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DO STATUS-SEEKING MOTIVES ENHANCE ECONOMIC GROWTH? A SMALL OPEN GROWTH MODEL

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This paper explores the growth effects of both consumption- and wealth-induced social comparisons in a unified *small open* endogenous growth model. We analytically show that in an open economy not only do these two distinct status-seeking motives have very different growth effects, but these growth effects are also quite different from the conventional wisdom based on a closed economy. Status-seeking behavior need not favor economic growth. The asset portfolios of households and the imperfection of the international asset market both play an important role and jointly govern the growth effects of social status seeking. We also perform a quantitative experiment, showing that our analytical findings are robust and empirically plausible. Our analysis provides novel implications for social comparisons and new insights into the literature.

Keywords: Social Status Seeking, Endogenous Growth, Open Economy

1. INTRODUCTION

It has been well documented that pursuing social status has major consequences for a macro economy.[1] The relevant studies emphasize that an individual's status-motivated preferences depend on her/his own consumption or wealth relative to a reference standard that is typically defined as the economy's average level of consumption or capital stock. Status-motivated preferences have been supported by a rapid development of the empirics of social status and happiness studies.[2] Based on such preferences, economists propose that status-seeking motives, regardless of whether in relation to consumption or wealth, can positively affect economic growth. Consumption-induced social comparisons generate an *employment effect*, which leads households to increase labor supply for their conspicuous consumption, and thus enhances output/growth [see, for example, Liu and Turnovsky (2005) and Gomez (2008)]. Wealth-induced status seeking triggers *the spirit of capitalism*, which accelerates capital accumulation and thus stimulates growth

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[see, for example, Corneo and Jeanne (1997), Futagami and Shibata (1998), Pham (2005), and Tournemaine and Tsoukis (2008)].

These conventional consequences of status-seeking motives are based on macro models of a closed economy. In the literature, little is known about their growth implications for an open economy. Fisher's studies (2005, 2008) are rare exceptions. By focusing on an *endowment economy* (capital is exogenously given), Fisher (2008) shows that consumption-based status seeking has a positive effect on output in a small open economy. In a standard Ramsey model with *inelastic labor supply*, Fisher (2005) finds that wealth-based status seeking has no impact on output and capital accumulation if the international asset (bond) market is perfect. Similarly, in a model with *sustained growth but inelastic labor supply*, Fisher (2010) also implicitly refers to a zero-growth effect of wealth preference, although the main focus of this paper is the effects of fiscal policy, instead of status seeking. Undoubtedly, these seminal works have contributed to the literature, but there has still been a notable lack of systematic analysis of the macro consequences of the two types of status-seeking motives in a unified open economy model. This is particularly true when our results suggest rather different growth implications for social status seeking than theirs.

To thoughtfully deal with this neglected issue, this paper builds an endogenous growth model of a small open economy, which is characterized by several salient model settings. First, we consider both the consumption- and the wealth-induced status-seeking motives in a unified model. Given that previous research has investigated the cases with either consumption- or wealth-enhanced social comparisons separately, simultaneously considering both types of status-seeking motives allows us to shed light on the distinct implications of these two different motives.[3] Second, in an open economy, households can access the international asset market by holding foreign bonds. As for wealth-based social comparisons, they imply that households are allowed to exhibit their social status through accumulating not only physical capital but also foreign bonds. Thus, asset portfolio allocation gives rise to a rather different effect on growth from that of a closed economy. Third, the international asset market is allowed to be either perfect or imperfect. If the international asset market is perfect, the rate of return on international bonds is fixed at an exogenously given world interest rate. If the international asset market is imperfect, a lending (borrowing) premium leads to a downward-sloping (upward-sloping) supply of credit (debt) to the world credit (debt) market. This market (im)perfection and the household's asset portfolio jointly govern the growth consequences of the status-seeking motives.

In this study, we show not only that in an open economy status seeking in consumption and in wealth have very different growth effects, but also that these growth effects are also quite different from the conventional wisdom based on a closed economy. First of all, in the absence of the asset portfolio effect (for wealth-induced status seeking, households exhibit their status to others *only* through capital accumulation), we find that status-seeking motives in both consumption- and wealth-enhanced social comparisons leave the balanced-growth rate unchanged

under a perfect international asset market. By contrast, under an imperfect international asset market, social comparisons in capital have a positive growth effect, whereas social comparisons in consumption have an ambiguous effect on growth. The rationale for this ambiguity is that greater social aspirations in consumption make people more impatient. In contrast to the conventional employment effect, this *intertemporal preference effect* discourages households from accumulating capital, resulting in deterioration in growth.

When we allow households to display their social status by either accumulating capital or holding foreign bonds, the households' asset portfolio allocation may crucially alter the intertemporal preference effect on growth. Because of the existence of the investment adjustment cost, households are more likely to exhibit their status to others by accumulating foreign bonds, instead of physical capital. As it turns out, if the international asset market is perfect, social comparisons in consumption have a positive effect on growth, whereas social comparisons in wealth have an ambiguous effect on growth. Obviously, the growth consequences offer quite different implications for status seeking when households can commit to asset allocation and exhibit their social status by holding foreign bonds. If we consider an imperfect international asset market, an additional *interest rate effect* also plays a role in terms of the growth effect of status seeking. Under such circumstances, either consumption- or wealth-based status seeking has a mixed impact on growth.

We perform a quantitative experiment to support our analytical results. By appropriately parameterizing the model, our numerical examination enables us to obtain the growth impact of both the consumption- and wealth-based comparisons more clearly in an empirically convincing way. We also conduct robustness and sensitivity analyses. It is found that greater social aspirations are more likely to favor economic growth when the business cycles is relatively high, the time preference rate is relatively low, the supply of credit (debt) to the world market is relatively inelastic (the international asset market is imperfect), and the investment adjustment cost is relatively low.

2. THE MODEL

We incorporate the status-seeking motives in consumption and in wealth into a standard endogenous growth model of a small open economy. There are two types of agents: households and firms. Households are concerned about their own consumption and wealth relative to the reference standards that are defined as the economy's average levels of consumption and wealth. The social comparisons give rise to externalities in terms of influencing each individual household's behavior. In this small open economy, firms operating in a perfectly competitive market specialize in the production of a domestically produced good, whereas part of the output can be exported. Meanwhile, households have access to both domestic and imported goods.

2.1. Households

The economy is populated by a unit measure of identical, infinitely lived households. If the status-motivated preferences are taken into account, the household's discounted stream of expected utilities over its lifetime is given by

$$U = \int_0^\infty \left\{ \ln(c_{Dt} - \alpha_D \overline{c}_{Dt}) + \ln(c_{ft} - \alpha_f \overline{c}_{ft}) + \Omega \ln(W_t - \gamma \overline{W}_t) - \Lambda \frac{l_t^{1+\chi}}{1+\chi} \right\} e^{-\rho t} dt;\ \alpha, \gamma, \Omega, \Lambda \geq 0, \tag{1}$$

where $\rho > 0$ is the subject time preference rate, $\chi > 0$ is the inverse of the wage elasticity for labor supply, l_t represents labor hours, c_{Dt} and c_{ft}, respectively, denote the individual consumption levels of domestic and imported goods, and W_t is the individual's wealth. The utility function (1) consists of both consumption- and wealth-based social comparisons. The consumption-based social comparisons are represented by consumption ownership on domestically (c_{Dt}) and internationally produced goods (c_{ft}) relative to the economy's respective average levels, $\overline{c}_{Dt}$ and $\overline{c}_{ft}$. In an open economy, the consumption of imported goods (often perceived as luxury goods) may be more likely to arouse interpersonal influence than domestic consumption. People often purchase internationally produced goods in order to keep up with others and/or display their social status to others.[4] Given that $\alpha_D > 0$ and $\alpha_f > 0$, this conspicuous consumption gives rise to a negative "externality" (jealousy) toward others. Equation (1) also conforms to the keeping-up-with-the-Joneses preference in the studies by Ljungqvist and Uhlig (2000) and Dupor and Liu (2003) whereby an individual's marginal rate of substitution of consumption for leisure (MRS) is increasing in the level of preference $\overline{c}_{Dt}$ and $\overline{c}_{ft}$. As in their analysis, the restrictions $\alpha_D < 1$ and $\alpha_f < 1$ are needed so that the household's utility is monotonically increasing with consumption in a symmetric equilibrium.

The wealth-based social comparisons are represented by wealth ownership (W_t) relative to the average level of wealth ($\overline{W}_t$), with the parameter Ω capturing "the spirit of capitalism" [Kurz (1968) and Zou (1994)]. Similarly to the consumption-based social comparisons, we use $\gamma \in (0, 1)$ to measure the degree of capitalist spirit. Given $\gamma > 0$, the status-seeking motive in wealth also generates a negative externality in the household's preferences. Of particular note, in our study the utility stemming from wealth-based social status includes physical capital k_t and international bonds b_t, i.e., $W_t = k_t + \phi b_t$ and $\overline{W}_t = \overline{k}_t + \phi \overline{b}_t$, where ϕ is a dummy variable that measures the weight of foreign bonds relative to capital. If $\phi = 1$, there is an equal weight attached to both kinds of asset, whereas when $\phi = 0$, households derive the utility of wealth-based social status by only accumulating capital, which recovers the case of Kurz (1968) and Zou (1994).

Investment, i_t, in physical capital involves adjustment costs, as stressed in Hayashi (1982). The consideration of adjustment costs in investment not only excludes perfect substitutes between capital and foreign bonds, but also produces

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nondegenerated dynamics. In line with the common specification, we assume a quadratic convex function of adjustment cost, i.e., $\frac{h}{2}\frac{(i_t)^2}{k_t}$, with a positive adjustment coefficient, i.e., $h > 0$. The specification that the adjustment costs are proportional to the rate of investment per unit of installed capital is necessary to sustain an equilibrium of ongoing growth [Turnovsky (1996)]. Let the wage and interest rates be w_t and r_t, respectively. Then the intertemporal budget constraint facing the representative household is

$$\dot{b}_t = w_t l_t + r_t k_t + r_t^* b_t - i_t\left(1 + \frac{h}{2}\frac{i_t}{k_t}\right) - c_{Dt} - pc_{ft}, \tag{2}$$

where r_t^* is the rate of return on foreign bonds and p is the price of foreign relative to domestic goods, i.e., the terms of trade. By assumption, the country is so small that its terms of trade are exogenously determined by the world markets, as in Obstfeld (1982) and Buckus (1993), among others. With δ defined as the rate of capital depreciation, the law of motion for capital is given by

$$\dot{k}_t = i_t - \delta k_t. \tag{3}$$

In this study, we consider two distinctive scenarios, in the sense that the international asset market could be either perfect or imperfect. To the end, we specify the rate of return on foreign bonds as follows:

$$r_t^* = r_0^* - \varepsilon\left(\frac{\overline{b}_t}{\overline{k}_t}\right). \tag{4}$$

If the international asset market is perfect ($\varepsilon = 0$), (4) reduces to $r_t^* = r_0^*$, an exogenously given world interest rate. In contrast, in line with Turnovsky (1997), when the international asset market is imperfect ($\varepsilon > 0$), the term $-\varepsilon(\overline{b}_t/\overline{k}_t)$ captures the lending premium, which is diminishing in the holding of foreign bonds as $\overline{b}_t > 0$, if we view the imperfection of the bond market from the standpoint of a lending nation. This term can also capture the borrowing premium associated with default risk as $\overline{b}_t < 0$, if we view the imperfection of the bond market from the standpoint of a borrowing nation. In other words, there is a downward-sloping (upward-sloping) supply of credit (debt) to the world credit (debt) market, i.e., $\varepsilon' = \frac{\partial\varepsilon}{\partial(\overline{b}_t/\overline{k}_t)} > 0$, when $\overline{b}_t > 0$ ($\overline{b}_t < 0$). To satisfy these features, we follow Chatterjee et al. (2003) and specify that $\varepsilon(\frac{\overline{b}_t}{\overline{k}_t}) = e^{a\cdot\overline{b}_t/\overline{k}_t} - 1$, for simplicity. Because our focus is on the effects of social status seeking, we confine the attention to a lending nation ($\overline{b}_t > 0$) most of the time.[5] As we will see later, this generalized specification, together with various measures of wealth (reflected by the dummy variable ϕ), will allow us to differentiate the growth effects of the motives of status-seeking in consumption and wealth.

Given the initial wealth (W_0), the household maximizes the lifetime utility (1) subject to its budget constraint (2) and the evolution of capital (3), while taking

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all price variables as given. Because each individual behaves *atomistically*, the economy's average consumption ($\bar{c}_{Dt}$, $\bar{c}_{ft}$) and wealth ($\bar{k}_t$, $\bar{b}_t$) are also taken as given. Let λ_t be the Lagrange multiplier associated with the household's budget constraint (2) (which is also the shadow price of foreign bonds) and let $q_t^{'}$ be the Lagrange multiplier associated with the law of motion for capital (3) (which is the shadow price of capital). Accordingly, the first-order conditions for the household's optimization problem with respect to c_{Dt}, c_{ft}, l_t, i_t, b_t, and k_t are, respectively,

$$\frac{1}{(c_{Dt} - \alpha_D \bar{c}_{Dt})} = \lambda_t, \tag{5}$$

$$\frac{1}{(c_{ft} - \alpha_f \bar{c}_{ft})} = \lambda_t p_t, \tag{6}$$

$$\Lambda l_t^{\chi} = \lambda_t w_t, \tag{7}$$

$$\lambda_t \left[1 + h\left(\frac{i_t}{k_t}\right)\right] = q_t^{'}, \tag{8}$$

$$\dot{\lambda}_t = \lambda_t \rho - \lambda_t \left[r_0^* - \varepsilon\left(\frac{\bar{b}_t}{\bar{k}_t}\right)\right] - \frac{\phi\Omega}{(k_t + \phi b_t) - \gamma(\bar{k}_t + \phi\bar{b}_t)}, \tag{9}$$

$$\dot{q}_t^{'} = q_t^{'}(\rho + \delta) - \lambda_t \left[r_t + \frac{h}{2}\left(\frac{i_t}{k_t}\right)^2\right] - \frac{\Omega}{(k_t + \phi b_t) - \gamma(\bar{k}_t + \phi\bar{b}_t)}. \tag{10}$$

Equations (5) and (6) are the household's demand for domestic and imported goods, respectively. Equation (7) is the household's labor supply, which equates the slope of the household's indifference curve to the real wage rate, whereas (8) refers to the optimal condition for investment. Equations (9) and (10) show that the Euler equations are modified to reflect the expected marginal utility benefit from agents' status-seeking in bond holdings (captured by $\frac{\phi\Omega}{(k_t+\phi b_t)-\gamma(\bar{k}_t+\phi\bar{b}_t)}$) and capital holdings (captured by $\frac{\Omega}{(k_t+\phi b_t)-\gamma(\bar{k}_t+\phi\bar{b}_t)}$). Finally, the transversality conditions $\lim_{t\to\infty} q_t^{'} k_t = 0$ and $\lim_{t\to\infty} \lambda_t b_t = 0$ are met.

Given that all households are homogeneous, a symmetric equilibrium holds true, i.e., $c_{Dt} = \bar{c}_{Dt}$, $c_{ft} = \bar{c}_{ft}$, $k_t = \bar{k}_t$, and $b_t = \bar{b}_t$ at equilibrium. Define the composite consumption as $c_t = c_{Dt} + p_t c_{ft}$. Accordingly, from (5) and (6), we further obtain

$$p_t c_{ft} = \frac{(1 - \alpha_D)c_t}{(2 - \alpha_D - \alpha_f)} \quad \text{and} \quad c_{Dt} = \frac{(1 - \alpha_f)c_t}{(2 - \alpha_D - \alpha_f)}, \tag{11}$$

indicating that both the equilibrium domestic-good consumption and the equilibrium imported-good consumption are proportional to the composite consumption.

By letting $q_t = q_t^{'}/\lambda_t$, (8) together with (3) yields the growth rate of capital,

$$g_t^k = \frac{\dot{k}_t}{k_t} = \frac{i_t}{k_t} - \delta = \frac{q_t - 1}{h} - \delta, \tag{12}$$

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which states that the growth rate of capital accumulation crucially depends on Tobin's q. With (12), under the symmetric equilibrium (9) and (10) yield the nonarbitrage condition between holding capital and foreign bonds,

$$\frac{1}{q_t}\left\{\frac{\Omega}{(1-\gamma)(k_t+\phi b_t)}+\lambda_t\left[r_t+\frac{h}{2}\left(\frac{q_t-1}{h}\right)^2\right]\right\}$$
$$-\lambda_t\delta=\frac{\phi\Omega}{(1-\gamma)(k_t+\phi b_t)}+\lambda_t\left[r_0^*-\varepsilon\left(\frac{\bar{b}_t}{\bar{k}_t}\right)\right]. \quad (13)$$

2.2. Firms

There is a continuum of identical competitive firms in the economy, with the measure normalized to one. Each firm hires labor, l_t, and capital, k_t, in order to produce output, y_t, according to the following constant-returns-to-scale Cobb–Douglas production function:

$$y_t=A_t\cdot k_t^{1-\beta}l_t^{\beta};\ 0<\beta<1. \quad (14)$$

The term A_t is the index of knowledge, measured by the average stock of capital ($\bar{k}$), and is available to all producers. To ensure sustained growth, we specify this spillover of knowledge as $A_t=A_0\bar{k}_t^{\beta}$.

The representative firm maximizes its profits, $\Pi_t=y_t-w_tl_t-r_tk_t$, by choosing capital and labor hours. In perfectly competitive factor markets, we have the firm's demand functions for labor and capital, respectively:

$$w_t=\beta\frac{y_t}{l_t}\quad\text{and}\quad r_t=(1-\beta)\frac{y_t}{k_t}. \quad (15)$$

3. STEADY-STATE EFFECT OF SOCIAL-SEEKING MOTIVES

With (15), combining the individual budget constraint (2) and the law of motion for capital (3) yields the aggregate resource constraint for the economy:

$$\dot{b}_t=y_t+r_t^*b_t-i_t\left(\frac{h}{2}\frac{i_t}{k_t}\right)-c_t. \quad (16)$$

Equation (16) can also refer to the balance-of-payments equilibrium, indicating that the accumulation of foreign bonds (or the capital-account deficit $\dot{b}_t$) is equal to the current-account surplus, which equals the trade surplus, $y_t-i_t(\frac{h}{2}\frac{i_t}{k_t})-c_t$, plus interest payments on the holding of foreign bonds, $r_t^*b_t$.

3.1. Balanced-Growth-Path Equilibrium

The competitive equilibrium is defined as a set of market clearing prices and quantities such that (i) the representative household maximizes its lifetime utility,

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i.e., (5)–(10) hold true; (ii) the representative firm maximizes its profits, i.e., (15) is met; and (iii) the good market clears, i.e., (16) is met. By focusing on a symmetric equilibrium, the individual values of consumption, capital, and international bonds coincide with their corresponding average values, i.e., $c_{Dt} = \bar{c}_{Dt}$, $c_{ft} = \bar{c}_{ft}$, $k_t = \bar{k}_t$, and $b_t = \bar{b}_t$ in the competitive equilibrium.

To embody the balanced-growth-path (BGP) equilibrium, we define two transformed variables: $x_t = \frac{c_t}{k_t}$ and $z_t = \frac{b_t}{k_t}$. Thus, from (15), (5), (7), and (13), we obtain the following relationship concerning employment:

$$l_t = \left[\frac{(2 - \alpha_D - \alpha_f)\beta A_0}{(1 - \alpha_f)(1 - \alpha_D)\Lambda x_t} \right]^{\frac{1}{(1-\beta)+\chi}}. \tag{17}$$

Because a higher level of capital (a lower $x_t = c_t/k_t$) induces the firm to demand more labor, labor hours (l_t) are decreasing in the consumption–capital ratio (x_t). In addition, we rewrite the nonarbitrage condition (13) in terms of two transformed variables, x_t and z_t, as well as Tobin's q_t, as follows:

$$\phi\Psi + r_0^* - \varepsilon(z_t) + \delta = \frac{1}{q_t}\left[\Psi + (1 - \beta)A_0 l_t^{\beta} + \frac{h}{2}\left(\frac{q_t - 1}{h} \right)^2 \right], \tag{18}$$

where $\Psi = \frac{\Omega(1-\alpha_f)(1-\alpha_D)x_t}{(2-\alpha_D-\alpha_f)(1-\gamma)(1+\phi z_t)}$.

By using (5), (9), (11), and (12), we have

$$g_t^c = \frac{\dot{c}_t}{c_t} = r_0^* - \varepsilon(z_t) + \phi\Psi - \rho. \tag{19}$$

Moreover, substituting (12) into the aggregate resource constraint (16) yields

$$g_t^b = \frac{\dot{b}_t}{b_t} = \frac{A_0 l_t^{\beta}}{z_t} + r_0^* - \varepsilon(z_t) - \frac{(q_t^2 - 1)}{2hz_t} - \frac{x_t}{z_t}. \tag{20}$$

Equations (17)–(20) construct the economy's dynamic system, which allows us to determine l_t, q_t, x_t, and z_t. It is clear from (12) and (17)–(20) that in the steady-state employment ($\widetilde{l}$), Tobin's $\widetilde{q}$, the consumption–capital ratio ($\widetilde{x}$), and the foreign bond–capital ratio ($\widetilde{z}$) are positive constants and, consequently, the economy is characterized by a BGP equilibrium in which consumption, capital, and real foreign bond holdings all grow at a common rate, $g = g^c = g^k = g^b$.

To ensure a nondegenerate BGP, we consider

Assumption 1 (Positive Growth). $\widetilde{q} > 1 + \delta h$.

By referring to (12), this assumption indicates that given the positive depreciation of capital and adjustment cost in investment, Tobin's q must be larger than one, providing an incentive for firms to invest, and increasing in the capital depreciation rate (δ) and the adjustment cost coefficient (h), ensuring a positive rate of perpetual growth. We next impose

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TABLE 1. Summary of the growth effects

	Wealth-based status motive exclusive of international bonds ($\phi = 0$)	Wealth-based status motive inclusive of international bonds ($\phi = 1$)
Perfect international asset market ($\varepsilon = 0$)	$\frac{\partial \widetilde{g}}{\partial \alpha_D} = 0, \frac{\partial \widetilde{g}}{\partial \alpha_f} = 0$ $\frac{\partial \widetilde{g}}{\partial \Omega} = 0$	$\frac{\partial \widetilde{g}}{\partial \alpha_D} > 0, \frac{\partial \widetilde{g}}{\partial \alpha_f} > 0$ $\frac{\partial \widetilde{g}}{\partial \Omega} \gtrless 0$
Imperfect international asset market ($\varepsilon > 0$)	$\frac{\partial \widetilde{g}}{\partial \alpha_D} \gtrless 0, \frac{\partial \widetilde{g}}{\partial \alpha_f} \gtrless 0$ $\frac{\partial \widetilde{g}}{\partial \Omega} > 0$	$\frac{\partial \widetilde{g}}{\partial \alpha_D} \gtrless 0, \frac{\partial \widetilde{g}}{\partial \alpha_f} \gtrless 0$ $\frac{\partial \widetilde{g}}{\partial \Omega} \gtrless 0$

Assumption 2 (Equilibrium Determinacy). $E(\widetilde{z}) < 2\rho$, where $E(\widetilde{z}) = \varepsilon'(\widetilde{z}) \cdot \widetilde{z}$ is the elasticity of the international interest rate.

As shown in Appendix A, Assumption 2 allows us to rule out the steady-state indeterminacy in which the BGP equilibrium has three roots with a negative real part. It indicates that to guarantee an equilibrium determinacy for our BGP equilibrium, the extent of the bond market imperfection cannot be so high that a high elastic interest rate, $E(\widetilde{z})$, leads agents' optimistic expectations to be self-fulfilling, generating belief-driven fluctuations [see Weder (2001) for more details].

Accordingly, we have

THEOREM 1 (Existence and Uniqueness of the BGP). *Under Assumptions 1 and 2, there exists a nondegenerate, unique BGP equilibrium, which is a determinate steady state.*

Proof. See Appendix A.

3.2. Comparative Statics

We are ready to examine the relationship between the balanced-growth rate ($\widetilde{g}$) and the consumption- (α_D and α_f) and wealth-based (Ω) social status-seeking motives.[6] For ease of comparison among various scenarios, the growth effects of the status-seeking motives are summarized in Table 1. As is evident, in an open economy distinct status-seeking motives give rise to quite different effects on the balanced-growth rate. Our results not only differ from the conventional notion in a closed economy but also provide insightful implications for social comparisons in an open economy.

First, we focus on the case where wealth-based status seeking excludes the holding of foreign bonds, i.e., $\phi = 0$.

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PROPOSITION 1 (Status Seeking and Growth with $\phi = 0$). *In a small open economy, given that households exhibit their social status through conspicuous consumption and capital only,*

(i) *status-seeking motives in both consumption-based (α_D and α_f) and wealth-based (Ω) social comparisons have no impact on the balanced-growth rate if the international asset market is perfect ($\varepsilon = 0$);*
(ii) *in contrast, if the international bond market is imperfect ($\varepsilon > 0$),*
  (a) *the status-seeking motive in consumption-based social comparisons (α_D and α_f) has an ambiguous effect on growth;*
  (b) *the status-seeking motive in capital-based social comparisons (Ω) has an unambiguously positive effect on growth.*

Proof. See Appendix B.

Under the scenario where the wealth-induced status motives exclude foreign bonds ($\phi = 0$), if the international asset market is perfect ($\varepsilon = 0$), the balanced-growth rate of a small open economy is bound by an *exogenously given* world interest rate (r_0^*). Consequently, neither social comparisons in consumption (α_D or α_f) nor in capital accumulation (Ω) have any effect on the balanced-growth rate. This result contradicts the conventional notion in a closed economy in the sense that social status seeking enhances labor hours and, as a result, stimulates capital accumulation and economic growth.

However, under an imperfect international asset market ($\varepsilon > 0$), the *flexible* world interest rate provides room for the domestic capital stock to react to greater social aspirations in the small open economy. Greater social aspirations in consumption (regardless of α_D or α_f) give rise to two distinct effects on economic growth, namely, the employment effect and the intertemporal preference effect. The employment effect indicates that in the presence of a higher α_D (α_f), the marginal utility of the consumption of domestic goods, $\widetilde{c}_D$ (imported goods $\widetilde{c}_f$), becomes higher, which induces agents to substitute for leisure by increasing the imported goods consumption. Because labor supply increases, the equilibrium labor hours ($\widetilde{l}$) increase, and this further raises the marginal productivity of capital and hence the balanced-growth rate ($\widetilde{g}$). The positive employment effect is captured by the first term of $\frac{\partial \widetilde{g}}{\partial \alpha_D\,(\phi=0;\ \varepsilon>0)}$ in Appendix B. On the other hand, the intertemporal-preferences effect indicates that greater social aspirations in consumption make people more impatient; households are thus inclined to increase their current consumption, instead of their capital accumulation (an increase in $\widetilde{x}$). In contrast to the employment effect, this is unfavorable to the balanced-growth rate, as is reflected in the second term of $\frac{\partial \widetilde{g}}{\partial \alpha_D\,(\phi=0;\ \varepsilon>0)}$ in Appendix B. Given these two opposite effects, the status-seeking motive in consumption has an ambiguous long-run impact on growth.

Focusing on the growth effect of wealth-based social comparisons (Ω), seeking greater social status in wealth triggers the so-called spirit of capitalism, encouraging households to accumulate more capital. Thus, the balanced-growth rate rises

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in response to a higher Ω. Moreover, differing from conspicuous consumption, greater social aspirations in capital (Ω) make people more patient, so that the intertemporal-preference effect motivates households to accumulate more capital, reinforcing the growth-enhancing effect of the spirit of capitalism.

The result of Proposition 1(ii) differs from that of Fisher (2008). In an endowment economy (capital is exogenously given), Fisher (2008) shows that consumption-based status seeking has a positive effect on output. By accounting for the role of capital, our model creates an additional intertemporal-preference effect. Therefore, consumption-based status seeking has an ambiguous effect on growth. Nonetheless, the growth consequences of social status seeking in the open economy [Proposition 1(ii)] resemble those in the closed economy, shown in Tournemaine and Tsoukis (2008), provided that households do not exhibit their social status through foreign bonds ($\phi = 0$) and the international asset market is not perfect ($\varepsilon > 0$). In contrast, once the international asset market is perfect ($\varepsilon = 0$), Proposition 1(i) indicates that households constrain their time preference rate (ρ) by the investment opportunities available to them, which are ultimately determined by the exogenously given rate of return (r_0^*) in the world market. Because capital accumulation is bounded by this exogenously given world interest rate, the equilibrium growth rate is irrespective of both consumption- and wealth-based status seeking. Moreover, as we will see later from Proposition 2, if households do exhibit their social status through foreign bonds ($\phi = 1$), the asset portfolios of households also lead these growth consequences in an open economy to differentiate from the conventional predictions based on a closed economy.

We turn to the scenario where the wealth-induced status motives include the holding of two alternative assets—capital and foreign bonds ($\phi = 1$).

PROPOSITION 2 (Status Seeking and Growth with $\phi = 1$). *In a small open economy, given that households can display their social status by conspicuous consumption and the holding of both capital and foreign bonds,*

(i) *if the international asset market is perfect ($\varepsilon = 0$),*
   (a) *the status-seeking motive in consumption-based social comparisons (α_D and α_f) has a positive effect on growth;*
   (b) *the status-seeking motive in wealth-based social comparisons (Ω) has an ambiguous effect on growth;*

(ii) *if the international asset market is imperfect ($\varepsilon > 0$), the status-seeking motive in both consumption- (α_D and α_f) and wealth-based social comparisons (Ω) has an ambiguous effect on growth.*

Proof. See Appendix C.

In the case where $\phi = 1$, the inclusion of foreign bondholding as one of the status-seeking behaviors also gives rise to a flexibility for the domestic capital to react to greater social aspirations even in the small open economy with a perfect international asset market ($\varepsilon = 0$), as shown in (9) and (19). Thus, as for employment effect mentioned earlier, a stronger status motive in consumption

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(α_D or α_f) induces households to work more, giving rise to a positive effect on economic growth. The positive employment effect is reflected in the first term of $\frac{\partial \widetilde{g}}{\partial \alpha_D\,(\phi=1;\,\varepsilon=0)}$ in Appendix C. On the other hand, the intertemporal-preference effect indicates that social comparisons in consumption make households less patient and this leads them to consume more and save less, decreasing their holdings of both physical capital and foreign bonds. The decrease in physical capital is unfavorable to economic growth, as shown in the second term of $\frac{\partial \widetilde{g}}{\partial \alpha_D\,(\phi=1;\,\varepsilon=0)}$ in Appendix C. Nevertheless, because a change in capital holding is associated with adjustment costs, but the holding of foreign bonds does not involve such adjustment costs, the decline in saving will be greatly reflected in the form of foreign bonds, instead of physical capital. Because of asymmetric asset adjustment costs, a better portfolio reallocation for households is to decrease their holdings of foreign bonds more than their holdings of capital, i.e., $\frac{\partial \widetilde{z}}{\partial \alpha_D} = \frac{\widetilde{x}}{\Delta(2-\alpha_D-\alpha_f)h}\Big[\frac{(\rho h+\widetilde{q}-1)(1-\alpha_f)\Omega\widetilde{x}}{(\widetilde{z}+1)(2-\alpha_D-\alpha_f)(1-\gamma)} + \frac{\beta(1-\beta)A_0\widetilde{l}^{\beta}}{(1+\chi-\beta)(1-\alpha_D)}\Big] < 0$, where $\widetilde{z} = \tilde{b}/\tilde{k}$.[7] With foreign bonds as a buffer to absorb the shock, the unfavorable intertemporal preference effect is weakened and thus is dominated by the employment effect. As a result, greater social aspirations in consumption (α_D or α_f) can unambiguously enhance the balanced growth rate in the scenario where foreign bonds are viewed as one form of conspicuous wealth [Proposition 2(i-a)].

However, if the international asset market is imperfect ($\varepsilon > 0$), there is an additional interest rate channel, creating an adversary impact on growth. When the preference effect leads households to decrease their holdings of foreign bonds, this decrease in the foreign bonds is associated with a higher lending premium (as $b_t > 0$), raising the rate of return on foreign bonds, as shown in (4). This additional interest rate effect induces households to choose foreign bonds instead of physical capital. Consequently, as indicated in Proposition 2(ii), the status-seeking motive in consumption has an ambiguous long-run impact on economic growth.

We next focus on the growth effect of wealth-based social comparisons (Ω). When the international asset market is perfect ($\varepsilon = 0$), the spirit of capitalism leads households to accumulate more wealth in the form of both capital and foreign bonds. However, the intertemporal preference effect indicates that households display their social status to others by holding foreign bonds, rather than accumulating capital, because only capital exhibits adjustment costs. Once capital is substantially replaced by foreign bonds, the balanced growth rate may fall, rather than rise, in response to a higher status motive in wealth (Ω). To be specific, we derive $\frac{\partial \widetilde{z}}{\partial \Omega} = \frac{(1-\alpha_D)(1-\alpha_f)\widetilde{x}}{\Delta(\widetilde{z}+1)(2-\alpha_D-\alpha_f)(1-\gamma)h}\Big[\frac{\beta(1-\beta)A_0\widetilde{l}^{\beta}(\widetilde{q}+\widetilde{z})}{1+\chi-\beta} - (\rho h+\widetilde{q}-1)\big(\frac{\beta A_0\widetilde{l}^{\beta}}{1+\chi-\beta}+\widetilde{x}\big)\Big] \gtrless 0$, which indicates that higher investment adjustment costs, captured by h, are more likely to have a negative effect on capital accumulation. Because of this ambiguity, the reallocation of the household's asset portfolio may create a negative effect on growth. Because the effects of the spirit of capitalism and of intertemporal preference are opposite, Proposition 2(i-b) indicates that greater social aspirations in wealth have an ambiguous growth effect.

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The result of Proposition 2(i-b) recovers that of Fisher (2010), which implicitly indicates that the balanced growth rate is neutral to wealth preference. When we shut down the labor supply channel by fixing time worked, l, at an exogenously given level, $\bar{l}$, the growth effect of wealth-based social comparisons (Ω), as shown in Appendix C, can be reduced to

$$\frac{\partial \widetilde{g}^{\,l=\bar{l}}}{\partial \Omega_{(\varepsilon=0;\ \phi=1)}} = \frac{(1-\alpha_D)(1-\alpha_f)\widetilde{x}\Psi\left(\rho+\frac{\widetilde{q}-1}{h}\right)}{\overline{\Delta}(\widetilde{z}+1)(2-\alpha_D-\alpha_f)(1-\gamma)} \times \left[\underbrace{\left(\rho-\Psi-\frac{\widetilde{x}}{1+\widetilde{z}}\right)(1+\widetilde{z})\widetilde{z}}_{\text{spirit of capitalism}} + \underbrace{\left(A_0-\frac{\widetilde{q}^2-1}{2h}\right)(1+\widetilde{z})-\widetilde{x}}_{\text{intertemporal preference}}\right] = 0,$$

where $\overline{\Delta} = \Psi(\rho+\frac{\widetilde{q}-1}{h})(\rho-\Psi-\frac{\widetilde{x}}{1+\widetilde{z}}) < 0$. Under fixed labor supply, it is easy from (A.1) of Appendix A to obtain $(A_0-\frac{\widetilde{q}^2-1}{2h})(1+\widetilde{z})-\widetilde{x} = -(\rho-\Psi-\frac{\widetilde{x}}{1+\widetilde{z}})(1+\widetilde{z})\widetilde{z}$, meaning that the opposite effects of the spirit of capitalism and intertemporal preference exactly cancel each other out. As it turns out, the balanced growth rate is irrespective of wealth-based social comparisons, as shown in Fisher (2010). However, once we consider the household's labor–leisure choice, the equality of effects between the spirit of capitalism and intertemporal preference is broken down by the endogenously determined allocation of labor. Because the existence of elastic labor supply asymmetrically affects both effects, greater social aspirations in wealth can have either a positive or a negative impact on economic growth. In other words, elastic labor supply breaks Fisher's superneutrality of wealth preference on growth in a small open economy.

If the international asset market is imperfect ($\varepsilon > 0$), the interest rate effect also plays a role in governing the growth effect. Under such circumstances, households may increase either capital accumulation or foreign bondholding, depending upon the relative magnitude of the intertemporal preference and interest rate effects. On one hand, because of the adjustment costs of investment, the intertemporal preference effect motivates households to increase the holding of foreign bonds. On the other hand, the interest rate effect indicates that the increase in b_t lowers the rate of return on foreign bonds, which encourages households to accumulate more capital. Thus, the balanced growth rate also ambiguously responds to greater social aspirations in wealth, as shown in Proposition 2(ii).

With rare exceptions, most existing studies focus on a closed economy. A main prediction is that both higher status seeking in consumption [e.g., Rauscher (1997), Alonso-Carrera et al. (2004), Turnovsky and Monteiro (2007), and Gomez (2008)] and in wealth [e.g., Zou (1994), Corneo and Jeanne (1997), and Pham (2005)] have a positive long-run growth (capital) effect. In contrast, our comparative statics analysis demonstrates that status-seeking motives do not necessarily stimulate economic growth in an open economy. As shown in Table 1, the growth effect of

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TABLE 2. Values of parameters in the benchmark

Parameter	Value	Parameter	Value
β	0.6	Ω	0.4
r_0^*	0.03	h	16
α_D	0.35	ϕ	1
α_f	0.35	a	0.1
ρ	0.04	Λ	20
δ	0.05	χ	2
A_0	0.5		

status seeking is crucially dependent on how agents exhibit their social status (by conspicuous consumption, capital accumulation, or bondholding) and whether the world capital market is perfect or imperfect. Not only do status seeking in consumption and in wealth have very distinctive growth effects, but these growth effects are also rather different from the conventional wisdom, based on a closed economy.

4. QUANTITATIVE ANALYSIS

In what follows, we will perform a simple numerical analysis in order to clearly obtain the growth impacts of both the consumption- and wealth-based comparisons. As a benchmark, we calibrate our model in a more generalized scenario, $\phi = 1$ (households can display their social status by both capital and foreign bonds) and $\varepsilon > 0$ (the international asset market is imperfect). All benchmark parameterizations are summarized in Table 2.

For most parameters, we adopt standard and commonly used values in the literature. First, we follow Fisher (2005) and assume that $r_0^* = 0.03$ and $\rho = 0.04$. Moreover, we set the inverse of the wage elasticity for labor supply $\chi = 2$, as used in Keane and Rogerson (2012). In line with Osang and Turnovsky (2000), we set the labor income share as $\beta = 0.6$ and the adjustment cost parameter as $h = 16$. To parameterize the risk premium function $\varepsilon = e^{az_t} - 1$ under the symmetric equilibrium, we follow Chatterjee et al. (2003) and set the premium coefficient as $a = 0.1$ and the capital depreciation rate as $\delta = 0.05$. Regarding the parameters of social status, given $\Omega = 0.4$, we set $\gamma = 0.5$, as used in Nguyen-Van and Pham (2013), and $\alpha_D = \alpha_f = 0.35$, as used in Alonso-Carrera et al. (2004). Accordingly, using (12), (17), (18), (19), and (20), we calculate the technology (or business cycle) coefficient $A_0 = 0.5$ and the preference parameter $\Lambda = 20$ such that Tobin's $\widetilde{q} = 2$, the consumption–capital ratio $\widetilde{x} = 0.23$, and the foreign bond–capital ratio $\widetilde{z} = 0.23$. As a result, we have the growth rate $\tilde{g} = 1.6\%$ in the BGP equilibrium.

Under the parameterizations, Figure 1 confirms the results of Proposition 1(ii) whereby a stronger status motive in wealth (Ω) stimulates the balanced growth rate,

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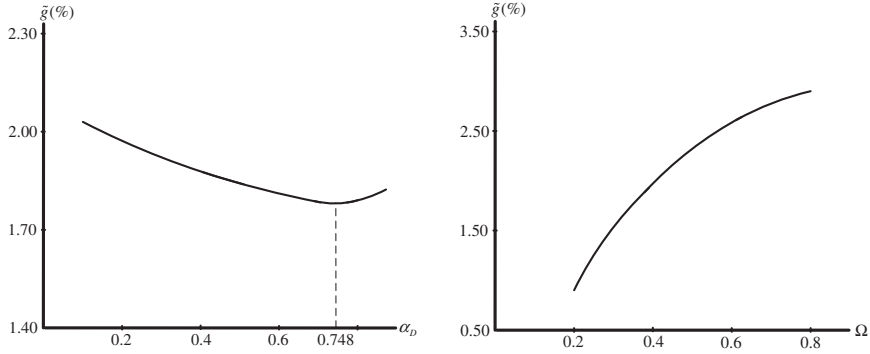

FIGURE 1. Growth effects with $\phi = 0$ and $\varepsilon > 0$.

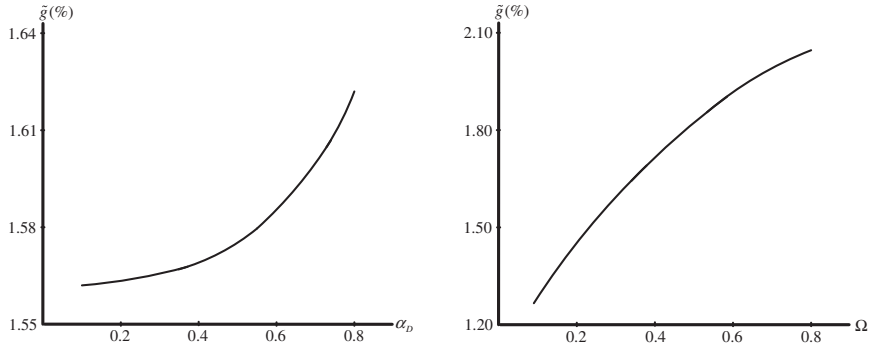

FIGURE 2. Growth effects with $\phi = 1$ and $\varepsilon = 0$.

whereas the relationship between status motivation in consumption (α_D) and economic growth is not monotonic, exhibiting a U-shaped relationship. Nonetheless, Figure 1 implies that the intertemporal preferences effect, in general, dominates the employment effect, unless the extent of conspicuous consumption is substantially high, $\alpha_D > 0.784$. This result stands in sharp contradiction to the prediction based on a closed economy model, as in Rauscher (1997), Alonso-Carrera et al. (2004), Turnovsky and Monteiro (2007), and Gomez (2008). Note also that the growth effect of greater social aspirations in the imported-good consumption (α_f) is very similar to that of α_D.

Focusing on Proposition 2(i), Figure 2 indicates that greater social aspirations, whether in relation to consumption or wealth, can enhance economic growth if the international asset market is perfect ($\varepsilon = 0$) and social comparisons in wealth include both capital accumulation and foreign bond holdings. The positive growth effect of social comparisons in wealth differs from our theoretical result in Proposition 2(i), given that the intertemporal preference effect stemming from asset portfolio reallocation is relatively small in the benchmark case.

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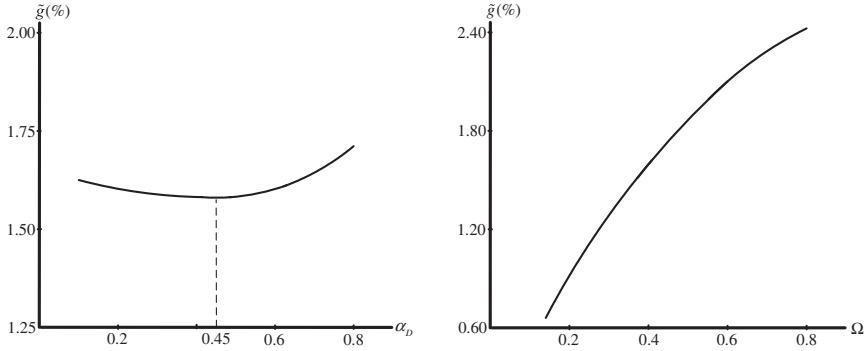

FIGURE 3. Growth effects with $\phi = 1$ and $\varepsilon > 0$.

Figure 3 shows that, as predicted in Proposition 2(ii), higher social aspirations in consumption (α_D) have an ambiguous effect on growth if the international asset market is imperfect and if social comparisons in wealth include both capital accumulation and foreign bond holdings. To be specific, the balanced growth rates exhibit a U-shaped relationship with social aspirations in consumption. To have a positive growth effect, the extent of the consumption-induced motivation should be substantially high ($\alpha_D > 0.45$). However, greater social aspiration in wealth unambiguously enhances the balanced growth rate under our parameterizations. Nonetheless, it is possible to obtain a negative growth effect of social aspirations in wealth if we, for example, raise the time preference (ρ) associated with relatively high adjustment costs in investment (h). Higher time preference leads households to become less patient for future consumption and higher investment adjustment costs slow down the capital formation, both retarding economic growth. As is evident, it is important for the quantitative analysis to further examine the model robustness and sensitivity, to which we now turn.

4.1. Robustness and Sensitivity

In this subsection, we examine how the growth effect of social status seeking is sensitive to the economy's business condition (captured by the parameter of the business cycle, A_0), the household's patience for future consumption (captured by the time preference rate, ρ), the international asset market's imperfection (captured by the risk premium parameter, a), and the cost of capital formation (captured by the adjustment cost in investment, h). As shown in Figures 4–7, our results are robust to these alternative parameterizations. We here abstract the effects of social aspirations in imported-good consumption (α_f), because they are very similar to those of social aspirations in domestic-good consumption (α_D).

First and most intuitively, better economic conditions favor capital accumulation, and as a result, for each scenario, a higher A_0 is associated with a higher balanced growth rate for a given specific value of α_D or Ω. By focusing on the

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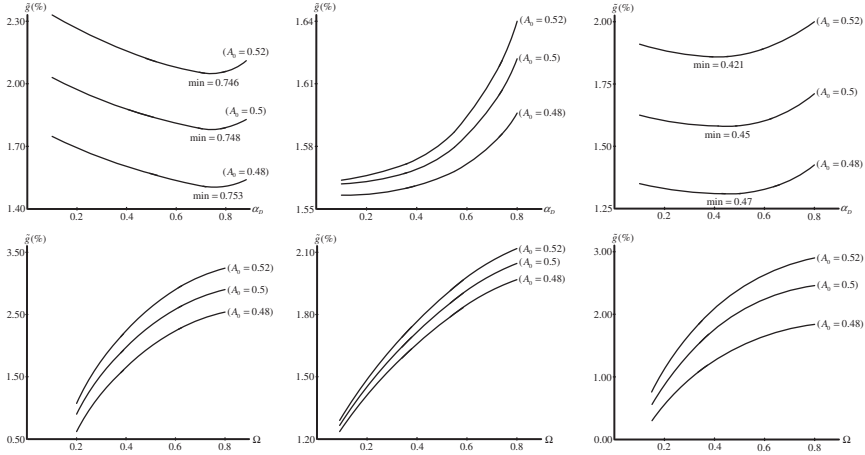
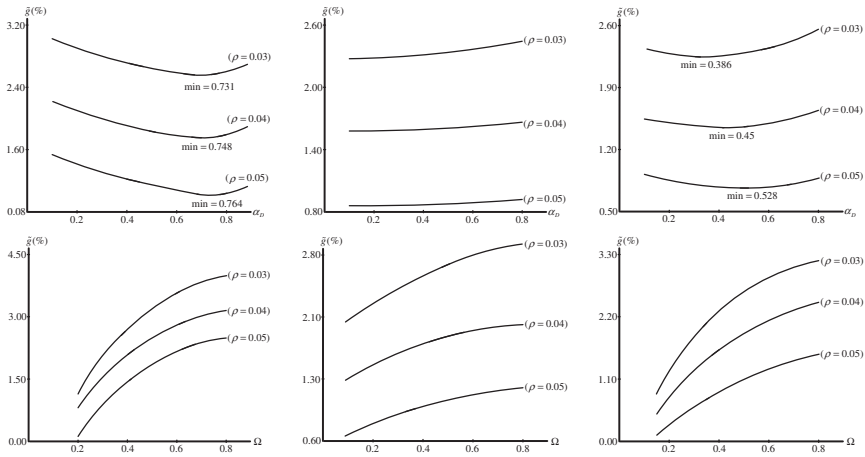


1. $\phi = 0$ and $\varepsilon > 0$ 2. $\phi = 1$ and $\varepsilon > 0$ 3. $\phi = 1$ and $\varepsilon > 0$

FIGURE 4. Growth effects with various A_0.



1. $\phi = 0$ and $\varepsilon > 0$ 2. $\phi = 1$ and $\varepsilon = 0$ 3. $\phi = 1$ and $\varepsilon = 0$

FIGURE 5. Growth effects with various ρ.

cases with ambiguous growth effects of α_D, Figures 4(1) and 4(3) also show that in response to a higher A_0, the critical values of α_D become lower, because better economic conditions raise the marginal product of factors (labor and capital), which reinforces the employment effect, but attenuate the (negative) intertemporal preference effect of conspicuous consumption. This implies that seeking greater social status in consumption is more likely to enhance, rather than retard, economic growth when the business cycle goes up or the economy has better technology (A_0) associated with a higher income. This result, to some extent, is consistent

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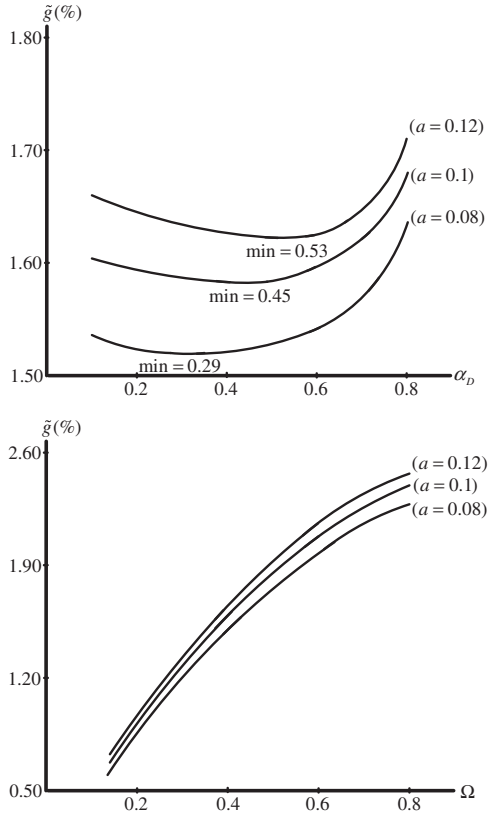

FIGURE 6. Growth effects with various a.

with the Hirsch (1976) hypothesis, in the sense that the status-seeking motive is more intensive as society becomes more affluent.

In contrast, Figure 5 shows that for each scenario a higher ρ is associated with a lower balanced growth rate for a given specific value of α_D or Ω. Time preference refers to the inclination of an agent toward current consumption over future consumption and, accordingly, a higher time preference rate implies that the agent views current consumption as more valuable and is less patient for future consumption. Thus, a higher ρ reinforces the (negative) intertemporal preference effect of social aspirations in consumption (α_D), but weakens the capital-enhancing effect of the spirit of capitalism (Ω). It turns out that in the presence of a higher time preference rate, the balanced growth rates decrease, as shown in Figure 5. As for the ambiguous growth effects of α_D, Figures 5(1) and 5(3) show that with higher critical values of of α_D, greater social aspirations in consumption are more likely to retard, rather than enhance, economic growth, in the presence of higher time preference rates.

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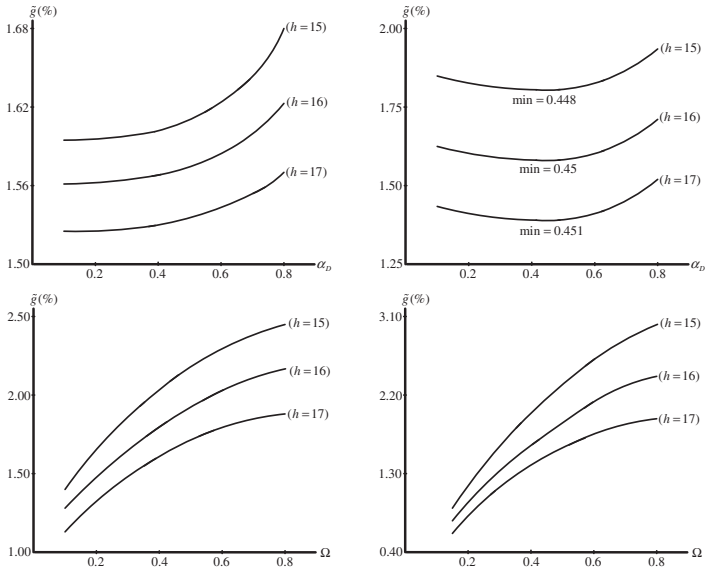

1. ϕ=1 and $\varepsilon > 0$ 2. ϕ=1 and $\varepsilon > 0$

FIGURE 7. Growth effects with various h.

In our model, the extent of the investment adjustment cost is measured by h, whereas the corresponding (or analogous) measure for the holding of foreign bonds is the risk premium parameter, a. To shed light on the asset portfolios of households between domestic capital and foreign bonds, this sensitivity analysis then focuses on the scenario where the wealth-induced status motives include the holding of two alternative assets—capital and foreign bonds ($\phi = 1$). Thus, Figure 6 shows how much the growth effect of social status seeking is influenced by the friction of the international asset market (a). It is clear from Figure 6 that for each scenario a higher a is associated with a higher balanced growth rate for a given specific value of α_D or Ω. The underlying intuition is straightforward. In a lending nation ($\bar{b}_t > 0$), for example, higher friction of the international asset market (a) implies a lower rate of returns to foreign bonds ($\varepsilon' = \frac{\partial \varepsilon}{\partial(\bar{b}_t/\bar{k}_t)} > 0$). In response, households reallocate their asset portfolios by reducing the holding of foreign bonds and accumulating more physical capital. This is in favor of capital formation and hence raises economic growth. In sharp contrast to the friction of the international asset market (a), the investment adjustment cost (h) has an opposite influence on the growth effects of social status seeking. Intuitively, higher investment adjustment costs imply a lower rate of return to physical capital, and this impedes capital formation and retards economic growth. Therefore, Figure 7 shows that for each scenario a higher h is associated with a lower balanced-growth rate under a given specific value of α_D or Ω. When the investment adjustment cost

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(h) becomes higher, capital is more easily replaced by foreign bonds. As a result, the marginal growth effect of greater social aspirations becomes less pronounced in the presence of higher investment adjustment costs.

5. CONCLUDING REMARKS

This paper has built a small open endogenous growth model and accordingly shed light on the growth effect of both consumption-induced and wealth-induced social status seeking. We have shown that in an open economy distinct status-seeking motives give rise to quite different effects on the balanced growth rate. In a numerical experiment with robustness and sensitivity analyses, we have also shown that our results are empirically convincing.

Based on closed-economy models, the conventional notion refers to a positive growth effect of social aspirations in either consumption or wealth. Our study has shown that this positive growth effect cannot apply directly to an open economy. Status-seeking behavior need not favor economic growth. The asset portfolios of households and the imperfection of the international asset market both play an important role and jointly govern the growth effects of social status seeking. Consumption-based status seeking has an unambiguously positive effect on growth only if the international asset market is perfect and wealth-induced status motives include the holding of both physical capital and foreign bonds. Wealth-based status seeking has an unambiguously positive effect on growth only if the international asset market is imperfect and wealth-induced status motives include only physical capital, but not foreign bonds. These findings contradict the conventional notion based on a closed economy and provide new insights into the literature.

The growth ambiguity of our model may provide policy implications for status-seeking behavior when the role of government is abstracted from the present paper. For a normative aspect, a "rat race" with conspicuous consumption and wealth gives rise to negative externalities for others, which call for government intervention in that the competitive equilibrium does not yield Pareto-optimal resource allocation. A positive income tax is then called for to removeg these externalities of social aspiration in wealth (which generates an overaccumulation of capital) and in consumption (which results in overconsumption); see, for example, Ljungqvist and Uhlig (2000). Given that social status seeking may result in a deterioration in growth, one may expect that the optimal tax policy should be modified. For a positive aspect, Fisher (2010) has shown that wealth-based status seeking plays an important role in both the short- and long-run effects of fiscal policy. Given that the asset portfolios of households crucially affect the intertemporal preferences effect of consumption-based status seeking (Proposition 2), one may expect that they also play a role in the effectiveness of fiscal policy. These interesting issues will be explored in our future research.

NOTES

1. Social status seeking has been widely studied in many contexts, such as in analyzing asset pricing [e.g., Gali (1994) and Campbell and Cochrane (1999)], wealth distribution [e.g., Pham (2005) and Tsoukis (2007)], optimal taxation [e.g., Rauscher (1997), Ljungqvist and Uhlig (2000), Liu and Turnovsky (2005), and Fisher and Hof (2008))], and the effectiveness of government policies [e.g., Fisher (2010)].

2. See Truyts (2010) for a survey of the relevant empirical studies.

3. Although Tournemaine and Tsoukis (2008) also examine the growth effect under these two types of social status seeking, their analysis is restricted to a closed economy.

4. The effect of interpersonal influence on consuming products made abroad has been supported empirically by the marketing and management literature. These empirical studies point out that, in developing countries, foreign brands are perceived as possessing attractive attributes such as status and esteem, which enhance the emotional reward that a consumer derives from the use of those brands [Bhat and Reddy (1998) and Kinra (2006)]. More specifically, Shen et al. (2002) show that consumers in China, Singapore, and Hungary prefer products from Western countries because Western brands provide more emotional benefits. Lee et al. (2008) find that Mexican consumers are status-oriented and want to exhibit their social standing through their purchases of U.S. products.

5. Note that when $\overline{b}_t < 0$, we follows Fisher (2010) and restrict our focus on the case where the net asset is non-negative, $\overline{k}_t + \overline{b}_t > 0$, even though $\overline{b}_t$ could be negative.

6. In line with the literature on social status, we use Ω to capture the wealth-based status motivation. However, a similar growth effect can be applied to another parameter of social comparisons, γ.

7. As shown in Appendix A, we shall impose $\Delta = \text{Det}(J) < 0$ for equilibrium determinacy.

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APPENDIX A: PROOF OF THEOREM 1

This Appendix shows the existence and uniqueness of the BGP equilibrium and derives the conditions for generating steady-state determinacy in a general case in which the world capital market is imperfect ($\varepsilon \geq 0$) and households display social status to others by accumulating capital and holding foreign bonds ($\phi = 1$).

By substituting (17) into (18)–(20) and linearizing the resulting equations around the steady state, we have

$$\begin{bmatrix} \dot{q}_t \\ \dot{x}_t \\ \dot{z}_t \end{bmatrix} = \begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} \begin{bmatrix} q_t - \widetilde{q} \\ x_t - \widetilde{x} \\ z_t - \widetilde{z} \end{bmatrix}, \tag{A.1}$$

where

$$a_{11} = \frac{(1-\alpha_D)(1-\alpha_f)\widetilde{x}\Omega}{(2-\alpha_D-\alpha_f)(1-\gamma)(1+\phi\widetilde{z})\widetilde{q}} + \frac{(1-\beta)A_0\widetilde{l}^{\beta}}{\widetilde{q}} - \frac{(\widetilde{q}^2-1)}{2h\widetilde{q}},$$

$$a_{12} = \frac{(1-\alpha_D)(1-\alpha_f)(\phi\widetilde{q}-1)\Omega}{(2-\alpha_D-\alpha_f)(1-\gamma)} + \frac{\beta(1-\beta)A_0\widetilde{l}^{\beta}}{(1+\chi-\beta)\widetilde{x}},$$

$$a_{13} = -\left[\varepsilon'(\widetilde{z})\widetilde{q} + \frac{\phi(1-\alpha_D)(1-\alpha_f)(\phi\widetilde{q}-1)\widetilde{x}\Omega}{(2-\alpha_D-\alpha_f)(1-\gamma)(1+\phi\widetilde{z})^2}\right],$$

$$a_{21} = -\frac{\widetilde{x}}{h}, \quad a_{22} = \frac{\phi(1-\alpha_D)(1-\alpha_f)\Omega}{(2-\alpha_D-\alpha_f)(1-\gamma)(1+\phi\widetilde{z})},$$

$$a_{23} = -\left[\varepsilon'(\widetilde{z}) + \frac{\phi^2(1-\alpha_D)(1-\alpha_f)(\phi\widetilde{q}-1)\widetilde{x}\Omega}{(2-\alpha_D-\alpha_f)(1-\gamma)(1+\phi\widetilde{z})^2\widetilde{q}}\right]\widetilde{x},$$

$$a_{31} = -\frac{(\widetilde{q}+\widetilde{z})}{h}, \quad a_{32} = -\left[1 + \frac{\beta A_0\widetilde{l}^{\beta}}{(1+\chi-\beta)\widetilde{x}}\right],$$

$$\text{and } a_{33} = -\frac{A_0\widetilde{l}^{\beta}}{\widetilde{z}} - \varepsilon'(\widetilde{z})\widetilde{z} + \frac{(\widetilde{q}^2-1)}{2h\widetilde{z}} + \frac{\widetilde{x}}{\widetilde{z}}.$$

Let v_1, v_2, and v_3 be the characteristic roots of the dynamic system. We then obtain the determinant and the trace of the Jacobian matrix J, respectively, as follows:

$$\mathrm{Det}(J) = -\rho\left[\phi\Psi\Theta_1 + \Theta_2\left(\frac{\beta A_0\widetilde{l}^{\beta}}{1+\chi-\beta} + \widetilde{x}\right)\right]$$
$$- \frac{\left(\widetilde{q}\Theta_2 - \frac{\phi\Psi}{1+\phi\widetilde{z}}\right)}{h}\left[\frac{\beta A_0\widetilde{l}^{\beta}}{1+\chi-\beta} + \widetilde{x} + \phi\Psi(\widetilde{q}+\widetilde{z})\right]$$
$$- \frac{[\Theta_1 - (\widetilde{q}+\widetilde{z})\Theta_2]}{h}\left[\Psi(\phi\widetilde{q}-1) + \frac{\beta(1-\beta)A_0\widetilde{l}^{\beta}}{1+\chi-\beta}\right],$$

$$\mathrm{Tr}(J) = 2\rho - \varepsilon'(\widetilde{z})\cdot\widetilde{z},$$

where $\Theta_1 = \phi\Psi + \varepsilon'(\widetilde{z})\widetilde{z} - \rho$ and $\Theta_2 = \varepsilon'(\widetilde{z}) + \frac{\Psi\phi^2}{1+\phi\widetilde{z}}$.

As shown in dynamic rational expectations models [see, for example, Burmeister (1980)], the economy has a unique perfect-foresight equilibrium if the number of unstable roots is

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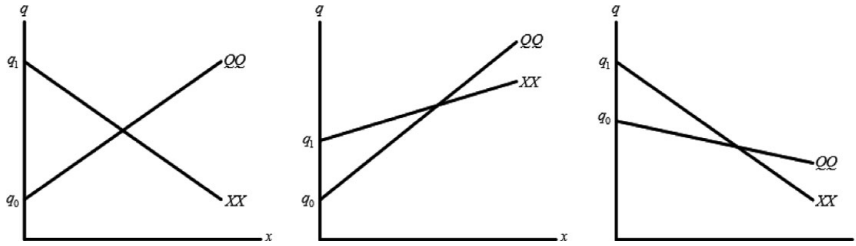

FIGURE A.1. Three cases of BGP equilibria.

equal to the number of jump variables. Because the economy has two jump variables x and q and one state variable z, the dynamic system has a saddlepoint equilibrium if $\text{Det}(J) = v_1 v_2 v_3 < 0$. To exclude the case of all negative eigenvalues, we then impose the following sufficient condition:

$$2\rho > \varepsilon'(\widetilde{z}) \cdot \widetilde{z},$$

as shown in Assumption 2. With this restriction, $\text{Det}(J) < 0$ guarantees steady-state determinacy, implying that there is one root with a negative real part and there are two roots with a positive real part in this model.

Next, we turn to the proof of the existence and uniqueness of the BGP equilibrium. First of all, given $g^c = g^k$, from (12) and (19), we have

$$\widetilde{z} = \frac{1}{a} \ln \left(r_0^* + \phi\Psi + \delta - \rho - \frac{\widetilde{q} - 1}{h} \right). \tag{A.2}$$

Moreover, from (17), (19), and (20), we derive

$$\frac{A_0 \widetilde{l}^{\beta}}{\widetilde{z}} + r_0^* - (e^{a\widetilde{z}} - 1) - \frac{\widetilde{q}^2 - 1}{2h\widetilde{z}} - \frac{\widetilde{x}}{\widetilde{z}} - \frac{\widetilde{q} - 1}{h} + \delta = 0, \tag{A.3}$$

where $\widetilde{l} = \left[\frac{(2-\alpha_D-\alpha_f)\beta A_0}{(1-\alpha_f)(1-\alpha_D)\Lambda\widetilde{x}} \right]^{1/[(1-\beta)+\chi]}$. Accordingly, by using (A.2) to substitute out $\widetilde{z}$ from (18) and (A.3), we obtain the following two equations:

$$\frac{\widetilde{q}^2 - 1}{2h} + \rho\widetilde{q} = \Psi + (1-\beta) A_0 \left[\frac{(2-\alpha_D-\alpha_f)\beta A_0}{(1-\alpha_f)(1-\alpha_D)\Lambda\widetilde{x}} \right]^{\frac{\beta}{(1-\beta)+\chi}}, \tag{A.4}$$

$$\begin{aligned} & a A_0 \left[\frac{(2-\alpha_D-\alpha_f)\beta A_0}{(1-\alpha_f)(1-\alpha_D)\Lambda\widetilde{x}} \right]^{\frac{\beta}{(1-\beta)+\chi}} \\ & = \frac{a(\widetilde{q}^2 - 1)}{2h} + a\widetilde{x} + (\phi\Psi - \rho) \ln \left[\phi\Psi - \rho + r_0^* + \delta - \frac{(\widetilde{q} - 1)}{h} \right], \end{aligned} \tag{A.5}$$

which allow us to solve the steady-state $\widetilde{x}$ and $\widetilde{q}$. With these two steady-state $\widetilde{x}$ and $\widetilde{q}$, all other endogenous variables can be easily derived.

As shown in Figure A.1, there are three possible cases for the BGP equilibria. In the space (q, x), the QQ locus is satisfied (A.4), whereas the XX locus is satisfied (A.5). To focus on the equilibrium determinacy, the slope of locus QQ is required to be larger than that of locus XX. In addition, from (A.4) and (A.5), we learn that locus QQ intercepts the

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q axis at $q_0 = -\rho h + \sqrt{1 + 2h(1-\beta)A_0\widetilde{l}^{\beta} + (\rho h)^2}$, whereas locus XX intercepts the q axis at $q_1 = \sqrt{1 + 2h(A_0\widetilde{l}^{\beta} + \rho\widetilde{z})}$, as shown in Figure A.1. Because $q_1 > q_0$, Figure A.1 indicates that under Assumptions 1 and 2, there exists a nondegenerate, unique BGP equilibrium. ■

APPENDIX B: PROOF OF PROPOSITION 1

Under Assumptions 1 and 2, given that $\phi = 0$, we can utilize (17)–(20) to obtain

$$\frac{\partial \widetilde{g}}{\partial \alpha_{D\ (\phi=0;\ \varepsilon=0)}} = 0, \quad \frac{\partial \widetilde{g}}{\partial \alpha_{f\ (\phi=0;\ \varepsilon=0)}} = 0, \quad \frac{\partial \widetilde{g}}{\partial \Omega_{\ (\phi=0;\ \varepsilon=0)}} = 0,$$

$$\frac{\partial \widetilde{g}}{\partial \alpha_{D\ (\phi=0;\ \varepsilon>0)}} = -\frac{(1-\alpha_f)\varepsilon'(\widetilde{z})\widetilde{x}}{\Delta(2-\alpha_D-\alpha_f)h} \times \left[\frac{\beta(1-\beta)A_0\widetilde{l}^{\beta}}{(1+\chi-\beta)(1-\alpha_D)} - \frac{(1-\alpha_f)\Omega\widetilde{x}}{(2-\alpha_D-\alpha_f)(1-\gamma)}\right] \gtrless 0,$$

$$\frac{\partial \widetilde{g}}{\partial \alpha_{f\ (\phi=0;\ \varepsilon>0)}} = -\frac{(1-\alpha_D)\varepsilon'(\widetilde{z})\widetilde{x}}{\Delta(2-\alpha_D-\alpha_f)h} \times \left[\frac{\beta(1-\beta)A_0\widetilde{l}^{\beta}}{(1+\chi-\beta)(1-\alpha_f)} - \frac{(1-\alpha_D)\Omega\widetilde{x}}{(2-\alpha_D-\alpha_f)(1-\gamma)}\right] \gtrless 0,$$

$$\frac{\partial \widetilde{g}}{\partial \Omega_{\ (\phi=0;\ \varepsilon>0)}} = -\frac{(1-\alpha_D)(1-\alpha_f)\varepsilon'(\widetilde{z})}{\Delta(2-\alpha_D-\alpha_f)h}\left[\frac{\beta A_0\widetilde{l}^{\beta}}{(1+\chi-\beta)} + \widetilde{x}\right] > 0.$$

where we impose $\Delta = \mathrm{Det}(J) < 0$ so that the steady state is determinate. ■

APPENDIX C: PROOF OF PROPOSITION 2

Under Assumptions 1 and 2, if $\phi = 1$, we have

$$\frac{\partial \widetilde{g}}{\partial \alpha_{D\ (\phi=1;\ \varepsilon=0)}} = -\frac{(1-\alpha_f)^2\beta(1-\beta)A_0\widetilde{l}^{\beta}\widetilde{x}^2\Omega}{\Delta(2-\alpha_D-\alpha_f)^2(1+\widetilde{z})^2(1+\chi-\beta)(1-\gamma)h} > 0,$$

$$\frac{\partial \widetilde{g}}{\partial \alpha_{f\ (\phi=1;\ \varepsilon=0)}} = -\frac{(1-\alpha_D)^2\beta(1-\beta)A_0\widetilde{l}^{\beta}\widetilde{x}^2\Omega}{\Delta(2-\alpha_D-\alpha_f)^2(1+\widetilde{z})^2(1+\chi-\beta)(1-\gamma)h} > 0,$$

$$\frac{\partial \widetilde{g}}{\partial \Omega_{\ (\phi=1;\ \varepsilon=0)}} = -\frac{(1-\alpha_D)(1-\alpha_f)\beta(1-\beta)A_0\widetilde{l}^{\beta}\widetilde{x}(\Psi-\rho)}{\Delta(2-\alpha_D-\alpha_f)(1+\chi-\beta)(1+\widetilde{z})(1-\gamma)h} \gtrless 0,$$

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$$\frac{\partial \widetilde{g}}{\partial \alpha_D}_{(\phi=1;\ \varepsilon>0)}$$
$$= -\frac{\Xi_1\left[\varepsilon'(\widetilde{z})(1+\widetilde{z})(2-\alpha_D-\alpha_f)(1-\gamma)+\frac{(1-\alpha_D)(1-\alpha_f)\widetilde{x}\Omega}{(1+\widetilde{z})}\right]-\varepsilon'(\widetilde{z})(1-\alpha_f)^2\widetilde{x}^2\Omega}{\Delta(2-\alpha_D-\alpha_f)^2(1+\widetilde{z})(1-\gamma)h} \gtrless 0,$$

$$\frac{\partial \widetilde{g}}{\partial \alpha_f}_{(\phi=1;\ \varepsilon>0)}$$
$$= -\frac{\Xi_2\left[\varepsilon'(\widetilde{z})(1+\widetilde{z})(2-\alpha_D-\alpha_f)(1-\gamma)+\frac{(1-\alpha_D)(1-\alpha_f)\widetilde{x}\Omega}{(1+\widetilde{z})}\right]-\varepsilon'(\widetilde{z})(1-\alpha_D)^2\widetilde{x}^2\Omega}{\Delta(2-\alpha_D-\alpha_f)^2(1+\widetilde{z})(1-\gamma)h} \gtrless 0,$$

$$\frac{\partial \widetilde{g}}{\partial \Omega}_{(\phi=1;\ \varepsilon>0)}$$
$$= -\frac{(1-\alpha_D)(1-\alpha_f)\widetilde{x}\left\{\varepsilon'(\widetilde{z})\left[\frac{\beta A_0\widetilde{l}^{\beta}}{(1+\chi-\beta)}+\widetilde{x}\right]+\frac{\beta(1-\beta)A_0\widetilde{l}^{\beta}}{(1+\chi-\beta)}\left[\Psi+\varepsilon'(\widetilde{z})\widetilde{z}-\rho\right]\right\}}{\Delta(2-\alpha_D-\alpha_f)(1+\widetilde{z})(1-\gamma)h} \gtrless 0.$$

where $\Xi_1 = \frac{(1-\alpha_f)\beta(1-\beta)A_0\widetilde{l}^{\beta}\widetilde{x}}{(1+\chi-\beta)(1-\alpha_D)}$ and $\Xi_2 = \frac{(1-\alpha_D)\beta(1-\beta)A_0\widetilde{l}^{\beta}\widetilde{x}}{(1+\chi-\beta)(1-\alpha_f)}$. ■

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