Occupation-Induced Status, Social Norms, and Economic Growth*

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Abstract

We analyse a monetary growth model where entrepreneurs borrow funds to invest in projects that produce capital goods. In addition to their varying pecuniary returns, different projects also vary with respect to the status they confer to the entrepreneurs who operate them. We show that (i) social status increases the growth rate, but this effect is mitigated by a social norm that inversely links overall levels of employment in the high-return project with the status conferred to it; (ii) the combined effect of social status and inflation is a source of transitional dynamics in an environment where such dynamics would not emerge if considerations of occupational prestige were absent; (iii) when the social norm affects social status, the economy's dynamics may be manifested in the form of endogenous volatility; (iv) the presence and characteristics of social status can generate a negative correlation between volatility and growth.

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1 Introduction

The role of social status on decision making has long been recognised as an important determinant of economic outcomes (Weiss and Fershtman 1998; Heffetz and Frank 2011). Our objective is to focus on occupation-induced social status and present some important macroeconomic implications that result from it, by means of a simple, analytically-tractable monetary growth model. More specifically, we will argue that (i) social status increases the growth rate, but this effect is mitigated by a social norm that inversely links overall levels of employment in an occupation with the status conferred to it; (ii) the combined effect of social status and inflation is a source of transitional dynamics in an environment where such dynamics would not emerge if considerations of occupational prestige were absent; (iii) when the social norm affects the magnitude of occupation-induced social status, the economy's dynamics may be manifested in the form of endogenous volatility; (iv) the presence and characteristics of social status can generate a negative correlation between volatility and growth.

Sociologists have long recognised the important role of occupation-induced status (or occupational prestige) in the overall determination of social status (e.g., Treiman 1977; Nakao and Treas 1994). The economic implications of occupational prestige can be readily understood once we identify growth-enhancing occupations as areas of economic activity in which considerations of social status seem to be pertinent. Indeed, many analyses confirm the view that social status, and the characteristics that confer it, such as prestige, recognition, approval, and a sense of achievement, are important elements of entrepreneurial aspirations, decisions, and performance (e.g., Scheinberg and MacMillan 1988; Shane *et al.* 1991; Collins *et al.* 2004; Malach-Pines *et al.* 2005; Van Praag 2011). Of course, an even better understanding of these economic implications may require us to delve deeper into what determines the prestige attached to different occupations in the first place. This is not an easy task though, mainly because of the difficulty in disentangling some of the cultural, historical or political origins of a society's ranking of occupation-induced status. Moreover, in several countries many professional associations restrict entry (e.g., via laws and regulations which restrict service provision), which drives up both status and salaries. Examples of such associations are the American Medical Association or the Bar Association in several

countries. Nevertheless, there seems to be a general agreement that the prestige conferred to an occupation is positively related to its pecuniary return (e.g., MacKinnon and Langford 1994). In a similar vein, some researchers (e.g., Hollingshead 1975) have argued that the scale of entrepreneurial activities – typically measured by the monetary value of firms – increases the status conferred to their proprietors.

In addition to income-related characteristics, it is also reasonable to consider the possibility that the level of employment in a specific occupation could affect the society's perception on how much of an accomplishment the involvement with this occupation actually is. With this in mind, one would expect that (other things being equal) occupations in which a relatively large number of people are employed, are perhaps those occupations that have a lower prestige attached to them. In order to support this conjecture with evidence, we used US data and calculated the unconditional correlation coefficient between the average occupational prestige score for different occupations, extracted from the General Social Survey (GSS)¹, and the corresponding average number of people employed in these occupations, extracted from the Current Population Survey (CPS)². We use data for both sources from 2012 because this is the latest year for which occupational prestige scores are available from the GSS. Overall, we managed to match 246 occupations between the two datasets and obtained an unconditional correlation coefficient of -0.01 , thus supporting the idea of a negative correlation between the level of employment in an occupation and the status conferred to it (see the scatterplot and fitted values in Fig. 1a). This coefficient may appear small, but this is mainly due to the fact that it matches levels of employment with the corresponding prestige of occupations from various (largely incomparable) sectors. For this reason, we undertook the same exercise using narrower categorisations of occupations from the CPS. For example, a narrow classification, in which we restrict the sample data to the CPS's categories of "Service Occupations", "Sales and Office Occupations" and "Management, Professional, and Related Occupations" results in a correlation coefficient of approximately -0.14 (see

¹ The GSS is a survey dataset conducted annually. In 2012, the occupational prestige score was calculated by using the responses of 1001 participants who were asked to rank a large number of occupations on a 9-scale "occupational prestige ladder". Increasing values of the score are associated with higher prestige. See www.gss.norc.umd.edu/Documents/reports/methodological-reports/MR122%20Occupational%20Prestige.pdf

² The CPS is the US government's monthly survey of unemployment and labour force participation, featuring categories similar to the ones found in the GSS. It uses a representative sample of the population, which is why our variable takes values from 0 to 3,250. See https://www.bls.gov/cps/cps_aa2012.htm.

Fig. 1b) whereas with an even narrower classification, which restricts the data to “Service Occupations” only, the correlation coefficient is as high as -0.3 approximately (see Fig. 1c).

Figure 1. Unconditional correlations between occupational prestige and the number of people employed in each occupation

This paper is an attempt to take explicit account of the status concerns that originate from entrepreneurial decisions, and present their macroeconomic implications in terms of economic dynamics as well as of long-run growth. In our model, entrepreneurs are individuals who borrow funds in order to operate projects that produce capital goods. In addition to their varying pecuniary returns, different projects also vary with respect to the status they confer to the entrepreneurs who operate them – an idea that is conceptually similar to the occupation-induced status of Fershtman *et al.* (1996). More status is conferred to the capital-producing project with the higher return in terms of income. Nevertheless, we also introduce a social norm whereby such status concerns are

linked to past outcomes – specifically, the prestige that an entrepreneur enjoys as a result of her involvement with the high-return project is less pronounced in economies where, historically, the involvement with this project was more common among entrepreneurs. Both these characteristics of occupation-induced social status are consistent with the empirical arguments that we discussed previously, i.e., the positive relation between status and the income that accrues from an occupation (e.g., Hollingshead 1975; MacKinnon and Langford 1994) as well as our own analysis on the negative correlation between status and the level of employment in an occupation. The model is a monetary one in the sense that there is a demand for money by lenders who face a liquidity constraint in their role as loan providers.³ We show that, in addition to its effect on the economy's long-run growth rate, which is positive, the occupation-induced social status has important implications for the shape of the economy's dynamics towards the balanced growth path. In fact, despite the presence of a production technology with permanently constant (social) returns to capital, the existence of status concerns generates transitional dynamics that do not allow an instantaneous adjustment to the balanced growth path. This occurs even in the absence of the social norm that ties the high-return project's prestige to (historical) levels of involvement with this project. In the presence of this social norm, however, the economy's dynamics differ; in addition to sustaining a lower growth rate in the long-run, the economy also undergoes cyclical fluctuations as it converges to its balanced growth path.

Given that the characteristics of social status have implications for the shape of economic dynamics (i.e., monotonic or cyclical) and long-term economic performance (i.e., the growth rate), we also use the model's implications to provide a novel explanation for the relation between volatility and growth. This issue relates to empirical studies that have shown a significant, negative relation between the average growth rate and its volatility (e.g., Ramey and Ramey 1995; Martin and Rogers 2000; Koren and Tenreyro 2007). From a theoretical perspective, the more common approach in examining the underlying characteristics of this relation has been the construction of stochastic endogenous growth models in which the fluctuations generated by stochastic

³ Other monetary models that include elements relevant to social status are those by Chang *et al.* (2000) and Gong and Zou (2001). These analyses show that, under the 'spirit of capitalism' assumption, inflation has real effects in circumstances where money would otherwise be neutral.

shocks impinge on the long-run growth rate (e.g., Femminis 2001; Canton 2002; Varvarigos 2010). Our approach in inferring a relation between cyclical fluctuations and growth is rather different, being rooted on behavioural characteristics. Specifically, we show that the correlation between growth and volatility reflects the idea that cyclical growth converges to a lower value in the long-run, compared with a growth rate that is smoother (i.e., monotonic) during the transition – outcomes that, in our model, are affected by the determinants of occupation-induced status.

Before we proceed to the formal presentation and analysis of our model, we will compare and contrast our framework with other studies that have sought to examine related issues. The related literature spans in two fields. First, in the broader field of macroeconomics with a special focus on status considerations and its implications for growth. In this field, economists have investigated the effects of various cultural mechanisms, including status considerations, on economic growth and social welfare by means of frameworks in which status concerns are associated with either a desire for high relative wealth per se, or conspicuous/positional consumption, or both. Konrad (1992) shows that in a model where individuals are interested in their relative wealth ranking and contest for wealth, over-accumulation in the steady state may occur. Zou (1994) implicitly considers status, by introducing into an endogenous growth model a cultural element associated with a desire for high relative wealth per se, i.e., the spirit of capitalism (as developed by Adam Smith, Karl Marx and Max Weber among others). He finds that countries that differ in the degree of capitalist spirit will also differ in per capita consumption, per capita capital stock and endogenous growth rates. Bakshi and Chen (1996) explore theoretically and empirically the implications of the spirit of capitalism, modelled as relative social status, and find that propensity to consume and risk-taking behaviour will depend on social status. Corneo and Jeanne (1997, 2001) introduce status and relative wealth considerations in a standard endogenous growth model and find that the presence of status may as well lead to a growth rate that is excessive.

A strand of this literature comes up with more ambiguous results. Rauscher (1997) studies whether status-seeking behaviour accelerates economic growth but comes up with an ambiguous answer driven by different type of preferences. Similarly, Futagami

and Shibata (1998) illustrate that relative wealth considerations can either lower or raise the growth rate in an endogenous growth model depending on whether agents are heterogeneous or identical. An ambiguous result is also reported in Tournemaine and Tsoukis (2008) depending on whether status considerations are formed over consumption or over wealth. A similar ambiguity applies to the analysis of Fershtman *et al.* (1996). They employ a model with costly occupational choice where higher status is attached to the growth-enhancing occupation. Their results indicate that, in addition to its direct positive effect on growth, social status may also be a source of negative growth effects due to the fact that it attracts wealthy, but low-ability, individuals to the growth-enhancing occupation, hence reducing its average quality.

Additional implications of status considerations are modelled in Alvarez-Cuadrado *et al.* (2004) who depart from the time separable specification and study how the ‘catching up with the Joneses’ attitude (among other preference specifications) affects the process of economic growth. Wendner (2010) explores the implications of the desire to ‘keep up with the Joneses’ with the optimal tax implications. Varvarigos (2011) shows that in the presence of conspicuous consumption and a labour/leisure choice, social welfare may not increase monotonically with economic growth.

Furthermore, our study relates to a number of papers that focus on the analysis of endogenous volatility. Sources of endogenous volatility in the existing literature include, among others, consumption externalities (Lahiri and Puhakka 1998) increasing returns to capital (Benhabib and Farmer 1994); credit market imperfections (Azariadis and Smith 1996); the interplay between behavioural rules of price-output determination with different inventory adjustment processes (Fan 1981); public health investments and their impact on efficient labour (Fanti and Gori 2011); and endogenous fertility (Fanti and Gori 2013).

Our study differs from the aforementioned literature in various dimensions. First, concerning the models that introduce status considerations, either in the form of relative wealth or relative consumption, we explicitly model status as a norm and study its evolution – motivated by data that illustrate the inverse relationship between occupational prestige and the number of people employed in each occupation. Second, while the aforementioned papers introduce status in endogenous growth models in

order to study how it affects the optimal growth rate, our study is the first to pinpoint the combined role of status and norms as a source of endogenous macroeconomic fluctuations.

The rest of the paper is organized as follows: In Section 2, we present the economic environment and derive the economy's equilibrium. In Section 3, we analyse the effects of occupation-induced social status, and its underlying characteristics, on the economy's dynamics and the (long-run) growth rate. Section 4 shows that the model's implications remain identical, even in the presence of financial market imperfections. Section 5 summarises and discusses some policy implications.

2 The Economy

Consider an economy populated by overlapping generations of individuals who live for three periods. The population mass of each age cohort is constant over time and equal to $2n$ ($n > 0$). Following their birth, nature divides individuals into two equal-sized groups of varying characteristics. Particularly, half of these individuals will spend their lifetimes as workers; the rest of them will spend their lifetimes as entrepreneurs. Irrespective of their type, all individuals are risk-neutral and enjoy utility from the consumption of goods during the last period of their lifetime.

Consider a worker born in period t . During the first period of her lifetime she is endowed with one unit of labour which she supplies (inelastically) to firms that produce the economy's final good. In exchange, she receives the competitive salary w_t . Subsequently, she explores opportunities for saving her income until the third period of her lifetime, during which she will receive the proceeds of her savings and use them to purchase consumption goods. One such opportunity is a safe asset that returns $1+q$ ($q \geq 0$) units of output in period $t+2$ for each unit of output stored in period t . Alternatively, she can agree to offer a loan to an entrepreneur, in a manner that will be described shortly.

Now let us consider an entrepreneur born in period t . She is largely inactive during the first period of her lifetime. In the second period, however, she is endowed with the ability to operate an investment project that generates $\Phi(j) > 0$ ($j = \{H, L\}$) units of

capital in period $t+2$ for each unit of output invested in period $t+1$. The entrepreneur will sell her capital to firms at a competitive price $r > 0$ per unit.⁴ There are two such projects at her disposal, but she can choose to operate only one of them – a decision that, once made, is irreversible. The H project returns $\Phi(H) = \varphi$ units of capital for each unit of investment. In addition to its cost in terms of output, this project entails an effort cost for the entrepreneur. We assume that this effort cost is proportional to the scale of the project as it requires B units of effort per unit of output invested in it. We also assume that B is uniformly distributed across entrepreneurs, with support on $[0, n]$. The L project, on the other hand, does not entail such an effort cost. Nevertheless, it offers a lower return of $\Phi(L) = (1 - \psi)\varphi$ units of capital ($0 < \psi < 1$) for each unit of output invested in it. For simplicity, we assume that both projects will be successful in generating units of capital with certainty. Note that, given the lack of own sources of income, entrepreneurs have no other option other than to borrow funds from workers in order to occupy themselves with any of these two projects.⁵ Once an entrepreneur repays the loan in period $t+2$, she will use the residual income to purchase consumption goods.

The economy's final good can be used for both consumption and investment purposes. It is produced by a unit mass of perfectly competitive firms who combine labour from workers, denoted N_t , and capital purchased by entrepreneurs, denoted K_t , in order to produce Y_t units of output according to the following technology:

$$Y_t = AK_t^a (\Gamma_t N_t)^{1-a}, \quad a \in (0, 1), \quad A > 0. \quad (1)$$

Following Romer (1986), the variable Γ_t captures the productivity benefits that accrue as a result of an economy-wide, learning-by-doing externality that is related to the stock of capital per worker according to⁶

$$\Gamma_t = \frac{K_t}{n}. \quad (2)$$

⁴ Capital is assumed to depreciate completely during the production process.

⁵ An alternative approach would be to assume that, similarly to lenders, entrepreneurs earn labour income during the first period, which they use, together with the funds they borrow, in the operation of the capital-producing project. Other than rescaling the process of capital accumulation, and therefore the growth rate, by a constant factor (due to the increased number of funds employed in the projects), this setting would not have affected our model's mechanisms and results.

⁶ This externality is introduced as a means of allowing the emergence of an equilibrium with positive long-run growth.

2.1 Entrepreneurial Choice and Occupation-Induced Status

The differences between the two projects are not restricted to their varying (pecuniary) returns in terms of investment. On the contrary, we envisage a scenario where the choice of investment project generates direct utility effects that accrue to the entrepreneur who is involved in its operation. Such non-pecuniary differences are justified by alluding to the idea that an entrepreneur's occupational choice will have a direct impact on her utility due to social status concerns.

Recalling that individuals are risk-neutral (i.e., they have a linear utility function), we formalise the aforementioned ideas by assuming that the marginal utility of consumption in period $t+2$, denoted $X_{t+2}(j)$, of an entrepreneur who is born in time t is

$$X_{t+2}(j) = \begin{cases} x_{t+2} & \text{if } j = H \\ 1 & \text{if } j = L \end{cases}, \quad x_{t+2} \geq 1. \quad (3)$$

The underlying idea is that the high-effort/high-return project confers a relatively higher social status to those entrepreneurs who are occupied with it. This may be because, given the H project's higher return, it is viewed as a more prestigious occupational choice for an entrepreneur, or because it is associated with a sense of accomplishment, as it reflects the entrepreneur's abilities and her willingness to strive for a more rewarding occupation. The recognition of these characteristics by a person's peers increases her status and, therefore, has a positive effect on her well-being. Note that the assumption through which occupation-induced social status impinges on the marginal utility of consumption is not an alien one. On the contrary, it is consistent with the existing literature on the economic implications of status (e.g., Fershtman *et al.* 1996; Becker *et al.* 2005; Hopkins 2018).⁷

We shall also consider two different scenarios regarding the driving forces behind such status considerations. The limiting scenario is one where the marginal utility of consumption is constant at $x_{t+2} = \bar{x} \geq 1 \quad \forall t$. Nevertheless, it is also reasonable to consider

⁷ It is for this reason that we assume that status is conferred during the period when the entrepreneur who undertook the H project "reaps the fruits of her labour". A reasonable argument is that status could also be conferred during the period where the project is undertaken (i.e., in $t+1$). However, this extension will complicate the technical part of our analysis considerably, perhaps blurring the clarity of the mechanisms and intuition, without altering qualitatively our main ideas and arguments.

a social norm whereby the status attached to an entrepreneur's occupational choice also depends on perceptions about how much of an accomplishment the involvement with the high-return project actually is. Naturally, such perceptions will (among other factors) rely upon how common was the involvement with the H project historically. After all, it is reasonable to assume that the status (e.g., due to prestige; admiration etc.) enjoyed by entrepreneurs who operate the H project, albeit still higher compared with the status attached to the alternative low-return project, will not be as high in a society where the involvement with the high-return project has been more common among the population of entrepreneurs. We capture this scenario by assuming that $x_{t+2} = x(\beta_{t+1})$ ($x' < 0$), where β_{t+1} is the number of the previous generation's entrepreneurs who earned capital income after having operated in the H project. A general function that encompasses all the aforementioned scenarios is

$$x_{t+2} = \bar{x} - i(\bar{x} - 1) \frac{\beta_{t+1}}{n}, \quad (4)$$

where $i = \{0, 1\}$ is a binary variable. Particularly, $i = 0$ captures the case where the utility benefit of social status is constant, whereas for $i = 1$ this benefit is mitigated by the fraction of the previous generation's entrepreneurs who devoted the effort necessary in order to operate the high-return project. Notice that the differences in social status that originate from an entrepreneur's choice of investment projects disappear when $\bar{x} = 1$.

2.2 The Markets for Credit and Money

We follow others (e.g., Bencivenga and Smith 1993; Bose and Cothren 1996; Bose 2002) in assuming that the credit market operates as follows. Loan contracts are agreed upon one period in advance of a capital-producing project's operation.⁸ Therefore, in period t each worker announces a contract according to which she will offer loans in period $t + 1$ at a rate R_{t+1} per unit, to be repaid during the next period (i.e., in $t + 2$). Lenders will be approached by entrepreneurs, each of whom applies for a loan l_{t+1} . Furthermore, it is assumed that each entrepreneur can only submit one loan application.

⁸ This assumption ensures there will be a positive demand for money by young workers who wish to offer loans to entrepreneurs.

The above imply that a worker willing to lend funds through the credit market, needs to have such funds available in period $t+1$. However, let us imagine that the safe asset is illiquid in the following sense: Despite the fact that it offers a (gross) return $1+q$ between t and $t+2$, if prematurely liquidated (i.e., in $t+1$) it entails a cost that is proportional to the amount of income invested in the asset. We normalise this proportional cost to 100%, meaning that premature liquidation is prohibitively costly. Nevertheless, there is a liquid asset in the economy that allows the possibility of storage within one period. Henceforth, this asset will be called money.

Each unit of the good in period t is exchangeable for p_t units of money, where p_t is the price level. During the next period, each unit of money can be exchanged for $\frac{1}{p_{t+1}}$ units of goods. Subsequently, these are supplied to the credit market in the form of loanable funds that can be borrowed by entrepreneurs who operate capital projects. It follows that, from a lender's point of view, the overall return from lending to entrepreneurs is $\frac{1+R_{t+1}}{1+\pi_{t+1}}$, where $\pi_{t+1} = \frac{p_{t+1}-p_t}{p_t}$ is the inverse of the (net) period return on money holdings – i.e., the rate of inflation.

The stock of the liquid asset is controlled by a monetary authority that supplies a quantity of money m_t every period. Following other analyses of money in models of economic growth (e.g., Ireland 1994; Schreft and Smith 1997) we assume that the monetary authority follows a rule whereby the supply of money evolves according to

$$m_{t+1} = (1+\mu)m_t, \quad \mu > 0. \quad (5)$$

2.3 Equilibrium

Let us begin with the reasonable assumption that the two-period return of the illiquid asset dominates the two-period return of holding money. Formally,

$1+q > \frac{1}{(1+\pi_{t+1})(1+\pi_{t+2})}$. It follows that workers will be willing to offer their funds in

the credit market as long as the overall return from doing so does not fall short of the return of the illiquid asset. Given the competition among workers in their role as loan

providers, their net economic profit will be driven down to zero. Therefore, the equilibrium interest rate on loans is

$$R_{t+1} = (1 + \pi_{t+1})(1 + q) - 1. \quad (6)$$

Now, let us consider an entrepreneur who is contemplating which project to undertake after having secured a loan. Taking account of (3), the utility associated with earning income through the H project is⁹

$$u_{t+2}^H = x_{t+2}[r\varphi - (1 + R_{t+1})]l_{t+1} - Bl_{t+1}, \quad (7)$$

whereas the utility associated with earning income through the L project is

$$u_{t+2}^L = [r(1 - \psi)\varphi - (1 + R_{t+1})]l_{t+1}, \quad (8)$$

where $r(1 - \psi)\varphi \geq 1 + R_{t+1}$ is imposed as a type of participation constraint, ensuring that all entrepreneurs will avoid bankruptcy.¹⁰

Entrepreneurs will choose which project to operate by comparing the corresponding utilities in (7) and (8), with the marginal entrepreneur being the one who is indifferent between the two. Setting $u_{t+2}^H = u_{t+2}^L$ defines a threshold

$$\beta_{t+2} = x_{t+2}[r\varphi - (1 + R_{t+1})] - [r(1 - \psi)\varphi - (1 + R_{t+1})], \quad (9)$$

such that entrepreneurs with $0 \leq B \leq \beta_{t+2}$ ($\beta_{t+2} < B \leq n$) will operate the H (L) project. Naturally, β_{t+2} is also the number of entrepreneurs who earn capital income in $t+2$, having been occupied with the high-return/high-status project in $t+1$. Note that the condition $r(1 - \psi)\varphi > 1 + R_{t+1}$ ensures that $\beta_{t+2} > 0$. Therefore, in order to guarantee that β_{t+2} is interior, we naturally assume that $x_{t+2}[r\varphi - (1 + R_{t+1})] - [r(1 - \psi)\varphi - (1 + R_{t+1})] < n$ holds in equilibrium.¹¹ Furthermore, given the preceding analysis, it is straightforward

⁹ Each entrepreneur's consumption expenditures during maturity equal $r\Phi(j)l_{t+1} - (1 + R_{t+1})l_{t+1}$. Given that all individuals are risk-neutral, the presence of x_{t+2} in Eq. (7) reflects the social status associated with operating the H project in the previous period.

¹⁰ Note that $\frac{(1-a)(1+q)}{a(1-\psi)^2} < \left[\frac{(1-a)A\varphi}{1+\mu} \right]^2 < (1+\mu)^2(1+q)$ is a sufficient condition for both $1+q > \frac{1}{(1+\pi_{t+1})(1+\pi_{t+2})}$ and $r(1-\psi)\varphi > 1 + R_{t+1}$ to hold simultaneously. In other words, it is sufficient that inflation is positive but not too high so that the interest rate becomes prohibitively costly for all entrepreneurs to borrow.

¹¹ A sufficient condition is $n > [\bar{x} - (1 - \psi)]aA\varphi - (\bar{x} - 1)\frac{(1+q)(1+\mu)^2}{(1-a)A\varphi}$. In other words, the population should be sufficiently large.

to establish that $\frac{\partial u_{t+2}^H}{\partial l_{t+1}}, \frac{\partial u_{t+2}^L}{\partial l_{t+1}} > 0$. In other words, the amount of loan secured by each entrepreneur is bound by the amount of funds supplied by workers who offer loan contracts. Recalling that each entrepreneur can only make one loan application, and that the two groups of individuals are of equal size, it follows that

$$l_{t+1} = \frac{w_t}{1 + \pi_{t+1}}, \quad (10)$$

i.e., the loan is equal to the funds available to each worker in period $t + 1$.¹²

Now, let us turn to the money market equilibrium. Given the earlier discussion, the demand for money during period t is $np_t w_t$. It follows that the equilibrium in the money market is characterised by $m_t = np_t w_t$. Substituting this condition in Eq. (5) yields

$$1 + \pi_{t+1} = (1 + \mu) \frac{w_t}{w_{t+1}}, \quad (11)$$

i.e., the familiar condition that links inflation to the relative growth rates of money and (real) income.

3 Status, Norms, and the Dynamics of Growth

Using the production technology in (1), together with (2) and the labour market equilibrium condition $N_t = n$, we can solve the profit maximisation problem to derive the following results regarding the wage w_t and the return to capital r :

$$w_t = (1 - a)A \frac{K_t}{n}, \quad (12)$$

$$r = aA. \quad (13)$$

Recall that the process of capital formation is driven by those entrepreneurs who are occupied with the capital-producing projects H and L . Therefore, the aggregate stock of capital is given by

$$K_{t+2} = \int_0^{\beta_{t+2}} \phi l_{t+1} dB + \int_{\beta_{t+2}}^n (1 - \psi) \phi l_{t+1} dB = [n(1 - \psi) + \beta_{t+2} \psi] \phi l_{t+1}. \quad (14)$$

Combining Eq. (9) and (14), a preliminary result comes in the form of

¹² Note that the same outcomes associated with Eq. (6) and (10) would also apply if we dispel the idea behind a credit market altogether and assume, instead, that workers and entrepreneurs of the same age are randomly matched into pairs who agree on loan contracts. In that case, the loan rate would be the one that maximises the entrepreneur's utility subject to the lender's participation constraint.

Proposition 1. *The presence of status concerns associated with the choice of entrepreneurial projects stimulates the process of capital accumulation.*

Proof. It is $\frac{\partial K_{t+2}}{\partial x_{t+2}} = \frac{\partial K_{t+2}}{\partial \beta_{t+2}} \frac{\partial \beta_{t+2}}{\partial x_{t+2}} = \phi l_{t+1} \psi [r\phi - (1 + R_{t+1})] > 0$ by virtue of the condition $r(1 - \psi)\phi > 1 + R_{t+1}$. $\square$

This result is quite intuitive. As long as $x_{t+2} > 1$, the marginal utility of consumption associated with earning income through the H project is higher due to the social status attached to it. Consequently, it increases an entrepreneur's willingness to devote the effort required in order to operate the project that returns more units of capital for each unit of loan invested in it.

The expression in (14), when combined with our previous analysis, also allows us to derive the result that is formally presented in

Proposition 2. *The rate of inflation impedes the process of capital accumulation.*

Proof. It is $\frac{\partial K_{t+2}}{\partial \pi_{t+1}} = \frac{\partial K_{t+2}}{\partial l_{t+1}} \frac{\partial l_{t+1}}{\partial \pi_{t+1}} + \frac{\partial K_{t+2}}{\partial \beta_{t+2}} \frac{\partial \beta_{t+2}}{\partial \pi_{t+1}}$. Given $\frac{\partial K_{t+2}}{\partial l_{t+1}} \frac{\partial l_{t+1}}{\partial \pi_{t+1}} = -\frac{[n(1 - \psi) + \beta_{t+2}\psi]\phi w_t}{(1 + \pi_{t+1})^2} < 0$ and $\frac{\partial K_{t+2}}{\partial \beta_{t+2}} = \psi \phi l_{t+1} > 0$, the effect will be unambiguously negative as long as $\frac{\partial \beta_{t+2}}{\partial \pi_{t+1}} \leq 0$.

Indeed, combining (6) and (9), it is straightforward to establish that

$$\frac{\partial \beta_{t+2}}{\partial \pi_{t+1}} = -(x_{t+2} - 1)(1 + q) \leq 0. \quad \square$$

Inflation has two distinct, but both negative, effects on the process of capital formation. Firstly, it erodes the real value of the funds that are available in the credit market, i.e., the market where entrepreneurs seek to secure loans in order to operate their projects (see Eq. 10). Furthermore, inflation reduces the workers' return from lending relative to the return of the illiquid asset – an outcome that induces them to charge a higher loan rate in order to compensate for this loss (see Eq. 6). Due to $x_{t+2} > 1$ however, the higher

cost of borrowing has a more pronounced marginal effect on the utility of those who are attracted to the more prestigious venture. Consequently, the increased loan rate will induce fewer entrepreneurs to undertake the H project.

Our next step is to derive the economy's growth rate. To do this, we define

$$\frac{K_{t+1}}{K_t} = g_{t+1}. \quad (15)$$

Combining (10), (11), (12), (14) and (15) yields

$$g_{t+1} = \frac{(1-a)A\varphi}{n(1+\mu)}[n(1-\psi) + \beta_{t+1}\psi] = g(\beta_{t+1}). \quad (16)$$

As expected, the growth rate is increasing in the number of entrepreneurs who are occupied with the the high-return/high-prestige project, i.e., $g' > 0$. Now, let us substitute (4), (6), (11), (12), (13), and (16) in (9), and write the resulting expression one period backwards, to get

$$\beta_{t+1} = \left[\bar{x} - i(\bar{x} - 1)\frac{\beta_t}{n} \right] \left[aA\varphi - \frac{(1+q)(1+\mu)}{g(\beta_t)} \right] - \left[aA(1-\psi)\varphi - \frac{(1+q)(1+\mu)}{g(\beta_t)} \right] = f(\beta_t). \quad (17)$$

Evidently, the entrepreneurial choice of capital-producing projects is a source of dynamics that will permeate the economy's growth performance (see Eq. 16). These transitional dynamics rest on the fact that, in the presence of occupation-induced social status, there are two distinct (and conflicting) effects that link intertemporally the number of entrepreneurs who opt for the H project. On the one hand, a higher β_t increases the growth rate of income and, therefore, reduces the rate of inflation (see Eq. 11) – an outcome that increases the workers' return from lending relative to the return of the illiquid asset, hence inducing them to charge a lower loan rate in the competitive credit market (see Eq. 6). Given the prestige component $\bar{x} > 1$, the lower cost of borrowing has a more pronounced marginal effect on the utility of those who are attracted to the venture with the higher return. Consequently, the lower loan rate will attract more entrepreneurs towards the H project. On the other hand, however, a higher β_t may also have a direct effect on the status-induced utility increment of those entrepreneurs who are occupied with the high-return project, because of the presence of the social norm (see Eq. 3 and 4). This effect mitigates the potential utility benefits that stem from an entrepreneur's choice to get involved with the H project, hence reducing

the fraction of entrepreneurs who ultimately decide to devote the effort required in order to operate it.

We shall begin our analysis of the economy's long-run equilibrium with the baseline scenario where there are no varying status considerations emanating from an entrepreneur's involvement with any of the two available projects. Of course, this is a case where $\bar{x} = 1$. The long-run equilibrium outcomes associated with this scenario are summarised in

Lemma 1. *Suppose that $\bar{x} = 1$. The occupational choices of entrepreneurs do not vary over time. Therefore, irrespective of initial conditions, the economy adjusts instantaneously to a balanced growth path characterised by $\hat{g}$.*

Proof. Setting $\bar{x} = 1$ in Eq. (17) yields

$$\beta_{t+1} = aA\psi\varphi \equiv \hat{\beta} \quad \forall t, \quad (18)$$

which can be substituted in (16) in order to get

$$g_{t+1} = \frac{(1-a)A\varphi}{n(1+\mu)} [n(1-\psi) + \hat{\beta}\psi] \equiv \hat{g} \quad \forall t, \quad (19)$$

thus completing the proof. $\square$

This result is not surprising given the discussion that followed Eq. (17) and the fact that the output production technology is (at the social level) linear to the stock of capital per person. The presence of status concerns is critical in generating the outcomes that ultimately shape the intertemporal profile of the variable β_t and, therefore, the growth rate of income. Consequently, as long as there are no forces that allow β_t to deviate from its steady state, the economy will not deviate from the balanced growth path characterised by Eq. (19).

Next, we turn our attention to the outcomes that transpire when status concerns play a role in an entrepreneur's occupational choice, i.e., when $\bar{x} > 1$. We summarise these in

Lemma 2. *Suppose that $\bar{x} > 1$.*

- i. If $i=0$, the number of entrepreneurs who invest in the high-return project converges monotonically to a long-run equilibrium $\tilde{\beta}$. Therefore, the economy converges gradually and monotonically to a balanced growth path characterised by $\tilde{g}$.
- ii. If $i=1$, the number of entrepreneurs who invest in the high-return project converges cyclically to a long-run equilibrium $\tilde{\beta} < \tilde{\beta}$. Therefore, the economy converges gradually and cyclically to a balanced growth path characterised by $\tilde{g} < \tilde{g}$.

Proof. Combine (16) and (17) to calculate the derivative

$$f'(\beta_t) = -(\bar{x} - 1) \frac{i(1-\psi) + \psi}{n(1-\psi) + \beta_t \psi} \left[\frac{in(1-\psi) + i\beta_t \psi}{in(1-\psi) + n\psi} aA\varphi - \frac{(1+q)(1+\mu)}{g(\beta_t)} \right]. \quad (20)$$

Furthermore, note that $f''(\beta_t) < 0$ and recall that $f(\beta_t) \in (0, n)$.

Firstly, consider $i=0$. In this case, Eq. (20) becomes

$$f'(\beta_t) = (\bar{x} - 1) \frac{\psi}{n(1-\psi) + \beta_t \psi} \frac{(1+q)(1+\mu)}{g(\beta_t)} > 0.$$

Thus, we conclude that there is a unique $\tilde{\beta}$, such that $\tilde{\beta} = f(\tilde{\beta})$ and $f'(\tilde{\beta}) < 1$. Moreover, for $\beta_t \neq \tilde{\beta}$, convergence is monotonic given $f'(\beta_t) > 0$. Substituting in Eq. (16) yields

$$\tilde{g} = \frac{(1-a)A\varphi}{n(1+\mu)} [n(1-\psi) + \tilde{\beta}\psi]. \quad (21)$$

Since $\beta_t \neq \tilde{\beta} \Rightarrow g(\beta_t) \neq \tilde{g}$, and given Eq. (16), we can infer that the growth rate will converge to its long-run equilibrium monotonically as well.

Secondly, consider $i=1$. Now, Eq. (20) becomes

$$f'(\beta_t) = -\frac{(\bar{x} - 1)}{n} \left[aA\varphi - \frac{n}{n(1-\psi) + \beta_t \psi} \frac{(1+q)(1+\mu)}{g(\beta_t)} \right] < 0,$$

given that $r(1-\psi)\varphi > 1 + R_t$ holds by assumption. Again, we conclude that there is a unique $\tilde{\beta}$, such that $\tilde{\beta} = f(\tilde{\beta})$. Since $f''(\beta_t) < 0$, then $f'(n) > -1$ is a sufficient condition to ensure that $f'(\tilde{\beta}) > -1$ holds as well - a condition necessary to establish the stability of the steady state equilibrium. Note that the expression $f'(n) > -1$ corresponds to

$$n - (\bar{x} - 1) \left[aA\varphi - \frac{n}{n(1-\psi) + \beta_t \psi} \frac{(1+q)(1+\mu)}{g(\beta_t)} \right] > 0.$$

It is sufficient to show that this expression holds for the minimum possible n . Indeed, using the condition in Footnote 9, we can establish that

$$\begin{aligned} & [\bar{x} - (1 - \psi)]aA\varphi - (\bar{x} - 1)\frac{(1+q)(1+\mu)^2}{(1-a)A\varphi} - (\bar{x} - 1)\left[aA\varphi - \frac{n}{n(1-\psi) + \beta_t\psi} \frac{(1+q)(1+\mu)}{g(\beta_t)}\right] \Rightarrow \\ & [\bar{x} - (1 - \psi)]aA\varphi - (\bar{x} - 1)\frac{(1+q)(1+\mu)}{g(n)} - (\bar{x} - 1)aA\varphi + (\bar{x} - 1)\frac{n}{n(1-\psi) + \beta_t\psi} \frac{(1+q)(1+\mu)}{g(\beta_t)} \Rightarrow \\ & aA\varphi - (\bar{x} - 1)(1+q)(1+\mu)\left[\frac{1}{g(n)} - \frac{n}{n(1-\psi) + \beta_t\psi} \frac{1}{g(\beta_t)}\right]. \end{aligned} \quad (22)$$

Given $\beta_t \leq n$ and $g' > 0$, the expression in (22) is unambiguously positive, thus establishing that β is an asymptotically stable steady state. Furthermore, convergence towards the steady state is cyclical given $f'(\beta_t) < 0$. To obtain the long-run growth rate, we substitute in Eq. (16) to get

$$\tilde{g} = \frac{(1-a)A\varphi}{n(1+\mu)}[n(1-\psi) + \beta_t\psi]. \quad (23)$$

Since $\beta_t \neq \beta \Rightarrow g(\beta_t) \neq \tilde{g}$, and given Eq. (16), we can infer that the growth rate will converge to its long-run equilibrium through cycles (damped oscillations).

Finally, note that, by virtue of Eq. (17), we have $\frac{\partial f(\cdot)}{\partial i} < 0$. Consequently, $\beta < \tilde{\beta}$ - a result that can be used together with (21) and (23) to establish that $\tilde{g} < \tilde{g}$. $\square$

In order to facilitate the exposition of the mechanisms underlying Lemma 2, recall the discussion that followed Eq. (17) and consider the effects of a higher β_t on β_{t+1} . When the impact of occupation-induced social status on the marginal utility of consumption is positive, but unaffected by any social norm (i.e., $\bar{x} > 1$ and $i = 0$), the effect is unambiguously positive due to the fact that an increase in β_t increases the growth rate, reduces inflation and the loan rate, thus attracting more entrepreneurs towards the high-return project because, under status concerns, the utility associated with this project is more responsive to these changes. Consequently, when $\beta_t < \tilde{\beta}$ ($\beta_t > \tilde{\beta}$), the number of entrepreneurs who invest in the H project will be increasing (decreasing) over time as it converges to its steady state (see Figure 2). Similarly, the growth rate will adjust

gradually and monotonically to its long-run equilibrium since it is an increasing function of the fraction of entrepreneurs who operate the project that returns more capital goods per unit of investment.

Nevertheless, when the impact of occupation-induced social status on the marginal utility of consumption is also affected by the social norm (i.e., $\bar{x} > 1$ and $i = 1$) there is an additional mechanism through which β_t impinges on β_{t+1} . By reducing the increment of the marginal utility of consumption – an effect that is attributed to the idea that the social status attached to the decision to devote effort and be occupied with a more rewarding project, is less pronounced in circumstances where more entrepreneurs took a similar decision in the past – this effect is a negative one. In fact, it dominates the positive effect to which we alluded earlier. As a result, when $\beta_t \neq \tilde{\beta}$, the number of entrepreneurs who invest in the H project converges to its steady state through cycles (see Figure 3). In terms of intuition, consider a relatively high (low) realisation of β_t . This will reduce (increase) the current utility benefits that stem from an entrepreneur's choice to operate the high-return project, hence reducing (increasing) the fraction of entrepreneurs who ultimately decide to invest in it. Given that the growth rate is an increasing function of the fraction of entrepreneurs who are occupied with the project that returns more capital goods, the cyclical nature of β_t will be the underlying cause for the emergence of cycles in the economy's growth performance, as it gradually converges to the balanced growth path.

Figure 2. Phase diagram ($i = 0$)

Figure 3. Phase diagram ($i = 1$)

One implication from the preceding analysis is presented in

Proposition 3. *The impact of status concerns in the choice of entrepreneurial projects is an additional source of transitional dynamics, even when the status-induced increase of marginal utility is time-invariant.*

Proof. It follows from Lemmas 1 and 2. $\square$

It is well-known that in the presence of an AK-type technology, the economy adjusts instantaneously to a balanced growth path – i.e., a time-invariant growth rate – irrespective of initial conditions (e.g., Acemoglu 2009). In our model, this outcome emerges only in the absence of any status considerations associated with an entrepreneur’s occupational choice. Nevertheless, when status affects this choice, the adjustment to the balanced growth path is gradual, irrespective of whether the status-induced increase of marginal utility is constant ($i=0$) or varies over time due to the social norm ($i=1$).

Despite the fact that transitional dynamics emerge regardless of the fundamental characteristics of occupation-induced social status, there are still important implications that emanate from the two different scenarios that capture these characteristics. Specifically, the shape of the economy’s dynamics towards the long-run equilibrium, as well as the long-run equilibrium itself, differ in each case. The upshot from the comparison of these two cases is formally presented in

Proposition 4. *The underlying characteristics of occupation-induced social status generate a negative relation between cyclical volatility and growth in the sense that when $i=0$, the economy converges monotonically to a growth rate which is higher compared with the growth rate when $i=1$, to which the economy converges cyclically.*

Proof. It follows from Lemmas 1 and 2. $\square$

The majority of existing theories on the growth-volatility nexus have investigated this issue on the basis of stochastic growth models that allowed researchers to examine circumstances under which the (exogenous) volatility generated by stochastic terms impinges on the economy's long-term growth. Our paper offers a different approach which, contrary to these analyses, does not stem from the presence of exogenous shocks. In our framework, the structural characteristic (in this case, occupation-induced status) that is responsible for the emergence of cycles, is also an important characteristic in determining the long-term prospects of the economy. Put differently, here the correlation between growth and cycles reflects the idea that cyclical growth converges to a lower value in the long-run, compared with a growth rate that is smoother (i.e., monotonic) during the transition.

Note that the implications can be generalised to the case where, rather than treating i as a binary variable, we consider it as a parameter that takes values on $[0,1]$, thus measuring the magnitude of the social norm – i.e., the direct effect of β_t on the current generation's perceptions regarding the status associated with the high-return project. Given the complexity of doing so, we are going to examine the implications for the function in Eq. (17) and, therefore, the economy's dynamics, by means of a numerical example.¹³ In Figure 4, we employ a 3-dimensional plot of $f(\beta_t)$ against β_t and i . As we can see, these general results are consistent with the implications of Lemma 2 and Proposition 4. Specifically, we can see that the slope of $f(\beta_t)$ changes from positive to negative as we increase the value of i . Consequently, we can infer that the higher the strength of the social norm is, the more likely it is that the steady state will lie on the downward-sloping part of $f(\beta_t)$, thus leading to damped oscillations (i.e., cycles) in the transition to the steady state.

¹³ The parameter values we use for this example are $a = 0.4$; $A = 2$; $\varphi = 2.5$; $q = 0.2$; $\mu = 0.75$; $n = 2$; and $\bar{x} = 3$.

Figure 4. The slope of $f(\beta_i)$ when $i \in [0,1]$

4 Introducing Financial Market Imperfections

One characteristic of our model is that the repayment of loans is always guaranteed. In this respect, our analysis did not consider the issue of financial market imperfections. This is because the focus of our study was on issues pertaining to status and social norms, thus we did not want to complicate the analysis and blur our main points by directing attention to an issue that is not central to our main ideas. Nevertheless, in order to illustrate that the study's main mechanisms and results can apply even in the presence of financial market imperfections, in this section we shall sketch an extension that draws on Galor and Zeira (1993).

Suppose that the lender has the opportunity to run away with the borrowed funds and operate the project in an environment where she can be undetected by the borrower, hence evading the repayment of her debt. In turn, the lender can devote θ_{t+1} units of effort, with the purpose of operating a tracking technology that traces the borrower's movements, thus ensuring the loan's repayment. Nevertheless, the borrower can still avoid her debt's repayment by devoting $e\theta_{t+1}$ ($e > 1$) units of effort in a technology that facilitates her in remaining undetected. Given the above, and recalling the loan amount in (10), lenders will be indifferent between offering loans and investing in the illiquid asset as long as

$$(1 + R_{t+1})l_t - \theta_{t+1} = (1 + q)w_t \Rightarrow (1 + R_{t+1})\frac{w_t}{1 + \pi_{t+1}} - \theta_{t+1} = (1 + q)w_t. \quad (24)$$

Furthermore, lenders will choose a level of effort that ensures that borrowers will not have any incentive to evade the repayment of their debts, i.e., they will choose θ_{t+1} to guarantee that the incentive compatibility constraint

$$(1 + R_{t+1})l_t \leq e\theta_{t+1} \Rightarrow (1 + R_{t+1})\frac{w_t}{1 + \pi_{t+1}} \leq e\theta_{t+1}, \quad (25)$$

holds. In other words, the borrower's utility cost of avoiding detection is at least equal to the utility gain of evading the repayment of debt. Taking (25) as an equality, solving for θ_{t+1} , substituting the result in (24) and solving the resulting expression for R_{t+1} yields

$$R_{t+1} = \frac{e}{e-1}(1 + \pi_{t+1})(1 + q) - 1. \quad (26)$$

The expression in (26) replaces Eq. (6) in showing the relation between the lending rate and the return of the illiquid asset. In this scenario, the wedge (in real terms) between the two rates is higher, reflecting the presence of financial market imperfections that emanate from the borrowers' opportunity to evade the repayment of debt, and the lenders' desire to be compensated for the effort they devote in deterring borrowers from such wrongdoing.¹⁴ For the purposes of our study, however, what is important is that the presence of financial market imperfections simply increases the wedge between the two rates of return by a fixed scale factor. Consequently, the dynamic equation in (17) will only change by means of this scale factor, whereas the main mechanisms that permeate the impact of β_t on β_{t+1} , and therefore all our original results, will remain unaffected.

5 Summary and Discussion

The model we developed in this paper represents yet another attempt to shed more light on the macroeconomic implications of social status concerns. Assuming that such concerns are induced by occupational choice, we have shown that the impact of status on the macroeconomic environment goes beyond its effect on the growth rate. In

¹⁴ Indeed, check that when detection avoidance becomes prohibitively costly for borrowers ($e \rightarrow \infty$), (26) is reduced to (6).

addition to its impact on long-term macroeconomic performance, the presence of occupation-induced social status is also a source of transitional dynamics. The shape of these dynamics (monotonic or cyclical) depends on the underlying characteristics that drive status concerns. As a result, we have employed these characteristics as a means of inferring a relation between growth and cyclical volatility, in addition to identifying social status as a source of endogenous macroeconomic fluctuations.

Our framework brings forth some interesting policy implications. Given the beneficial effect of status on macroeconomic performance, there is perhaps scope for supporting activities directed towards people's aspirations – for example, activities that will instil into successive generations of individuals the idea that the pursue of more rewarding/productive occupations results in benefits that are not solely restricted to high income. Instead, such occupations can offer additional rewards, such as recognition, admiration, prestige, and all other characteristics that confer status. Another policy implication relates to the negative relation between cyclical volatility and growth. Stochastic growth models that generate this relation suggest that conventional stabilisation policies – designed to eradicate the volatility stemming from exogenous shocks – may entail additional benefits in terms of improved growth performance. In our model, there is clearly no scope for such policies. This is because there is no underlying causal effect that underpins the cyclical volatility-growth nexus. On the contrary, both growth and cycles are endogenously determined by the relative strength of the social norm that governs the status accruing to those who opt for a more challenging, but also more rewarding, occupation. Hence, an appropriate policy should be one that can somehow impinge directly on people's perceptions and reduce the magnitude of this norm. Such a policy will improve the economy's growth prospects while, at the same time, alleviating the forces that are responsible for the emergence of cycles. Interestingly, public policies that use lessons from behavioural science in order to affect people's attitudes, beliefs and choices are, in fact, already adopted by some countries. For example, the UK government has set-up a “nudge unit” – known as the Behavioural Insights Team – in which the academic advisory panel includes, among others, the 2017 Nobel Laureate Richard Thaler.¹⁵ The objective of this unit is to use

¹⁵ See www.behaviouralinsights.co.uk/about-us/

insights from psychology and behavioural economics so as to improve the effectiveness of public policy.

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