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The Spirit of Capitalism, Entrepreneurship, and Talent Allocation*

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This paper develops a theoretical model to explore the impact of the spirit of capitalism (SOC) on entrepreneurship and the allocative efficiency of talent. In the presence of financial frictions, both individual abilities and wealth play crucial roles in shaping occupational choices. Consequently, individuals with a stronger SOC are more inclined towards entrepreneurship. However, this heightened entrepreneurial activity leads to allocative inefficiencies in talent allocation, as some wealthy but less skilled individuals pursue entrepreneurial ventures. Mitigating financial frictions serves to enhance overall productivity by rectifying this inefficiency, though its influence on entrepreneurship remains uncertain. Conversely, increasing the fraction of individuals with higher SOC yields non-monotonic effects on both aggregate productivity and entrepreneurship. The calibrated model introduces a novel perspective on the decline in entrepreneurship witnessed in the U.S. and other advanced economies over recent decades.

Key Words: Spirit of capitalism; Entrepreneurship; Talent allocation; Occupational choice.
JEL Classification Numbers: J24, O15, O16.

1. INTRODUCTION

Entrepreneurship, whether measured by entry rates or the proportion of the population engaged, has exhibited a documented decline since the 1980s in the U.S. and other advanced economies[1]. This trend has captured the attention of macroeconomists, yet consensus remains elusive regard-

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[1]For comprehensive evidence concerning the U.S., see Hathaway and Litan (2014a), Goldschlag and Tabarrok (2018), Hopenhayn, Neira and Singhania (2018), and Salgado (2019). Regarding other high-income economies, consult Calvino, Criscuolo and Menon

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ing the causes and consequences[2]. A natural exploration involves delving into the literature on occupational choices, where agents decide between working as employees or pursuing entrepreneurship (Buera, Kaboski and Shin 2015 offer a comprehensive review of such models). However, existing models in this category often link occupational choices to financial frictions (drr Evans and Jovanovic 1989, Cagetti and De Nardi 2006, Buera and Shin 2013, among others). In these models, a decline in entrepreneurship typically results from credit contraction, which contradicts the prevailing economic conditions during much of the observed decline period (see Unel 2020). Moreover, if tightened financial frictions were a contributing factor, the model would predict an increase in real interest rates, a trend incongruent with U.S. data and thus unable to account for the decline in entrepreneurship.

This paper introduces a novel occupational choice model that allows for variations in the entrepreneur share, representing the proportion of entrepreneurs in the population, independent of credit constraint tightness. Additionally, our model posits that a credit expansion can lead to either an increase or decrease in the entrepreneur share, contingent upon the initial tightness of the credit constraint. This unique feature renders our model more aligned with empirical observations on entrepreneurship, presenting a distinctive mechanism that supplements conventional occupational choice models.

> The new feature we introduce to the occupational choice model is the spirit of capitalism (SOC), often conceptualized as a preference for wealth accumulation. This conceptualization draws inspiration from the work of Michaillat and Saez (2021) and Michaillat and Saez (2022), who incorporate wealth into the utility function within the New Keynesian framework, preserving the model's tractability while unveiling new properties. Notably, these studies offer a concise yet insightful exploration of integrating wealth into households' preferences, positing that wealth is a social status marker, directly contributing to individuals' utility. In our approach, we adopt a similar perspective, where wealth becomes a proxy for the spirit of capitalism, aligning with the concept introduced by Weber (1958). In this context, individuals derive enjoyment not only from the consumption facilitated by wealth but also from the act of wealth accumulation itself:

(2015) Ugur, Trushin and Solomon (2016), Bijnens and Konings (2018), and Naudé (2019).

[2]As articulated in Decker et al. (2014): "We do not yet fully understand the causes of the decline in indicators of business dynamism and entrepreneurship, nor, in turn, their consequence." Regrettably, this situation has not markedly improved since then.

> "*In fact, the summum bonum of his ethic, the earning of more and more money, combined with the strict avoidance of all spontaneous enjoyment of life, is above all completely devoid of any eudaemonistic, not to say hedonistic, admixture. It is thought of so purely as an end in itself, that from the point of view of the happiness of, or utility to, the single individual, it appears entirely transcendental and absolutely irrational. Man is dominated by the making of money, by acquisition as the ultimate purpose of his life. Economic acquisition is no longer subordinated to man as the means for the satisfaction of his material needs. This reversal of what we should call the natural relationship, so irrational from a naive point of view, is evidently as definitely a leading principle of capitalism as it is foreign to all peoples not under capitalistic influence.* "(p.53)

Our approach is an approximation in the sense that wealth is a by-product, or symptom, of entrepreneurial success. This conceptualization aligns with the perspective of Joseph Schumpeter, who believes that entrepreneurs are driven not solely by the pursuit of profits but also by intangible motivations such as "the dream and the will to found a private kingdom," "the will to conquer," and "the joy of creating," as in Schumpeter (1934). In this context, wealth emerges as a tangible outcome, reflecting the broader fulfillment of entrepreneurial aspirations beyond mere financial gain:

> "*Then there is the will to conquer, the impulse to fight, to prove oneself superior to others, to succeed for the sake, not of the fruits of success, but of success itself, from this aspect, economic action becomes akin to sport.... The financial result is a secondary consideration, or, at all events, mainly valued as an index of success and as a symptom of victory, the displaying of which very often is more important as a motive of large expenditure than the wish for the consumers' goods themselves.* "(p.93)

The above thoughts are not captured by economic models with profit-maximizing entrepreneurs. In our model, the entrepreneurs are depicted as households actively selecting the entrepreneurial occupation, where their wealth stems from the entrepreneurial profit. Unlike models that view profit as the primary objective, in our framework, profit serves as a means rather than the ultimate end for entrepreneurs. This distinction reflects a nuanced understanding of entrepreneurial motivations, acknowledging the multifaceted aspirations described by Schumpeter, such as the desire to establish a private kingdom, the will to conquer, and the joy of creating. By treating wealth as a consequence of entrepreneurial success, our model captures a more holistic view of the motivations driving entrepreneurial choices.

With the spirit of capitalism approximated by the taste for wealth, we assume there are two types of agents, denoted as H and L, with the former exhibiting a stronger SOC. In an economy with financial frictions, the entrepreneurial share among H-type agents surpasses that among L-types due to their heightened taste for wealth, rendering them less constrained by credit constraints. An increase in the fraction of H-type individuals yields two notable effects: firstly, a rise in the number of entrepreneurs emerges as fewer agents are bound by credit constraints; secondly, the new entrepreneurs with higher wealth levels and larger firm sizes, resulting in larger firm sizes boost labor demand and wages, prompting the exit of the least productive entrepreneurs who transition into the workforce.

The net impact of a larger fraction of high-SOC agents on entrepreneurship hinges on which of the above two effects dominates. In our calibrated model, the dominance of the second effect leads to a lower entrepreneur share. Thus, a stronger SOC at the aggregate level explains a lower entrepreneur share without changes in the credit constraints. Furthermore, as the overall wealth level rises with a larger fraction of high-SOC agents, the aggregate supply of capital expands, leading to a decline in the interest rate.

Conversely, in a financially frictionless economy, the entrepreneur share remains unaffected by the fraction of high-SOC agents. In this scenario, the capacity of all agents to raise capital at any amount renders SOC and individual wealth levels irrelevant to occupational choices.

Utilizing U.S. data, our calibrated model reveals a non-monotonic impact of financial deregulation on entrepreneurship. Specifically, when the fraction of high-SOC agents is relatively small, the removal of credit constraints results in an increased entrepreneur share. However, in cases where this fraction is large, the entrepreneur share diminishes following deregulation. This divergence arises from the dual and conflicting effects of deregulation on entrepreneurship.

Firstly, the elimination of credit constraints enables high-ability but low-wealth agents to embark on entrepreneurial endeavors. On the other hand, the improvement in aggregate productivity leads to a surge in wages, forcing the exit of the least productive entrepreneurs. In situations where a substantial fraction of high-SOC agents exists, most high-ability agents also possess considerable wealth. Consequently, the second effect predominates over the first, explaining why financial deregulation can lead to a reduction in entrepreneurship within an economy characterized by a high degree of the spirit of capitalism.

In addition to the insights into how the spirit of capitalism influences entrepreneurship, our model yields quantitative implications for the allocative efficiency of entrepreneurial talents and aggregate productivity. Specifically, we observe that relaxing the credit constraint consistently enhances the allocative efficiency of talents. This improvement stems from a heightened emphasis on individual ability in occupational choices relative to wealth. The impact of an increased fraction of high-SOC agents on allocative efficiency is contingent on the initial fraction of the population with high SOC. The outcome can vary, leading to either an improvement or diminution in allocative efficiency. This variation underscores the nuanced interplay between the prevalence of high-SOC agents and their influence on the efficient allocation of entrepreneurial talents within the model.

This paper contributes to the existing literature aimed at explaining the observed decline in entrepreneurship. One strand of research within this field attributes the phenomenon to an aging population. For instance, Liang, Wang and Lazear (2018) provides cross-sectional evidence, indicating a negative correlation between new business formation and median age. Similarly, Hathaway and Litan (2014b) and Karahan, Pugsley and Şahin (2019) analyze U.S. data and identify a comparable pattern. However, these studies highlight that demographic factors can only partially elucidate the decline in U.S. entrepreneurship, leaving significant room for the involvement of other mechanisms. In contrast, Davis and Haltiwanger (2014) posits that the escalating cost of regulation is a key factor responsible for the decline in entrepreneurship. This viewpoint is scrutinized by Salgado (2019), who challenges the notion, arguing that an unreasonably large entry cost would be required to generate the observed data. Additionally, Goldschlag and Tabarrok (2018) finds that the increasing federal regulation in the U.S. fails to account for the trends in economic dynamism. By engaging with and expanding upon these diverse perspectives, this paper contributes to a more comprehensive understanding of the multifaceted factors influencing the decline in entrepreneurship.

Our theory also makes a contribution to the literature on the spirit of capitalism by delving into its impact on occupational choices and aggregate productivity. Comprehensive reviews by Quadrini (2011) and Buera, Kaboski and Shin (2015) offer an extensive overview of research on occupational choices, while the concept of SOC has been employed to elucidate a diverse array of macroeconomic phenomena. Noteworthy studies include Karnizova (2010) on business cycles, He et al. (2023) on growth, Li, Wang and Zou (2020) on optimal fiscal policy, and Luo, Gong and Zou (2010), Luo, Nie and Zou (2021) on inequalities. While our work aligns with the broader theme of integrating these two strands of studies, we acknowledge that Doepke and Zilibotti (2008) have previously explored the impact of one factor on the other, albeit in a different direction. Their focus is on the role of social class (occupation) in preference formation, whereas our narrative centers on the mechanism operating in the inverse order. This distinctive perspective adds a novel dimension to the existing literature, enriching our understanding of the interplay between the spirit of capitalism, occupational choices, and broader macroeconomic dynamics.

Our study is closely tied to the literature addressing the allocative efficiency of entrepreneurial talents, a critical aspect influencing economic growth, as exemplified in Murphy, Shleifer and Vishny (1991). The ramifications of credit constraints on allocative efficiency are underscored by

Murphy, Shleifer and Vishny (1991), Bianchi (2010), and Jaimovich (2011). By incorporating the spirit of capitalism into our model, we bring forth novel insights into the dynamics of allocative efficiency in the realm of entrepreneurial talents. This contribution enhances our understanding of how the interplay between credit constraints and the spirit of capitalism shapes the optimal allocation of entrepreneurial resources, thereby influencing economic growth.

The subsequent sections of this paper are structured as follows. In Section 2, we establish a model of occupational choices that incorporates heterogeneous degrees of the spirit of capitalism among agents. Section 3 presents the theoretical results and provides insights derived from the model. In Section 4, we calibrate the model to the U.S. economy. In Section 5, we conduct quantitative analyses based on the calibrated model. Section 6 discusses the transitional dynamics of financial deregulation under different degrees of the spirit of capitalism. Finally, Section 7 offers concluding remarks to summarize our findings and contributions.

2. MODEL SETUP

Consider an economy populated by a continuum of infinitely-lived agents $i \in [0,1]$. The agents are of two types $m \in \{H, L\}$, distinguished by their levels of the spirit of capitalism (SOC). The H-type agents constitute a measure of $\omega \in (0,1)$, while the L-type agents account for $1-\omega$. Each agent seeks to maximize their expected lifetime utility, as represented by the following utility function:

$$\max_{(c_t)_{t\geq 0}} \mathbb{E}_0 \int_0^\infty e^{-\rho t} \left[\log\left(c(t)\right) + \theta_m \log\left(a(t)\right)\right] dt \tag{1}$$

where c_t and a_t denote the agent's consumption and wealth at time t, respectively. The parameter ρ represents the time preference rate, and θ_m captures the extent of the spirit of capitalism. It is assumed that $0 \leq \theta_L < \theta_H$, signifying that H-type agents exhibit a greater inclination toward wealth accumulation compared to their L-type counterparts.

Each agent possesses an individual ability denoted by z_t, subject to idiosyncratic shocks governed by the Ornstein-Uhlenbeck process:

$$d\log\left(z(t)\right) = -\mu \log\left(z(t)\right) dt + \sigma dW(t) \tag{2}$$

where W_t is the standard Wiener process. This Gaussian process has a stationary normal distribution: $\log(z) \sim \mathcal{N}\left(0, \frac{\sigma^2}{2\mu}\right)$ (see Feller 1971). Both the initial distribution and the diffusion process are independent of the agent's type.

Agents in the economy can choose between two occupations, either as a worker or an entrepreneur, at any given time. The income derived from being a worker is expressed as wz^γ, where w represents the wage, and z^γ is a skill premium associated with the individual ability z_t. On the other hand, entrepreneurial profit is optimized based on the individual ability z_t, common productivity A, wage w, and the interest rate r, as given by the maximization problem:

$$\Pi(a, z, A; w, r) = \max_{k \leq \lambda a,\ l} f(z, A, k, l) - (r + \delta)k - wl. \tag{3}$$

The production function f takes on the Cobb-Douglas form:

$$f(z, A, k, l) = zA\left(k^\alpha l^{1-\alpha}\right)^{1-\nu}. \tag{4}$$

In the profit maximization problem (3), the parameter δ represents the depreciation rate of the capital stock. The term $(1-\nu)$ within the production function (4) serves a dual purpose: it functions as the span-of-control parameter following the framework of Lucas (1978) and denotes the share of output allocated to productive factors, aligning with Buera and Shin (2013). The constraint $k \leq \lambda a$ $(\lambda > 0)$ encapsulates the financial friction, where an entrepreneur's capital is bound by a fraction of their wealth level. This financial constraint reflects the limitation on capital procurement, justified by the issuance of limited credits by financial intermediaries. Given these considerations, each agent determines his occupation by comparing the two potential incomes:

$$M(a, z, A; w, r) = \max\left\{wz^\gamma, \Pi(a, z, A, w, r)\right\} \tag{5}$$

The law of motion of wealth, $da(t)$, is determined by the current wealth $a(t)$, consumption $c(t)$ and the occupational income $M\left(a(t), z(t), A(t); w(t), r(t)\right)$

$$da(t) = \left[M\left(a(t), z(t), A(t); w(t), r(t)\right) + r(t)a(t) - c(t)\right]dt \tag{6}$$

as the increment in wealth is the occupational income and interest net of the consumption. Each agent solves the utility maximization problem (1) subject to conditions (2) to (6). The entrepreneurial profit maximization problem (3) is intratemporal, and thus the optimal capital and labor demand have explicit solutions as follows:

$$k(a,z,A;w,r) = \min\left\{\lambda a, (zA)^{\frac{1}{\nu}}\left(\frac{\alpha(1-\nu)}{r+\delta}\right)^{\frac{1-(1-\alpha)(1-\nu)}{\nu}}\left(\frac{(1-\alpha)(1-\nu)}{w}\right)^{\frac{(1-\alpha)(1-\nu)}{\nu}}\right\}, \tag{7}$$

$$l(a,z,A;w,r) = \left(\frac{(1-\alpha)(1-\nu)zA}{w}\right)^{\frac{1}{1-(1-\alpha)(1-\nu)}} k(a,z,A;w,r)^{\frac{\alpha(1-\nu)}{1-(1-\alpha)(1-\nu)}}. \tag{8}$$

The demand for factors is type-independent, as both types face the same factor prices and the same production function.

Similar to the framework presented in Cagetti and De Nardi (2006) and Quadrini (2000), there exists an additional production sector known as the nonentrepreneurial sector. This sector is occupied by a single representative firm that engages in production characterized by the Cobb-Douglas function with constant returns to scale:

$$Y = F(A,K,L) = AK^{\alpha}L^{1-\alpha} \tag{9}$$

The nonentrepreneurial sector is designed to represent large-scale corporations not constrained by credit limitations. The first-order conditions of this sector are expressed as:

$$r = \frac{\partial F(A,K,L)}{\partial K} - \delta, \tag{10}$$

$$w = \frac{\partial F(A,K,L)}{\partial L}. \tag{11}$$

3. EQUILIBRIUM ANALYSIS

The competitive equilibrium consists of a tuple of time paths of prices $(w(t), r(t))_{t\geq 0}$, a tuple of time paths of quantities $(c_i(t), a_i(t), M_i(t))_{i\in[0,1],t\geq 0}$, the time paths of individual ability and common productivity $(z_i(t), A(t))_{i\in[0,1],t\geq 0}$, and the time-varying joint probability density function of wealth and ability $g(a,z,t)$.

Given the time path of factor prices, the consumption and wealth for an m-type agent satisfy the following Hamilton-Jacobi-Bellman (HJB) equation:

$$
\begin{aligned}
\rho v_m(a,z,t) =& \max_{c>0} \log(c) + \theta_m \log(a) + \partial_a v_m(a,z,t) \left[M(a,z,A(t);w(t),r(t)) + r(t)a - c\right] \\
& + \partial_z v_m(a,z,t)\mu(z) + \frac{1}{2}\partial_{zz} v_m(a,z,t)\sigma^2(z) + \partial_t v_m(a,z,t).
\end{aligned}
\tag{12}
$$

In the above second-order partial differential equation, $\mu(z) = \left(-\mu \log(z) + \frac{1}{2}\sigma^2\right) z$, $\sigma^2(z) = \sigma^2 z^2$, as derived from (2) using Ito's lemma (for example, see Back 2005). The evolution of the joint distribution of wealth and ability specific to each type follows the Kolmogorov Forward (KF) equation (see Stokey 2009 or Gabaix 2009 for more examples):

$$
\partial_t g_m(a,z,t) = - \partial_a \left[s(a,z,t) g_m(a,z,t)\right] - \partial_z \left[\mu(z) g_m(a,z,t)\right] + \frac{1}{2}\partial_{zz}\left[\sigma^2(z) g_m(a,z,t)\right], \tag{13}
$$

$$
s(a,z,t) = M\left(a,z,A(t);w(t),r(t)\right) - r(t)a - c(a,z,t). \tag{14}
$$

The probability density function g_m in (13) is type-specific, and satisfies $\iint g_m(a,z,t)dadz = 1$ for either type m and any time t.

The time paths of factor prices are determined by the market-clearing conditions for capital and labor:

$$
\begin{aligned}
& K(t) + \omega \iint k\left(a,z,A(t);w(t),r(t)\right) \mathbb{1}\left\{\Pi\left(a,z,A(t);w(t),r(t)\right) > w(t)z^\gamma\right\} g_H(a,z,t)dadz \\
& + (1-\omega) \iint k\left(a,z,A(t);w(t),r(t)\right) \mathbb{1}\left\{\Pi\left(a,z,A(t);w(t),r(t)\right) > w(t)z^\gamma\right\} g_L(a,z,t)dadz \\
=& \omega \iint a g_H(a,z,t)dadz + (1-\omega) \iint a g_L(a,z,t)dadz; \qquad (15) \\
& L(t) + \omega \iint l\left(a,z,A(t);w(t),r(t)\right) \mathbb{1}\left\{\Pi\left(a,z,A(t);w(t),r(t)\right) > w(t)z^\gamma\right\} g_H(a,z,t)dadz \\
& + (1-\omega) \iint l\left(a,z,A(t);w(t),r(t)\right) \mathbb{1}\left\{\Pi\left(a,z,A(t);w(t),r(t)\right) > w(t)z^\gamma\right\} g_L(a,z,t)dadz \\
=& \omega \iint z^\gamma g_H(a,z,t)dadz + (1-\omega) \iint z^\gamma g_L(a,z,t)dadz \qquad (16)
\end{aligned}
$$

where k and l are the demand for capital and labor from the entrepreneurial sector, as in (7) and (8); K and L are the factor demand from the nonentrepreneurial sector, determined by (10) and (11). In this way, the left-hand side of (15) and (16) is the total demand, and the right-hand side represents the total supply of the corresponding factor.

The recursive competitive equilibrium is characterized as above. Now we focus on the steady state where both common and individual shocks are absent: $dA(t) = 0$, $dz(t) = 0$. Our particular interest lies in the influence of the degree of SOC θ, as well as that of the financial friction λ, on the entrepreneur share S at the steady state.

LEMMA 1. *The occupational choice is a function of wealth a and ability z, and is independent of type m.*

Proof. This is directly from the occupational income function (5). □

At the steady state, a continuous curve separates the wealth-ability plane into two regions. In one region, irrespective of their types, all agents opt to be workers, while in the other region, all agents choose to become entrepreneurs. The smoothness and continuity of this curve are evident when we examine the total differentiation of the indifference condition $wz^\gamma = \Pi(a, z, A; w, r)$ with respect to a and z.

LEMMA 2. *The steady-state wealth level of an H-type agent with any ability z is strictly higher than that of an L-type agent with the same ability.*

Proof. See Appendix.

A stronger taste for wealth accumulation naturally leads to a higher wealth level, facilitating a larger number of agents to become entrepreneurs under financial friction.

PROPOSITION 1. *The steady-state entrepreneur share among the H-type agents (S_H) is strictly larger than that among the L-type agents (S_L), as long as the credit constraint binds for some entrepreneurs.*

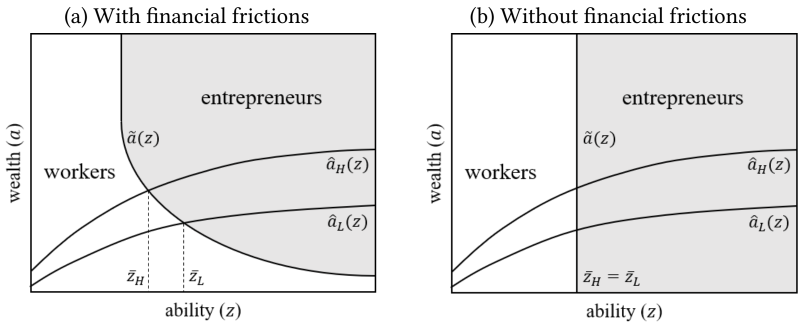
Proof. See Appendix.

A heightened preference for wealth accumulation results in a higher entrepreneur share within the subpopulation of H-type agents. This occurs due to their stronger SOC, leading to a larger steady-state wealth for any ability level. Consequently, this enables the establishment of larger firms with higher profitability, a scenario that is unattainable for their low-SOC counterparts with comparable abilities. The mechanics of this phenomenon are depicted in Figure 1a below:

In Figure 1a, the occupational choice for both types is determined by the curve $\widetilde{a}(z)$[3]. This curve is a non-increasing function in z. For a given ability level z, an agent opts to be an entrepreneur if and only if his wealth surpasses the threshold $\widetilde{a}(z)$. Otherwise, the optimal choice is to become a worker. The type-specific function $\widehat{a}_m(z)$ delineates the steady-state wealth

[3]The shapes of curve $\widetilde{a}(z)$ and of $\widetilde{a}_m(z)$ for $m = H, L$ are discussed in the proof of Proposition 1.

FIG. 1. Steady-state entrepreneur share



level for agents with ability z and of type m. According to Lemma 2, the curve of $\widehat{a}_H(z)$ consistently lies above that of $\widehat{a}_L(z)$. Consequently, as long as credit constraints bind for certain entrepreneurs, at least one of $\widehat{a}_H(z)$ and $\widehat{a}_L(z)$ intersects with $\widetilde{a}(z)$ at a point where the latter curve is downward sloping. In such cases, the threshold in ability for occupational choice $\overline{z}_H$ for the H-type must be strictly lower than that of the L-type. This implies that the minimum ability required to become an entrepreneur for agents with a higher degree of SOC is lower. Since the ability distribution is type-independent, the entrepreneur share among H-type agents is strictly higher than that among L-type agents. Notably, this discrepancy in the entrepreneur share is absent in the steady state without financial frictions.

Proposition 2. *$S_H = S_L$ as $\lambda \to \infty$.*

Proof. See Appendix.

In the absence of financial frictions, occupational choices are uninfluenced by wealth levels. Consequently, in Figure 1b, the occupational indifference curve $\widetilde{a}(z)$ is vertical, resulting in equal ability thresholds for entrepreneurship between the two types. Given the type-independent distribution of ability, the within-type entrepreneur shares are also identical.

According to Propositions 1 and 2, the influence of the spirit of capitalism on occupational choices hinges on the presence of financial frictions. In the presence of financial frictions, agents with stronger SOC have a higher likelihood of becoming entrepreneurs due to their elevated wealth levels, allowing for larger firm sizes and greater profitability. This advantage in wealth accumulation compensates for individual ability, leading to situations where a few wealthy entrepreneurs with stronger SOC have lower ability than some workers who derive less utility from wealth accumulation. This wealth advantage in occupational choices becomes irrelevant once the financial restrictions are absent. In such cases, capital can be raised in any desired quantity, and occupational choices are uniquely determined by individual ability.

We are also interested in the variations in the aggregate entrepreneur share based on the fraction of high-SOC agents, as well as how the occupational decisions are made under idiosyncratic shocks. The responses to these inquiries are contingent on the specific parameter values, which we will calibrate in the following section.

4. CALIBRATION

Some of our parameter values are drawn from existing studies on occupational choices or the spirit of capitalism, while the remainder are selected to align with U.S. data.

Following He et al. (2023), we set the discount rate $\rho = 0.04$, a commonly utilized value in the literature. We assume that there is no depreciation rate, so $\delta = 0$. On the production side, we choose $\alpha = 0.4$, a value close to that employed by Luo, Gong and Zou (2010). The span-of-control parameter $\nu = 0.16$, and $\gamma = 0.07$ in the worker's income function, are both from Yang (2016). The normalize the common TFP value to be $A = 1$ and the degree of SOC for L-type agents to be $\theta_L = 0$.

Determining an appropriate value for the parameter λ in the credit constraint $k \leq \lambda a$ poses a challenge. In Buera and Shin (2013), λ varies from 1.13 to 1.55, reflecting a simulation of economic reforms aimed at reducing imperfections in financial markets. Focusing on the so-called miracle economies, Buera and Shin (2013) associates $\lambda = 1.55$ with low financial friction post-reform. We adopt this value as a reference point for the U.S. economy. A summary of parameter values from external sources is presented in Table 1:

TABLE 1.

Model Parameters from External Sources

Parameter	Description	Value	Source
ρ	discount rate	0.04	He et al. (2023)
α	capital share	0.40	Luo, Gong and Zou (2010)
ν	revenue share of entrepreneurs	0.16	Yang (2016)
γ	worker's wage function	0.07	Yang (2016)
λ	degree of financial frictionless	1.55	Buera and Shin (2013)
A	common productivity	1.00	normalization
θ_L	L-type's preference for wealth accumulation	0.00	normalization

The external sources have provided values for several parameters, leaving four parameters to be jointly calibrated: (i) μ and σ in the stochastic process of individual ability (2); (ii) the H-type agent's spirit of capitalism θ_H and (iii) ω, the fraction of the H-types in the population. The calibration process focuses on achieving alignment with four key moments extracted from U.S. data, as documented by Cagetti and De Nardi (2006). These moments include the entrepreneur share, the wealth share of entrepreneurs, and the top 10% and 20% wealth shares. The calibrated parameter values and the matched moments are reported in Table 2:

TABLE 2.

Calibration

	Model	Data	Parameter
Entrepreneur share	8.0%	7.6%	$\mu = 0.025$
Wealth share of entrepreneurs	32.9%	33.0%	$\sigma^2 = 0.0175$
Top 10% wealth share	56.6%	67.0%	$\theta_H = 0.05$
Top 20% wealth share	79.7%	81.0%	$\omega = 0.15$

The degree of SOC of the H-type agents is calibrated to be 0.05, a seemingly modest value but in line with the calibration of 0.09 observed in He et al. (2023). Additionally, the calibration outcome reveals that, under the assumption of a binary classification based on high and low spirit of capitalism, the former constitutes 15% of the entire population.

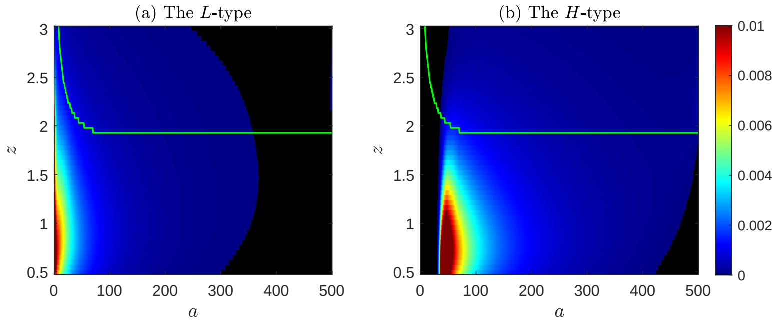
5. QUANTITATIVE ANALYSIS

In this section, we conduct a numerical analysis of the stationary equilibrium of the model presented in Section 2, employing the sparse grids algorithm (refer to Achdou et al. 2021, Achdou et al. 2014, Garcke and Ruttscheidt 2019, and Brumm and Scheidegger 2017). In the stationary equilibrium, influenced by idiosyncratic shocks, the wealth level ceases to be solely contingent on ability; instead, there emerges a type-specific distribution of wealth conditioned on each ability level. The joint distribution of wealth and ability, denoted as $g_m(a, z, t)$ and formulated in accordance with the Kolmogorov Forward equation (13), remains time-invariant within the stationary equilibrium.

Utilizing the parameter values detailed in Section 4, we compute the joint density functions for the two types, alongside the uniform occupational decision rule. Subsequently, we visually represent these distributions through heatmaps as follows:

The green lines depicted in Figure 2 represent the occupational indifferent curves. Above these lines lie the wealth-ability combinations of the entrepreneurs, while below them are those of the workers. Notably, in this numerical illustration, the least wealthy agents of type H surpass the

FIG. 2. Joint density of wealth and ability in the stationary equilibrium with financial frictions



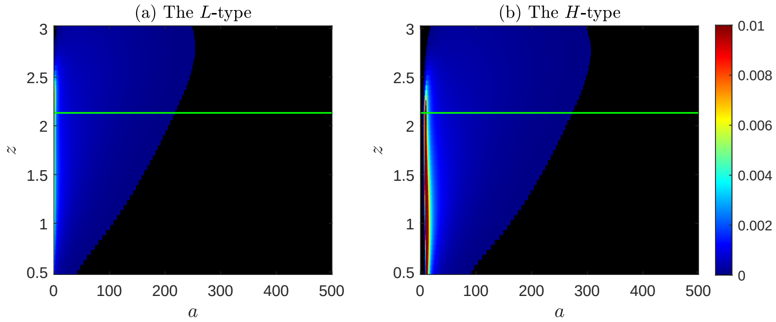
The black area indicates probability density values close to zero. The green curves represent occupational indifference, agents with wealth-ability combinations northeast of these curves choose to be entrepreneurs, those southwest of these curves choose to be workers.

wealthiest agents of type L in terms of wealth. Additionally, at each level of individual ability, the mass of wealth qualified for entrepreneurship among the H-types consistently exceeds that among the L-types. In this specific numerical solution of the stationary equilibrium, we observe that the entrepreneur shares among the H-type and L-type agents are $S_H = 12.45\%$ and $S_L = 7.26\%$, respectively. With the H-type share of 0.15, the resulting overall entrepreneur share amounts to 8.04%.

As depicted in Figure 3 below, the disparity in entrepreneur shares between the two types is absent in the stationary equilibrium without the financial restriction. With the amount of capital entrepreneurs can raise no longer contingent on their wealth level, occupational choices become uniquely determined by individual ability. This explains the parallel orientation of the green occupational indifference curve to the wealth axis, dividing the entire wealth-ability plane into two regions based on a critical value of ability. Beyond this threshold, all individuals become entrepreneurs. In the numerical solution of the stationary equilibrium without the financial friction, the entrepreneur shares of the two types are equal: $S_H = S_L = 8.69\%$. The removal of the financial friction leads to an increase in the entrepreneur share among agents with a low degree of SOC and a decrease among those with a high degree of SOC.

The quantitative outcomes illustrated in Figures 2 and 3 appear to extend Propositions 1 and 2 to the stationary equilibrium, where individual ability z is modeled as a stochastic process. With the presence of credit constraints impacting certain entrepreneurs, occupational choice becomes a function of both wealth and ability. Consequently, the entrepreneur

FIG. 3. Joint density of wealth and ability in the stationary equilibrium without financial frictions



The black area indicates probability density values close to zero. The green curves represent occupational indifference, agents with wealth-ability combinations above these curves choose to be entrepreneurs, those below these curves choose to be workers.

share among high-SOC agents surpasses that among low-SOC individuals, because the higher wealth associated with a stronger SOC compensates for ability when initiating a business. On the other hand, in a frictionless economy, occupational choice hinges solely on ability, eradicating the aforementioned divergence in occupational choices conditioned on the spirit of capitalism.

The contrast observed between Figures 2 and 3 suggests that the removal of financial friction diminishes the right tail of the wealth distribution. To illustrate this, we present the marginal density function of wealth a

$$g_m(a) = \int g_m(a, z)dz, \quad m \in \{H, L\} \tag{17}$$

in the stationary equilibrium, both with and without the financial friction.

FIG. 4. Marginal density of wealth in the stationary equilibrium

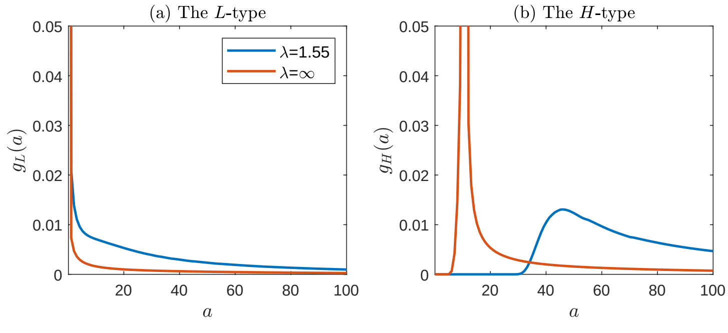
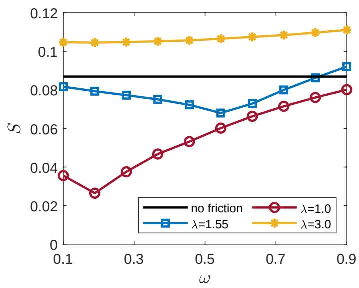


Figure 4 confirms that the presence of financial friction results in a wealth distribution with a thicker right tail for both types. This phenomenon arises because agents, constrained by credit limitations, must self-finance to achieve the optimal firm scale. This motivation for wealth accumulation vanishes in a frictionless economy.

Now we turn to the examination of the aggregate entrepreneur share $S = \omega S_H + (1-\omega)S_L$ and explore how it is influenced by (i) the share of high-SOC agents, ω, and (ii) the tightness of the credit constraint λ.

FIG. 5. Aggregate entrepreneur share in the stationary equilibrium



Increasing the share of H-type agents has contrasting effects on the aggregate entrepreneur share. On one hand, under financial friction, the entrepreneur share among H-types exceeds that among L-types due to the former's preference, resulting in a lower cost of wealth accumulation. This implies that an increase in the fraction of H-type agents mechanically leads to a higher aggregate entrepreneur share. On the other hand, in general equilibrium, the growth in the entrepreneur share raises labor demand and wages, potentially motivating some entrepreneurs with low ability (or wealth) to exit and become workers. These conflicting effects make the aggregate entrepreneur share non-monotonic with respect to the fraction of H-types, as illustrated in Figure 5 for $\lambda = 1.0$ and $\lambda = 1.55$. In a financially frictionless economy, where agents can freely raise the optimal level of capital stock, the aggregate entrepreneur share becomes independent of the SOC.

For the counterfactual analysis, we also compute the aggregate entrepreneur share under alternative levels of credit constraint tightness: $\lambda = 1.0$, $\lambda = 3.0$, and $\lambda = \infty$ (no friction). In comparison to the calibrated model where $\lambda = 1.55$, tightening the credit constraint by setting $\lambda = 1.0$ diminishes the entrepreneur share consistently across the entire range of ω, the fraction of H-type agents. Conversely, relaxing the credit constraint with $\lambda = 3.0$ enhances the entrepreneur share. The underlying mechanism is clear: easing the credit constraint facilitates capital raising and business initiation, prompting some of the most talented or wealthy workers to transition into entrepreneurship.

However, the entrepreneur share does not necessarily falls as the credit constraint tightens. To illustrate this, consider the comparison between the curve with $\lambda = 3.0$ and that with $\lambda = \infty$ in Figure 5: the latter scenario represents a completely frictionless economy, yet its entrepreneur share is pointwise lower than the case with frictions. In a frictionless economy, occupational choices are uniquely determined by individual ability, leading to entrepreneurs being the most talented (with the highest z) and operating businesses on a larger scale (with large k and l). This intensive use of factors results in elevated wages and interest rates, thereby increasing the opportunity cost of becoming an entrepreneur. Tightening the credit constraint by a small degree reduces this opportunity cost, while still allowing most agents to raise funds to initiate businesses, leading to an increase in the aggregate entrepreneur share.

The analysis above suggests that reducing financial frictions does not always guarantee higher entrepreneurship. A modest reduction in financial frictions can promote entrepreneurship by facilitating funding for high-ability agents. However, a more substantial relaxation of credit constraints may lead to the emergence of giant enterprises, which can, in turn, drive up factor prices and potentially crowd out small businesses.

The final inquiry in this section examines the impact of financial friction on the stationary aggregate TFP, defined as

$$TFP = \frac{Y}{K^{\alpha(1-\nu)}L^{(1-\alpha)(1-\nu)}}, \tag{18}$$

where

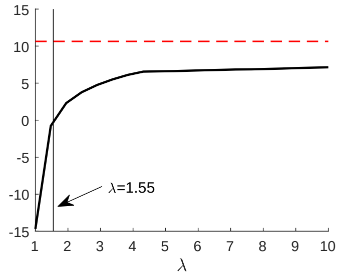
$$Y = \sum_{\theta=H,L} \omega_\theta \iint zA\left(k(a,z)^\alpha l(a,z)^{1-\alpha}\right)^{1-\nu} \mathbb{1}\left\{\Pi(a,z) > wz^\gamma\right\} g_\theta(a,z) da dz, \tag{19}$$

$$K = \sum_{\theta=H,L} \omega_\theta \iint k(a,z)\mathbb{1}\left\{\Pi(a,z) > wz^\gamma\right\} g_\theta(a,z) da dz, \tag{20}$$

$$L = \sum_{\theta=H,L} \omega_\theta \iint l(a,z)\mathbb{1}\left\{\Pi(a,z) > wz^\gamma\right\} g_\theta(a,z) da dz, . \tag{21}$$

In the above, $\omega_H = \omega$ and $\omega_L = 1 - \omega$ represent the fractions of the two types in the population, the time subscript is omitted as we concentrate on the stationary equilibrium. To explore the impact of the credit constraint parameter in $k \leq \lambda a$, we vary λ across a range from 1 to 10. Subsequently, we calculate the corresponding aggregate TFP in the stationary equilibrium and present the outcomes in the figure below.

FIG. 6. Aggregate TFP and the tightness of the credit constraint



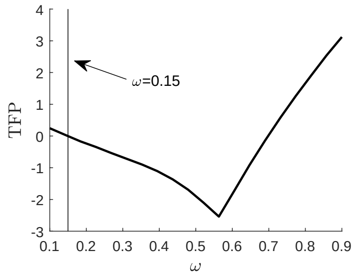
The figure shows the percentage change in the aggregate TFP as the credit constraint parameter λ varies, the red dashed line is the aggregate TFP in a frictionless economy where $\lambda = \infty$.

As depicted in Figure 6, the aggregate total factor productivity (TFP) exhibits a strict increase as the credit constraint loosens, eventually approaching the asymptotic value observed in a frictionless environment. As discussed in Section 3, financial frictions in the economy lead to instances where some low-ability H-type agents become entrepreneurs primarily due to their accumulated wealth, allowing for larger firm sizes. However, as the credit constraint becomes less restrictive, the advantage stemming from wealth accumulation diminishes. This is because more talented but less wealthy agents can borrow more freely. Consequently, high-ability agents replace their low-ability counterparts as entrepreneurs, contributing to an enhancement in aggregate productivity.

The relationship between the fraction of agents with a high degree of the spirit of capitalism (ω) and the resulting aggregate TFP is not strictly monotonic, as illustrated in Figure 7. When the share of H-types is low, increasing this fraction leads to a lower aggregate TFP. This occurs because some high-ability L-type entrepreneurs get crowded out by low-ability but wealthier H-types. However, as ω continues to rise, the aggregate TFP improves. With a diminishing fraction of L-types, the impact of crowded-out high-ability entrepreneurs of this type becomes negligible. Simultaneously, a larger population of H-types contributes more capital, facilitating larger firm sizes, which explains the subsequent increase in aggregate TFP. Consequently, the aggregate TFP is higher when everyone is of H-type ($\omega = 1$) compared to when everyone is of L-type ($\omega = 0$), reflecting the positive influence of a higher fraction of the population exhibiting a strong spirit of capitalism.

Figures 5 and 7 suggest that any change in the fraction of H-type agents leading to a decline in the entrepreneur share also corresponds to a decrease in aggregate total factor productivity. This observation poses a

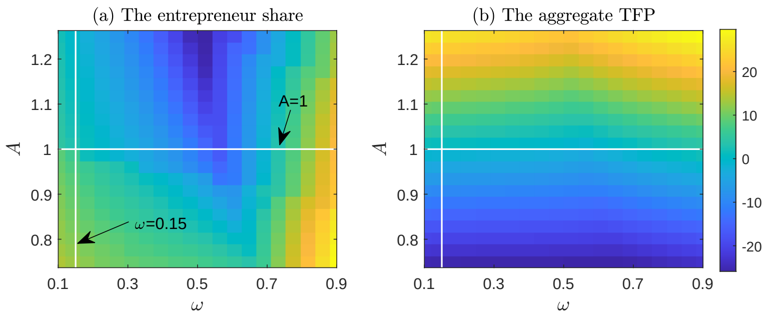
FIG. 7. Aggregate TFP and the fraction of the H-type agents



The figure shows the percentage change in the aggregate TFP as the fraction of the H-types ω varies.

challenge in explaining the observed reduction in entrepreneurship in the U.S. and other developed economies, often accompanied by an increase in TFP. However, this apparent contradiction can be reconciled if we consider the parameter of common productivity A as flexible. Figure 8 illustrates the equilibrium entrepreneur share and aggregate TFP for different combinations of ω and A, demonstrating that an increase in the fraction of high-SOC agents accompanied by growth in common productivity results in a lower entrepreneur share and a higher aggregate TFP. This growth in common productivity may reflect improvements in institutional factors, infrastructural development, or technological progress, aligning with the experiences of the U.S. and other developed economies.

FIG. 8. Comparative statics for different fraction of H-types and common productivity



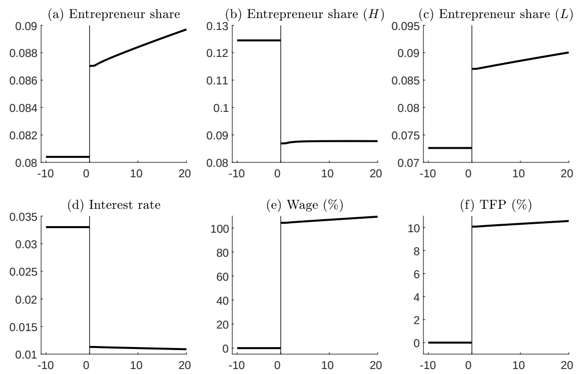
The figure shows the percentage change in the entrepreneur share and aggregate TFP as the fraction of the H-types ω and common productivity A changes. The white lines indicate the calibrated values.

In summary, the reduction of financial frictions does not guarantee a promotion of entrepreneurship. While it enhances the allocative efficiency of talents, leading to an increase in aggregate productivity. However, the influence of a larger high-SOC population share on entrepreneurship or aggregate TFP remains indeterministic.

6. TRANSITIONAL DYNAMICS

This section studies the transitional dynamics of the economy as it transitions from one stationary equilibrium under credit constraints to another, following the permanent removal of the constraints. The focal point of interest lies in understanding the dynamics of entrepreneurship for the two types in the face of financial deregulation. The elimination of the credit constraint is triggered by an MIT shock, and this change is permanent. The economy's response is determined by the Hamilton-Jacobi-Bellman equation (12) and the Kolmogorov Forward equation (13). Preceding the shock, the entrepreneurial profit (3) is governed by the credit constraint $k \leq \lambda a$, where $\lambda < \infty$. Following the shock, this constraint is removed, or equivalently, λ is set to infinity.

FIG. 9. Transitional dynamics after a permanent removal of the credit constraint

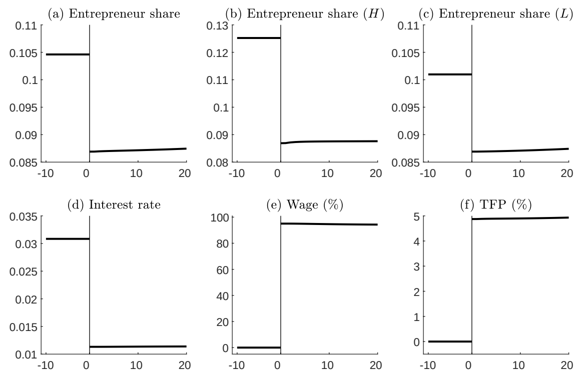


Even though the shock is instantaneous and permanent, the adjustment of variables does not complete immediately. Consistent with the earlier analysis, the removal of the credit constraint results in the worker-entrepreneur boundary becoming dependent on ability alone. Consequently, there is an abrupt exit of low-ability H-type entrepreneurs and a simultaneous entry of high-ability L-type workers. The existing entrepreneurs, who were previously constrained by the credit limit, now augment their capital stock, while the entrants replacing the existing entrepreneurs must demand a higher capital stock due to their higher ability. The increase in the aggregate capital stock contributes to a lower marginal product of capital, resulting in a decline in the interest rate. Simultaneously, there is an upward jump in the marginal product of labor and wages. This complex interplay of adjustments characterizes the transitional dynamics following the removal of the credit constraints.

Following the immediate response outlined above, the economy undergoes further adjustments in occupational choices. The substantial drop in the interest rate attracts some L-type workers into entrepreneurship, including those who did not immediately change their occupations when the shock occurred, along with a few H-type workers who recently transitioned from entrepreneurs to workers. This phenomenon elucidates the gradual increases in the entrepreneur share of L-types and the modest rebound of the entrepreneur share of H-types. Throughout this process, the aggregate capital stock continues to accumulate, pushing down the interest rate and attracting additional L-type workers to become entrepreneurs. Concurrently, wages continue to rise, counteracting the effect of the declining interest rate. Consequently, the population switching occupations gradually diminishes over time, and the overall entrepreneur share approaches its new stationary level. As a result of the reallocation of talents between occupations, the aggregate TFP, as defined by (18), experiences an upward jump of 10%, followed by a gradual increase.

As illustrated in Figure 5, financial deregulation does not consistently lead to an increase in the aggregate entrepreneur share. In the counterfactual analysis, rather than commencing from the stationary equilibrium with the calibrated parameter $\lambda = 1.55$, we portray the transitional dynamics of variables in an equilibrium with a more lenient credit constraint ($\lambda = 3.0$) responding to the same shock of removing the credit constraint.

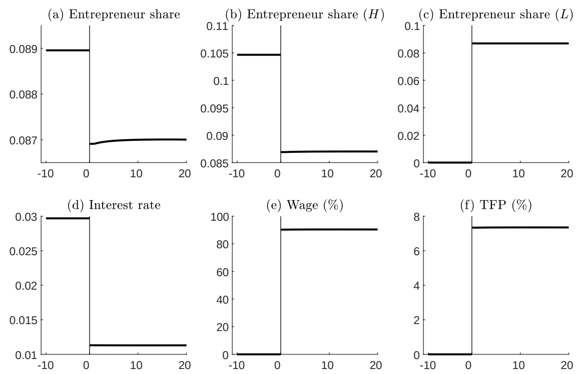
FIG. 10. Transitional dynamics after a permanent removal of the credit constraint (pre-shock $\lambda = 3.0$)



In contrast to Figure 9, a notable difference in the current scenario is the drop in the entrepreneur share of L-type agents in response to the removal of the credit constraint. As discussed in Section 5, with a loose credit constraints, there is a substantial number of lowability but wealthy entrepreneurs in either the high-SOC or low-SOC group of population. Upon the removal of the credit constraint, they are immediately replaced by the highability individuals. Therefore, entrepreneur shares drop within both groups of population. With only the most talented individuals being the entrepreneurs, the aggregate TFP jumps upward, pushing up wages and facilitating wealth accumulation for both the entrepreneurs and the workers. As a result, capital supply increases and interest rate falls.

In the final counterfactual case, we consider financial deregulation unfolding in an economy with a substantial fraction of H-type agents ($\omega = 0.85$). The responses of the key variables closely mirror those observed in the calibrated model (Figure 9). However, in this case, the decline in the entrepreneur share among H-types outweighs the increase in the share among L-types. Consequently, the aggregate entrepreneur share experiences a pronounced downward jump at the point of deregulation and subsequently recovers by a marginal amount.

FIG. 11. Transitional dynamics after a permanent removal of the credit constraint ($\omega = 0.85$)



This section shows how the economy adjusts to the new stationary equilibrium in response to the relaxation of credit constraints, as typically exampled by a financial deregulation. The results are consistent with the comparative statics in the previous section. Specifically, whether the removal of the financial frictions leads to a higher or lower entrepreneurship depends on the initial tightness of the credit constraints, as well as on the fraction of the agents with a strong spirit of capitalism among the population. However, regardless of these two factors, the transitional dynamics imply that alleviating the financial frictions always improves the aggregate TFP with a more efficient allocation of entrepreneurial talents.

7. CONCLUDING REMARKS

This paper has demonstrated the significant role played by the spirit of capitalism – the inclination towards wealth accumulation – in shaping entrepreneurial choices in a world with financial frictions. In the stationary equilibrium, individual ability and wealth level act as substitutes in determining who becomes entrepreneurs rather than workers. Within our theoretical model, the subgroup of the population with a greater spirit of capitalism exhibits a higher entrepreneur share due to their increased wealth accumulation. However, it is noteworthy that increasing the fraction of high-SOC agents does not necessarily imply a higher entrepreneur share, as it concurrently raises the wage and may prompt some low-ability entrepreneurs to transition to workers. Similarly, the relaxation or removal of credit constraints can lead to either an increase or decrease in the entrepreneur share.

Furthermore, our investigation extends to the impact of financial frictions and the spirit of capitalism on the allocative efficiency of entrepreneurial talent. The relaxation of credit constraints, exemplified by financial deregulation, consistently enhances this efficiency. It achieves this by enabling high-ability individuals with lower wealth to engage in entrepreneurship, replacing those with the opposite characteristics. However, the same cannot be said for an increase in the fraction of high-SOC agents, as this does not uniformly improve allocative efficiency. In this case, some high-ability but less wealthy entrepreneurs may be crowded out by individuals who are richer but less talented. Our model proposes a V-shaped relationship between aggregate productivity and the economy-wide spirit of capitalism. A comparison between the two extremes reveals that an economy exclusively populated by high-SOC agents is more productive than one comprised solely of low-SOC agents.

Our model offers a novel explanation for the observed decline in entrepreneurship in the U.S. and other advanced economies – an increasing spirit of capitalism. This seemingly counter-intuitive statement is confirmed by our model calibrated to the U.S. economy. In this paper, the degree of the spirit of capitalism, as well as the share of population with a high SOC, is exogenous. Endogenizing the economy-wide degree of the spirit of capitalism and exploring its interaction with technological progress presents an intriguing avenue for future studies. Such investigations could shed further light on the intricate dynamics influencing entrepreneurial choices and their impact on economic outcomes.

APPENDIX

Proof of Lemma 2

The Hamiltonian equation for the m-type agent's utility-maximizing problem is

$$\mathcal{H} = \log(c) + \theta_m \log(a) + \mu \left[M\left(a, z, A; w, r\right) + ra - c\right]. \tag{A.1}$$

Its optimality conditions are

$$\frac{1}{c} = \mu; \tag{A.2}$$

$$\frac{\dot{\mu}}{\mu} = \rho - r - \frac{\partial M}{\partial a} - \frac{\theta_m}{\mu a}, \tag{A.3}$$

from which we have

$$\frac{\dot{c}}{c} = r + \frac{\partial M}{\partial a} + \theta_m \frac{c}{a} - \rho. \tag{A.4}$$

At the steady state, $\dot{c} = 0$, and $\dot{a} = 0$. Hence

$$\theta_m \left(r + \frac{M(a_m, z, A; w, r)}{a_m} \right) = \rho - r - \frac{\partial M(a_m, z, A; w, r)}{\partial a}, \tag{A.5}$$

where the type subscript m of a is to reflect the potential difference in the steady-state wealth level between the two types.

Now we analyze the sign of $\frac{\partial(M/a)}{\partial a}$ and that of $\frac{\partial^2 M}{\partial a^2}$. If the agent is a worker, or an entrepreneur not bound by the credit constraints, then his occupation income M is not varying in wealth a, thus $\frac{\partial(M/a)}{\partial a} < 0$ and $\frac{\partial^2 M}{\partial a^2} = 0$. If, on the other hand, the agent is an entrepreneur bound by the credit constraint: $k = \lambda a$, by equations (3), (4)and (8),

$$M(a, z, A; w, r) = \left[zA\Psi^{(1-\alpha)(1-\nu)} - w\Psi \right] (\lambda a)^{\frac{\alpha(1-\nu)}{1-(1-\alpha)(1-\nu)}} - (r+\delta)\lambda a \geq wz^{\gamma} > 0 \tag{A.6}$$

where

$$\Psi = \left[\frac{(1-\alpha)(1-\nu)zA}{w} \right]^{\frac{1}{1-(1-\alpha)(1-\nu)}}. \tag{A.7}$$

Therefore,

$$\frac{M}{a} = \left[zA\Psi^{(1-\alpha)(1-\nu)} - w\Psi \right] \lambda^{\frac{\alpha(1-\nu)}{1-(1-\alpha)(1-\nu)}} a^{-\frac{\nu}{1-(1-\alpha)(1-\nu)}} - (r+\delta)\lambda, \tag{A.8}$$

from which $\dfrac{\partial(M/a)}{\partial a} < 0$. Also, from (A.6),

$$\frac{\partial M}{\partial a} = \left[zA\Psi^{(1-\alpha)(1-\nu)} - w\Psi\right] \frac{\alpha\lambda(1-\nu)}{1-(1-\alpha)(1-\nu)}(\lambda a)^{-\frac{\nu}{1-(1-\alpha)(1-\nu)}} - (r+\delta)\lambda, \tag{A.9}$$

and it is easy to see that $\dfrac{\partial^2 M}{\partial a^2} < 0$. To summarize, we have $\dfrac{\partial(M/a)}{\partial a} < 0$ and $\dfrac{\partial^2 M}{\partial a^2} \leq 0$ on the entire domain of M. This implies that in (A.5), for the same ability z, given $\theta_H > \theta_L$, it is impossible that $a_H \leq a_L$, thus $a_H > a_L$. $\square$

Proof of Proposition 1

By Lemma 1, construct a function

$$H(a, z, A; w, r) = \Pi(a, z, A; w, r) - wz^\gamma \tag{A.10}$$

where w and r are the steady-state wage and interest rate. In the steady-state equilibrium, all agents with $H > 0$ are entrepreneurs, and those with $H < 0$ are workers. In this way, the locus $H = 0$ separates the wealth-ability plane into two regions of occupational choices. Define $\widetilde{a}(z) = \{a|H(a, z, A; w, r) = 0\}$, it is a non-increasing function of z, and must satisfies $\dfrac{d\widetilde{a}(z)}{dz} < \infty$ when the credit constraint $k \leq \lambda a$ binds, otherwise the entrepreneurial profit is independent of the wealth level, contradictory to binding credit constraints.

From Lemma 2, in the steady state, the wealth level is a type-specific function of ability. Denote such a function by $a = \widehat{a}_m(z)$. By the optimality condition (A.5),

$$\theta_m \left[\frac{\partial(M/a_m)}{\partial a}\frac{d\widehat{a}_m}{dz} + \frac{\partial(M/a_m)}{\partial z}\right] = -\left[\frac{\partial^2 M}{\partial a^2}\frac{d\widehat{a}_m}{dz} + \frac{\partial^2 M}{\partial a \partial z}\right] \tag{A.11}$$

$$\Rightarrow \frac{d\widehat{a}_m}{dz} = -\left[\frac{\partial^2 M}{\partial a \partial z} + \theta_m \frac{\partial(M/a_m)}{\partial z}\right] \Big/ \left[\theta_m \frac{\partial(M/a_m)}{\partial a} + \frac{\partial^2 M}{\partial a^2}\right]. \tag{A.12}$$

Now discuss the signs of the four partial derivatives on the right-hand side of equation (A.12). From (A.8),

$$\frac{\partial(M/a_m)}{\partial a} = -\frac{\nu}{1-(1-\alpha)(1-\nu)} \frac{(M/a_m) + (r+\delta)\lambda}{a_m} < 0. \tag{A.13}$$

By (A.7),

$$zA\Psi^{(1-\alpha)(1-\nu)} - w\Psi = \left\{ \left[\frac{(1-\alpha)(1-\nu)}{w}\right]^{\frac{(1-\alpha)(1-\nu)}{1-(1-\alpha)(1-\nu)}} - w\left[\frac{(1-\alpha)(1-\nu)}{w}\right]^{\frac{1}{1-(1-\alpha)(1-\nu)}} \right\} (zA)^{\frac{1}{1-(1-\alpha)(1-\nu)}}. \tag{A.14}$$

Thus again from (A.8), we have

$$\frac{\partial(M/a_m)}{\partial z} \propto \frac{1}{1-(1-\alpha)(1-\nu)} \frac{zA\Psi^{(1-\alpha)(1-\nu)} - w\Psi}{z} > 0. \tag{A.15}$$

For the second-order partial derivatives, from (A.9),

$$\frac{\partial^2 M}{\partial a^2} = -\frac{\nu}{1-(1-\alpha)(1-\nu)} \frac{(\partial M/\partial a) + (r+\delta)\lambda}{a} < 0, \tag{A.16}$$

and

$$\frac{\partial^2 M}{\partial a \partial z} \propto \frac{1}{1-(1-\alpha)(1-\nu)} \frac{zA\Psi^{(1-\alpha)(1-\nu)} - w\Psi}{z} > 0. \tag{A.17}$$

By (A.12) and the inequalities (A.13), (A.15), (A.16) and (A.17), we have $\dfrac{d\widehat{a}_m}{dz} > 0$. That is, for either type, the steady-state wealth level is strictly increasing in ability.

Because the occupational indifference curve $\widetilde{a}(z)$ is non-increasing, and the steady-state wealth $\widehat{a}_m(z)$ is strictly increasing, their intersection determined the threshold $\overline{z}_m$, below which all m-type agents becomes workers, and above entrepreneurs. By Lemma 2, the curve $\widehat{a}_H(z)$ is pointwise higher than $\widehat{a}_L(z)$. And as the credit constraint binds for some entrepreneurs, the curve $\widetilde{a}(z)$ is non-vertical at at least one of $\overline{z}_H$ and $\overline{z}_L$. Therefore, it must be $\overline{z}_H < \overline{z}_L$, meaning that the entrepreneur share is larger among the H-type agents than among the L-type agents. □

Proof of Proposition 2

As $\lambda \to \infty$, namely, there are no credit constraints, neither the entrepreneurial profit function (3) nor the occupational income function (5) is dependent on the wealth level a. Therefore, in such an steady state, both types' ability thresholds in occupational choices are implicitly determined by the same function:

$$w\overline{z}_m^{\gamma} = \Pi(\overline{z}_m, A; w, r), \tag{A.18}$$

Because both types have the identical set of solution to equation (A.18), and the individual ability is identically independently distributed for the two types, the within-type entrepreneur shares must be equal. □

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