Status-Seeking Culture and Development of Capitalism

Chu, Angus C. and Wang, Xilin

University of Liverpool, Fudan University

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Angus C. Chu Xilin Wang

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Abstract

According to Werner Sombart's classic text *Luxury and Capitalism*, the status-seeking behavior of individuals may facilitate the development of capitalism and give rise to an early industrialization. In this study, we develop a growth-theoretic framework to formalize this hypothesis by introducing a status-seeking preference into the Schumpeterian growth model of endogenous takeoff. Then, we use the model to explore how this cultural preference affects the transition of an economy from pre-industrial stagnation to modern economic growth. We find that a stronger preference for status seeking causes an earlier takeoff and a positive effect on economic growth in the short run but an overall ambiguous effect on growth in the long run. We also calibrate the model to data to perform a quantitative analysis and find that a stronger status-seeking preference reduces the steady-state equilibrium growth rate under reasonable parameter values. Therefore, the effects of status-seeking behaviors evolve across different stages of economic development.

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Chu: anguscccc@gmail.com. Management School, University of Liverpool, Liverpool, United Kingdom.
Wang: 17110680014@fudan.edu.cn. China Center for Economic Studies, School of Economics, Fudan University, Shanghai, China.

A new emphasis on the deployment of expensive, often durable manufactured objects—silks, mirrors, elegant furniture, etc.—replaced earlier ways of expressing status, such as maintaining large retinues, which did less to stimulate production. Pomeranz (2001, p. 107)

The bourgeois who lived in a hierarchical society had to prove himself and his self-worth [...] and thus necessitated a new, heightened degree of luxury. This further increased the demand for luxury, which according to Sombart specifically resulted in the creation of new markets that expanded the economy: as the desire for luxury grew immensely, so did the markets to accommodate it. Franchetti (2013, p. 135-136)

1 Introduction

According to Sombart (1967), the status-seeking behavior of individuals may facilitate the development of capitalism and give rise to an early industrialization. In this study, we provide a growth-theoretic framework to formalize this hypothesis. Specifically, we introduce a status-seeking preference into the Schumpeterian growth model of endogenous takeoff in Peretto (2015). Then, we use the model to explore how this cultural preference affects the transition of an economy from pre-industrial stagnation to modern economic growth. In summary, we find that a stronger preference for status seeking leads to an earlier takeoff and a higher rate of economic growth in the short run. However, the overall effect of status seeking on long-run economic growth is ambiguous. Therefore, the effects of status-seeking behaviors evolve across different stages of economic development.

The intuition of the above results can be explained as follows. The preference for status seeking encourages the accumulation of assets and mitigates the preference for discounting, which in turn reduces the equilibrium interest rate. This *interest-rate* effect from the status-seeking preference serves to stimulate the entry of firms with new products and the quality improvement of products (for a given market size of firms). Therefore, the market size (which is increasing in the population size)[1] required for innovation to occur becomes smaller, and the economy experiences an earlier transition to growth. However, the increased entry of firms eventually reduces the market size of each firm. Given that the equilibrium rate of innovation also depends positively on the firm size,[2] the overall effect of status seeking on economic growth in the long run is ambiguous. We also calibrate the model to data to perform a quantitative analysis and find that a stronger status-seeking preference reduces the steady-state equilibrium growth rate under reasonable parameter values.

This study relates to the literature on economic growth and innovation. Romer (1990) develops the seminal R&D-based growth model in which the invention of new products drives innovation. Aghion and Howitt (1992) develop the Schumpeterian growth model in which the quality improvement of products drives innovation.[3] A small number of studies in this

[1] Kremer (1993) provides evidence for a positive relationship between the population size and technological progress in early historical eras.

[2] See Cohen and Klepper (1996a, b) for evidence.

[3] See also Grossman and Helpman (1991) and Segerstrom *et al.* (1990) for other early studies.

literature explore how the behavioral aspects of people's preferences affect innovation and economic growth; see for example, Chu (2007) on entrepreneurial overconfidence, Furukawa *et al.* (2018, 2019) on the love of novelty, and Pan *et al.* (2018) and Hof and Prettner (2019) on status-seeking preferences. We contribute to this literature by introducing a status-seeking preference into the second-generation Schumpeterian growth model,[4] whose implications are supported by empirical evidence,[5] to explore its different implications on economic growth at different time horizons, which complement the interesting studies by Pan *et al.* (2018) and Hof and Prettner (2019) who consider status-seeking households in the Romer model and focus on economic growth in the long run.[6]

This study also relates to the literature on economic growth and endogenous takeoff. In this literature, seminal studies by Galor and Weil (2000) and Galor and Moav (2002) develop unified growth theory.[7] Unified growth theory explores the endogenous transition of an economy from stagnation to growth through a quality-quantity tradeoff in childrearing and human-capital accumulation.[8] In this literature, Galor and Michalopoulos (2012) explore the evolutionary advantage of entrepreneurial spirit at different stages of economic development. The present study relates to this literature by introducing a status-seeking preference into a Schumpeterian growth model with endogenous takeoff developed by Peretto (2015) and exploring how this cultural preference affects the endogenous transition of an economy from the pre-industrial era to modern industrial eras through technological progress.[9]

The rest of this paper is organized as follows. Section 2 presents the model. Section 3 provides our results and performs a quantitative analysis. Section 4 concludes.

2 A Schumpeterian model with status-seeking culture

The Schumpeterian growth model of endogenous takeoff is based on Peretto (2015). We consider two types of agents in the Peretto model: workers and asset owners. Furthermore, we assume that asset owners have a status-seeking preference to flaunt their wealth as hypothesized by Sombart (1967).[10]

2.1 Population

The population size in the economy at time t is L_t, which grows at an exogenous rate $\lambda > 0$. An exogenous share $s \in (0, 1)$ of the population is workers, and they simply consume their

[4] Peretto (1994, 1998, 1999), Smulders and van de Klundert (1995), Dinopoulos and Thompson (1998), Young (1998) and Howitt (1999) combine the two dimensions of innovation and develop the second-generation Schumpeterian growth model, which is free from the counterfactual scale effect in the Romer model.

[5] See Laincz and Peretto (2006), Ha and Howitt (2007), Madsen (2008, 2010) and Ang and Madsen (2011).

[6] There is also an established literature on status seeking and economic growth in capital-based growth models; see Kurz (1968), Zou (1994, 1995), Corneo and Jeanne (1997) and Futagami and Shibata (1998) for early studies and Pan *et al.* (2018) for a discussion of subsequent studies in this literature.

[7] See also Jones (2001) and Hansen and Prescott (2002) for other early studies on endogenous takeoff.

[8] See also Galor and Mountford (2008), Galor *et al.* (2009), Ashraf and Galor (2011) and Galor (2011).

[9] Chu *et al.* (2020) explore the effects of patent protection on endogenous takeoff in the Peretto model.

[10] See Heffetz and Frank (2011) for a survey of experimental and empirical evidence on preferences for social status.

wage income w_t. The remaining share $1-s$ of the population is asset owners, and they accumulate assets for consumption and status seeking.

2.2 Status-seeking households

There is a unit continuum of households, which are indexed by $h \in [0,1]$. They have identical homothetic preferences over consumption. Household h's utility function is given by[11]

$$U(h)=\int_0^{\infty} e^{-(\rho-\lambda)t}\left\{\ln c_t(h)+\kappa \ln\left[\frac{a_t(h)}{a_t}\right]\right\} dt, \tag{1}$$

where $c_t(h)$ is household h's per capita consumption of the final good (numeraire) and the parameter $\rho>\lambda$ is the subjective discount rate. The parameter $\kappa>0$ captures the household's status-seeking preference in its wealth relative to other households. The asset-accumulation equation is given by

$$\dot{a}_t(h)=(r_t-\lambda)a_t(h)-c_t(h), \tag{2}$$

where $a_t(h)$ is the real value of assets owned by each member of household h.

We perform dynamic optimization and obtain the growth path of consumption $c_t(h)$ as

$$\frac{\dot{c}_t(h)}{c_t(h)}=r_t-\rho+\kappa\frac{c_t(h)}{a_t(h)}, \tag{3}$$

where the term $\kappa c_t(h)/a_t(h)$ captures the effect of the status-seeking behavior of households. Although the households are heterogeneous *ex ante*, they are homogeneous *ex post* such that $c_t(h)=c_t$ and $a_t(h)=a_t$ for all $h\in[0,1]$.[12]

2.3 Final good

The production function of the final good is given by[13]

$$Y_t=\int_0^{N_t} X_t^{\theta}(i)\left[Z_t^{\alpha}(i)\, Z_t^{1-\alpha} L_{y,t}/N_t^{1-\sigma}\right]^{1-\theta} di, \tag{4}$$

where $\{\theta,\alpha,\sigma\}\in(0,1)$. N_t is the number of differentiated intermediate goods. $L_{y,t}$ denotes production workers and is given by $L_{y,t}=sL_t$ in equilibrium. $X_t(i)$ is the quantity of non-durable intermediate good $i\in[0,N_t]$. The productivity of $X_t(i)$ depends on its own quality

[11] Given the complexity of our model with multiple dimensions of innovation, we focus on the log utility function for analytical tractability, which also has the advantage of being consistent with the relative-wealth-status specification in Corneo and Jeanne (1997) and Futagami and Shibata (1998) and the absolute-wealth-status specification in Zou (1994, 1995).

[12] This assumption can be rationalized by an equal initial wealth $a_0(h)=a_0$ such that $a_t(h)=a_t$ for all t. See Chu and Peretto (2019) for an analysis of heterogeneous households in the Peretto model.

[13] A more familiar special case of the production function is $Y_t=\int_0^{N_t} X_t^{\theta}(i)\left[Z_t(i)\, L_{y,t}\right]^{1-\theta} di$, which however does not capture technology spillovers $1-\alpha$ and the congestion effect $1-\sigma$ of variety. The latter feature serves to remove the scale effect for all $\sigma<1$; see Peretto (2018) for a discussion on the robustness of scale invariance in the second-generation Schumpeterian growth model.

$Z_t(i)$ as well as the average quality of all intermediate goods $Z_t \equiv \int_0^{N_t} Z_t(j)\, dj/N_t$, which captures technology spillovers. The parameter α determines the private return to quality, and hence, $1-\alpha$ determines the degree of technology spillovers. The parameter σ determines a congestion effect $1-\sigma$ of variety. As we will show, the social return to variety is σ.

Profit maximization yields the conditional demand functions for $L_{y,t}$ and $X_t(i)$ as

$$w_t = (1-\theta)\frac{Y_t}{L_{y,t}}, \tag{5}$$

$$X_t(i) = \left(\frac{\theta}{P_t(i)}\right)^{1/(1-\theta)} \frac{Z_t^{\alpha}(i)\, Z_t^{1-\alpha} L_{y,t}}{N_t^{1-\sigma}}, \tag{6}$$

where $P_t(i)$ is the price of $X_t(i)$. Perfect competition implies that final-good firms pay $(1-\theta)Y_t = w_t L_{y,t}$ for workers and $\theta Y_t = \int_0^{N_t} P_t(i)\, X_t(i)\, di$ for intermediate goods.

2.4 Intermediate goods and in-house R&D

The intermediate-good sector is characterized by monopolistic competition. There is a continuum of differentiated intermediate goods $i \in [0, N_t]$. A monopolistic firm produces differentiated intermediate good i with a linear technology that requires $X_t(i)$ units of the final good to produce $X_t(i)$ units of intermediate good i. In other words, the marginal cost for the monopolistic firm in industry i to produce $X_t(i)$ with quality $Z_t(i)$ is one. The monopolistic firm also needs to incur $\phi Z_t^{\alpha}(i)\, Z_t^{1-\alpha}$ units of the final good as a fixed operating cost. To improve the quality of its products, the firm devotes $I_t(i)$ units of the final good to in-house R&D. The process of in-house R&D is specified as

$$\dot{Z}_t(i) = I_t(i). \tag{7}$$

The firm's (before-R&D) profit flow at time t is

$$\Pi_t(i) = [P_t(i) - 1]\, X_t(i) - \phi Z_t^{\alpha}(i)\, Z_t^{1-\alpha}. \tag{8}$$

The value of the monopolistic firm in industry i is

$$V_t(i) = \int_t^{\infty} \exp\left(-\int_t^s r_u du\right) [\Pi_s(i) - I_s(i)]\, ds. \tag{9}$$

The monopolistic firm maximizes (9) subject to (7) and (8). We solve this dynamic optimization problem below and find that the familiar profit-maximizing price is

$$P_t(i) = 1/\theta. \tag{10}$$

Following the standard approach in the literature, we consider a symmetric equilibrium in which $Z_t(i) = Z_t$ for $i \in [0, N_t]$ and the size of each intermediate-good firm is identical across all industries $X_t(i) = X_t$.[14] From (6) and (10), the quality-adjusted firm size is

$$\frac{X_t}{Z_t} = \theta^{2/(1-\theta)} \frac{L_{y,t}}{N_t^{1-\sigma}}. \tag{11}$$

[14]Symmetry also implies $\Pi_t(i) = \Pi_t$, $I_t(i) = I_t$ and $V_t(i) = V_t$.

We define the following transformed variable:

$$x_t \equiv s\theta^{2/(1-\theta)} \frac{L_t}{N_t^{1-\sigma}} = \frac{X_t}{Z_t}, \tag{12}$$

which is a state variable whose dynamics depends on the ratio $L_t/N_t^{1-\sigma}$. Lemma 1 shows that the rate of return on quality-improving R&D is increasing in the firm size x_t.

Lemma 1 *The rate of return on quality-improving in-house R&D is given by*

$$r_t^q = \alpha \frac{\Pi_t}{Z_t} = \alpha \left(\frac{1-\theta}{\theta} x_t - \phi \right). \tag{13}$$

Proof. See the Appendix. ■

2.5 Entrants

To enter the market with a new variety of intermediate goods and set up its operation, a new firm has to pay δX_t units of the final good, where $\delta > 0$ is an entry-cost parameter. The value of a new firm at time t is V_t.[15] The asset-pricing equation can be written as

$$r_t = \frac{\Pi_t - I_t}{V_t} + \frac{\dot{V}_t}{V_t}. \tag{14}$$

When entry is positive, the entry condition is given by

$$V_t = \delta X_t. \tag{15}$$

Then, we can use (8), (10), (12), (14) and (15) to derive the rate of return on entry as

$$r_t^e = \frac{\Pi_t - I_t}{\delta Z_t} \frac{Z_t}{X_t} + \frac{\dot{X}_t}{X_t} = \frac{1}{\delta} \left(\frac{1-\theta}{\theta} - \frac{\phi + z_t}{x_t} \right) + z_t + \frac{\dot{x}_t}{x_t}, \tag{16}$$

which also uses $\dot{V}_t/V_t = \dot{X}_t/X_t = z_t + \dot{x}_t/x_t$, and $z_t \equiv \dot{Z}_t/Z_t$ is the quality growth rate. Equation (16) shows that the rate of return on entry is also increasing in the firm size x_t.

2.6 Equilibrium

The equilibrium is a time path of allocations $\{a_t, Y_t, C_t, X_t, I_t\}$ and prices $\{r_t, w_t, P_t, V_t\}$ such that

- workers supply labor and consume their wage income w_t;
- asset owners maximize utility taking r_t as given;

[15] To ensure symmetry, we assume that all new firms at time t have access to the aggregate technology Z_t.

- competitive final-good firms produce Y_t and maximize profits taking $\{w_t, P_t\}$ as given;
- intermediate-good firms choose $\{P_t, I_t\}$ to maximize V_t taking r_t as given;
- entrants make entry decisions taking V_t as given;
- the value of all existing monopolistic firms adds up to the value of the households' assets such that $N_t V_t = a_t(1-s)L_t$;
- the labor market clears such that $L_{y,t} = sL_t$; and
- the market-clearing condition of final good holds:

$$Y_t = C_t + N_t\left(X_t + \phi Z_t + I_t\right) + \dot{N}_t \delta X_t,$$

where $C_t = c_t(1-s)L_t + w_t s L_t$ is the total consumption of asset owners and workers.

2.7 Aggregate production function

Substituting (6) and (10) into (4) yields the aggregate production function given by

$$Y_t = s\theta^{2\theta/(1-\theta)} N_t^{\sigma} Z_t L_t. \tag{17}$$

The growth rate of per capita output $y_t \equiv Y_t/L_t$ is then

$$g_t \equiv \frac{\dot{y}_t}{y_t} = \sigma n_t + z_t. \tag{18}$$

which depends on the variety growth rate $n_t \equiv \dot{N}_t/N_t$ and the quality growth rate z_t.

2.8 Dynamics of the consumption-wealth ratio

We can use (3) to rewrite (2) as

$$\frac{\dot{c}_t}{c_t} - \frac{\dot{a}_t}{a_t} = (1+\kappa)\frac{c_t}{a_t} - \rho + \lambda,$$

which shows that the c_t/a_t ratio always jumps to the following steady-state value:

$$\frac{c_t}{a_t} = \frac{1}{1+\kappa}\left(\rho - \lambda\right). \tag{19}$$

Substituting (19) into (3) yields the interest rate as

$$r_t = \frac{\dot{c}_t}{c_t} + \rho - \frac{\kappa}{1+\kappa}\left(\rho - \lambda\right), \tag{20}$$

which shows that the preference for status seeking mitigates the preference for discounting and reduces the equilibrium interest rate (for a given consumption growth rate of the households). As we will show, this interest-rate effect from the status-seeking preference serves to stimulate the entry of firms and quality-improving R&D but also reduces the steady-state equilibrium firm size.

3 Status-seeking culture and endogenous takeoff

As we will show below, the dynamics of the economy is determined by the dynamics of the firm size x_t, which is stable if the following condition holds:

$$\delta\phi > \frac{1}{\alpha}\left[\frac{1-\theta}{\theta} - \delta\left(\frac{\rho-\lambda}{1+\kappa} + \frac{\lambda}{1-\sigma}\right)\right] > \frac{1-\theta}{\theta}. \tag{21}$$

Given an initial value $x_0 > \phi\theta/(1-\theta)$,[16] the economy begins in a pre-industrial era in which the growth rate of output per capita is zero. As the market size of firms becomes sufficiently large, the economy enters into the first industrial era in which firms start to create new products. Then, as the market size of firms becomes even larger, the economy enters into the second industrial era in which firms also start to improve the quality of products. Eventually, the economy converges to the balanced growth path as the firm size x_t converges to the steady state. In what follows, we show that a stronger preference for status seeking gives rise to an earlier takeoff of the economy (i.e., from the pre-industrial era to the first industrial era).

3.1 The pre-industrial era

In the pre-industrial era, the firm size x_t is too small for innovation to be viable. Therefore, the growth rate of output per capita is

$$g_t = \sigma n_t + z_t = 0 \tag{22}$$

because $n_t = z_t = 0$. In the pre-industrial era, the economy is in an equilibrium with zero growth because the firm size x_t is not large enough to provide sufficient incentives for innovation. However, the state variable $x_t = s\theta^{2/(1-\theta)}L_t/N_0^{1-\sigma}$ increases according to

$$\frac{\dot{x}_t}{x_t} = \lambda, \tag{23}$$

and the firm size x_t eventually becomes sufficiently large to trigger the transition to growth.

3.2 The first industrial era

Variety-expanding innovation becomes viable when the firm size x_t reaches the threshold:

$$x_N \equiv \frac{\phi}{(1-\theta)/\theta - \delta(\rho-\lambda)/(1+\kappa)} > x_0, \tag{24}$$

which is decreasing in the status-seeking parameter κ. Intuitively, a stronger status-seeking preference reduces the equilibrium interest rate, which in turn increases the value of monopolistic firms and provides more incentives for the entry of firms; therefore, the market size that is required for triggering entry becomes smaller.

[16] This condition implies $\Pi_0 > 0$.

Lemma 2 shows that the c_t/y_t ratio jumps to a steady-state value when the economy enters the first industrial era. This stationary property implies that c_t and y_t grow at the same rate; i.e., $\dot{c}_t/c_t = \dot{y}_t/y_t$.

Lemma 2 *Whenever $n_t > 0$, the c_t/y_t ratio jumps to the steady state.*

Proof. See the Appendix. ■

Given Lemma 2, we can use (16) and (20) to derive the variety growth rate as[17]

$$n_t = \frac{1}{\delta}\left(\frac{1-\theta}{\theta} - \frac{\phi}{x_t}\right) - \frac{\rho - \lambda}{1+\kappa} > 0, \tag{25}$$

which is positive given $x_t > x_N$. Substituting (25) into $\dot{x}_t/x_t = \lambda - (1-\sigma)n_t$ yields

$$\dot{x}_t = \frac{1-\sigma}{\delta}\left\{\phi - \left[\frac{1-\theta}{\theta} - \delta\left(\frac{\rho-\lambda}{1+\kappa} + \frac{\lambda}{1-\sigma}\right)\right] x_t\right\} > 0. \tag{26}$$

Finally, the equilibrium growth rate of output per capita is

$$g_t = \sigma n_t = \frac{\sigma}{\delta}\left(\frac{1-\theta}{\theta} - \frac{\phi}{x_t}\right) - \frac{\sigma(\rho-\lambda)}{1+\kappa} > 0, \tag{27}$$

which is increasing in the status-seeking parameter κ (for a given firm size x_t). Intuitively, a stronger status-seeking preference reduces the equilibrium interest rate and provides more incentives for the entry of firms. In summary, economic growth is driven by variety-expanding innovation in the first industrial era and gradually rises as the firm size x_t increases.

3.3 The second industrial era

When the firm size x_t reaches the second threshold x_Z (to be derived below), quality-improving innovation also becomes viable. In this case, the equilibrium growth rate of output per capita is given by

$$g_t = r_t - \rho + \frac{\kappa}{1+\kappa}(\rho - \lambda) = \alpha\left(\frac{1-\theta}{\theta}x_t - \phi\right) - \rho + \frac{\kappa}{1+\kappa}(\rho-\lambda) > 0, \tag{28}$$

which uses $r_t = r_t^q$ in (13) and is increasing in the status-seeking parameter κ (for a given firm size x_t). Intuitively, a stronger status-seeking preference reduces the equilibrium interest rate and provides more incentives for in-house R&D. The equilibrium growth rate g_t in (28) continues to rise gradually as the firm size x_t increases.

[17] Here we also use $z_t = 0$, $r_t^e = r_t = \rho + g_t - \kappa c_t/a_t = \rho + \sigma n_t - \kappa c_t/a_t$ and $\dot{x}_t/x_t = \lambda - (1-\sigma)n_t$.

In the second industrial era, economic growth is driven by both quality-improving innovation and variety-expanding innovation. Then, (18) and (28) imply that the quality growth rate z_t is given by

$$z_t = g_t - \sigma n_t = \alpha \left(\frac{1-\theta}{\theta} x_t - \phi \right) - \rho + \frac{\kappa}{1+\kappa} (\rho - \lambda) - \sigma n_t > 0, \tag{29}$$

where the variety growth rate n_t can be derived from (16) and (20) as[18]

$$n_t = \frac{1}{\delta} \left(\frac{1-\theta}{\theta} - \frac{\phi + z_t}{x_t} \right) - \frac{\rho - \lambda}{1+\kappa} > 0. \tag{30}$$

We can use (29) and (30) to solve for the variety growth rate n_t and substitute it into $\dot{x}_t / x_t = \lambda - (1-\sigma) n_t$ to derive the linearized dynamics of x_t as

$$\dot{x}_t = \frac{1-\sigma}{\delta} \left\{ (1-\alpha)\phi - \left(\frac{\rho-\lambda}{1+\kappa} + \frac{\lambda}{1-\sigma} \right) - \left[\frac{(1-\alpha)(1-\theta)}{\theta} - \delta \left(\frac{\rho-\lambda}{1+\kappa} + \frac{\lambda}{1-\sigma} \right) \right] x_t \right\} \geq 0, \tag{31}$$

which uses the approximation $\sigma / x_t \cong 0$ as in Peretto (2015). We can also use (29) and (30) to solve for the quality growth rate z_t as a function of x_t. The following threshold for $x_t > x_Z$ ensures $z_t > 0$:

$$x_Z \equiv \underset{x}{\arg \operatorname{solve}} \left\{ \left(\frac{1-\theta}{\theta} x - \phi \right) \left(\alpha - \frac{\sigma}{\delta x} \right) = \frac{(1-\sigma)(\rho-\lambda)}{1+\kappa} + \lambda \right\}. \tag{32}$$

The following parameter restriction ensures that $x_Z > x_N$:[19]

$$\alpha < \frac{1}{\phi} \left(\frac{1-\theta}{\delta\theta} - \frac{\rho-\lambda}{1+\kappa} \right) \left[1 + \left(\frac{1+\kappa}{\rho-\lambda} \right)^2 \frac{\lambda(1-\theta)}{\delta\theta} \right]. \tag{33}$$

3.4 Balanced growth path

In the long run, the firm size x_t converges to the steady state x^* given by

$$x^*(\underset{-}{\kappa}) = \frac{(1-\alpha)\phi - \left(\frac{\rho-\lambda}{1+\kappa} + \frac{\lambda}{1-\sigma} \right)}{(1-\alpha)(1-\theta)/\theta - \delta \left(\frac{\rho-\lambda}{1+\kappa} + \frac{\lambda}{1-\sigma} \right)} > 0, \tag{34}$$

which is decreasing in the status-seeking parameter κ given (21) due to a higher rate of entry of firms such that the market size of each firm eventually becomes smaller. The steady-state equilibrium growth rate is then

$$g^* = \alpha \left[\frac{1-\theta}{\theta} x^*(\underset{-}{\kappa}) - \phi \right] - \rho + \frac{\kappa}{1+\kappa} (\rho - \lambda) > 0, \tag{35}$$

[18] Here we also use $r_t^e = r_t = \rho + g_t - \kappa c_t / a_t = \rho + \sigma n_t + z_t - \kappa c_t / a_t$ and $\dot{x}_t / x_t = \lambda - (1-\sigma) n_t$.

[19] Derivations are available upon request.

which can be either increasing or decreasing in the status-seeking parameter κ. On the one hand, the status-seeking preference mitigates the preference for discounting and reduces the equilibrium interest rate, which stimulates quality-improving R&D. On the other hand, it also stimulates the entry of firms and decreases the equilibrium firm size, which reduces economic growth.

3.5 Dynamics from stagnation to growth

The dynamics of the equilibrium growth rate from stagnation to growth can be summarized as follows. In the pre-industrial era, the growth rate of output per capita is zero. When the economy enters the first industrial era with variety-expanding innovation, the growth rate of output per capita becomes positive. After that, the growth rate rises further as the economy enters the second industrial era with both quality-improving innovation and variety-expanding innovation. Eventually, the economy converges to the balanced growth path with a steady-state equilibrium growth rate; see Figure 1.

Figure 1 also shows that a stronger preference κ for status seeking leads to an earlier takeoff of the economy because x_N in (24) is decreasing in the status-seeking parameter κ, which reduces the equilibrium interest rate and increases the value of monopolistic firms. For a given x_t, a stronger preference κ for status seeking also increases the equilibrium growth rate by reducing the interest rate and providing more incentives for the entry of firms and quality-improving R&D; see (27) and (28). This positive effect of status-seeking preference on economic growth is consistent with Pan *et al.* (2018) and Hof and Prettner (2019). However, we also find that the steady-state equilibrium firm size is decreasing in κ due to the increased entry of firms. Therefore, the overall effect of status-seeking preference κ on the steady-state equilibrium growth rate is ambiguous. We summarize all these results in Proposition 1.

Proposition 1 *A stronger preference for status seeking leads to an earlier takeoff and a higher rate of economic growth (for a given firm size) in industrial eras; however, it also reduces the steady-state firm size and has an ambiguous effect on long-run economic growth.*

Proof. Proven in text. ■

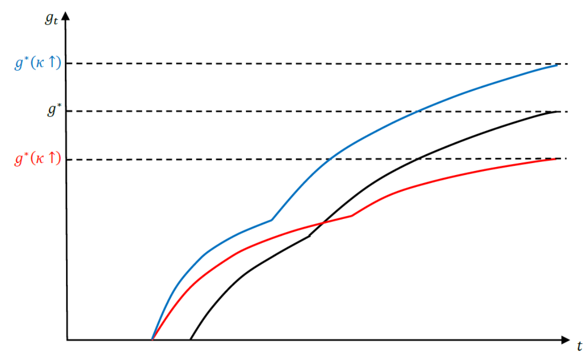

Figure 1: Dynamics of the growth rate

3.6 Quantitative analysis

In this section, we calibrate the model to US data to perform a quantitative analysis. The model features the following parameters: $\{\rho, \sigma, \lambda, \theta, \delta, \phi, \alpha, \kappa\}$. We set the discount rate ρ to a conventional value of 0.05. We follow Iacopetta *et al.* (2019) to set the social return of variety σ to 0.25. The long-run population growth rate in the US is 1.8%.[20] Furthermore, we calibrate $\{\theta, \delta, \phi\}$ by matching the following moments of the US economy: 60% for the labor income share of GDP, 64% for the consumption share of GDP, and 2% for the long-run growth rate of output per capita. We consider a range of values for $\alpha \in [0.05, 0.65]$, which determines the degree of technology spillovers $1 - \alpha$. Finally, we consider $\kappa = 0$ as our benchmark and simulate the steady-state growth rate as κ increases.

Table 1: Calibrated parameter values

α	ρ	σ	λ	θ	δ	ϕ
0.050	0.050	0.250	0.018	0.400	7.813	3.352
0.200	0.050	0.250	0.018	0.400	7.813	0.802
0.350	0.050	0.250	0.018	0.400	7.813	0.438
0.500	0.050	0.250	0.018	0.400	7.813	0.292
0.650	0.050	0.250	0.018	0.400	7.813	0.214

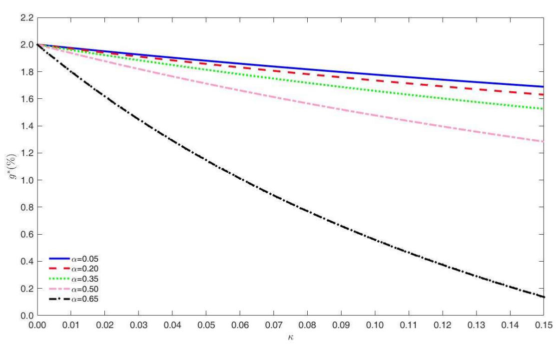

Figure 2: Status seeking and long-run growth

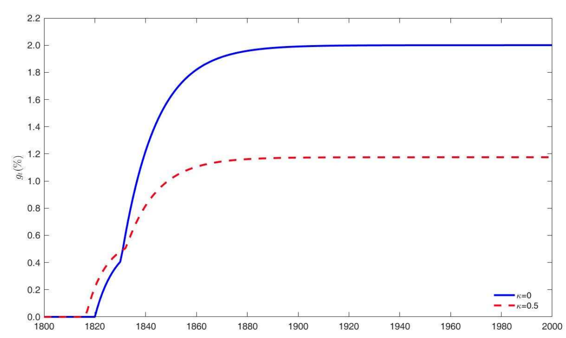

Figure 3: Simulated path of the growth rate

Figure 2 simulates the effects of the status-seeking preference κ on the steady-state equilibrium growth rate g^* under different values of α. For all values of α, the steady-state growth rate g^* is decreasing in κ. We see that as the value of α increases (i.e., the degree of technology spillovers $1 - \alpha$ decreases), the negative effect of κ becomes stronger. Equation (35) shows that the magnitude of the negative effect of κ via x^* is increasing in α. We stop at the value of $\alpha = 0.65$ because a larger value of α corresponds to a smaller calibrated value of ϕ in Table 1, and the inequality in (21) requires a sufficiently large ϕ. Iacopetta *et al.* (2019) find that the empirically relevant range of values for α is from 0.17 to 0.33. Therefore, we conclude that a stronger status-seeking preference reduces the steady-state equilibrium growth rate under reasonable parameter values. We consider the set of parameter values

[20] Data source: Maddison Project Database.

that correspond to $\alpha = 0.2$. Figure 3 simulates and compares the dynamic paths of the equilibrium growth rate from pre-industrial stagnation to modern economic growth for the following values of $\kappa \in \{0, 0.5\}$. The larger value of κ leads to an earlier takeoff by about 4 years but reduces the long-run growth rate from 2% to 1.2%.

4 Conclusion

In this study, we have introduced a status-seeking preference into the Schumpeterian growth model to explore how this cultural preference affects the endogenous transition of an economy from pre-industrial stagnation to modern economic growth. We find that a stronger preference for status seeking leads to an earlier takeoff by increasing the entry of firms with new differentiated products. This theoretical finding formalizes the hypothesis on status-seeking luxury and capitalism proposed by Sombart (1967).

Furthermore, a stronger preference for status seeking causes a higher rate of economic growth in the short run by increasing the entry of firms and quality-improving R&D. However, due to the increased entry of firms, the market size of each firm eventually becomes smaller and causes a negative effect on economic growth. As a result, the overall effect of a stronger status-seeking preference on long-run economic growth is ambiguous. These contrasting effects on economic growth at different time horizons highlight the importance of endogenous firm size (which removes the scale effect) for the analysis of status seeking and economic growth.

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Appendix

Proof of Lemma 1. We use the Hamiltonian to solve the firm's dynamic optimization. The current-value Hamiltonian of firm i is given by

$$H_t(i) = \Pi_t(i) - I_t(i) + \zeta_t(i)\dot{Z}_t(i), \tag{A1}$$

where $\zeta_t(i)$ is the costate variable on $\dot{Z}_t(i)$. We substitute (6)-(8) into (A1) and derive

$$\frac{\partial H_t(i)}{\partial P_t(i)} = \frac{\partial \Pi_t(i)}{\partial P_t(i)} = 0, \tag{A2}$$

$$\frac{\partial H_t(i)}{\partial I_t(i)} = 0 \Rightarrow \zeta_t(i) = 1, \tag{A3}$$

$$\frac{\partial H_t(i)}{\partial Z_t(i)} = \alpha\left\{[P_t(i) - 1]\left[\frac{\theta}{P_t(i)}\right]^{1/(1-\theta)}\frac{sL_t}{N^{1-\sigma}} - \phi\right\}\frac{Z_t^{1-\alpha}}{Z_t^{1-\alpha}(i)} = r_t\zeta_t(i) - \dot{\zeta}_t(i), \tag{A4}$$

where $Z_t(i)$ is a state variable. It can be shown that $\partial\Pi_t(i)/\partial P_t(i) = 0$ yields $P_t(i) = 1/\theta$. Substituting (A3), (10) and (12) into (A4) and imposing symmetry yield (13). ■

Proof of Lemma 2. When the economy enters into the first industrial era, variety-expanding innovation is activated. Then, we can apply the entry condition $V_t = \delta X_t$ to

$$a_t = \frac{V_t N_t}{(1-s)L_t} = \frac{\delta X_t N_t}{(1-s)L_t} = \frac{\delta\theta^2}{1-s}y_t, \tag{A5}$$

which also uses $\theta Y_t = P_t X_t N_t = X_t N_t/\theta$. Differentiating (A5) with respect to t yields

$$\frac{\delta\theta^2}{1-s}\dot{y}_t = \dot{a}_t = (r_t - \lambda)\frac{\delta\theta^2}{1-s}y_t - c_t. \tag{A6}$$

Then, we can use (3) and (A5) to rearrange (A6) as

$$\frac{\dot{c}_t}{c_t} - \frac{\dot{y}_t}{y_t} = (1+\kappa)\frac{1-s}{\delta\theta^2}\frac{c_t}{y_t} - \rho + \lambda, \tag{A7}$$

which shows that the c_t/y_t ratio jumps to its steady-state value when the economy enters the first industrial era. ■