses for a program that also counts investors' returns and pays the full capital of the funds it backs.

The ranking also rests on the expected payoff being linear in capital. If the capital elasticity of the expected payoff, $\partial \ln m / \partial \ln \iota$, is the same for every idea, the non-founder-slot policy stays ahead unless that elasticity exceeds 7.34 at the fee price (1.46 at the capital-inclusive price).

Other calibrated values. Per dollar at the fee-based slot price, the non-founder-slot policy gives founders more welfare than the bigger-deal policy wherever accredited investors are scarce. At $\alpha = 1.03$ they are scarce at every book breadth n_D in Table A.1, the undiversified investor included; in all 400 sampling draws of the payoff law (α, π_0); and in all 17 scenarios that change one calibrated constant and hold the others at the baseline, the baseline itself included (Appendix A.8). Across those scenarios the ratio $\mathfrak{g}_E/\mathfrak{g}_I$ of the two policies' welfare effects per dollar runs from 4.6 to 8.7; across the sampling draws it lies between 5.56 and 8.73 (median 7.30; 95% interval). At $\alpha = 1.18$ it runs from 15.2 to 26.3 over the 16 of 17 scenarios in which accredited investors are scarce. In the remaining one, slower investor exit, the price of venture capital limits supply instead.

Scarcity has a limit. If the price of venture capital V_{vac} falls to R, the value to an accredited investor of holding the capital risk-free, the price rather than the number of accredited investors limits supply. A supply push then displaces private capital and the multiplier is off (Proposition 6). Past episodes suggest supply pushes can land there: when fund inflows doubled, valuations rose 7–21% rather than deal counts [Gompers and Lerner, 2000], and Canada's tax-subsidized labour-sponsored funds crowded out private venture capital [Cumming and MacIntosh, 2006]. Non-founder slots are far from this limit: the price reaches R only when the number of non-founder slots M_v^0 is 4.03 times its calibrated level. A higher slot count n (slots per accredited investor) and slower investor exit move the market toward it (Table A.2). The calibrated slot count matches the response of investor-backed entry to the accredited pool that the evidence admits (Section 4); a smaller response would give a smaller n, a smaller multiplier and a market further from the limit.

Along those two changes, gross total welfare (Definition 2) comes to favor the bigger-deal policy per dollar at the fee price before accredited investors stop being scarce, while founder welfare still favors the non-founder-slot policy. Founder welfare favors the bigger-deal policy only outside the risk-aversion grid of Table A.2, for a founder rich enough to be nearly risk-neutral over the startup (Appendix A.5).

6 Conclusion

Per dollar of government spending, the non-founder-slot policy does more for founders than the bigger-deal policy. Founders whose exits clear the accredited-investor wealth test become the next investors. Where accredited investors are scarce, mainly through this recycling loop, each vacancy a policy adds multiplies into 2.11 vacancies, counting itself. The model also comes close to a moment its calibration does not target. A founder whose claim has the mean size among founders who search values her stake at 4.9% of its expected payoff, just below the 5.1% that Azevedo et al. [2025] imply at similar risk aversion and the lowest outside wage in their scenarios.

Three features give the non-founder-slot policy that edge. The first is the multiplier, which

scales the whole effect of a non-founder slot but only the part of a bigger deal's effect that works through vacancies. The second is how far a policy dollar reaches. A vacancy is shared, raising every searcher's chance of a match, while a deal dollar reaches one founder, so the government pays for a bigger deal once for every founder who matches. The third is the risk ceiling. Because most startups fail, an undiversified founder values any single startup at a bounded amount however large the deal, so each further increase in capital per deal adds less. Which policy leads turns on risk aversion and the failure probability through the ceiling, on the wealth test and the exit tail through the multiplier, and on the relative cost of the two policies. A policy that increases non-founder slots by 5% raises founder welfare by 2.90%, 51.2% of it through the recycling loop, and draws 3.84% more founders into search. An equal-cost policy that increases capital per deal by 0.48% raises welfare by only 0.40%, 45.9% of it through the recycling loop, and draws only 0.19% more. The two policies raise exit value by 1.28% and 0.55% (50.9% and 15.1% of each through the recycling loop). Per dollar spent a year at these sizes, with slots priced at the management fee, the non-founder-slot policy adds $1.48 of exit value a year, against $0.63 for the bigger-deal policy (Table 7), so only the non-founder-slot policy creates more exit value than it costs.

Welfare and exit value respond to different groups of founders. Founders whom the non-founder-slot policy moves from their outside option into search account for 99.8% of its exit-value gain but only 3.8% of its welfare gain. Their welfare share is small by the envelope property: they were nearly indifferent between searching and staying out, so each adds a whole deal to exit value but almost nothing to welfare. Their exit-value share is large because founders who were already searching add little exit value: faster matching only shortens a wait that is already short, and exit value ignores the larger equity share through which cheaper venture capital gives them almost all of their welfare gain (Table 7). The equal-cost bigger-deal policy draws few founders in, and they account for only 11.7% of its exit-value gain and 0.1% of its welfare gain. Exit value also ignores risk: it counts each deal at its full size, while a risk-averse founder values a mean-size stake at only 4.9% of its expected payoff.

The lower-threshold policy costs the government nothing. By lowering the wealth test, which decides which exits turn founders into investors, it also adds investors and strengthens the multiplier. Inflation has eroded the wealth test for four decades: the dollar thresholds set in 1982 were never indexed, so ever more founders' exits clear it and join the founder-investor pool. Restoring the wealth test's real value at its 1982 adoption, a revision the SEC has studied [U.S. Securities and Exchange Commission, 2023], would shrink the founder-investor pool by two-thirds and cut the multiplier from 2.11 to 1.42. The number of founders who search would fall by 39.8%, and founder welfare by a third (Table 8). Founders who no longer search would bear 39.7% of that loss. The rest would fall on founders who still search, mainly through a smaller equity share as the price of VC capital rises.

A Proofs and Derivations

This appendix gives the formal arguments behind the separability of CARA values (Lemma 1 and the exact recursions (13)), Proposition 5, Theorem 1, and Propositions 6 and 7. Proposition 4, Lemma 3 and Corollary 1 are proved in Appendix A.1, Appendix A.4 and Appendix A.5, respectively. Appendix A.1 also derives the exact more-investors gradient $\partial h_S/\partial p$ behind Proposition 2 and proves Proposition 1 and Lemma 2. Appendix A.6 proves Proposition 3. For reading alongside the main text, it also restates the proofs of Lemma 1 and Proposition 5, whose full versions are in Appendix A.1 and Appendix A.2, and it points to Appendix A.3 for Theorem 1. Lemma 4 and Remark 2 are stated and used in Appendix A.2. Throughout, the equilibrium objects are those of

Definition 1 and the closed forms of Lemma 2 are used freely.

Three conventions hold throughout. The discount rate equals the risk-free rate, $\rho = r$: r is written on the exact recursions and the annuity terms of the budget, ρ on the leading-order forms. The closed forms and the quantitative model leave the accreditation option unpriced: founders do not value it, so $\mathrm{CE}_{\mathrm{acc}} = \mathrm{CE}$ (footnote 15); conditions stated with the option priced cover the general case. Assumption 1 holds the tail index α fixed. Four further objects recur below: the option-corrected certainty equivalent $\mathrm{CE}_{\mathrm{acc}} \equiv \mathrm{CE} + \Delta\,\mathrm{CE}$, the accreditation probability $S_{\mathrm{acc}}(z) \equiv \Pr\left(s^*(z)\, m(z;\iota)\, \xi \geq \bar{w}\right)$ that a type-z exit makes the founder pass the accredited-investor wealth test $\bar{w}$, the Laplace transform $\mathcal{L}_P$ of the Pareto branch (so that $\mathcal{L}_\xi = \pi_0 + (1-\pi_0)\mathcal{L}_P$), and the match surpluses $\sigma_E \equiv h_M - h_S$ (the gap Δ_S of (13), written Δ in Appendix A.1) and $\sigma_F \equiv h_M^F - V_{\mathrm{vac}}$.

The effective stake (7) has no counterpart in the standard labor search model, where the match surplus is transferable and risk plays no role. It is the single index through which undiversified *payoff* risk enters (the timing risk of (13) is priced by $\gamma r \Delta$). Three stake thresholds derive from it: b^*, the crossing stake at which the non-founder-slot policy and the bigger-deal policy give the same welfare effect per dollar of government spending inside the tilt-only benchmark; $\hat{b}$, the tilt-equivalent stake, the single effective stake that, held by every founder, reproduces the economy's average tilt (both defined before Corollary 1, the benchmark in Remark 3); and $\bar{b}$, the large-stake threshold beyond which the non-founder-slot policy provably gives the larger welfare effect per dollar of government spending (Appendix A.5).

A.1 The Exact Value Functions and How Payoff Risk Moves the Certainty Equivalent (Lemma 1, Proposition 4)

This subsection derives the exact recursions (13) behind Lemma 1 and the exact more-investors gradient behind Proposition 2, shows how the certainty equivalent moves with the failure probability π_0 and the tail index α (the survival-function crossings behind (12)), and proves Proposition 4.

Value function and consumption. In state ς the agent solves the CARA consumption–savings problem with flow utility $u(c) = -\frac{1}{\gamma}e^{-\gamma c}$, budget $dw = (rw - c - f_\varsigma)\,dt$ (flow cost $f_S = \kappa$, $f_M = 0$), discount $\rho = r$, and Poisson transitions. Guess $V_\varsigma(w) = -\frac{1}{\gamma r}e^{-\gamma r(w+h_\varsigma)}$ as in (9); then $V_\varsigma'(w) = e^{-\gamma r(w+h_\varsigma)}$, and the consumption first-order condition $u'(c) = V_\varsigma'(w)$ gives $c^* = r(w + h_\varsigma)$ — the agent annuitizes certainty-equivalent wealth. The curvature $-V_\varsigma''/V_\varsigma' = \gamma r$ is the effective absolute risk aversion on wealth lotteries, so an added wealth lottery L has certainty equivalent $\mathrm{CE}(L) = -\frac{1}{\gamma r}\log \mathbb{E}[e^{-\gamma r L}]$ (coefficient γr, not γ); this is the operator behind (10).

Exact recursions. In the searching state S (jump to M at rate p) the HJB is

$$rV_S(w) = u(c^*) + V_S'(w)\,(rw - c^* - \kappa) + p\big[V_M(w) - V_S(w)\big].$$

With $c^* = r(w+h_S)$, $u(c^*) = -\frac{1}{\gamma}e^{-\gamma r(w+h_S)}$, and $V_M(w) - V_S(w) = \frac{1}{\gamma r}e^{-\gamma r(w+h_S)}\big[1 - e^{-\gamma r(h_M - h_S)}\big]$, divide through by $e^{-\gamma r(w+h_S)}$; the two $-\frac{1}{\gamma}$ terms cancel (since $\rho = r$), leaving

$$rh_S = -\kappa + \frac{p}{\gamma r}\big[1 - e^{-\gamma r(h_M - h_S)}\big] \implies h_S = \frac{p}{\gamma r^2}\big[1 - e^{-\gamma r(h_M - h_S)}\big] - \frac{\kappa}{r},$$

the second half of (13). The matched state M (resolution at rate τ, delivering sX into wealth, so the post-jump certainty-equivalent wealth is $\mathrm{CE}(z;\iota)$ — which, with the option unpriced (footnote 15), is also $\mathrm{CE}_{\mathrm{acc}}$ where accredited investors are scarce; the recursion is the same with CE or $\mathrm{CE}_{\mathrm{acc}}$,

while the concavity in s used in Appendix A.2, Step 0, is automatic with the option unpriced and otherwise maintained for $\mathrm{CE}_{\mathrm{acc}}$) yields identically (with post-resolution continuation $h_0 = 0$) $h_M = \frac{\tau}{\gamma r^2}[1 - e^{-\gamma r(\mathrm{CE} - h_M)}]$. Only the *payoff* risk in sX is priced by CE; the outer bracket prices timing risk. Each recursion has exactly one solution, so the guess holds with a unique h_ς in each state: the maps $h \mapsto h - \frac{\tau}{\gamma r^2}[1 - e^{-\gamma r(\mathrm{CE} - h)}]$ and $h \mapsto h - \frac{p}{\gamma r^2}[1 - e^{-\gamma r(h_M - h)}] + \frac{\kappa}{r}$ are continuous and strictly increasing, with slopes $1 + \frac{\tau}{r} e^{-\gamma r(\mathrm{CE} - h)}$ and $1 + \frac{p}{r} e^{-\gamma r(h_M - h)}$, and tend to $\mp\infty$ as $h \to \mp\infty$; the first is nonpositive at $h = 0$ and nonnegative at $h = \mathrm{CE}$, since $\mathrm{CE} \geq 0$ for the nonnegative payoff sX, so $h_M \in [0, \mathrm{CE}]$.

Leading order, the bound on the value of search, and the more-investors gradient. Since $1 - e^{-x} = x + O(x^2)$, as $\gamma r \Delta \to 0$ the recursions collapse to $h_M = \frac{\tau}{\rho + \tau}\,\mathrm{CE}$ and $h_S = \frac{p}{\rho + p} h_M - \frac{\kappa}{\rho + p}$ — the leading-order forms (14)–(15). Away from that limit the bracket $1 - e^{-\gamma r \Delta}$ is bounded by one, so h_S is bounded above by $p/(\gamma r^2) - \kappa/r$ (not attained: as shown below, $0 < \Delta < h_M + \kappa/r$, so the bracket stays strictly below one; the matched recursion bounds h_M likewise by $\tau/(\gamma r^2)$ and, since $1 - e^{-x} \leq x$, by $\tau\,\mathrm{CE}\,/(r + \tau)$). Differentiating the exact S-recursion (holding h_M fixed, $\Delta \equiv h_M - h_S$, the gap Δ_S of (13) and the founder surplus σ_E),

$$\frac{\partial h_S}{\partial p} = \frac{1 - e^{-\gamma r \Delta}}{\gamma r \left(r + p\, e^{-\gamma r \Delta}\right)} > 0,$$

strictly positive because $\Delta > 0$ (the M-recursion gives $h_M \geq 0$ since $\mathrm{CE} \geq 0$, while $\Delta \leq 0$ would give $h_S \leq -\kappa/r < 0 \leq h_M$, a contradiction), with limit $1/(\gamma r^2)$ as $\gamma r \Delta \to \infty$; holding the value gap Δ fixed, its initial slope in γr has the sign of $p - r$ (if instead h_S is re-solved with h_M held fixed, the sign of $2p - r$). To first order in γr the gradient with Δ held fixed is $\frac{\Delta}{r+p}\left[1 + \gamma r \Delta \frac{p - r}{2(r+p)}\right]$, and re-solving the recursion gives $\Delta = \Delta_0 + \gamma r\, p \Delta_0^2/[2(r + p)]$ with $\Delta_0 \equiv (r h_M + \kappa)/(r + p)$, so $\partial h_S/\partial p = \left[\Delta_0 + \gamma r\, \Delta_0^2 (2p - r)/(2(r + p))\right]/(r + p) + O(\gamma^2)$. So when the meeting rate far exceeds the risk-free rate, $p \gg r$, risk aversion, at a frozen matched value h_M, amplifies the more-investors gradient near $\gamma = 0$ (once CE, and with it h_M, responds to γ, the loss from payoff risk outweighs this amplification near $\gamma = 0$ when $\alpha < 2$, where $1 - \mathbb{E}^Q[\xi]$ vanishes only at rate $b^{\alpha - 1}$); the amplification is local, since at large $\gamma r \Delta$ the gradient tends to $1/(\gamma r^2)$, which decays in γ (only the initial rise and this decay rate are established). These are the exact objects behind Proposition 2; the payoff derivative $\partial\,\mathrm{CE}\,/\partial m = s\,\mathbb{E}^Q[\xi]$ (Proposition 1) is a property of CE alone, so linearizing the timing brackets leaves it unchanged.

Failure risk lowers the certainty equivalent. Fix $\alpha > 1$ and the unit-mean normalization, so $\underline{\xi}(\pi_0) = (\alpha - 1)/[\alpha(1 - \pi_0)]$ and the mixture survival function is $\bar{F}_\xi(x) \equiv \Pr(\xi > x) = (1 - \pi_0) \min\{1, (x/\underline{\xi})^{-\alpha}\}$ for $x > 0$. Raising π_0 does two things: it moves mass into the atom at zero (at a fixed Pareto floor, a rise from π_0 to π_0' scales the survival function by $(1 - \pi_0')/(1 - \pi_0)$) and it scales the surviving branch up, $\underline{\xi} \propto 1/(1 - \pi_0)$. The two survival functions cross exactly once, as follows. Write $\pi_0' > \pi_0$ for the higher failure probability and $\underline{\xi} < \underline{\xi}'$ for the two Pareto floors. On $[0, \underline{\xi}]$ both survival functions are constant, at $1 - \pi_0$ and $1 - \pi_0'$ (no Pareto mass lies below $\underline{\xi}$), so the difference is the constant $-(\pi_0' - \pi_0) < 0$; on $(\underline{\xi}, \underline{\xi}')$ the higher-π_0 law is still flat while the lower one strictly decreases, so the difference is strictly increasing; and on $[\underline{\xi}', \infty)$ the ratio $\bar{F}_\xi'/\bar{F}_\xi = [(1 - \pi_0')/(1 - \pi_0)]^{1 - \alpha} > 1$ is constant. The difference is therefore negative, then strictly increasing, then positive: exactly one crossing, strictly inside $(\underline{\xi}, \underline{\xi}')$. Both laws have unit mean by construction ($(1 - \pi_0)\alpha\underline{\xi}/(\alpha - 1) = 1$ for either), so the higher-π_0 law is a mean-preserving spread of the lower one. Since $\xi \mapsto e^{-b\xi}$ is strictly *convex*, a mean-preserving spread *raises* $\mathcal{L}_\xi(b) = \mathbb{E}[e^{-b\xi}]$

and hence *lowers* CE $= -(1/\gamma r)\log \mathcal{L}_\xi(b)$: for every stake $b > 0$, $\partial \,\mathrm{CE}\,/\partial \pi_0 \le 0$. Strictness follows from the differential form of the same crossing (differentiating under the integral is valid: at each x, $\bar{F}_\xi$ is continuous and piecewise smooth in π_0 across the moving kink $\underline{\xi}(\pi_0)$, where both branches equal $1-\pi_0$, and $|\partial_{\pi_0}\bar{F}_\xi| \le \max\{1, \alpha-1\}$, so $e^{-bx}|\partial_{\pi_0}\bar{F}_\xi|$ is bounded by an integrable function uniformly in π_0): $\partial_{\pi_0}\bar{F}_\xi = -1$ on $[0, \underline{\xi})$ and $\partial_{\pi_0}\log \bar{F}_\xi = (\alpha-1)/(1-\pi_0) > 0$ on $(\underline{\xi}, \infty)$, so $\partial_{\pi_0}\bar{F}_\xi$ single-crosses zero from below at $\underline{\xi}$ with $\int_0^\infty \partial_{\pi_0}\bar{F}_\xi\, dx = 0$ (unit mean for every π_0); writing $\mathcal{L}_\xi(b) = 1 - b\int_0^\infty e^{-bx}\bar{F}_\xi(x)\,dx$ gives $\partial_{\pi_0}\mathcal{L}_\xi = -b\int_0^\infty \left(e^{-bx} - e^{-b\underline{\xi}}\right)\partial_{\pi_0}\bar{F}_\xi(x)\,dx > 0$, the integrand $(e^{-bx} - e^{-b\underline{\xi}})\partial_{\pi_0}\bar{F}_\xi$ being negative on both sides of $\underline{\xi}$; hence $\partial\,\mathrm{CE}\,/\partial\pi_0 < 0$ strictly. For the limit, $\mathcal{L}_\xi(b) \to \pi_0$ as $b \to \infty$ (only the atom survives the exponential tilt), so CE $\to \log(1/\pi_0)/(\gamma r) = \bar{C}$; and since $\partial_{\pi_0}\mathcal{L}_\xi = 1 - \mathcal{L}_P(b) + (1-\pi_0)\,\partial_{\pi_0}\mathcal{L}_P(b)$ with both branch terms $O(b\,e^{-\underline{\xi}b})$, the limit $b \to \infty$ and the π_0-derivative interchange, giving $\partial\,\mathrm{CE}\,/\partial\pi_0 \to -1/(\gamma r\,\pi_0) = d\bar{C}/d\pi_0$: at large stakes the whole sensitivity to failure risk is the ceiling's. □

Higher risk aversion raises the risk discount. As a function of $\gamma r \ge 0$, $\log \mathbb{E}[e^{-\gamma r\, sm(\xi-1)}]$ is convex (strictly, for a risky payoff), and it is zero with zero right-hand slope at $\gamma r = 0$ because $\mathbb{E}[\xi] = 1$. The risk discount Π of (11) is its chord slope from the origin, so $\Pi \ge 0$ and Π is strictly increasing in γ.

A lighter tail raises the certainty equivalent (the α single crossing behind (12)). Fix π_0 and the unit-mean normalization, and take $\alpha_1 < \alpha_2$, so $\underline{\xi}_1 < \underline{\xi}_2$ ($\underline{\xi}$ is increasing in α). On $[0, \underline{\xi}_1]$ both survival functions equal $1-\pi_0$; on $(\underline{\xi}_1, \underline{\xi}_2)$ the α_1-law has begun to decay while the α_2-law is still flat, so $\bar{F}^{(1)}_\xi < \bar{F}^{(2)}_\xi$; and on $[\underline{\xi}_2, \infty)$ the ratio $\bar{F}^{(2)}_\xi / \bar{F}^{(1)}_\xi \propto x^{\alpha_1 - \alpha_2}$ decreases continuously from a value above one to zero. The difference $\bar{F}^{(1)}_\xi - \bar{F}^{(2)}_\xi$ is therefore zero, then negative, then changes sign once: exactly one crossing, and with equal (unit) means the lower-α law is a mean-preserving spread of the higher-α law. Convexity of $x \mapsto e^{-bx}$ then gives $\mathcal{L}_\xi(b;\alpha_1) \ge \mathcal{L}_\xi(b;\alpha_2)$, i.e. CE nondecreasing in α for every $b > 0$. Strictness of $\partial\,\mathrm{CE}\,/\partial\alpha > 0$ follows from the differential form (differentiating under the integral is valid: $\bar{F}_\xi$ is continuous at the moving kink $\underline{\xi}(\alpha)$, where both branches equal $1-\pi_0$, so no boundary term arises, and $|\partial_\alpha \bar{F}_\xi|$ is bounded by an integrable function uniformly for α in compact subsets of $(1,\infty)$): $\partial_\alpha \bar{F}_\xi = 0$ on $[0, \underline{\xi})$ and, on $(\underline{\xi}, \infty)$, $\partial_\alpha \log \bar{F}_\xi = 1/(\alpha-1) - \log(x/\underline{\xi})$ single-crosses zero from above at $x^\dagger = \underline{\xi} e^{1/(\alpha-1)}$, with $\int_0^\infty \partial_\alpha \bar{F}_\xi\, dx = 0$ (unit mean for every α), so $\partial_\alpha \mathcal{L}_\xi = -b\int_0^\infty \left(e^{-bx} - e^{-bx^\dagger}\right)\partial_\alpha \bar{F}_\xi(x)\,dx < 0$, the integrand $(e^{-bx} - e^{-bx^\dagger})\partial_\alpha \bar{F}_\xi$ being nonnegative, and strictly positive on $(\underline{\xi}, \infty) \setminus \{x^\dagger\}$. □

Proposition 1 (main text).

Proof. The derivative (17) is a direct computation from (10) using $\mathcal{L}'_\xi(b) = -\mathbb{E}[\xi e^{-b\xi}]$. $\mathbb{E}^Q[\xi] < \mathbb{E}[\xi] = 1$ because Q tilts mass away from large ξ: ξ is increasing and $e^{-b\xi}$ decreasing in ξ, so Chebyshev's covariance inequality gives $\mathbb{E}[\xi e^{-b\xi}] < \mathbb{E}[\xi]\,\mathbb{E}[e^{-b\xi}]$ for nondegenerate ξ; and $\mathbb{E}^Q[\xi] > 0$ because $\xi \ge 0$ with $\mathbb{P}(\xi > 0) = 1 - \pi_0 > 0$. As $\gamma r sm \to 0$, $\mathbb{E}^Q[\xi] \to 1$ by dominated convergence ($\xi e^{-b\xi} \le \xi$, integrable for $\alpha > 1$). Monotonicity in $\gamma r sm$ follows from $\partial \mathbb{E}^Q[\xi]/\partial b = -\mathrm{Var}^Q(\xi) < 0$ with $b = \gamma r sm$ (Var^Q finite for $b > 0$, the tilted law having an exponential tail). The limit $\mathbb{E}^Q[\xi] \to 0$ is the failure-state limit of Lemma 2. Without the failure state ($\pi_0 = 0$), $\xi \ge \underline{\xi} = (\alpha-1)/\alpha$ almost surely, so $\mathbb{E}^Q[\xi] > (\alpha-1)/\alpha$ at every stake. □

Lemma 2 (main text).

Proof. For the Laplace transform and $\mathbb{E}[\xi e^{-b\xi}]$, condition on the branch: the atom contributes π_0 (respectively 0 to $\mathbb{E}[\xi e^{-b\xi}]$), and on the Pareto branch substitute $f_P(x) = \alpha \underline{\xi}^{\alpha} x^{-\alpha-1}$ $(x \geq \underline{\xi})$ and change variables $u = bx$: $\mathbb{E}[e^{-b\xi_P}] = \alpha(\underline{\xi}b)^{\alpha}\Gamma(-\alpha, \underline{\xi}b)$ and $\mathbb{E}[\xi_P e^{-b\xi_P}] = \alpha\underline{\xi}(\underline{\xi}b)^{\alpha-1}\Gamma(1-\alpha, \underline{\xi}b)$; both integrals converge at $+\infty$ for every α and at the strictly positive lower limit $\underline{\xi}b$. Since $\log \mathcal{L}_\xi$ is the cumulant generating function of $-\xi$ at b, $\partial_b \mathbb{E}^Q[\xi] = -\operatorname{Var}^Q(\xi) < 0$ (the tilt of (17), $\mathbb{E}[\xi e^{-b\xi}]/\mathcal{L}_\xi(b)$, being $-\partial_b \log \mathcal{L}_\xi$; differentiating under the integral is licensed by $\xi e^{-b\xi} \leq 1/(eb)$). For the limits: $\mathcal{L}_\xi(b) \downarrow \pi_0$ monotonically (dominated convergence on the Pareto branch); Watson's lemma at the endpoint $\underline{\xi}$ (the integrand $x f_P(x)$ has endpoint value $\underline{\xi} f_P(\underline{\xi}) = \alpha > 0$) gives $\mathbb{E}[\xi e^{-b\xi}] = (1-\pi_0)\frac{\alpha}{b} e^{-\underline{\xi}b}[1 + O(b^{-1})]$, whence the stated rate on dividing by $\mathcal{L}_\xi(b) \to \pi_0$ — the tilted measure concentrates on the failure state, the atom at $\xi = 0$, which never pays. □

Supply-side attenuation (Proposition 4). The investor prices a book of n_D independent positions, each a $1/n_D$ share of a claim of size $(1-s)m$, at the book certainty equivalent $\mathrm{CE}_F^{\mathrm{div}} = -(n_D/\gamma r)\log \mathcal{L}_\xi\big(\gamma r(1-s)m/n_D\big)$ (6). Steps (i) and (ii) hold at a fixed equity share, cutoff z^* and tightness, because the sign of the induced response of the equity share is not established; step (iii) holds at every equity share, cutoff and tightness.

(i) Below the mean. By Jensen's inequality applied to the convex map $\xi \mapsto e^{-b\xi}$, $\mathcal{L}_\xi(b) > e^{-b\mathbb{E}[\xi]}$, so $\mathrm{CE}_F^{\mathrm{div}} < (1-s)m$: the book is worth strictly less than its mean, and solving (24) with (21) gives

$$V_{\mathrm{vac}} = \frac{-c + \frac{q\tau}{\rho+\tau}\bar{E}_F}{\rho + \delta_I + \frac{q\rho}{\rho+\tau}}, \qquad \bar{E}_F \equiv \mathbb{E}_{z|z\geq z^*}\big[\,\mathrm{CE}_F^{\mathrm{div}}(z, s^*(z))\big],$$

affine in $\bar{E}_F$ with a positive coefficient, so V_{vac} inherits the gap: it lies below its value with $(1-s)m$ in place of $\mathrm{CE}_F^{\mathrm{div}}$.

(ii) Also, V_{vac} decreases in γ and in $1/\alpha$ and increases in n_D. In γ: CE of any nondegenerate claim is decreasing in the absolute risk-aversion coefficient. Here, writing $b_F \equiv \gamma r(1-s)m/n_D$ for the per-position stake, (6) reads $\mathrm{CE}_F^{\mathrm{div}} = (1-s)m\big[-\log \mathcal{L}_\xi(b_F)/b_F\big]$, so γ and n_D act on $\mathrm{CE}_F^{\mathrm{div}}$ only through b_F, which rises in γ and falls in n_D, and $\partial_b\big[-\log \mathcal{L}_\xi(b)/b\big] = b^{-2}\big[\log \mathcal{L}_\xi(b) + b\,\mathbb{E}^Q[\xi](b)\big] < 0$, because $-\log \mathcal{L}_\xi$ is concave (its derivative, the tilt $\mathbb{E}^Q[\xi]$, is strictly decreasing by Proposition 1), so its average slope exceeds its marginal slope. In $1/\alpha$: a heavier tail at fixed unit mean is a mean-preserving spread of the payoff law, by the α single crossing above (equivalently, the integrated tails satisfy $\int_y^\infty [\bar{F}_\xi^{\mathrm{heavy}} - \bar{F}_\xi^{\mathrm{light}}]\,dx \geq 0$ for every $y \geq 0$ with equality at $y = 0$, which is second-order dominance at equal means), so the certainty equivalent is nonincreasing, strictly so at every finite stake (12); and at every α the α-free book ceiling $n_D\bar{C}$ of (iii) is approached only as the stake grows, never attained. In n_D: $\mathrm{CE}_F^{\mathrm{div}}$ is the certainty equivalent of the per-position *average* $(1/n_D)\sum_{i\leq n_D}(1-s)m\,\xi_i$, whose mean is $(1-s)m$ for every n_D; that average is a mean-preserving contraction of the (n_D-1)-average, so $\mathrm{CE}_F^{\mathrm{div}}$ rises in n_D at integer steps; and the same concavity of $-\log \mathcal{L}_\xi$ used in the risk-aversion step gives $\partial\,\mathrm{CE}_F^{\mathrm{div}}/\partial n_D > 0$ for every real $n_D > 0$, so the two arguments agree. As $n_D \to \infty$ it converges to $(1-s)m$ by the law of large numbers. The rate depends on the tail. For $1 < \alpha < 2$ the transform expands as $\mathcal{L}_\xi(b) = 1 - b + (1-\pi_0)\,\alpha\,\Gamma(-\alpha)\,\underline{\xi}^{\alpha} b^{\alpha} + O(b^2)$, with $\Gamma(-\alpha) > 0$ on $(1,2)$, so the gap below the mean is $(1-s)m - \mathrm{CE}_F^{\mathrm{div}} = (1-\pi_0)\,\alpha\,\Gamma(-\alpha)\,\underline{\xi}^{\alpha}(\gamma r)^{\alpha-1}\big((1-s)m\big)^{\alpha} n_D^{-(\alpha-1)} + o(n_D^{-(\alpha-1)})$; for $\alpha > 2$ the quadratic term leads and the gap falls like $1/n_D$ (like $\log n_D/n_D$ at $\alpha = 2$).

(iii) The book ceiling. $\mathcal{L}_\xi(b) \geq \pi_0$ for every b, because the atom alone contributes π_0 to the transform. Hence $-\log \mathcal{L}_\xi(\cdot) \leq \log(1/\pi_0)$ and $\mathrm{CE}_F^{\mathrm{div}} \leq n_D \log(1/\pi_0)/(\gamma r) = n_D\,\bar{C}$, uniformly in the deal scale m. So, by the solved form in (i), $V_{\mathrm{vac}} < (\tau/\rho)\,\bar{E}_F \leq (\tau/\rho)\,n_D\bar{C}$ at every tightness, equity share and cutoff, a level independent of m: the supply-side counterpart of Theorem 1. Breadth

relaxes the bound ($n_D\bar{C} \to \infty$) but never removes it at finite n_D; at $n_D = 1$ it is the concentrated case. □

A.2 Existence and Uniqueness (Proposition 5)

The proof runs in five steps. Step 0 solves the equity share and the value of search type by type; Step 1 solves for the price of VC capital at a given cutoff and tightness; Step 2 shows that the joint map of the cutoff and the price is monotone at fixed tightness, which only the uniqueness argument uses; Step 3 proves existence by Brouwer's theorem; Step 4 states the uniqueness conditions.

Regularity conditions. Proposition 5 maintains, at every state the fixed-point argument visits (every price in $[V_{\min}, V_{\max}]$ and every tightness at or above $(A_m v_{\min})^{1/\eta}$, the bounds Step 3 builds from the floor $v_{\min}$ of R2),

R1. a continuous type density g, positive on a support unbounded above, and a deal scale $m(\cdot;\iota)$ continuously differentiable in z with $m_z > 0$ and unbounded above in z;

R2. a floor on vacancies from non-founder investor slots: there is $v_{\min} > 0$ with $v_{\min} \le M_v^0 - [1 - G(z_{\min})]/\tau$, where $z_{\min}$ is the lowest cutoff of the box that Step 3 builds from $v_{\min}$. The non-founder slots alone then keep vacancies at or above $v_{\min}$, and interiority, $M_v > [1-G(z^*)]/\tau$, holds at every equilibrium in that box, so that the vacancy stock $v = M_v - n_F$ is positive (the primitive bound $M_v^0 > 1/\tau$ stated with the stocks in Section 2 implies the floor for the box built from any $v_{\min} \le M_v^0 - 1/\tau$, Step 3);

R3. participation: a finite cutoff z^* (so $1 - G(z^*) > 0$ by R1), with the investor's surplus σ_F strictly positive at every type $z \ge z_{\min}$, the lowest cutoff of the box (by Lemma 4 it suffices at $z_{\min}$).

The founder's surplus needs no condition: wherever the value of search is the one the matched value implies (the per-type fixed point of Step 0), $\sigma_E = h_M - h_S > 0$, for every type. The payoff sX is nonnegative, so CE ≥ 0 (and $\text{CE}_{\text{acc}} \ge$ CE, since the option pays only the positive part $\max\{\varpi, 0\}$ of the rent, so $\Delta\,\text{CE} \ge 0$); then $h_M \ge 0$ and $\sigma_E > 0$ follow from (13) by the sign argument of Appendix A.1 (the paragraph on the more-investors gradient), which uses $\kappa > 0$ and $h_0 = 0$. Nor does concavity need a condition: with the option unpriced (footnote 15) $h_M(z;s)$ is strictly concave in s (Step 0). Under R1–R3 the monotone-claim condition and the monotonicity of h_S in z hold (Lemma 4). The uniqueness conditions $\Lambda_{\text{loop}} < 1$ and $\lambda < 1$ enter only in Step 4. With the option priced, two further conditions are maintained: the concavity of h_M in s where accredited investors are scarce, and the rent–option contraction of Remark 2.

Step 0: the equity share of each type. Fix (θ, V_{vac}) and z. The pair $(s^*(z), h_S(z))$ solves the sharing rule (23) jointly with $h_S = [p\,h_M(s^*) - \kappa]/(\rho + p)$ (the leading-order S-recursion; on the exact recursion (13) the pass-through $dh_S/dh_M = pe^{-\gamma r \Delta_S}/(r + pe^{-\gamma r \Delta_S})$ is at most $p/(r+p)$, with $\rho = r$, so every bound below holds there too), on the participation region where both surpluses are strictly positive (below the cutoff no match forms; the cutoff structure of Definition 1(ii) is maintained, so the FOC is only ever evaluated where $\sigma_E, \sigma_F > 0$). On that region $h_M(z;s)$ is strictly concave in s: with the option unpriced (footnote 15), $\text{CE}_{\text{acc}} = \text{CE}$ is strictly concave in s and, on the exact recursion, h_M is an increasing concave transform of it; with the option priced, concavity where accredited investors are scarce is a maintained condition on the rent. Since h_M^F is concave in s as well (CE_F^{div} is concave in $1 - s$ and (21) is affine in it), the log Nash product is strictly concave and the objective single-peaked. Write the FOC (23) as $F(s, \cdot) = 0$, with F the

derivative in s of the log Nash product, so that $F_s < 0$; using the first-order condition to evaluate the ratio of surplus shares, the responses of each party's matched value to its own threat point, through the equity share, obey

$$0 \le \partial_s h_M^F \cdot \frac{\partial s^*}{\partial V_{\text{vac}}} \le (1-\beta)\,\frac{\rho}{\rho+\tau}, \qquad 0 \le \partial_s h_M \cdot \frac{\partial s^*}{\partial h_S} \le \beta,$$

with equality only in the transferable-utility limit (drop the strictly positive curvature terms in $|F_s|$ and use $(1-\beta)\partial_s h_M/\sigma_E = \beta|\partial_s h_M^F|/\sigma_F$); the investor bound carries the annuity factor $\rho/(\rho+\tau)$ because the threat point enters the surplus (21) with coefficient $\rho/(\rho+\tau)$ only. The per-type loop $h_S \mapsto s^* \mapsto h_M \mapsto h_S$ has gain at most $\frac{p}{\rho+p}\beta < 1$, so $(s^*(z), h_S(z))$ is unique and continuous, with the signs of Proposition 3.

Lemma 4 (Monotone claims)**.** *Fix (θ, V_{vac}) and the conditions of Step 0. Write $x \equiv s\,m(z;\iota)$ and $y \equiv (1-s)\,m(z;\iota)$ for the founder's and the investor's claims on the deal scale, and $x^*(z)$, $y^*(z)$ for their values at the equity share $s^*(z)$. Both claims strictly increase with the scale $m(z;\iota)$, hence with z, across participating types and from any participating type to every type of larger scale (such a type has equity shares that leave both surpluses strictly positive). A larger startup is shared: each party takes a strictly positive part of the increase. The investor's matched value $h_M^F(z; s^*(z))$ therefore strictly increases with z (the* monotone-claim condition*), and so do the founder's stake $b(z) = \gamma r\, x^*(z)$ and the value of search $h_S(z)$.*

Proof. The type enters the bargaining block only through $m(z;\iota)$, and each party's value only through its own claim: $h_M = \frac{\tau}{\rho+\tau}\,\text{CE}_{\text{acc}}(x)$, since the certainty equivalent (10) depends on (s,z) through sm alone, and $h_M^F = \frac{\tau}{\rho+\tau}\big(\text{CE}_F^{\text{div}}(y) + V_{\text{vac}}\big)$ by (21) and (6). Both certainty equivalents are strictly increasing in the claim, since the post-resolution position is nondecreasing in the claim path by path and strictly increasing where $\xi > 0$. CE_F^{div} is concave, and so, by Step 0, is CE_{acc} on $[0, m(z;\iota)]$ for every participating z, which is all the comparison below uses when both types participate (the extension below uses concavity at the larger type as well). At the per-type fixed point $h_S = [ph_M - \kappa]/(\rho+p)$, so each surplus depends on its own claim alone: $\sigma_E(x) = (\rho\, h_M(x) + \kappa)/(\rho+p)$ and $\sigma_F(y) = (\tau\ \text{CE}_F^{\text{div}}(y) - \rho\, V_{\text{vac}})/(\rho+\tau)$, both strictly increasing. The same holds on the exact recursion (13): there h_M is an increasing concave transform of $\text{CE}_{\text{acc}}(x)$ (Step 0), and $\sigma_E = \Delta_S$ solves the S-recursion given h_M, with $d\sigma_E/dh_M = r/(r + pe^{-\gamma r \Delta_S}) > 0$, so each surplus still depends on its own claim alone and is strictly increasing in it. At an interior equity share, which (23) presumes and Definition 1(i) requires, $\partial_s h_M = m\,\partial_x h_M$ and $-\partial_s h_M^F = m\,\partial_y h_M^F$, so cancelling m turns (23) into

$$\Phi_E(x) \equiv (1-\beta)\,\frac{\partial_x h_M(x)}{\sigma_E(x)} \;=\; \beta\,\frac{\partial_y h_M^F(y)}{\sigma_F(y)} \equiv \Phi_F(y), \qquad x + y = m(z;\iota).$$

Each ratio has a positive, nonincreasing numerator (h_M and h_M^F are increasing and concave in their claims) over a strictly increasing denominator that is positive wherever the ratio is evaluated below (both surpluses are strictly positive at participating types, Step 0), so Φ_E and Φ_F are strictly decreasing there. Take participating types with scales $m_1 < m_2$ and solutions (x_i, y_i). If $y_2 \le y_1$, then $x_2 = m_2 - y_2 > m_1 - y_1 = x_1$ and $\Phi_E(x_2) < \Phi_E(x_1) = \Phi_F(y_1) \le \Phi_F(y_2) = \Phi_E(x_2)$, a contradiction; so $y_2 > y_1$, and the symmetric argument gives $x_2 > x_1$. Only the smaller type need participate: if z_1 does and $m_2 > m_1$, let $y_0 \in [0, y_1)$ be the claim at which σ_F vanishes (it exists wherever $V_{\text{vac}} \ge 0$, since $\sigma_F(0) = -\rho V_{\text{vac}}/(\rho+\tau) \le 0 < \sigma_F(y_1)$: the interior case above). On $[0, m_2 - y_0)$ the map $x \mapsto \Phi_E(x) - \Phi_F(m_2 - x)$ is continuous and strictly decreasing, positive at $x = 0$ (since $\Phi_F(m_2) < \Phi_F(y_1) = \Phi_E(x_1) < \Phi_E(0)$) and unbounded below as $x \uparrow m_2 - y_0$ (where $\sigma_F \downarrow 0$),

so it has a unique root x_2, at which $\sigma_F(m_2 - x_2) > 0$ and $\sigma_E(x_2) = (\rho h_M(x_2) + \kappa)/(\rho + p) > 0$. With the threat point $h_S(z_2) \equiv [p h_M(x_2) - \kappa]/(\rho + p)$, (23) holds at x_2 and the objective is single-peaked (Step 0), so x_2 is z_2's per-type fixed point; here Φ_E is strictly decreasing on all of $[0, m_2]$ because CE is concave at every claim with the option unpriced (with it priced, concavity at z_2 is part of the maintained condition). The comparison above then applies to the pair. The consequences follow because $\mathrm{CE}_F^{\mathrm{div}}$ and $\mathrm{CE}_{\mathrm{acc}}$ are strictly increasing, so h_M^F, b and $h_S = [p h_M(x^*) - \kappa]/(\rho + p)$ rise with the claims. Where the ratios and m are differentiable, $dx^*/dm = \Phi_F'/(\Phi_E' + \Phi_F') \in (0, 1)$, so $\partial_z h_S > 0$ wherever $m_z > 0$. The inner-loop gain (33) divides by $\partial_z h_S$ at the cutoff, and the implicit-function step of Step 4 differentiates there, so both take $m(\cdot; \iota)$ to be C^1 in z with $m_z(z^*) > 0$. The equity share $s^* = x^*/m$ may still rise with z; because y^* rises, the elasticity of s^* in the scale is below $(1 - s^*)/s^*$. □

Step 1: the price map is a contraction. Substituting $s^*(\cdot; \theta, V_{\mathrm{vac}})$ into (24) defines $\mathcal{V}(V_{\mathrm{vac}}) = \big[-c + q(\theta)\, \mathbb{E}_{z|z \geq z^*}[h_M^F]\big]/(\rho + \delta_I + q)$. Because V_{vac} enters h_M^F through the equity share *and* through the return-to-vacancy continuation (21) (the per-type h_S feeds back into s^*),

$$\frac{dh_M^F}{dV_{\mathrm{vac}}} = P_s + \frac{\tau}{\rho + \tau}, \qquad P_s \leq \frac{(1 - \beta)\rho}{(\rho + \tau)\,(1 - \beta p/(\rho + p))},$$

so

$$\mathcal{V}' \leq \frac{q}{\rho + \delta_I + q}\Big[\frac{\tau}{\rho + \tau} + \frac{(1 - \beta)\rho}{(\rho + \tau)(1 - \beta p/(\rho + p))}\Big] \equiv \ell_V < 1 :$$

$\mathcal{V}$ is a contraction and, *given* (θ, z^*), has a unique fixed point. With the option priced (footnote 15), where $\varpi > 0$, $\varpi = V_{\mathrm{vac}} - R$ also enters $\mathrm{CE}_{\mathrm{acc}}$; under the rent–option contraction of Remark 2 the pair $(\varpi, \mathrm{CE}_{\mathrm{acc}})$ is single-valued and continuous along the price map, and $\mathcal{V}'$ in (33) is read inclusive of that channel. With the option unpriced the channel is absent.

Remark 2 (The rent and the option it prices determine each other). With the option priced (footnote 15), the rent ϖ enters $\mathrm{CE}_{\mathrm{acc}}$. That certainty equivalent feeds the values that determine V_{vac}, and V_{vac} determines ϖ. The pair $(\varpi, \mathrm{CE}_{\mathrm{acc}})$ is then unique, and continuous along the price map, when this loop is a contraction (the rent–option contraction). With the option unpriced, as in the quantitative model, $\mathrm{CE}_{\mathrm{acc}} = \mathrm{CE}$ does not depend on ϖ, so the rent–option loop is absent and the condition is not needed.

Step 2: the cutoff and the price at fixed θ (Knaster–Tarski). The joint map $(z^*, V_{\mathrm{vac}}) \mapsto \big(Z(V_{\mathrm{vac}}; \theta),\ \mathcal{V}(z^*, V_{\mathrm{vac}}; \theta)\big)$ on the rectangle $[z_{\min}, z_{\max}] \times [V_{\min}, V_{\max}]$ of Step 3, a complete lattice that the map sends into itself at every tightness the box of Step 3 contains ($\mathcal{V}$ maps $[V_{\min}, V_{\max}]$ into itself and Z maps it into $[z_{\min}, z_{\max}]$, Step 3, so neither is truncated), is isotone: Z is increasing in V_{vac} (a higher price lowers every s^*, hence h_S, raising the cutoff; Z is well defined because h_S is continuous, Step 0, and strictly increasing in z, Lemma 4); $\mathcal{V}$ is increasing in z^* (truncating the pool of searching founders from below raises the conditional investor value, by the *monotone-claim condition* that $h_M^F(z; s^*(z))$ is increasing in z, which Lemma 4 derives although $s^*(z)$ may rise with $m(z)$) and in V_{vac} (total pass-through $dh_M^F/dV_{\mathrm{vac}} = P_s + \tau/(\rho + \tau) > 0$, Step 1). By Knaster–Tarski its fixed-point set is a nonempty complete lattice. The map is antitone in θ (a higher θ raises p, hence h_S, lowering Z, and lowers q and raises every s^*, lowering $\mathcal{V}$), so both extremal selections are decreasing in θ. This is the inner loop linking the participation cutoff and the price.

Step 3: existence (Brouwer; no stability condition). Given the vacancy stock v, tightness is the closed form $\mathcal{T}(z^*, v) = (A_m v/[1 - G(z^*)])^{1/\eta}$, so an inner equilibrium is a fixed point of the

continuous map $(z^*, V_{\text{vac}}) \mapsto \big(Z(V_{\text{vac}}; \mathcal{T}),\, \mathcal{V}(z^*, V_{\text{vac}}; \mathcal{T})\big)$; appending the price-projection update $v' = \text{med}\{v^0(\theta),\, v+\omega(V_{\text{vac}}-R),\, v^0(\theta)+\Phi_{\text{acc}}/\delta_I\}$, whose fixed points are exactly the complementary-slackness configurations (25) (three configurations are possible: scarce accredited investors, $\varpi > 0$ with the whole founder-investor pool deployed; interior price-binding, $\varpi = 0$ with part of that pool idle; and the *non-founder-only* corner, in which the root of $V_{\text{vac}}(v) = R$ would require $v^R < 0$, so the nonnegativity constraint binds, $v^R = 0$ and $V_{\text{vac}}(v^0(\theta)) < R$), gives a continuous map of (z^*, V_{vac}, v). It sends the compact box $[z_{\min}, z_{\max}] \times [V_{\min}, V_{\max}] \times [v_{\min}, M_v^0 + 1/\delta_I]$ into itself, with $v_{\min}$ the floor of R2 and the other bounds built from it in turn. *Price.* By (24) and (21), the fixed point of the price map at given (θ, z^*) is $V_{\text{vac}} = \big[-c + \frac{q\tau}{\rho+\tau}\bar{E}_F\big] \big/ \big[\rho + \delta_I + \frac{q\rho}{\rho+\tau}\big]$, with $\bar{E}_F$ the mean of CE_F^{div} over participating types and $0 \le \bar{E}_F \le n_D \bar{C}$ by the book ceiling of Appendix A.1. The right side increases in $\bar{E}_F$ and in q (its q-derivative has the sign of $[(\rho+\delta_I)\tau\bar{E}_F + \rho c]/(\rho+\tau) \ge 0$), and on the box $q(\mathcal{T}(z,v)) = [1-G(z)]/v \le 1/v_{\min}$. So set $V_{\min} = -c/(\rho+\delta_I)$ and let $V_{\max}$ be the right side at $q = 1/v_{\min}$ and $\bar{E}_F = n_D\bar{C}$. Then $\mathcal{V}$ maps $[V_{\min}, V_{\max}]$ into itself: since $0 \le \text{CE}_F^{\text{div}} \le n_D\bar{C}$ in (21), $\mathcal{V}(V_{\text{vac}})$ lies below the same map with every CE_F^{div} replaced by $n_D\bar{C}$, an increasing contraction in V_{vac} whose fixed point is at most $V_{\max}$, and above $[-c+q\tau V_{\min}/(\rho+\tau)]/(\rho+\delta_I+q) \ge V_{\min}$. The bound sits strictly below the ceiling $\tau n_D\bar{C}/\rho$ of V_{vac} over all tightness, $\rho V_{\max} < \tau n_D \bar{C}$, because q is bounded on the box. At every price of the box the investor's surplus $\sigma_F = (\tau\,\text{CE}_F^{\text{div}} - \rho V_{\text{vac}})/(\rho+\tau)$ is therefore positive once its claim is large enough (the book ceiling is approached as the claim grows), and with the deal scale unbounded (R1) the largest types admit equity shares that leave both surpluses positive ($\sigma_E > 0$ needs no condition): participation is possible on every face of the box, and R3 asks only that the founders' cutoff be finite and fall among such types. *Cutoff.* On the box $1 - G(z) \le 1$ and $v \ge v_{\min}$, so $\theta \ge (A_m v_{\min})^{1/\eta}$. Since Z increases in V_{vac} and decreases in θ (Step 2), set $z_{\max} = Z\big(V_{\max}; (A_m v_{\min})^{1/\eta}\big)$, finite by R3, with $1 - G(z_{\max}) > 0$ by R1; then $\theta \le \mathcal{T}(z_{\max}, M_v^0 + 1/\delta_I) < \infty$ on the box, and $z_{\min} = Z\big(V_{\min}; \mathcal{T}(z_{\max}, M_v^0 + 1/\delta_I)\big)$. Z maps the box into $[z_{\min}, z_{\max}]$. *Vacancies.* The median update returns a value in $[v^0(\theta), v^0(\theta) + \Phi_{\text{acc}}/\delta_I]$, with $v^0 \le M_v^0$ and $\Phi_{\text{acc}} \le 1 - G(z^*) \le 1$ by (8), so at most $M_v^0 + 1/\delta_I$; and since $q \le [1-G(z_{\min})]/v_{\min}$ on the box, $v^0(\theta) \ge M_v^0 \tau v_{\min}/[1 - G(z_{\min}) + \tau v_{\min}] \ge v_{\min}$, the last inequality being R2. The positive floor keeps q bounded and $\mathcal{T}$ continuous on the box. *No truncation.* Each of the three maps takes its values in its own interval at every point of the box, so none is truncated: the composite is a continuous self-map of the compact box, each of its fixed points is a fixed point of the untruncated maps and hence an equilibrium, and the faces of the box create no fixed points of their own. The endpoints of the median in the v-update are the two bounds of (25), not truncations, so a fixed point on either is one of the corner configurations. Brouwer's theorem yields existence. *The floor is maintained, not derived.* The box is built from $v_{\min}$ and R2 is read at the box's own lowest cutoff, so R2 restricts the primitives and the box jointly. The primitive bound $M_v^0 > 1/\tau$ implies it for the box built from any floor $v_{\min} \le M_v^0 - 1/\tau$ (since $1 - G(z_{\min}) \le 1$), but neither the bound nor R2 holds at the calibration: the matched stock $[1 - G(z^*)]/\tau$ exceeds M_v^0, so no box containing the solved equilibrium satisfies R2, and existence there is computed, not proved.(The composed cutoff map is *not* globally monotone once tightness responds — as tightness rises, the higher $p(\theta)$ and the lower $q(\theta)$ oppose the inner loop of Step 2 — which is why existence is obtained by a topological rather than an order-theoretic argument; the order-theoretic structure of Step 2 is what the uniqueness condition $\Lambda_{\text{loop}} < 1$ exploits.)

Step 4: uniqueness. Define the inner-loop gain

$$\Lambda_{\text{loop}} \equiv \frac{q}{\rho + \delta_I + q} \cdot \frac{1}{1 - \mathcal{V}'} \cdot \frac{g(z^*)}{1 - G(z^*)} \cdot \Big(\mathbb{E}_{z|z \ge z^*}[h_M^F] - h_M^F(z^*)\Big) \cdot \frac{|\partial h_S/\partial V_{\text{vac}}|}{\partial h_S/\partial z}\bigg|_{z^*}, \tag{33}$$

the slope of the composed cutoff map at fixed θ: the first three factors and the gap $\mathbb{E}_{z|z\geq z^*}[h_M^F] - h_M^F(z^*)$ give $|dV_{vac}^{\text{fp}}/dz^*|$ ($V_{vac}^{\text{fp}}(z^*;\theta)$ is the fixed point of the price map $V_{\text{vac}} \mapsto \mathcal{V}(z^*, V_{\text{vac}};\theta)$ of Steps 1–2, unique because $\mathcal{V}' < 1$; derivative of a truncated mean, closed through the factor $1/(1-\mathcal{V}')$), the last is $|dz^*/dV_{\text{vac}}|$ at the participation cutoff. If $\sup \Lambda_{\text{loop}} < 1$, with Λ_{loop} evaluated at every cutoff and tightness of the box of Step 3, the subsystem of Step 2 is a contraction, hence single-valued and continuous, and decreasing in θ. At fixed θ the cutoff is the fixed point of the composed map $z \mapsto Z(V_{vac}^{\text{fp}}(z;\theta);\theta)$, whose slope is Λ_{loop}, so where the maps are differentiable

$$\frac{dz^*}{d\theta} = \frac{\partial_\theta Z + \partial_{V_{\text{vac}}} Z \cdot \partial_\theta V_{vac}^{\text{fp}}}{1 - \Lambda_{\text{loop}}} < 0,$$

the numerator being negative by the signs of Step 2 ($\partial_\theta Z < 0$, $\partial_{V_{\text{vac}}} Z > 0$, and $\partial_\theta V_{vac}^{\text{fp}} = \partial_\theta \mathcal{V}/(1 - \mathcal{V}') < 0$, with $\mathcal{V}' < 1$ by Step 1); without differentiability $z^*(\theta)$ is still nonincreasing, because the unique selection coincides with the extremal selections of Step 2, which are decreasing in θ; flow balance below needs only this. The flow-balance equation $\theta^\eta[1-G(z^*(\theta))] = A_m v$ then has a strictly increasing continuous left side and a unique root $\theta(v)$, increasing in v, with $z^*(v)$ decreasing, $V_{\text{vac}}(v)$ strictly decreasing, and $\Phi_{\text{acc}}(v)$ increasing. Define the price-binding bound $v^{R,d}(v) \equiv \hat{v} - v^0(\theta(v))$, where $\hat{v} \equiv \sup\{v : V_{\text{vac}}(v) \geq R\}$, the root of $V_{\text{vac}}(v) = R$ when one exists ($V_{\text{vac}}(\cdot)$ continuous and strictly decreasing). The outer map $T(v) = v^0(\theta(v)) + \max\{0, \min\{\Phi_{\text{acc}}(v)/\delta_I,\ v^{R,d}(v)\}\}$ (the outer max is the nonnegativity of deployment by founder-investors in (25)) is continuous and nondecreasing with slope $\lambda = \lambda_{\text{rec}} + \lambda_0$ on the branch where accredited investors are scarce, literally 0 on the interior price-binding branch (there $T(v) = \hat{v}$, a constant), and $\lambda_0 \leq \lambda$ on the non-founder-only corner branch (there $T(v) = v^0(\theta(v))$, the case $v^{R,d} < 0$). The pieces agree at the switch points, so under $\lambda < 1$ (globally, $\sup_v \lambda(v) < 1$), with the inner block (the map that returns $(\theta, z^*, V_{\text{vac}}, s^*(\cdot))$ for each vacancy stock v) single-valued by $\Lambda_{\text{loop}} < 1$ (with the option priced and $\varpi > 0$, also by the rent–option contraction of Remark 2), $T(v) - v$ is strictly decreasing on every branch and the equilibrium is unique across all three configurations. Local uniqueness needs the two bounds, $\Lambda_{\text{loop}} < 1$ and $\lambda < 1$, only at the equilibrium itself. If $\Lambda_{\text{loop}} < 1$ there, the composed cutoff map of Step 2 has slope below one at its fixed point, so by the implicit function theorem (the composed map is C^1 near the fixed point under R1, which makes $\partial_z h_S(z^*) > 0$) the inner block is single-valued and C^1 in a neighborhood, and so is $\theta(v)$ (the derivative of flow balance in θ is positive there, since $dz^*/d\theta < 0$ by the slope formula above, under $\Lambda_{\text{loop}} < 1$); if also $\lambda < 1$ there, T has slope below one near the fixed point (at the stake where the accreditation probability reaches one, T is only Lipschitz, and both one-sided slopes are required to be below one; Appendix A.4), so $T(v) - v$ is strictly decreasing near it and the equilibrium is isolated, whichever configuration it is in. Because the investor-value gap $\mathbb{E}_{z|z\geq z^*}[h_M^F] - h_M^F(z^*)$ of (33) is $O(\beta)$ (Nash sharing: $\sigma_F = \frac{\beta}{1-\beta}\frac{\mathbb{E}^{Q_{1-s}}[X]}{\mathbb{E}^{Q_s}[X]}\sigma_E$ at the FOC, with $\mathbb{E}^{Q_s}$ and $\mathbb{E}^{Q_{1-s}}$ the tilted expectations (17) at the founder's stake $\gamma r s m$ and at the investor's per-position stake $\gamma r(1-s)m/n_D$) while the pass-through factor $|\partial h_S/\partial V_{\text{vac}}|$ is $O(1)$ — its bound $\frac{p}{\rho+p}\beta\frac{\rho}{\rho+\tau}(\sigma_E/\sigma_F)/\big(1 - \beta p/(\rho+p)\big)$ carries a σ_F denominator that cancels the gap's β — the product is $\Lambda_{\text{loop}} = O(\beta)$ to first order in β at fixed equilibrium objects. This is an order count, not a bound uniform in β: the other factors of (33) are equilibrium objects that move with β, so the count alone does not deliver $\Lambda_{\text{loop}} < 1$ at a small Nash weight.

On the conditions. $\lambda < 1$ and $\Lambda_{\text{loop}} < 1$ (with the option priced, also the rent–option contraction of Remark 2) are conditions on equilibrium derivatives, reported in calibration; none is needed for existence. $\lambda < 1$ is the stability condition on recycling and doubles as the local-stability condition

of the recycling fixed point; $\lambda \geq 1$ opens the multiple-equilibrium regime. □

A.3 The Risk Ceiling (Theorem 1)

The theorem states the ceiling exactly and its other statements to leading order. Those statements follow from (14)–(15) at a fixed equity share: $\partial h_S/\partial h_M = p/(\rho+p)$, $dh_M/d\,\mathrm{CE} = \tau/(\rho+\tau)$ and $\partial\,\mathrm{CE}\,/\partial(sm) = \mathbb{E}^Q[\xi]$ give part (i); $\partial h_S/\partial p = (\rho h_M + \kappa)/(\rho+p)^2 = \Delta_S/(\rho+p)$ gives part (ii); $h_S \uparrow h_M$ as $p \to \infty$, and $\mathrm{CE} < \bar{C}$ at every finite stake, give (20). This subsection ($\rho = r$ throughout, as in Lemma 1) has three parts. Inequalities (i)–(ii) below prove the ceiling. Steps (iii)–(iv) show that every sign and ceiling also holds on the exact recursions (13), and that the timing pass-throughs, the responses of h_M to CE and of h_S to h_M, stay bounded away from zero at every deal scale. Step (v) adds the case in which the accreditation option of footnote 15 is priced.

(i) The failure state sets a floor. For every stake $b = \gamma r s m \geq 0$,

$$\mathcal{L}_\xi(b) = \mathbb{E}\big[e^{-b\xi}\big] \;\geq\; \pi_0,$$

because the failure state contributes $\pi_0 \cdot e^0 = \pi_0$ and the surviving branch contributes a nonnegative amount. Equality holds only in the limit $b \to \infty$, where the marginal-utility weight vanishes at every positive realization.

(ii) The ceiling on the certainty equivalent. Taking logs in (i),

$$\mathrm{CE}(b) = -\frac{1}{\gamma r}\log \mathcal{L}_\xi(b) \;<\; \frac{1}{\gamma r}\log\frac{1}{\pi_0} \;=\; \bar{C},$$

at every finite stake, because (i) holds with equality only in the limit, and uniformly in (m, ι, s), and $\mathrm{CE}(b) \uparrow \bar{C}$ as $b \to \infty$, because $\mathcal{L}_\xi(b) \downarrow \pi_0$ (proof of Lemma 2), the limiting case of (i). So $\sup_{b>0}\mathrm{CE} = \bar{C}$ if and only if $\xi_f = 0$ (a supremum over stakes, approached as $sm \to \infty$; with a floor $\xi_f > 0$ the supremum is $+\infty$, since $\mathrm{CE} \geq s\,m\,\xi_f$), and the supremum is approached, never exceeded: the bigger-deal policy pushes against a fixed ceiling. With a guaranteed floor $\xi_f > 0$ the same argument applies to the risky excess $\xi - \xi_f$, shifting the CE bound by the unattenuated floor term $s\,m\,\xi_f$ (and the h_M bound by $s\,m\,\xi_f\tau/(r+\tau)$). The ceiling then bounds only the risky excess: the certainty-equivalent gradient $\partial\,\mathrm{CE}\,/\partial(sm) = \mathbb{E}^Q[\xi] = \xi_f + \mathbb{E}^Q[\xi - \xi_f]$ falls to ξ_f, not to zero, as the stake grows, because the tilted excess vanishes (its denominator $\mathcal{L}_{\xi-\xi_f}(b)$ stays at least π_0, while its numerator $\mathbb{E}[(\xi-\xi_f)e^{-b(\xi-\xi_f)}]$ tends to zero by dominated convergence); at $\pi_0 = 0$ the bound is $+\infty$ and there is no ceiling, as stated: every outcome then pays at least the Pareto floor $\underline{\xi} = (\alpha-1)/\alpha$, so $\mathrm{CE} \geq s\,m\,\underline{\xi} \to \infty$ as $sm \to \infty$.

(iii) The timing factors $e^{-\gamma r\Delta}$ are bounded away from zero. Each timing factor is one minus the bracket of (13) that prices timing risk, and it scales the arrival rate in the pass-throughs below. Take the baseline $\xi_f = 0$ of Theorem 1 (with a floor the same steps go through with $\bar{C}$ replaced by $s\,m\,\xi_f + \bar{C}$, so the bounds below hold at any fixed scale but not uniformly in m). From the exact matched recursion, $\Delta_M = \mathrm{CE} - h_M \leq \mathrm{CE} \leq \bar{C}$ by (ii) and $h_M \geq 0$ (which holds because $\mathrm{CE} \geq 0$, itself immediate from $\mathcal{L}_\xi \leq 1$ since $\xi \geq 0$), so

$$e^{-\gamma r\Delta_M} \;\geq\; e^{-\gamma r\bar{C}} \;=\; \pi_0.$$

Since $(1-e^{-x})/x$ falls in $x>0$, evaluating it at $\gamma r\Delta_M \le \log(1/\pi_0)$ gives, for the exact matched value,

$$\frac{\tau(1-\pi_0)}{r\log(1/\pi_0)+\tau(1-\pi_0)}\ \mathrm{CE}\ \le\ h_M\ \le\ \frac{\tau}{r+\tau}\ \mathrm{CE},$$

so the leading-order h_M overstates the exact one by at most the ratio of the two coefficients, $[r\log(1/\pi_0)+\tau(1-\pi_0)]/[(r+\tau)(1-\pi_0)]$, whatever the deal scale. Without a failure state the matched gap $\gamma r\Delta_M$, and the error, would grow without bound as the deal grows. On the search margin $\Delta_S>0$ (were $\Delta_S\le 0$, the exact recursion would give $h_S\le -\kappa/r<0\le h_M$, i.e. $\Delta_S>0$, a contradiction), and $\Delta_S \le h_M+\kappa/r$ (the bracket in the exact search recursion is positive because $\Delta_S>0$, so $h_S>-\kappa/r$) with $h_M\le \tau\bar{C}/(r+\tau)$ ($1-e^{-x}\le x$ in the matched recursion gives $h_M\le(\tau/r)(\mathrm{CE}-h_M)$, i.e. $h_M\le\frac{\tau}{r+\tau}\mathrm{CE}$, and $\mathrm{CE}\le\bar{C}$), hence $\gamma r\Delta_S\le\bar{x}\equiv\frac{\tau}{r+\tau}\log(1/\pi_0)+\gamma\kappa$ and $e^{-\gamma r\Delta_S}\ge e^{-\bar{x}}=\pi_0^{\tau/(r+\tau)}e^{-\gamma\kappa}>0$. Both timing factors are therefore bounded below by constants depending only on primitives. Differentiating the exact recursions at a fixed equity share and meeting rate,

$$\frac{dh_M}{d\,\mathrm{CE}}=\frac{\tau e^{-\gamma r\Delta_M}}{r+\tau e^{-\gamma r\Delta_M}}\in\Big[\frac{\tau\pi_0}{r+\tau\pi_0},\frac{\tau}{r+\tau}\Big],\qquad \frac{\partial h_S}{\partial h_M}=\frac{pe^{-\gamma r\Delta_S}}{r+pe^{-\gamma r\Delta_S}}\in\Big[\frac{pe^{-\bar{x}}}{r+pe^{-\bar{x}}},\frac{p}{r+p}\Big],$$

each increasing in its timing factor, so no exact-recursion pass-through vanishes; with $\partial\,\mathrm{CE}/\partial(sm)=\mathbb{E}^Q[\xi]$ this gives the exact counterpart of part (i): the bigger-deal gradient still vanishes through the tilt alone, and the leading-order values are the upper ends of the two bands. The more-investors gradient factors as

$$\frac{\partial h_S}{\partial p}=\frac{1-e^{-\gamma r\Delta_S}}{\gamma r\big(r+pe^{-\gamma r\Delta_S}\big)}=\frac{\Delta_S}{r+p}\cdot\frac{1-e^{-x}}{x}\cdot\frac{r+p}{r+pe^{-x}},\qquad x\equiv\gamma r\Delta_S\in(0,\bar{x}],$$

strictly positive at every stake; the last factor, $(r+p)/(r+pe^{-x})$, is at least one and $(1-e^{-x})/x$ falls in x, which gives the exact counterpart of part (ii),

$$\frac{\partial h_S}{\partial p}\ \ge\ \frac{1-e^{-\bar{x}}}{\bar{x}}\cdot\frac{\Delta_S}{r+p}:$$

timing risk attenuates the more-investors gradient below its leading-order form at the same gap, $\Delta_S/(r+p)$, by at most a fixed factor, uniformly in the deal scale, and adds no tilt. The bound is a floor, not the typical size: near risk neutrality timing risk raises the gradient when $p>r/2$ (holding h_M fixed and re-solving h_S, its slope in γ at $\gamma=0$ has the sign of $2p-r$, Appendix A.1). At $\gamma r\to 0$ the gap Δ_S tends to its leading-order value $(\rho h_M+\kappa)/(\rho+p)$ and $\Delta_S/(r+p)$ becomes (18), at a given deal. The limit takes $\gamma\to 0$ at fixed r and holds deal by deal, not uniformly in m: at every $\gamma>0$, $\gamma r\Delta_M\ge\gamma r\ \mathrm{CE}\ r/(r+\tau)\to r\log(1/\pi_0)/(r+\tau)$ as $sm\to\infty$.

(iv) The ceiling over both policies. h_S is strictly increasing in p by (iii) and, from the exact search recursion at a frozen h_M (which is p-free at a given equity share), $h_S\uparrow h_M$ as $p\to\infty$: by (13), $1-e^{-\gamma r\Delta_S}=\gamma r^2(h_S+\kappa/r)/p\le\gamma r^2(h_M+\kappa/r)/p\to 0$, so $\Delta_S\to 0$ (to leading order, the discounted matching probability $p/(r+p)$ saturates at one). Combining with (ii), $\sup_p h_S=h_M\le\tau\ \mathrm{CE}/(r+\tau)<\tau\bar{C}/(r+\tau)$, which is the exact counterpart of (20) (whose equality $h_M=\tau\,\mathrm{CE}/(\rho+\tau)$ holds to leading order; on the exact recursion it becomes the strict inequality $h_M<\tau\,\mathrm{CE}/(r+\tau)$ for $\mathrm{CE}>0$, since $1-e^{-x}<x$ for $x>0$), the last inequality strict because $\mathrm{CE}<\bar{C}$ at every finite stake (the inequality in (i) is strict there). For the bigger-

deal ceiling, h_M and h_S are continuous and strictly increasing in CE by the pass-throughs in (iii), and CE $\uparrow \bar{C}$ as the stake grows, so h_S rises toward its value at CE $= \bar{C}$, a supremum it never attains, which lies strictly below h_M there because $\Delta_S > 0$; to leading order (16) that value is $\frac{p}{\rho+p}\frac{\tau}{\rho+\tau}\bar{C} - \frac{\kappa}{\rho+p}$. Over both policies, since h_S increases in p and in CE, the supremum on the exact recursions is the matched value at CE $= \bar{C}$, the root $h \in (0, \bar{C})$ of $h = \tau[1 - \pi_0 e^{\gamma r h}]/(\gamma r^2)$; it lies strictly below its leading-order value $\tau\bar{C}/(r+\tau)$ (since $1 - e^{-x} < x$) and is approached only as p and the stake grow together. The two ceilings differ in nature: $\bar{C}$, the ceiling for the deal, is a primitive of preferences and the failure probability, approached by risk attenuation, while h_M, the ceiling for slots, is a friction bound approached as matching frictions vanish.

(v) The accreditation option priced. Were the accreditation option of footnote 15 priced, the matched certainty equivalent where accredited investors are scarce would be $\mathrm{CE}_{\mathrm{acc}} \equiv \mathrm{CE} + \Delta\,\mathrm{CE}$. The failure state pays $0 < \bar{w}$ and earns no rent, so $\mathbb{E}\big[e^{-\gamma r(sm\xi + n\varpi \mathbf{1}\{sm\xi \geq \bar{w}\})}\big] \geq \pi_0$, strictly at every finite stake, and $\mathrm{CE}_{\mathrm{acc}} < \bar{C}$; since $\Delta\,\mathrm{CE} \geq 0$ (footnote 15), CE $\leq \mathrm{CE}_{\mathrm{acc}} < \bar{C}$, so $\mathrm{CE}_{\mathrm{acc}} \to \bar{C}$ as the stake grows, and every inequality above holds with $\mathrm{CE}_{\mathrm{acc}}$ in place of CE (the pass-through bands of step (iii) depend only on the lower bounds on the timing factors). □

A.4 The Recycling Fixed Point and the Supply Multiplier (Lemma 3 and Proposition 6)

The two sources of vacant slots and the supply condition. Fix the inner block, so that for each vacancy stock v the map of Appendix A.2 returns $(\theta, z^*, V_{\mathrm{vac}}, s^*(\cdot))$. Two objects are defined on that solved inner block. The *non-founder* vacant stock $v^0(\theta) = M_v^0 \tau/(q(\theta)+\tau)$ is the stationary vacant stock of a maintained measure M_v^0 of non-founder investor slots, each alternating between vacancy (left at rate q) and a match (left at the resolution rate τ). The *founder-investor* pool $\Phi_{\mathrm{acc}}/\delta_I$ is the stationary stock generated by the accreditation flow Φ_{acc} against turnover δ_I (Section 2.3). The supply condition (25) is complementary slackness on both bounds of the founder-investors' vacant stock: $\varpi = V_{\mathrm{vac}} - R > 0$ forces $v^R = \Phi_{\mathrm{acc}}/\delta_I$, and $\varpi < 0$ forces $v^R = 0$.

The price of VC capital falls with the vacancy stock (Lemma 3). Write $\theta(v)$ for the tightness returned by the inner block and $N(v) \equiv 1 - G(z^*(v))$ for the participation inflow. From (5), $\theta^\eta = A_m\, v/N$, so

$$\frac{d\log\theta}{d\log v} = \frac{1-\varepsilon_N}{\eta}, \qquad \varepsilon_N \equiv \frac{d\log N}{d\log v} \;\geq\; 0,$$

because a larger vacancy stock lowers the cutoff z^* (Appendix A.2, Step 4) and so widens participation. Tightness is therefore strictly increasing in v exactly when the participation response does not fully absorb the vacancy increase,

$$\varepsilon_N < 1, \tag{34}$$

which is the elasticity restatement of the monotonicity established in Appendix A.2, Step 4 (established there under $\Lambda_{\mathrm{loop}} < 1$, not assumed here), and which the solver reports at each solved equilibrium as an independent numerical check (it is not the same quantity as the inner-loop gain Λ_{loop} of (33), though Step 4 derives both from the same contraction). Since $\theta'(v) > 0$ under $\Lambda_{\mathrm{loop}} < 1$ (Appendix A.2, Step 4): (i) $q(\theta) = A_m\theta^{-\eta}$ falls, so the investor meets a founder more slowly; (ii) s^* rises type by type (Proposition 3, whose comparative static is in θ), so the investor's share of each match falls; (iii) the cutoff z^* falls, adding lower types to the founders who search, which lowers the conditional investor value $\mathbb{E}_{z|z\geq z^*}[h_M^F]$ by the monotone-claim condition (h_M^F increasing in z, Lemma 4). Solving the linear fixed point (24) gives $\partial V_{\mathrm{vac}}/\partial \mathbb{E}_{z|z\geq z^*}[\mathrm{CE}_F^{\mathrm{div}}] = qk/[\rho+\delta_I+q(1-k)] > 0$

and $\partial V_{\text{vac}}/\partial q = \mathbb{E}_{z|z\geq z^*}[\sigma_F]/[\rho+\delta_I+q(1-k)] > 0$ because every active match has $\sigma_F > 0$ (Step 0), with $k = \tau/(\rho+\tau) \in (0,1)$: all three channels therefore lower V_{vac} at a given equity share (these partials include the investor's return to vacancy after resolution, through the pass-through k, but hold every s^* fixed); because the equity share itself responds to V_{vac} (the pass-through P_s of Step 1), the price is the fixed point $V^{\text{fp}}_{vac}(z^*;\theta)$ of the price map, whose slope $\mathcal{V}'$ is below one by Step 1, so each channel reaches the price with its sign preserved (the feedback factor, one over one minus that slope, is positive): channels (i)–(ii) give $\partial_\theta V^{\text{fp}}_{vac} < 0$ and channel (iii) $\partial_{z^*} V^{\text{fp}}_{vac} > 0$. Along the solved inner block $dV_{\text{vac}}/dv = \left[\partial_\theta V^{\text{fp}}_{vac} + \partial_{z^*} V^{\text{fp}}_{vac}\, dz^*/d\theta\right] \theta'(v)$ with $dz^*/d\theta < 0$ and $\theta'(v) > 0$ (Appendix A.2, Step 4), so

$$V'_{\text{vac}}(v) < 0, \qquad V_{\text{vac}} \text{ continuous in } v$$

(continuity is inherited from the inner block, which is continuous by Appendix A.2, Steps 0–4). The founder-investor pool $\Phi_{\text{acc}}/\delta_I$ is nondecreasing in v. By (8), Φ_{acc} is the *integral* $\int_{z^*} S_{\text{acc}}(z)\, g(z)\, dz$ — equivalently $[1-G(z^*)]$ times the average of S_{acc} under the participant density $\hat{g}(z) \equiv g(z)/[1-G(z^*)]$, $z \geq z^*$ — so both of its channels push the same way: S_{acc} is increasing in s^* (a larger equity share makes the exit clear $\bar{w}$ more often), which rises pointwise with θ by Proposition 3 and hence with v under (34); and the domain of integration widens as z^* falls, which adds nonnegative mass. (Writing Φ_{acc} as an integral rather than an average matters here: adding low-S_{acc} entrants could lower an average, but cannot lower the integral.) Hence $\varpi(v) = V_{\text{vac}}(v) - R$ is continuous and strictly decreasing, so the price-binding branch $V_{\text{vac}}(v) = R$ has at most one root (continuity and strict monotonicity of V_{vac} alone suffice here). The pool's monotonicity, established above, is not needed for uniqueness on the branch where accredited investors are scarce, which uses only $\lambda < 1$; it makes $\lambda_{\text{rec}} \geq 0$, so that $\lambda \geq \lambda_0 \geq 0$ (under $\Lambda_{\text{loop}} < 1$), the multiplier $1/(1-\lambda)$ is at least one, and the non-founder-only slope obeys $\lambda_0 \leq \lambda$. On the branch where accredited investors are scarce the relevant map is $T(v)$ of (35), nondecreasing with slope λ, so $T(v) - v$ is strictly decreasing — and the root unique — exactly under the stability condition $\lambda < 1$ of Proposition 5(ii) (Appendix A.2, Step 4; globally $\sup_v \lambda < 1$, taking the inner block single-valued, which uses $\Lambda_{\text{loop}} < 1$ (with the option priced, also the rent–option contraction of Remark 2)). The pool cannot both be fully deployed at a positive rent and be partly idle at zero rent, so exactly one regime obtains and the solution is unique. Accredited investors are scarce only if $V_{\text{vac}}(v^0(\theta) + \Phi_{\text{acc}}/\delta_I) \geq R$; otherwise the market is price-binding at the root of $V_{\text{vac}}(v) = R$, clipped below at the non-founder-only stock $v^0(\theta)$ (where the price-binding root would require $v^R < 0$). □

The supply multiplier (Proposition 6). Where accredited investors are scarce the whole pool deploys, so v solves

$$v = v^0(\theta(v)) + \frac{\Phi_{\text{acc}}(v, \iota, \bar{w})}{\delta_I} \;\equiv\; T_{\text{pool}}(v; M_v^0, \bar{w}, \iota), \tag{35}$$

which coincides with the projection map of Appendix A.2, Step 4, on the branch where accredited investors are scarce (where λ is defined). Differentiating (35) in v at fixed policies gives the loop gain

$$\lambda \;\equiv\; \frac{\partial T}{\partial v} \;=\; \underbrace{\frac{\partial_v \Phi_{\text{acc}}}{\delta_I}}_{\lambda_{\text{rec}}} + \underbrace{\frac{\partial v^0}{\partial \theta}\,\theta'(v)}_{\lambda_0}, \qquad \frac{\partial v^0}{\partial \theta} = -\frac{M_v^0 \tau\, q'(\theta)}{(q+\tau)^2},$$

and since $q' < 0$ at every θ, $\partial v^0/\partial\theta > 0$ whenever $M_v^0 > 0$, so λ_0 has the sign of $\theta'(v)$, that is, of $1 - \varepsilon_N$ ((34) and the sentence before it): positive under $\Lambda_{\text{loop}} < 1$ (Appendix A.2, Step 4). A negative λ_0 therefore means $\varepsilon_N > 1$, which requires $\Lambda_{\text{loop}} \geq 1$ at that equilibrium (by the slope

formula of Step 4, whose numerator is negative by Step 2); the broadest-book rows of Table A.1 are of this kind (see its caption); $\lambda_{\text{rec}} \geq 0$ under (34) by the pool monotonicity established above (in Table A.1 it is positive in every row), strictly positive whenever $g(z^*) > 0$ with $S_{\text{acc}}(z^*) > 0$ and $dz^*/dv < 0$, or the wealth test binds for some participating type. Under R1 and $\Lambda_{\text{loop}} < 1$ the first three conditions always hold: $g > 0$, the Pareto branch has unbounded support, so $S_{\text{acc}}(z^*) > 0$, and $dz^*/dv < 0$ (Appendix A.2, Step 4); so $\lambda_{\text{rec}} > 0$, as (26) states. Two hypotheses license the implicit differentiation that follows. First, regularity of T in (v, x), where x is a policy. The non-founder term $v^0(\theta)$ is smooth in θ; tightness is single-valued and continuous in the vacancy stock by the Step-4 contraction where $\Lambda_{\text{loop}} < 1$ (elsewhere, as in the rows of Table A.1 with $\lambda_0 < 0$, only along the computed branch, by the implicit function theorem), and differentiable where the maps of Step 2 are C^1, the inner block's own Jacobian ($1 - \Lambda_{\text{loop}}$ for the composed cutoff map) being nonsingular under $\Lambda_{\text{loop}} < 1$ (the contraction alone delivers continuity, not smoothness). The accreditation flow $\Phi_{\text{acc}} = \int_{z^*} S_{\text{acc}} g \, dz$ has a C^1 lower limit $z^*(v)$ with g continuous at z^*, so Leibniz's rule applies to the limit; its integrand, however, is only *Lipschitz* and not C^1, because the accreditation probability is at most $1 - \pi_0$ and its derivative jumps at the stake where it reaches that bound. That stake lies inside the range of participating types at every reported row (solver diagnostics), so T is C^1 away from that locus and Lipschitz across it: dv/dx exists almost everywhere and the multiplier formula below holds almost everywhere, with one-sided derivatives at that locus itself. Second, the Jacobian is nonsingular: $\partial(T - v)/\partial v = \lambda - 1 \neq 0$ exactly when $\lambda \neq 1$, and $\lambda < 1$ is the stability condition already assumed. Under these conditions, for any policy $x \in \{M_v^0, \bar{w}, \iota\}$ implicit differentiation of (35) gives $(1 - \lambda)\, dv/dx = \partial T/\partial x$, i.e.

$$\frac{dv}{dx} = \frac{\partial T/\partial x}{1 - \lambda},$$

which is (27) once the three partials are read off: $\partial T/\partial M_v^0 = \tau/(q + \tau)$ (the vacant share of a non-founder slot); $\partial T/\partial \bar{w} = \partial_{\bar{w}} \Phi_{\text{acc}}/\delta_I < 0$; and $\partial T/\partial \iota = \partial_\iota \Phi_{\text{acc}}/\delta_I + v_\theta^0 \theta_\iota|_v$, where the second term appears because ι moves z^* and hence tightness at a *fixed* vacancy stock. The common factor $1/(1-\lambda)$ is the multiplier; it is finite and positive iff $\lambda < 1$, and the fixed point is locally stable under exactly the same condition (iterating (35) contracts iff $|\lambda| < 1$), which is the stability condition $\lambda < 1$ of Proposition 5(ii). If $\lambda > 1$ at a root, that root is unstable and, since $T(0^+) > 0$ (the non-founder slots: $M_v^0 > 0$, and flow balance $q(\theta)v = 1 - G(z^*(\theta))$ keeps $\theta(v)$ above the tightness at which search stops paying, which is positive because $\kappa > 0$ and $h_M \leq \tau \bar{C}/(\rho + \tau)$, so q stays bounded and $v^0(\theta(v))$ does not vanish) while T is bounded, (35) has at least two further roots ($\lambda = 1$ is the nongeneric tangency), one on each side; the lower one is an equilibrium where accredited investors are scarce whenever the unstable root is, because V_{vac} falls with v (Lemma 3), and the upper one only if $V_{\text{vac}} \geq R$ there: the recycling loop from deployed capital to new accredited investors and back can sustain more than one stock.

The recycling part of the loop gain as a product (28). With $\varrho = (\Phi_{\text{acc}}/\delta_I)/v$ the share of vacant slots that founder-investors can supply and $\varepsilon_v = \partial \log \Phi_{\text{acc}}/\partial \log v$ the elasticity of the accreditation flow to the vacancy stock,

$$\varrho \cdot \varepsilon_v = \frac{\Phi_{\text{acc}}/\delta_I}{v} \cdot \frac{\partial_v \Phi_{\text{acc}}\, v}{\Phi_{\text{acc}}} = \frac{\partial_v \Phi_{\text{acc}}}{\delta_I} = \lambda_{\text{rec}},$$

an identity, not an approximation: the Φ_{acc} and v factors cancel. In the price-binding regime the recycling channel is dormant ($\lambda_{\text{rec}} = 0$) and Φ_{acc} no longer enters, so $dv/d\bar{w} = 0$; the non-founder-slot policy depends on which configuration obtains. At an *interior* price-binding point v is pinned

by $V_{\text{vac}}(v) = R$, which involves neither M_v^0 nor $\bar{w}$, so $dv/dM_v^0 = 0$ as well. At the *non-founder-only* corner $v = v^0(\theta(v))$, which does involve M_v^0; differentiating gives $dv/dM_v^0 = [\tau/(q+\tau)]/(1-\lambda_0) > 0$, so the non-founder channel survives with its own multiplier $1/(1-\lambda_0)$ even though the recycling loop is shut. □

The configuration at each book breadth. Table A.1 re-solves the equilibrium at the calibrated exit sizes for each investor book breadth n_D and reports the loop gain and its recycling part. Accredited investors are scarce in every solved row, so the non-founder-only corner of Appendix A.2, Step 3, is a logical case of the existence argument that no solved calibration realizes.

Table A.1: Configuration of the market for VC capital at each investor book breadth n_D, at the calibrated exit sizes ($\alpha = 1.03$, $\pi_0 = 0.84$; bold: the baseline $n_D = 3.91$). Accredited investors are scarce in every solved row, including that of the undiversified investor ($n_D = 1$): the scarcity rent is positive ($\varpi > 0$), the whole founder-investor pool is deployed, and the recycling loop is active. The recycling part of the loop gain obeys $\lambda_{\text{rec}} = \varrho\,\varepsilon_v$, with ϱ the share of vacant slots that founder-investors can supply and ε_v the elasticity of the accreditation flow to the vacancy stock. The remainder $\lambda - \varrho\,\varepsilon_v$ is the non-founder part λ_0, which has the sign of the response of tightness to the vacancy stock, that is, of $1 - \varepsilon_N$ (Appendix A.4), with ε_N the elasticity of the participation inflow $1 - G(z^*)$ to the vacancy stock; Λ_{loop} is the inner-loop gain at fixed tightness (33). ε_N and Λ_{loop} are both below one at the baseline, where $\lambda_0 > 0$. In the broadest-book rows both exceed one: participation responds more than proportionally to the vacancy stock, so tightness falls as the stock grows, λ_0 is slightly negative, and the inner-loop condition $\Lambda_{\text{loop}} < 1$ fails. Since $\lambda < 1$ in every row, $1/(1-\lambda)$ remains the finite multiplier along the computed branch (the implicit differentiation of Appendix A.4 needs only $\lambda \neq 1$ and a nonsingular inner Jacobian); what those rows lose is the guarantee of local uniqueness in Proposition 5(ii). Breadth raises the price of VC capital V_{vac} and lowers λ, while the break-even tilt $\bar{\Xi}^*$ barely moves. The verdict column is the ranking of the tilt-only benchmark (Remark 3): in every row, the non-founder-slot policy gives the larger welfare effect per dollar of government spending. The full model's ranking at the baseline is in Table 3.

n_D	regime	V_{vac}	λ	ε_v	ϱ	Λ_{loop}	ε_N	$\bar{\Xi}^*$	verdict
1	investor-scarce	0.128	0.609	0.839	0.639	0.540	0.795	0.176	more financiers
3.91	investor-scarce	0.243	0.526	0.824	0.614	0.889	0.949	0.179	more financiers
5	investor-scarce	0.264	0.514	0.821	0.612	0.935	0.970	0.179	more financiers
8	investor-scarce	0.304	0.495	0.816	0.608	1.009	1.004	0.179	more financiers
10	investor-scarce	0.324	0.487	0.814	0.606	1.038	1.018	0.179	more financiers
20	investor-scarce	0.384	0.467	0.809	0.602	1.110	1.052	0.179	more financiers

A.5 The Dominance Condition and Its Limits (Proposition 7, Corollary 1)

In the baseline the payoff law's tail index α does not depend on the capital per deal ι, so $A_\alpha = 0$ throughout this subsection (Assumption 1), where $A_\alpha \equiv -\int_{z^*}^{\infty} \frac{p}{\rho+p}\frac{\tau}{\rho+\tau}\frac{\partial \text{CE}}{\partial \alpha}\,\alpha'(\iota)\,dG(z)$ is the welfare base that a payoff law whose tail fattens with capital per deal would add.

The welfare gradients of the two policies. With $h_0 = 0$ we have $h_S(z^*) = 0$, so for a policy x, in $dW/dx = \int_{z^*} \partial_x h_S\,dG - h_S(z^*)g(z^*)\,\partial_x z^*$ the participation term vanishes (the marginal participant is indifferent) and only inframarginal searchers contribute; participation still acts at first order through them, since the induced change in z^* moves θ (congestion), V_{vac} (composition),

and Φ_{acc} (recycling), each of which feeds the pointwise response of $h_S(z)$ to x through θ and s^*. *The non-founder-slot and lower-threshold policies.* The non-founder-slot policy acts on v through the vacant share of a non-founder slot, $dW/dM_v^0 = (\partial W/\partial v)\,[\tau/(q+\tau)]/(1-\lambda)$ (Proposition 6); the lower-threshold policy is identical with $\partial_{\bar{w}}\Phi_{\text{acc}}/\delta_I$ replacing the non-founder factor. The faster-matching, duration, and equity-share channels are all inside $\partial W/\partial v$ by definition, and by (18) the faster-matching gradient carries no marginal certainty-equivalent tilt (the equity-share channel does, Proposition 3). Proposition 7 reads the sign of $\bar{\Xi}^*$ off (30), which uses $\partial W/\partial v > 0$. Under $\Lambda_{\text{loop}} < 1$, the hypothesis of Lemma 3, every part of $\partial W/\partial v$ is signed. Pointwise $h_S(z)$ depends on v only through the meeting rate and the equity share, $dh_S/dv = (\partial h_S/\partial p)|_s\, dp/dv + \partial_s h_S\, ds^*/dv$. The first term is the channel of Proposition 2, duration channel included (the resolution rate τ is a primitive, so $\mathbb{E}[T] = 1/p + 1/\tau$ moves only through p); it is strictly positive, since $(\partial h_S/\partial p)|_s > 0$ by (18) and tightness, hence p, rises with v (Appendix A.2, Step 4). In the second, $\partial_s h_S = [p/(\rho+p)]\,\partial_s h_M > 0$ by (15) and $\partial_s h_M > 0$ (Section 3.3), and the equity share rises: the threat point h_S rises through the first term and V_{vac} falls with v (Lemma 3, which includes the dilution of the pool of founders as z^* falls), and by (23) both move s^* toward the founder, the induced response of h_S to s^* reinforcing the direct one (proof of Proposition 3). Hence $\partial W/\partial v > 0$ under $\Lambda_{\text{loop}} < 1$. Where $\Lambda_{\text{loop}} > 1$ the cutoff rises with tightness (the slope formula of Step 4); in the broadest-book rows of Table A.1 participation over-responds ($\varepsilon_N > 1$), so tightness there falls with v, and the sign of $\partial W/\partial v$ is not established analytically.

The two response bases. Write the sharing rule (23) as $F(s,m) = 0$, with F the derivative in s of the log Nash product, so that $F_s < 0$ (Appendix A.2, Step 0). Capital per deal enters F only through the exit scale $m = m(z;\iota)$, with $m_\iota \equiv \partial m/\partial \iota > 0$. Holding tightness, the cutoff and both threat points $(\theta, z^*, V_{\text{vac}}, h_S)$ fixed, the implicit function theorem gives

$$\left.\frac{\partial s^*}{\partial \iota}\right|_{\text{partial}} = -\,m_\iota\,\frac{F_m}{F_s} \;\xrightarrow{\gamma r \to 0}\; \frac{m_\iota}{m}\,\big(1-\beta-s^*\big), \tag{36}$$

where F_m is the scale channel: a larger m raises both parties' effective stakes and surpluses (and, near risk neutrality, their marginal values of the share). The limit is the risk-neutral case, where (23) gives the founder the threat point plus a share $1-\beta$ of the net surplus,

$$s^* m = \tfrac{\rho+\tau}{\tau} h_S + (1-\beta)\Big[m - \tfrac{\rho+\tau}{\tau} h_S - \tfrac{\rho}{\tau} V_{\text{vac}}\Big],$$

so a bigger pie dilutes the fixed threat points and the equity share moves toward the founder's Nash weight $1-\beta$. The partial share response (36) has welfare value A_s (Section 3.7); with risk aversion both parties' tilts enter F_m and F_s. The responses of (V_{vac}, θ) at a fixed vacancy stock enter A_P (Section 3.7), and the response of h_S enters the echo below.

The bigger-deal policy. From (16), (36), and Lemma 2, with the option unpriced ($\Delta\,\text{CE} = 0$),

$$\partial_\iota h_S = \frac{p}{\rho+p}\frac{\tau}{\rho+\tau}\big[s^*\,\mathbb{E}^Q[\xi](z)\,m_\iota + \partial_\alpha\,\text{CE}\;\alpha'(\iota) + m\,\mathbb{E}^Q[\xi](z)\,\partial s^*/\partial\iota|_{\text{partial}}\big]$$

(the share-response term does not vanish by the envelope theorem: s^* maximizes the Nash product, not h_S; and because s^* responds to h_S, the per-type h_S-echo multiplies the *whole* bracket — tilt, payoff-law, and share terms alike — by a factor in $[1, (1-\beta p/(\rho+p))^{-1}]$, bounded by Appendix A.2, Step 0; the bases are defined on the bracket above, before that factor, so the frozen direct effect below, which holds $(\theta, z^*, V_{\text{vac}})$ fixed, is stated up to that factor, which the exact inner-block re-

solve of Section 5.2 includes), so the frozen direct effect aggregates to $\overline{\mathbb{E}^Q[\xi]}\,A_I - A_\alpha + A_s$. The remaining two pieces of the bigger-deal gradient — the price-and-congestion base and the vacancy term — are set out in the following lemma, which records that A_P belongs to the welfare gradient $dW/d\iota$ and enters it exactly once.

Lemma 5 (The price-and-congestion base enters the gradient exactly once)**.** *Let $h_0 = 0$ and let accredited investors be scarce in equilibrium, with $\lambda < 1$ (as in Proposition 7). For a bigger deal, the total welfare gradient and its part at a fixed vacancy stock decompose as*

$$\frac{dW}{d\iota} = \partial_\iota W\big|_{\theta,z^*,V_{\text{vac}}} - A_P + \frac{\partial W}{\partial v}\,\frac{dv}{d\iota}, \qquad \frac{\partial W}{\partial \iota}\Big|_v = \partial_\iota W\big|_{\theta,z^*,V_{\text{vac}}} - A_P, \tag{37}$$

where the frozen direct effect $\partial_\iota W|_{\theta,z^*,V_{\text{vac}}}$ aggregates to $\overline{\mathbb{E}^Q[\xi]}\,A_I - A_\alpha + A_s$ up to the per-type feedback from h_S to s^*; $-A_P$ is the effect on W of the responses of (V_{vac},θ) to ι at a fixed vacancy stock; and $(\partial W/\partial v)\,dv/d\iota$ is the vacancy term. The three pieces do not overlap: A_P belongs to neither the frozen direct effect nor the vacancy term. The boundary term from $\partial_\iota z^*$ vanishes. The lemma is a chain-rule identity that defines A_P as the residual between the fixed-v gradient and the frozen direct effect. It therefore does not imply the sign $A_P \geq 0$, which Proposition 7 does not need. The limits below maintain it; it holds at every solved equilibrium of Section 5.2 but is not proved.

Proof. Two first-order channels act at a fixed vacancy stock and belong to neither the frozen direct effect, which holds $(\theta, z^*, V_{\text{vac}})$ fixed, nor the vacancy term: the bigger-deal policy raises the investor's matched value type by type, which raises V_{vac}, lowering the equity share, and it moves z^* and with it θ (at a fixed v the matching identity ties θ to the mass of searchers above z^*). Their combined effect on W is the price-and-congestion base $-A_P$, computed by re-solving the inner block $(\theta, z^*, V_{\text{vac}}, s^*(\cdot))$ at fixed v (Section 5.2); added to the frozen direct effect it gives the fixed-v gradient in (37). The indirect (vacancy) effect is $(\partial W/\partial v)\,dv/d\iota$ with $dv/d\iota = (\partial_\iota \Phi_{\text{acc}}/\delta_I + v^0_\theta \theta_\iota|_v)/(1-\lambda)$, which carries the v-response only, so there is no double count once A_P is counted separately: the first display is the chain rule $dW/d\iota = \partial W/\partial \iota|_v + (\partial W/\partial v)\,dv/d\iota$. The boundary term from $\partial_\iota z^*$ vanishes by the same zero-surplus condition $h_S(z^*) = 0$ that kills the non-founder-slot one. □

Comparing effects per present-value dollar (proof of Proposition 7). The welfare effects per present-value dollar are

$$\mathfrak{g}_E = \frac{dW/dM_v^0}{\psi_E}, \qquad \mathfrak{g}_I = \frac{r\,(dW/d\iota)}{c_\iota\,[1 - G(z^*)]}$$

(equivalently flow-for-flow with the slot cost annuitized at $r\psi_E$ — the same ratio; this is where the units factor $c_\iota[1-G(z^*)]/(r\psi_E)$ and the vacant-share factor $\tau/(q+\tau)$ of a non-founder slot of (29) enter). Substituting the two gradients, with the vacancy term truncated to the accreditation response $\partial_\iota \Phi_{\text{acc}}/\delta_I$ as in Proposition 7, and rearranging $\mathfrak{g}_E > \tilde{\mathfrak{g}}_I$ (the first-order effect of Proposition 7, in which the vacancy term is so truncated) on $A_I > 0$ gives (29), with (30) exactly the condition $\bar{\Xi}^* > 0$. □

The capital elasticity of the deal scale. The calibration takes the deal scale linear in capital, $m(z;\iota) = z\iota$ with $\iota_0 = 1$, so $\partial \ln m/\partial \ln \iota = 1$. The per-dollar solve holds the payoff law's α fixed as ι moves (the self-fattening base A_α is reported separately and is not in $\mathfrak{g}_I$), so ι enters the solved model, and W, only through the schedule $m(\cdot\,;\iota)$. Replace $z\iota$ by any scale with the same baseline schedule, $m(z;\iota_0) = z$, and a capital elasticity $\partial \ln m/\partial \ln \iota$ at ι_0 common to all types. The baseline

equilibrium is unchanged, and with it $\mathfrak{g}_E$ (the non-founder-slot policy leaves ι at ι_0) and the prices $c_\iota[1-G(z^*)]/r$ and ψ_E, fee or capital-inclusive, that turn the two gradients into effects per dollar. At ι_0 the schedule moves in the direction $\partial m/\partial\iota = (\partial \ln m/\partial \ln \iota)\, z$, that multiple of the linear scale's direction, so by the chain rule $dW/d\iota$, and with it $\mathfrak{g}_I$, is multiplied by $\partial \ln m/\partial \ln \iota$. Both effects are derivatives at the baseline, so the scaling is exact at the margin. The factor $\mathfrak{g}_E/\mathfrak{g}_I$ is therefore divided by the elasticity: the non-founder-slot policy wins per dollar while $\partial \ln m/\partial \ln \iota$ is below the factor, 7.34 at the fee-based slot price and 1.46 at the capital-inclusive slot price, and the two policies tie where the elasticity equals the factor.

The limit of large effective stakes. Multiply the exit scale by ℓ, $m \mapsto \ell m$, $\ell \to \infty$, at fixed γr and fixed equilibrium constants (the objects of Proposition 7 other than the tilt and the certainty equivalent), with $\pi_0 > 0$. *(a)* The direct bigger-deal bases other than A_P vanish exponentially (A_s conditionally): $\overline{\mathbb{E}^Q[\xi]}\, A_I = O(b^{-1}e^{-\underline{\xi} b})$ with A_I held fixed as in *(d)* below (under a literal $m \mapsto \ell m$, $A_I \propto \ell$ and the product is $O(e^{-\underline{\xi} b})$) and $A_\alpha = O(e^{-\underline{\xi} b})$ (the rates of Lemma 2 and the α-derivative at (12)); $A_s = O(e^{-\underline{\xi} b} \cdot \text{poly}) \to 0$ *provided* $\partial s^*/\partial\iota$ is polynomially bounded in the stake (true in the risk-neutral closed form (36), where it is $O(m^{-1})$, and numerically; a general large-stake bound on this share response under certainty-equivalent Nash bargaining is not claimed); A_P is not treated in this limit. *(b)* The non-founder-slot per-dollar effect is bounded away from zero: $\liminf \mathfrak{g}_E \geq W_v^\infty\, [\tau/(q+\tau)]/[(1-\lambda)\psi_E]$, where $W_v^\infty \equiv \liminf \partial W/\partial v$ along the scaling, with, on the leading-order values (18),

$$W_v^\infty \;\geq\; [1-G(z^*)]\,\frac{\rho\, h_M^\infty + \kappa}{(\rho+p)^2}\cdot\frac{dp}{dv} \;\geq\; [1-G(z^*)]\,\frac{\kappa}{(\rho+p)^2}\cdot\frac{dp}{dv} \;>\; 0, \qquad h_M^\infty \leq \frac{\tau}{\rho+\tau}\,\bar{C},$$

the search-cost term alone keeping the floor positive, with h_M^∞ the matched value h_M along the scaling. The first inequality keeps only the faster-matching channel of $\partial W/\partial v = \int_{z^*} \partial h_S/\partial v\, dG$, over the participant mass $1-G(z^*)$, and holds because the equity-share channel is nonnegative under $\Lambda_{\text{loop}} < 1$ (*The welfare gradients of the two policies* above, which also places the duration channel inside the faster-matching term); the floor is positive because $dp/dv > 0$ under $\Lambda_{\text{loop}} < 1$ (Appendix A.2, Step 4). On the exact recursion at fixed γr, (13) gives $\Delta_S \geq (r h_M + \kappa)/(r+p)$, so $\partial h_S/\partial p \geq [1 - e^{-\gamma r \kappa/(r+p)}]/[\gamma r (r+p)] > 0$; positive at every fixed γr, this floor decays along $\gamma r \to \infty$, a route this limit does not take. *(c)* The bigger-deal policy's surviving channel is its vacancy term, with two cases. At a *fixed* wealth test $\bar{w}$, as deals scale past $b = \gamma r \bar{w}/\underline{\xi}$ the wealth test stops binding type by type (the accreditation probability reaches its bound $1-\pi_0$), so of the two parts of $\partial_\iota \Phi_{\text{acc}}$, the part from the integrand of Φ_{acc} vanishes. The part from the moving cutoff, $S_{\text{acc}}(z^*) g(z^*) |\partial_\iota z^*|$, need not: $\partial_\iota z^* = -\partial_\iota h_S/\partial_z h_S$ at the cutoff, a ratio in which the tilt can cancel. If $g(z^*)\,\partial_\iota z^* \to 0$ along the scaling, the bigger-deal per-dollar effect has $\limsup \leq 0$ under the maintained $A_P \geq 0$, so the dominance of the non-founder-slot policy above a finite $\bar{b}$ needs *no* cost condition; otherwise this case reduces to the second. In the second case the wealth test binds throughout ($\bar{w}$ scaled with the deals, or a cutoff that falls along the scaling so that the marginal stake stays finite), and the comparison converges to the cost-dominance inequality (30) when $A_P \to 0$ along the scaling, and is implied by it under the maintained $A_P \geq 0$: in the limit both policies work only through vacancies, and the non-founder-slot policy recruits suppliers more cheaply iff (30) holds. *(d)* The stake $\bar{b}$ above which the non-founder-slot policy wins solves, to leading order,

$$\bar{b} \;=\; \frac{1}{\underline{\xi}}\Big[\log\frac{(1-\pi_0)\,\alpha}{\pi_0\,\bar{\Xi}^*_\infty} - \log\bar{b}\Big], \qquad \underline{\xi} = \frac{\alpha-1}{\alpha(1-\pi_0)},$$

where $\bar{\Xi}^*_\infty$ is the break-even tilt along the scaling with the equilibrium constants, A_I among them, held fixed. If A_I instead grows in proportion to the stake, as under a literal $m \mapsto \ell m$, then $b\,\bar{\Xi}^*$ tends to a constant K, the $-\log \bar{b}$ term drops, and $\bar{b} = \underline{\xi}^{-1} \log[(1-\pi_0)\alpha/(\pi_0 K)]$. Either way $\bar{b}$ is decreasing in π_0 (twice: the log prefactor and the decay rate $\underline{\xi}$), decreasing in the limiting break-even tilt ($\bar{\Xi}^*_\infty$ or the constant K), and of ambiguous sign in α ($\underline{\xi} \uparrow$ speeds the decay, the prefactor α and $(\partial W/\partial v)(\alpha)$ pull the other way). *Range of validity:* the fixed point is the $b \to \infty$ asymptote, quantitatively reliable only when $\bar{\Xi}^*_\infty$ is small enough that $\bar{b}$ is large; when the asymptotic threshold is $O(0.1\text{–}1)$ — as at the calibration's constants — the crossing falls at small stakes, where the exact tilt must be used (Section 5.2).

The limit of small effective stakes. As $b \to 0$: $\overline{\mathbb{E}^Q[\xi]} \to 1$, $A_\alpha \to 0$, $A_s \to A_s^{\mathrm{RN}}$ (the risk-neutral closed form of (36)), while A_P is carried at its small-stake value (its limit is not characterized), and W_v^0 is the small-stake value of $\partial W/\partial v$. To first order the dominance condition (29) reduces to a comparison of costs and the mean effect

$$\text{the non-founder-slot policy dominates} \iff 1+\frac{A_s^{\mathrm{RN}} - A_P}{A_I} < \frac{W_v^0}{(1-\lambda)A_I}\Big(\frac{\tau}{q+\tau}\,\frac{c_\iota[1-G]}{r\psi_E} - \frac{\partial_\iota \Phi_{\mathrm{acc}}}{\delta_I}\Big),$$

which fails — the bigger-deal policy dominates — when the bigger-deal policy is cheap enough ($c_\iota[1-G]/(r\psi_E)$ small) or the mean effect A_I large. At small stakes the tilt ($\overline{\mathbb{E}^Q[\xi]} \to 1$) and A_α drop out, A_s takes its risk-neutral value A_s^{RN}, A_P and W_v^0 stay at their small-stake values, and λ, the cost ratio $c_\iota[1-G]/(r\psi_E)$ and the accreditation response $\partial_\iota \Phi_{\mathrm{acc}}/\delta_I$ stay, so the dominance of the non-founder-slot policy at larger stakes is delivered by risk aversion and the failure probability π_0.

Remark 3 (The tilt-only benchmark). The benchmark raises ι with the equity-share schedule held at its pre-reform bargained values $s^*(\cdot\,;\iota_0)$ and the threat points held fixed, so that (29) reads $\overline{\mathbb{E}^Q[\xi]} < \bar{\Xi}^*$: it asks whether the risk discount alone ranks the policies. Here $A_s \equiv 0$ because the equity-share schedule is fixed, which a policy can do by conditioning the subsidy on unchanged equity terms; $A_P \equiv 0$ needs the vacancy value and tightness held fixed too, a convention rather than a policy. At every tail index of Table 4 the benchmark ranks the policies as the full model does. In every row of Table 3, restoring the responses moves the comparison further toward the non-founder-slot policy.

The effective stake ranks the policies. In the tilt-only benchmark, hold fixed the equilibrium constants of Proposition 7, every object in it other than the tilt and the certainty equivalent, and let the effective stake move only these two valuation objects. All types face one payoff law, so one *tilt curve* $\mathbb{E}^Q[\xi](b)$ serves every type. It falls strictly from 1 at $b = 0$ to 0 as $b \to \infty$ (Lemma 2). The *tilt-equivalent stake* $\hat{b}$ is the single effective stake that, held by every founder, reproduces the economy's average tilt,

$$\mathbb{E}^Q[\xi](\hat{b}) = \overline{\mathbb{E}^Q[\xi]}.$$

The mean stake cannot serve, because a founder's discount depends on her effective stake nonlinearly. The *break-even curve*

$$\Xi(b) \equiv \bar{\Xi}^*\,\frac{\rho h_M(b) + \kappa}{\rho h_M(\hat{b}) + \kappa}, \qquad h_M(b) = \tfrac{\tau}{\rho+\tau}\ \mathrm{CE}(b),$$

is the break-even tilt the economy would face if every founder held effective stake b, scaled to pass through $\bar{\Xi}^*$ at $\hat{b}$. When $\bar{\Xi}^* > 0$ the curve rises with the effective stake: only the welfare value

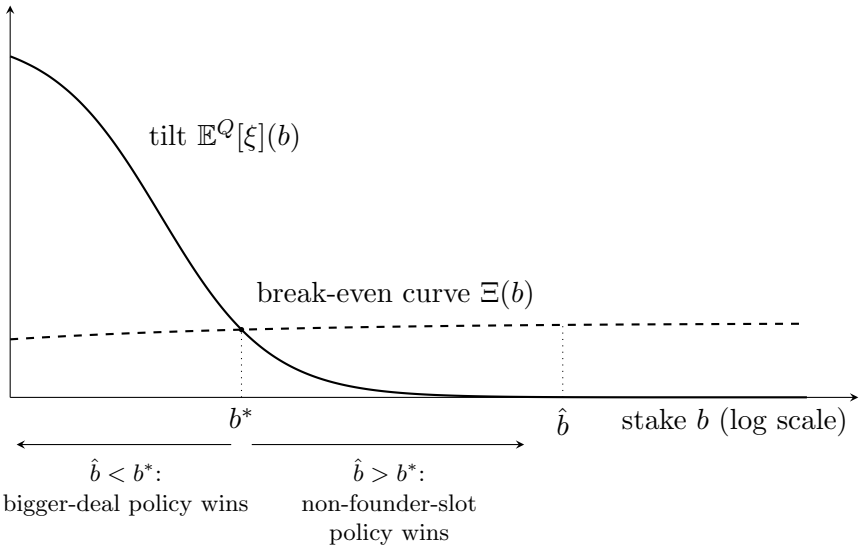


Figure A.1: The founder's effective stake ranks the policies (schematic; logarithmic stake axis).

of a vacancy moves, because a founder with a larger effective stake holds a match worth more in certainty-equivalent terms and benefits more from matching sooner (18). The *crossing stake* b^* is where the two curves meet, $\mathbb{E}^Q[\xi](b^*) = \Xi(b^*)$. When $\hat{b} > b^*$, the ratio $\hat{b}/b^*$ measures how far founders' effective stakes would have to fall, their match values falling with them, before the bigger-deal policy wins. The reading is exact when founders are identical and a heuristic otherwise.

Corollary 1 (*The founder's effective stake ranks the policies; proof below*). *In the tilt-only benchmark of Remark 3, with the equilibrium constants fixed, suppose the crossing stake b^* exists; otherwise one policy wins at every effective stake. Then: (i) the non-founder-slot policy wins, $\overline{\mathbb{E}^Q[\xi]} < \bar{\Xi}^*$, if and only if $\hat{b} > b^*$; (ii) if the effective stake of every founder who searches exceeds b^*, the non-founder-slot policy wins, and if every one falls below b^*, the bigger-deal policy wins.*

This ranking is partial equilibrium. Because Ξ is scaled to pass through $\bar{\Xi}^*$ at $\hat{b}$, comparing $\hat{b}$ with b^* restates (29) in the benchmark; it does not separate risk from supply.

With the equilibrium constants fixed and $\bar{\Xi}^* > 0$, a rise in every founder's effective stake lowers the average tilt and raises the break-even tilt, so it moves the benchmark toward the non-founder-slot policy (Figure A.1). A larger equity share therefore favours the non-founder-slot policy, the bigger-deal policy weakens its own case as it grows, and secondary sales and partial cash-outs, which lower the equity share, favour the bigger-deal policy. The direction is proved in the benchmark only, through the effective stake alone: along the full path of ι the mean effect A_I, the investor's effective stake and the cost c_ι move as well, and the benchmark signs neither these nor the net effect of risk aversion.

The benchmark at the calibration. On the tilt-only benchmark, the non-founder-slot policy wins at the baseline calibration: the average tilt $\overline{\mathbb{E}^Q[\xi]} = 0.018$ lies below the break-even tilt $\bar{\Xi}^* = 0.179$, the break-even curve at the tilt-equivalent stake $\hat{b} = 2.76$.

The same verdict can be read in effective stakes. The two curves of Corollary 1, the tilt curve and the break-even curve, cross at the stake $b^* = 0.0091$, and $\hat{b}$ is 303 times b^*. The verdict would reverse only if the tilt-equivalent stake were overstated by this ratio. The ratio is large for two reasons. Near $\alpha = 1$ the tilt falls only with the logarithm of the stake, at a rate of order $\alpha - 1$ per

log unit. Meanwhile the break-even curve barely moves. It moves with the stake only through the founder's benefit from matching sooner: the flow value of her match plus the search cost she saves. The matched value is bounded by the risk ceiling and is small next to the search cost. A gap in tilts is therefore a far larger gap in stakes.

Two rough checks show how large the ratio is. The effective stake is risk aversion times the founder's claim, $b = \gamma r\, sm$, so it is proportional to σ/W_E, because $\gamma r = \sigma U/W_E$. The mean estimate of Chetty [2006], $\sigma = 1$ instead of 1.5, divides $\hat{b}$ by 1.5, and a founder wealth twice the claim halves it. Both fall far short of a factor of 303.[24] Read the other way, the verdict reverses only for a founder whose wealth is 303 times W_E, about \$1.7 billion. The bigger-deal policy wins only for a founder already rich enough to be nearly risk-neutral over the startup.

The crossing stake. Assume the small-stake condition fails at $b \to 0$, so that the bigger-deal policy wins there, and $\pi_0 > 0$ with cost dominance (or a fixed wealth test under the proviso of case (c)). Then $\mathfrak{g}_I - \mathfrak{g}_E$ is positive near 0 and negative for all sufficiently large b (above $\bar{b}$ to leading order, using the maintained $A_P \geq 0$), and by continuity a crossing $\tilde{b}$ exists: taking $\tilde{b}$ to be the largest crossing (it exists, since the difference is continuous, positive near 0 and negative for all large b), the non-founder-slot policy dominates at every stake above $\tilde{b}$, and $\tilde{b} \leq \bar{b}$ to leading order. Uniqueness of $\tilde{b}$ is *not* a theorem in general — the bigger-deal vacancy term can rise in b — but it holds provably in the tilt-only benchmark of Corollary 1 ($A_s \equiv A_P \equiv 0$, $\alpha' \equiv 0$), where $\tilde{b} = b^*$ and the difference is $\Xi(b) - \mathbb{E}^Q[\xi](b)$ with the tilt strictly decreasing and the break-even curve strictly increasing (a decreasing curve crosses an increasing one at most once; the benchmark with a flat break-even tilt $\bar{\Xi}^*$ is the special case that holds the break-even curve constant, and it gives the same verdict at the tilt-equivalent stake $\hat{b}$ since $\Xi(\hat{b}) = \bar{\Xi}^*$ and $\mathbb{E}^Q[\xi](\hat{b}) = \overline{\mathbb{E}^Q[\xi]}$). □

The break-even curve rises and levels off (Corollary 1). The break-even curve $\Xi(b)$ defined before Corollary 1 rescales $\bar{\Xi}^*$ by the faster-matching part of (18) at the frozen meeting rate, with the equity share and λ held at their equilibrium values, so that $\Xi(\hat{b}) = \bar{\Xi}^*$. On the exact recursions (13), implicit differentiation gives $dh_M/d\,\mathrm{CE} = \tau e^{-\gamma r \Delta_M}/(r + \tau e^{-\gamma r \Delta_M}) \in (0,1)$, $dh_S/dh_M = pe^{-\gamma r \Delta_S}/(r + pe^{-\gamma r \Delta_S}) \in (0,1)$, and hence $d\Delta_S/dh_M = r/(r + pe^{-\gamma r \Delta_S}) > 0$; with $d\,\mathrm{CE}\,/db = \mathbb{E}^Q[\xi]/(\gamma r) > 0$ (Lemma 2) the chain $b \uparrow \Rightarrow \mathrm{CE} \uparrow \Rightarrow h_M \uparrow \Rightarrow \Delta_S \uparrow$ is strict at every b. The exact gradient $\partial h_S/\partial p = [1 - e^{-\gamma r \Delta_S}]/[\gamma r(r + pe^{-\gamma r \Delta_S})]$ is strictly increasing in Δ_S (the numerator rises, the denominator falls), so the break-even curve is strictly increasing in b; it saturates because Δ_S is bounded ($h_M \leq \frac{\tau}{r+\tau}\bar{C}$, (20)). The leading-order form used for the reported curve follows from (18): at frozen p the factor $(\rho + p)^{-2}$ is constant and the numerator $\rho\, h_M(b) + \kappa$ is affine in $h_M(b)$, strictly increasing and saturating at $\rho\frac{\tau}{\rho+\tau}\bar{C} + \kappa$. The cross-partial is $\partial^2 h_S/\partial p\, \partial b = \partial_{\Delta_S}\big[\partial h_S/\partial p\big] \cdot d\Delta_S/db > 0$, the product of the two positive factors above. Since $\Xi(b)$ has the stake-free sign of $\bar{\Xi}^*$ (the bracket of (30)) and, when positive, rises continuously from $\Xi(0^+)$, while $\mathbb{E}^Q[\xi](b)$ falls continuously from 1 to 0, the difference $\Xi(b) - \mathbb{E}^Q[\xi](b)$ has a root iff $\bar{\Xi}^* > 0$ and $\Xi(0^+) < 1$, and at most one; at the tilt-equivalent stake $\mathbb{E}^Q[\xi](\hat{b}) = \overline{\mathbb{E}^Q[\xi]}$ and $\Xi(\hat{b}) = \bar{\Xi}^*$, so $\overline{\mathbb{E}^Q[\xi]} < \bar{\Xi}^* \iff \hat{b} > b^*$. This is part (i) of Corollary 1. Without a root one policy wins at every stake. If $\bar{\Xi}^* \leq 0$, then $\Xi(b) \leq 0 < \mathbb{E}^Q[\xi](b)$ at every b and the bigger-deal policy wins; setting $b^* \equiv \infty$ keeps both equivalences. If $\Xi(0^+) \geq 1$, then $\Xi(b) > 1 > \mathbb{E}^Q[\xi](b)$ at every $b > 0$ and the non-founder-slot policy wins; setting $b^* \equiv 0$ keeps them. For part (ii), the weights $\frac{p}{\rho+p}\frac{\tau}{\rho+\tau}\, s^*(z)\, m_\iota(z;\iota)\, dG(z)$ that define $\overline{\mathbb{E}^Q[\xi]}$ are positive, since the equity share is interior (Definition 1(i)) and $m_\iota > 0$ (Section 2.3), so divided by A_I they form a probability measure on the participating types $z \geq z^*$. Let the crossing exist, so that b^* is finite.

[24] At $\sigma = 1$ the product γr lies inside the grid of Table A.2, and the non-founder-slot policy wins at every value of γr in that grid.

If $b(z) > b^*$ for every $z \geq z^*$, the tilt is strictly decreasing, so $\mathbb{E}^Q[\xi](b(z)) < \mathbb{E}^Q[\xi](b^*)$ type by type, and averaging under that measure gives $\mathbb{E}^Q[\xi](\hat{b}) = \overline{\mathbb{E}^Q[\xi]} < \mathbb{E}^Q[\xi](b^*)$; hence $\hat{b} > b^*$, and part (i) gives the non-founder-slot policy. If $b(z) < b^*$ for every $z \geq z^*$, the same steps give $\hat{b} < b^*$, and the bigger-deal policy wins. □

A.6 Proofs of Main-Text Results

Lemma 1 (main text).

Proof sketch. The exponential form (9) is the standard CARA guess: with linear budget dynamics and $\rho = r$, optimal consumption is $c^*(w) = rw + \text{const}$ and substituting into the HJB verifies that (9) solves it (full derivation: Appendix A.1); that this solution *is* the value function is the standard CARA verification argument (a C^2 candidate, the admissible annuitized policy $c^* = r(w + h_\varsigma)$, and the transversality condition along it), as in Miao and Wang [2007], which I assume rather than reproduce. For the lemma's claim about a lottery L, because V_ς is exponential in w, the expected post-lottery value factors as $\mathbb{E}[V_\varsigma(w + L)] = V_\varsigma\big(w + \text{CE}(L)\big)$ whenever $\mathbb{E}[e^{-\gamma r L}] < \infty$ (automatic for $L \geq 0$, the only case used), which defines the lemma's $\text{CE}(L)$ and shows it is additive in w. The no-wealth-effect property of CARA is exactly the statement that $\text{CE}(L)$ does not depend on w. □

Theorem 1 (main text).

Proof. See Appendix A.3: its first paragraph derives the leading-order statements, steps (i)–(iv) prove the ceiling and the exact-recursion versions, and step (v) treats the case with the accreditation option priced. □

Proposition 3 (main text).

Proof. In (23) the left side is decreasing in s (the numerator $\partial_s h_M$ falls by the concavity of h_M in s (Appendix A.2, Step 0), automatic with the accreditation option unpriced, while the denominator $h_M - h_S$ rises) and the right side is increasing in s, so the crossing s^* is unique. A rise in h_S shifts the left side up pointwise, moving the crossing to a larger s^*; a fall in V_{vac} shifts the right side down pointwise, also raising s^* — under (21) the surplus responds with coefficient $\partial\sigma_F/\partial V_{\text{vac}} = -\rho/(\rho + \tau)$, so this channel is damped by $\rho/(\rho + \tau)$ relative to a pure outside-option shift, but its sign is unchanged. Since p is increasing and q decreasing in θ, and h_S rises with p (Appendix A.1) while V_{vac} rises with q (from (24) and (21): at a fixed equity share and cutoff, $V_{\text{vac}} = [q\tau\bar{E}_F - c(\rho+\tau)]/[(\rho+\tau)(\rho+\delta_I)+q\rho]$, with $\bar{E}_F$ the mean of CE_F^{div} over participating types, so $\partial V_{\text{vac}}/\partial q = (\rho+\tau)[\tau\bar{E}_F(\rho+\delta_I)+c\rho]/[(\rho+\tau)(\rho+\delta_I)+q\rho]^2 > 0$), s^* is increasing in θ. A larger measure of investor slots raises θ at a fixed cutoff: $n_F = [1 - G(z^*)]/\tau$ is unchanged, so $v = M_v - n_F$ rises, and $\theta = (A_m v/[1 - G(z^*)])^{1/\eta}$ rises with v. With the cutoff adjusting, substituting $v = M_v - n_F$ into this expression for θ gives $\theta^\eta[1 - G(z^*(\theta))] + A_m[1 - G(z^*(\theta))]/\tau = A_m M_v$; under an inner-loop gain $\Lambda_{\text{loop}} < 1$ the cutoff $z^*(\theta)$ is decreasing (Appendix A.2, Steps 2 and 4), so the left side is strictly increasing in θ and θ rises with M_v. The statement concerns the equilibrium equity share, and h_S and V_{vac} themselves respond to s^*; both induced responses reinforce the direct effect ($s^* \uparrow \Rightarrow h_M \uparrow \Rightarrow h_S \uparrow$, and $s^* \uparrow \Rightarrow \text{CE}_F^{\text{div}} \downarrow \Rightarrow V_{\text{vac}} \downarrow$) and are contractions (Appendix A.2, Steps 0–1), so the total effect carries the direct sign. □

Proposition 5 (main text).

Proof (sketch; details in Appendix A.2). Step 0 (per-type bargaining). At fixed (θ, V_{vac}), for each type z the pair $(s^*(z), h_S(z))$ is the unique fixed point of a per-type contraction: the pass-through of each side's threat point into its own matched value, through the equity share, is bounded by $(1-\beta)\rho/(\rho+\tau)$ (investor, the annuity factor of (21)) and β (founder), so the per-type loop $h_S \mapsto s^* \mapsto h_M \mapsto h_S$ has gain at most $\frac{p}{\rho+p}\beta < 1$. *Step 1 (price of VC capital).* Substituting s^* into (24) gives a self-map in V_{vac} with modulus $\ell_V \equiv \frac{q}{\rho+\delta_I+q}\left[\frac{\tau}{\rho+\tau} + \frac{(1-\beta)\rho}{(\rho+\tau)(1-\beta p/(\rho+p))}\right] < 1$ (Appendix A.2, Step 1): total pass-through of the investor's threat point into its matched value — the slot's return to vacancy when the startup resolves plus the effect through the equity share, the latter inflated by the per-type feedback of Step 0 from h_S to s^* — is strictly below one because $(1-\beta)/(1-\beta p/(\rho+p)) < 1$. *Step 2 (cutoff and price at fixed θ).* The joint cutoff–price map is isotone on a product lattice, so its fixed-point set is a nonempty complete lattice (Knaster–Tarski), decreasing in θ — the inner loop between the cutoff and the price. *Step 3 (existence).* Given v, tightness is the closed form $\theta = (A_m v/[1-G(z^*)])^{1/\eta}$; appending an update of v that follows the scarcity rent within its bounds, whose fixed points are exactly the complementary-slackness configurations (25), gives a continuous self-map of a compact box, and Brouwer's theorem yields existence — no monotonicity and no stability condition (the composed cutoff map is *not* globally monotone once tightness responds, which is why the argument is topological). *Step 4 (uniqueness).* If the inner-loop gain satisfies $\sup \Lambda_{\text{loop}} < 1$ on the box of Step 3 the cutoff–price block is a contraction, hence single-valued; the outer vacancy map $T(v)$ then has slope $\lambda = \lambda_{\text{rec}} + \lambda_0$ on the branch where accredited investors are scarce, 0 on the interior price-binding branch, and $\lambda_0 \le \lambda$ on the non-founder-only corner branch, so $\sup_v \lambda < 1$ makes $T - \text{id}$ strictly decreasing and the equilibrium unique (with the accreditation option priced, where $\varpi > 0$, single-valuedness of the inner block also uses the rent–option contraction of Remark 2). At an equilibrium where $\Lambda_{\text{loop}} < 1$ and $\lambda < 1$, the equilibrium is locally unique by the implicit function theorem (Appendix A.2, Step 4). □

A.7 Four Primitives on a Grid

Wherever accredited investors are scarce on these grids, the non-founder-slot policy buys founders more welfare per dollar of government spending than the bigger-deal policy. Table A.2 reports the grids of Section 5.6. Each primitive varies alone, with the other calibrated constants at the baseline, so each solved row is a comparative static and the rows away from the baseline miss the calibration targets.

A.8 One Constant at a Time

No one-at-a-time change from the baseline reverses the ranking of the policies by founder welfare per dollar. Table A.3 reports the one-at-a-time sweep of Section 5.6: each constant moves alone, with the other calibrated constants at the baseline.

A.9 Recycling and the Lead of the Non-Founder-Slot Policy

Compared with a founder-investor pool frozen at its baseline size, recycling widens the lead of the non-founder-slot policy, the ratio $\mathfrak{g}_E/\mathfrak{g}_I$ of founder-welfare effect per dollar from it to that from the bigger-deal policy, wherever the paper evaluates the exact condition below. Holding the founder-investor pool $\Phi_{\text{acc}}/\delta_I$ fixed in (27) removes the recycling part λ_{rec} of the loop gain, and it removes

Table A.2: The non-founder-slot policy buys founders more welfare per dollar than the bigger-deal policy on every solved row of the four grids where accredited investors are scarce

						total welfare turns to the bigger-deal policy	
primitive	grid	baseline value	$1/(1-\lambda)$	Λ_{loop}	price binds	gross	net
$\sigma_{\log z}$	1.126–1.523	1.324	2.03–2.13	0.81–0.97	never	never	never
n	2–5.5	2.893	1.70–3.37	0.56–0.90	above (5.25, 5.281)	above (3.859, 3.875)	above (4.517, 4.8)
δ_I	0.03–0.12	0.08696	1.91–3.38	0.57–0.89	below (0.03469, 0.035)	below (0.05688, 0.05703)	below (0.04, 0.05)
γr	0.268–1.753	0.5351	2.11–2.30	0.64–0.90	never	never	never

Notes. Each primitive varies alone over its grid; the other calibrated constants stay at the baseline. $1/(1-\lambda)$, the supply multiplier, and Λ_{loop}, the inner-loop gain: ranges over the solved rows where accredited investors are scarce. Price binds: the bracket past which the price of VC capital, not the number of accredited investors, limits supply and the multiplier is off. Total welfare (Definition 2): the bracket past which the total-welfare ranking turns to the bigger-deal policy, gross and net, where net counts only the investor's gain from the current deal. Each bracket gives the two adjacent solved values of the primitive between which the label changes. Every ranking is per dollar at the fee-based slot price.

Table A.3: No single constant reverses the per-dollar ranking

		$\alpha = 1.03$		$\alpha = 1.18$	
Scenario	Value	$\mathfrak{g}_E/\mathfrak{g}_I$	$1/(1-\lambda)$	$\mathfrak{g}_E/\mathfrak{g}_I$	$1/(1-\lambda)$
pin		7.34	2.11	19.1	4.29
$\gamma r \times \frac{1}{2}$	0.268	6.55	2.12	16.9	3.98
$\gamma r \times 2$	1.07	8.54	2.19	21.1	5.02
τ	5.0%/yr	4.63	1.97	16.0	3.71
τ	6.4%/yr	5.48	2.01	16.7	3.87
τ	8.0%/yr	6.36	2.05	18	4.07
$A_m + 25\%$	4.12	7.28	2.05	19.3	4.27
$A_m - 25\%$	2.47	7.55	2.20	18.9	4.30
$\kappa + 25\%$	0.0613	7.41	2.15	19.1	4.30
$\kappa - 25\%$	0.0368	7.27	2.07	19.2	4.28
$c + 25\%$	0.274	7.37	2.13	18.8	4.30
$c - 25\%$	0.164	7.33	2.10	19.4	4.28
$\sigma_{\log z} + 25\%$	1.66	8.68	2.12	23.0	4.18
$\sigma_{\log z} - 25\%$	0.993	6.26	1.93	15.2	4.37
δ_I	0.04/yr	6.23	2.91	price binds	
δ_I	0.10/yr	7.4	2.01	20.1	3.95
n_D	20	7.12	1.88	26.3	3.35

Each row moves one constant from the baseline (the row labeled "pin"); the other calibrated constants stay at the baseline, in the $\alpha = 1.18$ columns too. $\mathfrak{g}_E/\mathfrak{g}_I$: the ratio of the effect per dollar from the non-founder-slot policy to that from the bigger-deal policy, at the fee-based slot price; $1/(1-\lambda)$: the supply multiplier; price binds: the price of VC capital, not the number of accredited investors, limits supply, and the per-dollar comparison is not defined.

from a bigger deal's vacancy shock T_ι in (31) the term $\partial_\iota \Phi_{\text{acc}}/\delta_I$, the new investors the deal creates:

$$\frac{dv}{dM_v^0}\Big|_{\Phi_{\text{acc}}\ \text{fixed}} = \frac{\tau/(q+\tau)}{1-\lambda_0}, \qquad \frac{dv}{d\iota}\Big|_{\Phi_{\text{acc}}\ \text{fixed}} = \frac{v_\theta^0\,\theta_\iota|_v}{1-\lambda_0}. \tag{38}$$

Recycling leaves the direct part of (31) alone. It raises the effect of a dollar spent on non-founder slots by the ratio $(1-\lambda_0)/(1-\lambda)$, which lies below the full multiplier $1/(1-\lambda)$ when $\lambda_0 > 0$, as at the baseline, because the frozen pool keeps the part λ_0 of the loop gain. For a bigger deal, recycling both multiplies the vacancy shock by the recycling loop and adds the term $\partial_\iota \Phi_{\text{acc}}/\delta_I$ to the shock itself. Let the deal's effect at a fixed vacancy stock, $\partial W/\partial \iota|_v$, be positive and let $\lambda_{\text{rec}} > 0$, as at every solved row. The following condition on the gradients is then exact: recycling widens the lead of the non-founder-slot policy if and only if

$$\varkappa_\iota \equiv \frac{(\partial W/\partial v)\,\partial_\iota \Phi_{\text{acc}}/\delta_I}{\lambda_{\text{rec}}\,\partial W/\partial \iota|_v} < 1,$$

that is, if the welfare value of the investors added by the extra exits a bigger deal lifts over the wealth test is smaller than λ_{rec} times the deal's effect at a fixed vacancy stock. The term $v_\theta^0 \theta_\iota|_v$ in (38) cancels because the deal's vacancy shock contains it with and without recycling. At the calibrated exit sizes $\varkappa_\iota = 0.765$, and it is 0.726 and 0.248 at the $\alpha = 1.18$ and $\alpha = 1.8$ rows. It stays below one across the sampling uncertainty in the measured payoff law (α, π_0): at the corners where each parameter sits at the 2.5% or 97.5% quantile of its sampling distribution (where $\varkappa_\iota$ lies in 0.715–0.809), and at every solved tail index from $\alpha = 1.03$ to 2.1 (at most 0.832, at $\alpha = 1.1$).

A.10 Calibration Details

Book breadth. Evaluating risk aversion at what each side holds in one deal (the founder's claim, the fund's check), not at either side's total wealth, is a convention: the investor, a partner acting for a fund, prices a deal at the fund's scale, on behalf of pooled capital. The book breadth n_D implements this convention. Under CARA, holding an equal $1/n_D$ share in each of n_D independent claims is equivalent to holding one whole claim at absolute risk aversion $\gamma r/n_D$,

$$\text{CE}_F^{\text{div}}(z, s; \iota) = \text{CE}_{\gamma r/n_D}\left[(1-s)\, m(z;\iota)\, \xi\right], \qquad \text{CE}_a[Y] \equiv -\tfrac{1}{a}\log \mathbb{E}\left[e^{-aY}\right].$$

The slot count. In the model, only investor-backed startups depend on the number of accredited investors. The model counterpart of the measured 2% is therefore the fall in investor-backed entry times the share of new businesses that are investor-backed. The estimate of Lindsey and Stein [2026] compares states that lost more accredited households with states that lost fewer, and the households that lost status were those whose home equity had carried them over the test. That shock changed who qualifies, not founders' exit wealth. Founders' stakes and the search cutoff respond to the stricter wealth test, so the model's counterpart is an equilibrium response, not one with founders' claims held fixed. With one slot per accredited investor, ε_{acc} falls well short of one.

Of the two values of n that yield the measured fall in entry (Section 4), the second carries the economy into the price-binding regime (Proposition 6). In that regime the value of a vacant slot V_{vac}, which is the price of venture capital in the model, limits supply, not the number of accredited investors. There the local response of entry to the number of accredited investors is zero. At the first value, accredited investors are scarce (their number limits supply), the multiplier operates, and both feedback gains at the solved equilibrium are below one (Section 3.5): the loop gain λ, and the inner-loop gain Λ_{loop}. The quantitative results therefore describe the regime in which accredited

investors are scarce.

The two departures from the analytic supply condition. The quantitative model changes the slots supplied by founder-investors (Section 2.3) in two ways, both needed by the calibration.

First, each founder-investor supplies n slots rather than one. Newly accredited investors therefore add to the founder-investors' stock of vacant slots, v^R, at rate $n\Phi_{\text{acc}}$. The slot count is the parameter set to match the entry response.

Second, an investor can leave the VC market while its deal is still open. In Section 2.3 an investor leaves only while its slot is vacant, which keeps the analytic model tractable. The calibration cannot keep that timing. The rate δ_I is read from fund-life data, so it is a rate in calendar time. An investor who could leave only while its slot is vacant, a small share of its time, would at that rate stay in the market far longer than any fund lasts. Letting it leave mid-deal makes δ_I a calendar-time rate. An investor who leaves keeps its claim to the exit but gives up the vacancy value V_{vac} it would recover by staying. A matched slot therefore ends at rate $\tau+\delta_I$. It returns to vacancy, at rate τ, only if its startup resolves before its investor leaves. A vacant slot of a founder-investor ends at rate δ_I+q, with q its meeting rate. Constant (stationary) stocks of vacant and matched slots, together with this valuation, give

$$
\begin{aligned}
&0 \le v^R \le \frac{n\,\Phi_{\text{acc}}}{\delta_I+(1-\chi_x)\,q(\theta)}, \qquad h_M^F(z;s)=\frac{\tau}{\rho+\tau}\big(\,\text{CE}_F^{\text{div}}(z,s)+\chi_v\,V_{\text{vac}}\big),\\
&\chi_x \equiv \frac{\tau}{\tau+\delta_I}, \qquad \chi_v \equiv \frac{\rho+\tau}{\rho+\tau+\delta_I}, \qquad M_v-M_v^0 = v^R\Big(1+\frac{\chi_x\,q(\theta)}{\tau}\Big),
\end{aligned}
\tag{39}
$$

with h_M^F the investor's value of a matched slot and $M_v-M_v^0$ the number of slots supplied by founder-investors. Here χ_x is the probability that the investor is still in the market when its startup resolves. The factor χ_v discounts V_{vac}, which the investor recovers only if it stays: the exit claim is discounted by $\tau/(\rho+\tau)$, V_{vac} by $\tau/(\rho+\tau+\delta_I)=\chi_v\,\tau/(\rho+\tau)$.

The structure carries over. At $n=1$ and $\chi_x=\chi_v=1$, (39) is the bound in (25), the matched value (21) and the slot identity that follows (25). Complementary slackness holds at the new bound, and the vacancy value (24) keeps its form. The two regimes are therefore defined as in Section 2.3: one where accredited investors are scarce, and the price-binding one. Two things change. First, where accredited investors are scarce, the slots supplied by founder-investors number $n\Phi_{\text{acc}}/\delta_I$. This level is set by the entry target, not by how investors leave, because n is set to match that target with investors leaving both while vacant and mid-deal. Second, the recycling part λ_{rec} of the loop gain λ, the part that runs through newly accredited investors, also responds through the meeting rate $q(\theta)$ in matched spells, a channel the closed forms do not have.

The selection feedback. The inner loop is a selection feedback. A lower cutoff z^* admits founders whose ideas are worse than the average searcher's. That lowers what an investor expects from a match, and so lowers the price of venture capital V_{vac}. A lower price raises the equity share and draws still more founders into search. The strength of this loop is the hazard rate of idea quality at the cutoff (the density of founders at the cutoff relative to the share above it) times how far the marginal founder sits below the average searcher. Wider dispersion moves both, and on net Λ_{loop} rises with it (Table A.2). As in Restuccia and Rogerson [2008] and Buera and Shin [2013], the dispersion of an unobserved productivity distribution is set to match a size distribution in the data. Unlike in those papers, the tail of outcomes here comes from the payoff shock, so the dispersion acts on which founders choose to search.

A.11 The Policy Changes in Full

Table A.4 reports each promoting change of Section 5.4, and its reverse, with where its response comes from and what it costs.

Table A.4: Where each promoting change's response comes from and what it costs.

Notes: Promoting changes and shared columns as in Table 7; each promoting change is also reversed. Supply response: the part of ΔW that runs through the supply of slots, one minus the direct part; of which recycling: the part that switching recycling off removes, with the part λ_0 of the loop gain left on, of ΔW and of ΔV_{exit}. Government spending: what the change costs the government a year at the fee-based slot price, in $ thousand per unit mass of founders; the lower-threshold policy costs the government nothing. Fee and capital: per $ at the fee-based and capital-inclusive slot prices (Section 5.6). Equal cost to the government: the bigger-deal policy scaled to the non-founder-slot policy's cost.

	what the change does			where it comes from (% of the response)							what it costs				
	ΔW	ΔV_{exit}	$\Delta(1-G(z^*))$	new entrants		supply	of which recycling		searching founders' ΔW via		public outlay	exit value per $		welfare (CE $) per $	
lever and change	(%)	(%)	(%)	of ΔW	of ΔV_{exit}	response, of ΔW	of ΔW	of ΔV_{exit}	s^*	ι	($ thousand a year)	fee	capital	fee	capital
Calibrated exit sizes ($\alpha = 1.03$)															
promoting															
accreditation bar, $\bar{w} - 5\%$	+2.01	+0.89	+2.65	2.6	99.8	100.0	100.0	100.0	98	0	free	—	—	—	—
seeded slots, $M_v^0 + 5\%$	+2.90	+1.28	+3.84	3.8	99.8	100.0	51.2	50.9	98	0	21.74	1.48	0.294	0.0531	0.0106
capital per deal, $\iota + 5\%$	+4.15	+5.70	+1.93	0.7	12.0	52.7	46.8	15.5	22	71	226.6	0.629	0.629	0.00727	0.00727
tightening															
accreditation bar, $\bar{w} + 5\%$	−1.85	−0.84	−2.42	2.5	99.8	100.0	100.0	100.0	98	0	free	—	—	—	—
seeded slots, $M_v^0 - 5\%$	−2.97	−1.35	−3.88	4.0	99.8	100.0	52.1	52.5	98	0	−21.74	1.55	0.310	0.0543	0.0108
capital per deal, $\iota - 5\%$	−4.20	−5.66	−1.98	0.7	12.0	50.4	44.7	14.7	22	72	−226.6	0.625	0.625	0.00736	0.00736
equal cost to the government															
capital per deal, $\iota + 0.48\%$ (same cost as seeded slots)	+0.40	+0.55	+0.19	0.1	11.7	51.7	45.9	15.1	23	71	21.74	0.627	0.627	0.00731	0.00731
Company tail ($\alpha = 1.18$)															
promoting															
accreditation bar, $\bar{w} - 5\%$	+1.88	+0.53	+2.22	4.1	99.0	100.0	100.0	100.0	97	0	free	—	—	—	—
seeded slots, $M_v^0 + 5\%$	+2.94	+0.82	+3.46	6.2	99.0	100.0	75.4	75.0	97	0	21.74	1.14	0.230	0.176	0.0355
capital per deal, $\iota + 5\%$	+2.96	+5.42	+1.60	1.5	7.4	75.3	70.7	11.3	39	56	421.2	0.388	0.388	0.00915	0.00915
tightening															
accreditation bar, $\bar{w} + 5\%$	−1.77	−0.51	−2.07	3.9	99.0	100.0	100.0	100.0	97	0	free	—	—	—	—
seeded slots, $M_v^0 - 5\%$	−3.01	−0.88	−3.52	6.6	99.0	100.0	76.0	76.4	97	0	−21.74	1.22	0.246	0.180	0.0363
capital per deal, $\iota - 5\%$	−3.07	−5.41	−1.69	1.5	7.6	75.3	70.4	11.2	39	55	−421.2	0.387	0.387	0.00950	0.00950
equal cost to the government															
capital per deal, $\iota + 0.26\%$ (same cost as seeded slots)	+0.16	+0.28	+0.08	0.1	7.3	75.3	70.6	11.2	40	55	21.74	0.388	0.388	0.00931	0.00931

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