Culture of Corruption and Comparative Development

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Abstract

Individuals in an economy vary in terms of their acceptability towards corrupt practices. Corruption in the form of bribe payment often affects individual occupational choices, some of which might be growth inducing. In a heterogeneous agent model, we explore this interaction between the acceptability of corruption and the occupational choices made by these heterogeneous individuals and show that economies with high proportion of a moral agents can move on a higher growth path much earlier than those with relatively fewer agents of the moral type. We further extend this model by endogenising the 'acceptability' through a parental role model effect and with different initial conditions show a possibility of a low moral, low productivity and zero growth trap; a high moral, high productivity and high growth equilibrium and also under certain assumptions a possibility where a high productivity, low moral economy which first grows at an increasing rate and then a decreasing rate.

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1 Introduction

> If a country is to be corruption free and become a nation of beautiful minds, I strongly feel there are three key societal members who can make a difference. They are the father, the mother and the teacher - APJ Abdul Kalam

A recent news article from the Business Standard[1] read as follows

"Two former high-ranking executives of technology major Cognizant have been charged by US prosecutors with allegedly paying Tamil Nadu government officials $2 million in bribes to get building permits for the companys Chennai campus."

Criminal charges have been filed against the US based multinational corporation for making bribe payments via a construction major to government officials to get permit to develop their new office campus. Cases like these aren't hard to come across indicating how corruption has become an integral part of our institutions.

The term corruption can be defined in multiple ways. Typically used as a catch all term for activities like bribery and rent seeking, nepotism and cronyism, extortion and others. But one particular way of defining corruption was given by Shleifer and Vishny (1993) as "the sale by government officials of government property for personal gain." They argue that government officials allocate licenses and permits which restricts economic activity for instance by constraining competition. By the virtue of the fact that they have a discretionary power in terms of who they want to allocate the licenses to, they provide for the permits in return of bribe payments. Since corrupt activities distort economic choices, one expects it to have an effect on the micro structures in the economy and therefore the aggregate macro economy as well.

Economic effects of corruption have been very well established in the literature. Corruption in various forms affects the process of development of an economy (Shleifer & Vishny, 1993). The direction of the effect is however quite inconsequential in the literature. Arguments have been put forth for the effect of corruption on economic growth to be working in both the directions. The negative effects on the macro economy are channeled through processes like lack of property rights and institutional delays in granting of permits and licenses in some cases. These act as a channel by lowering the incentives to invest and thereby negatively affecting the development path (Mauro, 1995). Also mis-allocation of talent to rent seeking like re-distributive activities negatively affect economic growth by diverting resources away from productive activities. (Murphy, Shleifer, & Vishny, 1991) In contrast to above negative effects, corruption can act as a grease

[1]Explained: Cognizant bribed govt officials in India, to pay $25-mn penalty ; Business Standard (February 18, 2019)

to smoothen out the inefficiencies of the market and bypass laws and institutions that cause delays. Apart from this, corruption also has a positive incentive effect on government officials. Bribe payment can provide an incentive to government official to extend greater effort from the supply side. Also, in cases where markets fail to function efficiently, bribe payment can generate a parallel free market mechanism that can help attain the desired efficient outcome.

Corruption as an issue is however not limited to one that is coming from economic forces but also needs to be analyzed from the perspective of the society. Corruption in this context could be related to an internalized norm resulting out of individual perspective and preferences regarding corrupt practices. Participating in corrupt activities and the associated punishment thereof need not just be a monetary payment but also a loss of reputation in the society. In every society there is an associated willingness to criticize corruption or conversely the acceptability towards it. This acceptability of an act of corruption for the individuals and therefore the aggregate economy varies across countries, tribes, caste, religion or in a nutshell across cultures. This is what we call as the culture of corruption. This term was first quoted by the democrats in the US in 2006 in the context of a string of scandals related to insider trading by the members of the republican party.

Culture of corruption as we call it, varies across the economies, however this variation in the culture of corruption across countries is not entirely historically given and time invariant. It changes over time as the economy evolves on the development path. These aggregate changes at the level of the economy could in principle be a result of conscious or unconscious socialization by each generation. Each generation that participates in these corrupt activities passes on the acceptability towards corruption to the subsequent generation through their actions. In this paper we explore this idea of inter generational transmission of acceptability for corrupt activities. This acquired trait then goes on to interact with the market forces through the occupational choices specifically affecting entrepreneurs who by the virtue of innovation contribute to the process of development. The effect of culture of corruption on economic growth and vice - versa is the central to the analysis of this paper. The precise role of corruption in entrepreneurship has been elaborated upon in the following paragraph

We follow the definition given by Shleifer and Vishny (1993) and consider a form of corruption that requires individuals to pay a bribe, in order to obtain a license and operate as an entrepreneur. Entrepreneurship is a process of intensive innovation possibly resulting in above normal profits to the entrepreneur through market power. In order to acquire such monopoly rights and operate as an entrepreneur, they are usually required to obtain a license to operate. These licenses are typically allocated by the government who have the discretion power on whom to give it out to. In the presence of such a power, they demand the potential entrepreneurs to pay a bribe in exchange for the license. In our model, we assume that every individual who wants to become an entrepreneur requires a license to operate and therefore necessarily has to pay a bribe to obtain the same. The alternative occupation is to become a worker and supply his labor in the final good production sector. Entrepreneurs however, through the process of innovation contribute to the total factor productivity of the economy. Thereby bribe payment required to obtain a license can discourage individuals to choose to be entrepreneurs, thereby slowing down the growth process.

Individuals however differ in their preferences on the acceptability of participation in corrupt activity which here is bribe payment.They vary in terms of their moral standards or the guilt thereby created from paying a bribe. There are some with high moral standards while there are others with relatively low ethical standards who feel little or no guilt while paying a bribe. The individuals with high moral standards, by definition have a higher psychological guilt cost of paying the bribe relative to those with lower moral values. This is to say that they get some dis utility from engaging in corrupt activity. Apart from having a higher psychological cost, the individuals with high moral values also act as whistle blowers and lower the amount of bribe that a potential entrepreneur is required to pay [2] Therefore despite of the presence of corruption, a good cultural environment in the sense of higher ethical standards can actually make corruption less effective and thereby become conducive to economic growth.

Apart from affecting the aggregate economic activity through occupational choice, bribe payment also influences the culture of corruption for future generations. Parents play a critical role in the development of various behavioral traits of their children. They often act as role model for their children and therefore they directly pick up cultural traits from the actions of their parents. When a child observes that his parent is paying a bribe, he learns from that it is okay to pay a bribe, thereby becoming relatively amoral. Since we know that those who choose to be entrepreneurs are the ones paying the bribe and therefore as more and more people choose to pay the bribe, the proportion of people with high moral values tends to go down over the generations.

This interaction between the cultural transmission of moral values and the aggregate productivity growth gives us a possibility of interesting implication for economic growth. We show that there is a possibility of an economy ending up in a low productivity, low moral and a no growth trap. Also under certain conditions, we show that an economy with fewer moral agents but high productivity, first grows at an increasing rate and later the growth rate for such an economy keeps on declining.

[2]There are multiple examples that can be provided for this in various contexts. One such example in the context of India is an online portal (ipaidabribe.com) where individuals who supposedly have higher ethical values can report the bribe paid to obtain various government services.

The rest of the paper is organized as follows. Section 2 describes the structure of the model followed by the optimal consumption and capital transfer choices. In section 4 the occupational choice for a no corruption case is analyzed, followed by two more benchmark cases with corruption but with homogeneous agents. We then in the section 7 look at occupational choice in a heterogeneous agent set up with the type given exogenously which we endogenize in the subsequent section and draw interesting growth implications and finally conclude with section 10.

2 The Model

We consider a small open economy with a given world interest rate in a standard overlapping generations set up with a constant population size on a continuum of unit interval. Each agent lives for two time periods. When young, he does not make any economic choices but only acquires a cultural type as well as some physical capital transferred by the previous generation. When an adult, he makes the following choices. He has to decide whether to be an entrepreneur or a worker. In order to be an entrepreneur, one has to pay a bribe to procure a license to operate. We assume that the bribe payment is made upfront that is before the profits from entrepreneurship have been obtained. The payment of the bribe amount is therefore made from the capital that was transferred by the previous generation.The bribe payment is mandatory to obtain a license and therefore to operate as an entrepreneur. There are however no fixed costs for becoming a worker. An economic agent therefore decides on whether to pay the bribe or not. If the bribe is paid, he operates as an entrepreneur, otherwise he becomes a worker. Once the bribe payment or the occupational choice has been made, he goes on to decide how much of the income he wants to consume and the rest is transferred as physical capital to the next generation.

The adult agents in our model are however not homogeneous. For simplification we assume that they are agents of two types - Moral (H) and Amoral (L). The moral ones or the High type ones are defined to be those set of agents who have a high psychological cost when engaging in a corrupt activity or bribe payment. The amoral ones or the Low types have a relatively lower psychological cost of participation in the corrupt activity. With loss of generality, we assume that the amoral ones have a psychological guilt cost of paying the bribe to be equal to zero and that for the high type is some positive dis-utility.

We further argue that the bribe to be paid depends on the proportion of moral types in the population. The moral types act as whistle blowers, thereby lowering the bribe amount to be paid in order to get the license. The bribe paid out is therefore a function of the population composition at any point of time. More particularly it is a decreasing function of the proportion of the high types in the population. The precise utility structure is described in the sub section that follows.

2.1 Preferences

Agents derive utility from their own current consumption, a warm glow from the physical capital transfer and also get a dis-utility due to the psychological cost of participation in corruption denoted by δ^i. Here i is used to denote the type of the agent such that $i \in \{H, L\}$. For simplification and without loss of generality, we assume that $\delta^H > 0$ and $\delta^L = 0$. This is to say that the low types are 'amoral ' and therefore psychologically do not care about or have a guilt in paying the bribe. The utility function of an agent of type i is therefore given by -

$$U_t^i = \left(c_t^i\right)^{\beta} \left(k_{t+1}^i\right)^{1-\beta} - \delta^i \tag{1}$$

Here c_t is the consumption of the adult agent of generation 't' and k_{t+1} is the capital transferred to an agent of generation 't+1'.

2.2 Production Structure

A single final good is produced in the economy using labor input and using intermediate inputs produced by entrepreneurs. The following is the production technology for the final good.

$$Y_t = l_t + A_t \left(l_t\right)^{\alpha} \left(\sum_{j=1}^{n_t} \left(x_t^i\right)^{1-\alpha}\right) \tag{2}$$

here l_t is the labor input coming from those who are choosing to be workers and n_t are those who are choosing to pay the bribe and operate as entrepreneurs and j is used to denote the variety of the intermediate input and $0 < \alpha < 1$

Each of the intermediate good producer is a monopolist for one year after which he produces under perfect competition. These monopolists produce the intermediate goods using capital inherited from the previous generation as the only input. The intermediate input is produced using a one- to one technology of production. Hence the production function for the intermediate good is

$$x_t^j = k_t \quad \forall \quad j = 1, 2, ...n_t \tag{3}$$

The monopolist takes into account the inverse demand from the final good production sector to decide on the optimal amount of the intermediate good to be produced as well as the price to be charged. The inverse demand for the intermediate good from the final good sector is derived using the profit maximization of the final good producer. We assume that the final good sector is operated by competitive firms who are price takers. We also assume the final good to be a numeraire.

$$p^i = A_t (1-\alpha)(l_t)^\alpha \left(x_t^i\right)^{-\alpha} \tag{4}$$

Each intermediate input is produced by a monopolist using his inherited capital stock. Taking into account the inverse demand for the intermediate input given by 4, we get the following as the equilibrium quantity of intermediate good supplied by the monopolist.

$$x_t^i = \left[\frac{A_t (1-\alpha)^2}{r^\star}\right]^{1/\alpha} l_t \tag{5}$$

here $r^\star$ is used to denote the world interest that is taken as given by the small open economy. The price charged by the monopolist is $p_t^j = \frac{r^\star}{1-\alpha}$. Substituting equation 5 into the profit function of the intermediate good producer, we get the following as the profit earned by the monopolist entrepreneur.

$$\pi_t^\star = \alpha (A_t)^{1/\alpha} (1-\alpha)^{\frac{2}{\alpha}-1} (r^\star)^{\frac{\alpha-1}{\alpha}} l_t \tag{6}$$

The wage return to the worker is given by the marginal product of labor in the final good production sector, the algebraic expression for which is the following

$$w_t^\star = 1 + \alpha (A_t)^{1/\alpha} (1-\alpha)^{\frac{2}{\alpha}-2} (r^\star)^{\frac{\alpha-1}{\alpha}} n_t \tag{7}$$

Given the above production structure and the utility description of the agents, we now derive the optimal choice of bribe payment and hence the occupation as well as the choice of consumption and physical capital bequest. The time line of decisions for an adult agent is as follows. He first decides on the what occupation to choose, that is whether to pay the bribe and become an entrepreneur earning the profits or to become a worker who gets a wage return. Depending on the occupation, his income is determined which he then splits between his own consumption and capital to be transferred to the following generation.

3 Optimal Choice of Consumption and Capital Transfer

An agent of type 'i' maximizes his utility given in equation 1 that is

$$U_t^i = \left(c_t^i\right)^\beta \left(k_{t+1}^i\right)^{1-\beta} - \delta^i$$

subject to the budget constraint

$$c_t + k_{t+1} = y_t$$

here

$$y_t = \begin{cases} w_t + r^{\star} k_t & \text{if a worker} \\ \pi_t + r^{\star}\left(k_t - B\left(q_t\right)\right) & \text{if an entrepreneur}\ ^{3} \end{cases}$$

Note here that the bribe to be paid out is a function of the proportion of the moral types in the population at any point of time. This proportion has been denoted by q_t. Therefore, $1 - q_t$ is the proportion of amoral agents at any point of time. Moral agents by the virtue of the fact that they have a guilt or a dis utility associated with participation in corrupt activities, tend to act as whistle blowers. Reporting of the act of bribery by the moral agents, thereby lowers the bribe amount that is required to be paid out for acquiring the license. The function $B\left(q_t\right)$ captures that. Here $B'\left(q_t\right) < 0$, $B\left(0\right) = \bar{B}$ and $B\left(1\right) = 0$. That is higher is the proportion of moral agents in the economy, lower is the bribe needed to acquire the license. Also if there are no moral agents in the economy or everyone is amoral, then the bribe amount is at the maximum level. On the contrary, if everyone is of the high moral type, then the bribe amount falls to zero. To obtain the optimal choices by agents of either type, we first solve for the optimal consumption and capital transfer choice. Given the Cobb Douglas utility structure, the optimal choices are as follows

$$c_t = \beta y_t$$

$$k_{t+1} = \left(1 - \beta\right) y_t$$

The indirect utility associated with an occupation with income y_t is given by

$$\tilde{U}_t^i = \left(\beta\right)^{\beta}\left(1 - \beta\right)^{1-\beta} y_t - \delta^i \tag{8}$$

Th above indirect utility expression takes into account the choice of consumption and capital transfer for any given income or occupation. So an agent of either type now makes an occupational choice decision based on the above indirect utility expressions. Given their type, they compare their indirect utility across the two occupations to make the occupational choice.

[3] Bribe payment to get a license can be potentially made in two ways. One could be an upfront payment made out of the inherited capital before the realisation of the profits or it can be made out of the profits as well as the capital stock after the profits have been received. In this model, we consider the former case.

4 Occupational Choice : Benchmark A : No Corruption

Consider a benchmark case where there is no corruption. In absence of any bribe payment, there will be no psychological cost of participation in a corrupt activity. Hence we have a case with homogeneous agents. A representative agent will choose to become an entrepreneur if and only if the indirect utility from being an entrepreneur exceeds that from being a worker. The indirect utility from becoming an entrepreneur in this benchmark case is given by

$$\tilde{U}_t^{iE} = \tilde{U}_t^{E} = (\beta)^{\beta}(1-\beta)^{1-\beta}\left[\pi_t^{\star} + (1+r^{\star})\,k_t^i\right] \tag{9}$$

$$\tilde{U}_t^{iW} = \tilde{U}_t^{W} = (\beta)^{\beta}(1-\beta)^{1-\beta}\left[w_t^{\star} + (1+r^{\star})\,k_t^i\right] \tag{10}$$

Assumption 1. *We assume that agents of either type are not capital constrained. That is* $k_t^i \geq B \;\; \forall i, t$. [4]

This is to say that an agent will choose to become an entrepreneur if the indirect utility given in equation 9 is greater than that in 10. This reduces to the following inequality

$$\pi_t^{\star} \geq w_t^{\star} \tag{11}$$

Note that the above inequality is independent of the capital inherited by the individuals. Here also note that $\pi_t^{\star}$ and $w_t^{\star}$ are endogenously determined. They depend on the proportion of the population who are choosing to be workers vis a vis entrepreneurs. These individuals in turn make their choices based on the aggregates. Hence we need to check for equilibria such that the individual choice of occupation and the aggregates are consistent with each other.

Consider the following possible equilibrium, $n_t^{\star} = 1$ and $l_t^{\star} = 0$. These values of $n_t^{\star}$ and $l_t^{\star}$ imply that $\pi_t^{\star} = 0$ and $w_t^{\star} = 1+\alpha\,(A_t)^{1/\alpha}(1-\alpha)^{\frac{2}{\alpha}-2}(r^{\star})^{\frac{\alpha-1}{\alpha}}$. Therefore $w_t^{\star} > \pi_t^{\star}$. This implies that the condition 11 is violated and no one chooses to be an entrepreneur. This contradicts with the fact that $n_t^{\star} = 1$. Therefore $n_t^{\star} = 1$ and $l_t^{\star} = 0$ is not an equilibrium.

Now consider the other possible corner solution. $n_t^{\star} = 0$ and $l_t^{\star} = 1$. In this case, $\pi_t^{\star} = \alpha\,(A_t)^{1/\alpha}(1-\alpha)^{\frac{2}{\alpha}-1}(r^{\star})^{\frac{\alpha-1}{\alpha}}$ and $w_t^{\star} = 1$. This will be an equilibrium if an only if condition 11 holds, which happens when

$$A_t < \left[\frac{1}{\alpha\,(r^{\star})^{\frac{\alpha-1}{\alpha}}(1-\alpha)^{2/\alpha-1}}\right]^{\alpha} \equiv \underline{A} \tag{12}$$

[4] The idea here is not to highlight the interaction between capital constraints or individual wealth and corruption. Though that would be an interesting idea in itself but that has been assumed away in our paper

If the above condition on the aggregate productivity term doesn't hold then we have an equilibrium in the interior such that equation 11 holds with equality. Therefore for $A_t > \underline{A}$, the equilibrium is given by

$$(l_t^\star)^B = \frac{1 + C_t^B}{2 - \alpha} \tag{13}$$

$$(n_t^\star)^B = 1 - \frac{1 + C_t^B}{2 - \alpha} \tag{14}$$

where $C_t^B \equiv \frac{1}{\alpha (A_t)^{1/\alpha} (r^\star)^{\frac{\alpha-1}{\alpha}} (1-\alpha)^{2/\alpha - 2}}$

As argued before, entrepreneurs through the process of innovation contribute to the growth of aggregate productivity. Therefore depending on how many individuals choose to be entrepreneurs, the future productivity term A_t gets determined and so does the rate of growth for the economy. Therefore

$$g_t^A \equiv \frac{A_{t+1} - A_t}{A_t} = f\left(n_t^\star\right) \tag{15}$$

such that $f'(.) > 0$

Therefore in this benchmark case where there is no corruption. The rate of growth of the economy is given by

$$g_t = 0 \qquad \text{if} \quad A_t \leq \underline{A} \tag{16}$$

$$= f\left((n_t^\star)^B\right) \qquad \text{if} \quad A_t > \underline{A} \tag{17}$$

This implies that economies that start out with very low productivity continue to stay at the low productivity levels and the growth rate for such economies continues to remain zero in the long run. However, if an economy starts out above a threshold level of productivity, then it continues to grow at an increasing rate and eventually reaches the maximum possible rate of growth in the long run. Also note that for $A_t > \underline{A}$, the rate of change of the aggregate productivity term is always positive. Hence A_t keeps on increasing over time. As this happens, C_t^B tends to zero and the proportion of entrepreneurs tends to a constant value of $\frac{1-\alpha}{2-\alpha}$. Hence, the rate of growth of the economy reaches it's maximum possible value in the long run given by $f\left(\frac{1-\alpha}{2-\alpha}\right)$

5 Occupational Choice : Benchmark B1 : Corruption with only Amoral Agents

Next we consider another benchmark case, wherein in order to become an entrepreneur one needs to pay a bribe but in this case we assume that agents are homogeneous and all of them are of the amoral type. Here, the agents have to make an upfront bribe payment out of their inherited capital stock in order to become an entrepreneur. However, due to the fact that they are of the amoral type and they have no psychological guilt of paying the bribe, we have $\delta^L = 0$. So the corresponding indirect utilities from the two occupations are

$$\tilde{U}_t^{LE} = (\beta)^\beta (1-\beta)^{1-\beta} \left[\pi_t^\star + (1+r^\star)\left(k_t^i - B(q_t)\right)\right] \tag{18}$$

$$\tilde{U}_t^{LW} = (\beta)^\beta (1-\beta)^{1-\beta} \left[w_t^\star + (1+r^\star) k_t^i\right] \tag{19}$$

since $q_t = 0$, we know that $B(q_t) = \bar{B}$, substituting for that in 18, we get the following reduced form

$$\tilde{U}_t^{LE} = (\beta)^\beta (1-\beta)^{1-\beta} \left[\pi_t^\star + (1+r^\star) k_t^i - \hat{B}\right]$$

where $\hat{B} = (1+r^\star) B(q_t)$ which in this case is equal to $(1+r^\star)\bar{B}$. So the agents of the Amoral type therefore compare the above indirect utility from being an entrepreneur to that from being a worker which is given by 19. The occupational choice condition for the amoral types to choose to be an entrepreneur therefore reduces to

$$\pi_t^\star - \hat{B} \geq w_t^\star \tag{20}$$

As in the case with no corruption analyzed in section 4, we look for similar equilibria in terms of the aggregate $l_t^\star$ and $n_t^\star$ that are consistent with the individual choices made on the basis of inequality given by equation 20.

As before $l_t^\star = 0$ and $n_t^\star = 1$ cannot be an equilibrium by the same argument as before. So if $n_t^\star = 1$ and $l_t^\star = 0$ then $w_t^\star > 0$ and $\pi_t^\star = 0$. Therefore the LHS of 20 becomes negative and the RHS becomes positive, thereby violating the inequality. Hence, no one becomes an entrepreneur, thereby negating the fact that $n_t^\star = 1$.

Now consider the other corner equilibrium where $l_t^\star = 1$ and $n_t^\star = 0$. Here, the LHS of equation refB1occ2 becomes equal to $\alpha (A_t)^{1/\alpha} (1-\alpha)^{\frac{2}{\alpha}-1} (r^\star)^{\frac{\alpha-1}{\alpha}} - \hat{B}$ and the RHS becomes to equal to one. So everyone will become a worker if the following condition on A_t holds.

$$A_t \leq \left[\frac{1+\hat{B}}{\alpha (r^\star)^{\frac{\alpha-1}{\alpha}} (1-\alpha)^{2/\alpha-1}}\right]^\alpha \equiv \underline{A}^L \tag{21}$$

Now if $A_t > \underline{A}^L$, some of the individuals all of whom are of amoral type would want to become entrepreneurs. We therefore have an equilibrium in the interior such that equation 20 holds with equality and we get the following values of n_t and l_t as the equilibrium.

$$(l_t^\star)^L = \frac{1 + C_t^L}{2 - \alpha} \tag{22}$$

$$(n_t^\star)^L = 1 - \frac{1 + C_t^L}{2 - \alpha} \tag{23}$$

where $C_t^L \equiv \frac{1+\hat{B}}{\alpha (A_t)^{1/\alpha} (r^\star)^{\frac{\alpha-1}{\alpha}} (1-\alpha)^{2/\alpha - 2}}$

The key thing to note here is that $C_t^L > C_t^B$. Therefore, $(n_t^\star)^L < (n_t^\star)^B$. From equation 15, we know that the rate of growth of aggregate productivity and therefore the growth rate of the economy is increasing in the proportion of population who are choosing to be entrepreneurs. So, in the benchmark case wherein without corruption $n_t^\star$ is high relative to the case where there is corruption and everyone is of the amoral type.That is $f\left((n_t^\star)^L\right) < f\left((n_t^\star)^B\right)$. However, in the long run, with increase in A_t, as C_t^L goes to zero over time, the rate of growth of the economy goes to it's maximum possible value. Also the threshold beyond which the economy starts growing is higher in this case relative to the no corruption benchmark.($\underline{A}^L > \underline{A}$)

6 Occupational Choice : Benchmark B2 : Corruption with only moral Agents

Now consider a parallel benchmark case, wherein there is corruption that is one is required to pay a bribe to become an entrepreneur, however, here we assume that all agents are of the moral type. This is to say that $q_t = 1$. Now since everyone is of the moral type, that drives down the bribe payment to zero. Therefore, the indirect utilities are as follows.

$$\tilde{U}_t^{HE} = (\beta)^\beta (1-\beta)^{1-\beta} \left[\pi_t^\star + (1 + r^\star)\left(k_t^i - B(q_t)\right)\right] \tag{24}$$

$$\tilde{U}_t^{HW} = (\beta)^\beta (1-\beta)^{1-\beta} \left[w_t^\star + (1 + r^\star) k_t^i\right] \tag{25}$$

since $q_t = 1$, we know that $B(q_t) = 0$, taking this into account, we obtain the following

$$\tilde{U}_t^{LE} = (\beta)^\beta (1-\beta)^{1-\beta} \left[\pi_t^\star + (1 + r^\star) k_t^i\right]$$

So the agents of the moral type therefore compare the above indirect utility from being an entrepreneur to that from being a worker which is given by equation 25 which in the reduced form looks as follows -

$$\pi_t^\star \geq w_t^\star \tag{26}$$

Note that above equation is exactly the same as the condition for the occupational choice in the no corruption benchmark. That is equation 11 is exactly the same as 26. So in this case, we have the same growth implications as the first benchmark case A. The economy grows at a high rate relative to the case where everyone is of the amoral type.Also the threshold level of aggregate productivity that takes the economy on a positive growth path is lower that the benchmark case B1.

Proposition 1. *An economy with homogeneous agents has a zero rate of growth if it starts with low aggregate productivity that is below a threshold. After that it grows at a positive and increasing growth rate. This threshold is lower for economies with no corruption and for those with corruption but all individuals of the moral type relative to one with corruption and all amoral agents.*

Also the growth rate for an economy without corruption and also for those with only moral agents is higher than that with only amoral ones.

The above proposition can be summarized in the following figure.

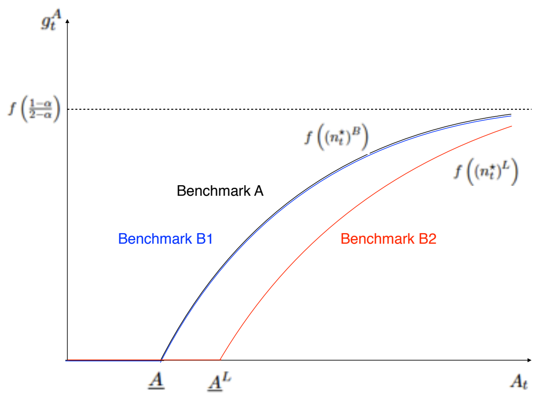

Figure 1: Growth Rate of the Economy in the Three Benchmark Cases

7 Occupational Choice : Benchmark C : Corruption with Heterogeneous Agents and Exogenous Type

As a benchmark, we first consider a version of the model where there are agents of both the type.However, the type distribution is exogenously given. Lets assume that there are q_t proportion of the High type (H) or the moral type and $1 - q_t$ proportion of the amoral type or the Low type (L) and we consider q_t to be a given for now.

Any agent of an amoral type will never choose to be an entrepreneur is the maximum possible return from entrepreneurship is less than the minimum possible return from being a worker. The entrepreneurs profit is the highest when $n_t = 0$. That is also when the wages of the workers are the least. Notationally, we can write the above condition as

$$\pi_t^\star (n_t = 0) - \hat{B}(q_t) \leq w_t^\star (n_t = 0) \tag{27}$$

$$\alpha (A_t)^{1/\alpha} (1-\alpha)^{\frac{2}{\alpha}-1} (r^\star)^{\frac{\alpha-1}{\alpha}} - \hat{B}(q_t) \leq 1$$

This reduces to

$$A_t \leq \left[\frac{1 + \hat{B}(q_t)}{\alpha (r^\star)^{\frac{\alpha-1}{\alpha}} (1-\alpha)^{2/\alpha - 1}} \right]^\alpha \equiv \underline{A}^L (q_t) \tag{28}$$

Similarly for agents of the moral type will never choose be an entrepreneur if the following holds

$$\pi_t^\star (n_t = 0) - \hat{B}(q_t) - \delta^H \leq w_t^\star (n_t = 0) \tag{29}$$

which reduces to

$$A_t \leq \left[\frac{1 + \hat{B}(q_t) + \delta^H}{\alpha (r^\star)^{\frac{\alpha-1}{\alpha}} (1-\alpha)^{2/\alpha - 1}} \right]^\alpha \equiv \underline{A}^H (q_t) \tag{30}$$

The equations derived above, 28 and 30 essentially give us the cutoff or the threshold for A_t below which the individuals of the low type and high type respectively will never choose to be an entrepreneur for all values of q_t. It is only above these thresholds that there is a possibility for them of choosing to be entrepreneurs depending upon the value of q_t.

In order to trace out the temporary equilibria for a given q_t, consider the following arbitrary allocation $n_t = 1 - q_t$ and $l_t = q_t$.For this allocation to be an equilibrium, it should be incentive compatible for the low or amoral types to choose to be entrepreneurs and also for the high types or moral ones to choose to be workers. This is to say that the following conditions hold

$$\pi_t^\star - \hat{B}(q_t) \geq w_t^\star \tag{31}$$

$$\alpha (A_t)^{1/\alpha} (1-\alpha)^{\frac{2}{\alpha}-1} (r^\star)^{\frac{\alpha-1}{\alpha}} q_t - \hat{B}(q_t) \leq 1 + \alpha (A_t)^{1/\alpha} (1-\alpha)^{\frac{2}{\alpha}-2} (r^\star)^{\frac{\alpha-1}{\alpha}} (1-q_t)$$

This gives the following condition on A_t

$$A_t > \left[\frac{1+\hat{B}(q_t)}{\alpha (r^\star)^{\frac{\alpha-1}{\alpha}} (1-\alpha)^{2/\alpha-2} ((2-\alpha) q_t - 1)} \right]^\alpha \equiv \tilde{A}^L(q_t) \tag{32}$$

Note that $\tilde{A}^L(q_t)$ can be reduced to

$$\tilde{A}^L(q_t) = \underline{A}^L(q_t) \left[\frac{1-\alpha}{(2-\alpha) q_t - 1} \right]^\alpha$$

As long as the condition 32 holds, all the amoral type will choose to be an entrepreneur. However, if this doesn't hold then either some or all of them do not have an incentive to become an entrepreneur depending upon the level of the productivity term A_t.

Similarly, since q_t proportion of people who are of the high type are choosing to be workers. The following inequality has to hold for them.

$$\pi_t^\star - \hat{B}(q_t) - \delta^H < w_t^\star \tag{33}$$

This reduces to the following condition on A_t

$$A_t < \left[\frac{1+\hat{B}(q_t)+\delta^H}{\alpha (r^\star)^{\frac{\alpha-1}{\alpha}} (1-\alpha)^{2/\alpha-2} ((2-\alpha) q_t - 1)} \right]^\alpha \equiv \tilde{A}^H(q_t) \tag{34}$$

Also here

$$\tilde{A}^H(q_t) = \underline{A}^H(q_t) \left[\frac{1-\alpha}{(2-\alpha) q_t - 1} \right]^\alpha$$

For any A_t below $\tilde{A}^H(q_t)$, all the q_t proportion of the moral types will choose to be workers. It is only when A_t rises above this threshold that some of them might want to become entrepreneurs.

Note that since $\underline{A}^L(q_t)$ and $\underline{A}^H(q_t)$ are lower bounds on the thresholds of A_t below which individuals of L type and H type will not choose to be entrepreneurs, it is easy to see that $\underline{A}^L(q_t) < \tilde{A}^L(q_t)$ and $\underline{A}^H(q_t) < \tilde{A}^H(q_t)$. We also know that $\underline{A}^L(q_t) < \underline{A}^H(q_t)$ holds. However, the comparison between $\tilde{A}^L(q_t)$ and $\underline{A}^H(q_t)$ is ambiguous. it depends on the value of q_t. More precisely,

$$\tilde{A}^L(q_t) \gtreqless \underline{A}^H(q_t)$$

according as

$$\left[\frac{1-\alpha}{(2-\alpha)\,q_t-1}\right] \gtreqless \left[\frac{1+\hat{B}\,(q_t)+\delta^H}{1+\hat{B}\,(q_t)}\right] \tag{35}$$

The above equation can be re written as

$$(2-\alpha)\,q_t-1 \lesseqgtr \left[\frac{1+\hat{B}\,(q_t)}{1+\hat{B}\,(q_t)+\delta^H}\right] \tag{36}$$

It is easy to see that such a q_t say equal to $\hat{q}$ exists where the above equation holds with equality.Since the LHS of the above equation is always increasing in q_t and the RHS is decreasing in q_t, there will exist a $\hat{q}$ such that the above holds with equality. For $q_t < \hat{q}$, $\tilde{A}^L\,(q_t) > \underline{A}^H\,(q_t)$ and for values of $q_t > \hat{q}$, $\tilde{A}^L\,(q_t) < \underline{A}^H\,(q_t)$ This can be seen using the following figure.

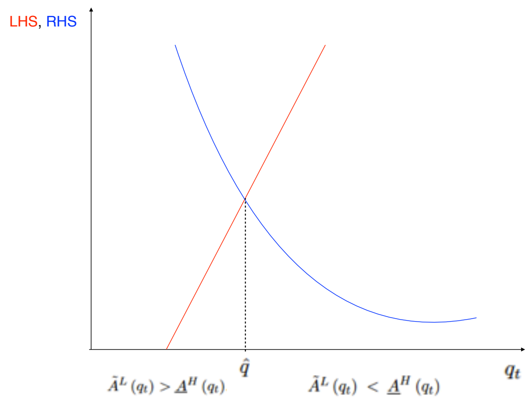

Figure 2: Existence of $\hat{q}$

Given that such a $\hat{q}$ exists, we can rank the four cutoffs obtained above, $\underline{A}^L\,(q_t)\,,\underline{A}^H\,(q_t)\,,\tilde{A}^L\,(q_t)$ and $\tilde{A}^H\,(q_t)$ for different values of q_t and identify the equilibria in terms of $l_t^\star$ and $n_t^\star$

7.1 Equilibrium for low values of q_t : $q_t < \frac{1}{2-\alpha}$

Note that the threshold values of A_t as defined by inequality 32 and inequality 34 need not always be positive. In fact when $q < \frac{1}{2-\alpha}$, both the $\tilde{A}^L\,(q_t)$ and $\tilde{A}^L\,(q_t)$ are negative. This implies that inequality 31 is always violated and 33 always holds.

First consider the case where we begin with a value of $A_t \leq \underline{A}^L(q_t)$ As before, the returns to entrepreneurship are too low to induce agents of either type into entrepreneurship. Therefore no one chooses to be an entrepreneur. So $n_t^\star = 0$ and $l_t^\star = 1$. This is also consistent with low returns to entrepreneurship and relatively high returns to being a worker and hence is an equilibrium.

Now, suppose $\underline{A}^L(q_t) \geq A_t \leq \underline{A}^H(q_t)$. As explained earlier condition 31 is violated, therefore not all of the L types would become entrepreneur but because $A_t \geq \underline{A}^L(q_t)$, some of the L types or the amoral types might want to become entrepreneurs. However, since $A_t \leq \underline{A}^H(q_t)$, none of the H types or the moral types want to become entrepreneurs. Hence, $l_t \geq q_t$ and $n_t < 1 - q_t$. This is only possible when the L types are indifferent between becoming an entrepreneur and a worker, the condition for which is the same as that derived in section 5.That is

$$\pi_t^\star - \hat{B} \geq w_t^\star$$

From the equilibrium derived earlier in section 5, we know that

$$(l_t^\star)^L = \frac{1 + C_t^L}{2 - \alpha}$$

$$(n_t^\star)^L = 1 - \frac{1 + C_t^L}{2 - \alpha}$$

Next consider the case where $A_t \geq \underline{A}^H(q_t)$, the amoral individuals anyway have an incentive to become an entrepreneur, now the moral types would also want to become entrepreneurs since the productivity is high enough. Recall that, with $n_t < 1 - q_t$ in the previous case, the L types were indifferent and the H types had their net profit to be less than the wages. Now if n_t rises further. Wages continue to rise and profits continue to fall, thereby making it not incentive compatible for the H types to be entrepreneurs. the equilibrium therefore remains at $(l_t^\star)^L$ and $(n_t^\star)^L$. To summarize

For $q_t < \frac{1}{2-\alpha}$

$$\begin{aligned} n_t^\star &= 0 && \text{for} A_t \leq \underline{A}^L(q_t) \\ &= (n_t^\star)^L && \text{for} A_t > \underline{A}^L(q_t) \end{aligned}$$

So if we start with a productivity that is below $\underline{A}^L(q_t)$, the economy doesn't grow. It stays where it started. But if we start with a productivity level that is greater than $\underline{A}^L(q_t)$, then since $n_t^\star > 0$, the economy continues to grow at the rate of $f\left((n_t^\star)^L\right)$. The aggregate productivity continues to rise and $n_t^\star$ tends to it's long run value $\frac{1-\alpha}{2-\alpha} < 1 - q_t$ and the long run growth rate for the economy is $f\left(\frac{1-\alpha}{2-\alpha}\right)$

7.2 Equilibrium for intermediate values of q_t : $\frac{1}{2-\alpha} < q_t < \hat{q}$

Since $q_t < \hat{q}$, we know that $\tilde{A}^L(q_t) > \underline{A}^H(q_t)$. Therefore the following is the ranking of the thresholds That gives various ranges for A_t where we need to identify the temporary equilibria.

$$\underline{A}^L(q_t) < \underline{A}^H(q_t) < \tilde{A}^L(q_t) < \tilde{A}^H(q_t)$$

Consider, very low values of A_t that is for $A_t < \underline{A}^L(q_t)$, as argued in the earlier sections due to low productivity, neither type choose to be an entrepreneur and everyone chooses to be a worker. So $n_t^\star = 0$

If $\underline{A}^L(q_t) < A_t < \underline{A}^H(q_t)$, the moral or H types still don't have any incentive to be an entrepreneur but the amoral types do. Hence the L - types are indifferent between the two occupations and the H types choose to be workers. Here also $\pi_t^\star - \hat{B} \geq w_t^\star$ holds in equilibrium, so the equilibrium $n_t^\star$ is $(n_t^\star)^L = 1 - \frac{1+C_t^L}{2-\alpha}$

For values of A_t such that $\underline{A}^H(q_t) < A_t < \tilde{A}^L(q_t)$, the H types now can possibly become entrepreneurs but if they do so then the proportion of entrepreneurs becomes higher, driving down the profit income and creating a disincentive for the moral types to choose to be entrepreneurs. the equilibrium is this case is therefore same as the previous one $n_t^\star = (n_t^\star)^L$

Now consider $\tilde{A}^L(q_t) < A_t < \tilde{A}^H(q_t)$. Now because $A_t > \tilde{A}^L(q_t)$, all the amoral types want to be entrepreneurs and also because $A_t < \tilde{A}^H(q_t)$ all the moral types would choose to be workers. That is inequalities 32 and 34 both hold. Hence $n_t^\star = 1 - q_t$ and $l_t^\star = q_t$ is an equilibrium.

Lastly, for values of $A_t > \tilde{A}^H(q_t)$, all the amoral types continue to choose to be entrepreneurs. The moral types on the other hand can choose to be entrepreneurs. This is because the condition 34 is violated, which means that not all of the moral types will want to be workers. This is possible only when the moral types are indifferent between the two occupations. From section 6, we know that when the moral types are indifferent with high aggregate productivity, the equilibrium is the same as that in the no corruption benchmark. The equilibrium proportion of individuals who are choosing to be entrepreneurs is therefore given by $n_t^\star = (n_t^\star)^B$

To collate the temporary equilibrium values together.

For $\frac{1}{2-\alpha} < q_t < \hat{q}$

$$\begin{aligned}
n_t^\star &= 0 && \text{for} \quad A_t \leq \underline{A}^L(q_t) \\
&= (n_t^\star)^L && \text{for} \quad \underline{A}^L(q_t) < A_t < \tilde{A}^L(q_t) \\
&= (1 - q_t) && \text{for} \quad \tilde{A}^L(q_t) < A_t < \tilde{A}^H(q_t) \\
&= (n_t^\star)^B && \text{for} \quad A_t > \tilde{A}^H(q_t)
\end{aligned}$$

7.3 Equilibrium for high values of q_t : $q_t > \hat{q}$

Here we know that since $q_t > \hat{q}$, $\tilde{A}^L(q_t) < \underline{A}^H(q_t)$. This gives us the following ranking of the A_t cutoffs

$$\underline{A}^L(q_t) < \tilde{A}^L(q_t) < \underline{A}^H(q_t) < \tilde{A}^H(q_t)$$

As before, for values of $A_t < \underline{A}^L(q_t)$, the equilibrium is given by $n_t^\star = 0$

For $\underline{A}^L(q_t) < A_t < \tilde{A}^L(q_t)$, the amoral types can possibly choose to be entrepreneurs, but since $A_t < \tilde{A}^L(q_t)$, inequality 32 is violated. Hence not all of the L types will choose to be entrepreneurs. Therefore, the equilibrium here is $(n_t^\star)^L$.

If $\tilde{A}^L(q_t) < A_t < \underline{A}^H(q_t)$, since condition 32 and condition 34 are satisfied, all the $1-q_t$ proportion of amoral types will choose to be entrepreneurs and the entire population of moral types q_t will be workers. Therefore in equilibrium $n_t^\star = 1 - q_t$

For the range of A_t given by $\underline{A}^H(q_t) < A_t < \tilde{A}^H(q_t)$, the equilibrium continues to be $n_t^\star = 1 - q_t$. The argument is exactly the same as in the previous section. Here even though, the H types can potentially choose to be entrepreneurs, they do not do so because then the profits are lowered further and that contradicts the fact that they are choosing to be entrepreneurs.

If $A_t > \tilde{A}^H(q_t)$, the moral types also would want to choose to be entrepreneurs. Since not all of them will want to do so (doing so would drive the profits to zero), they would be indifferent between the two occupations. Hence the equilibrium is given by the condition 26 which gives us the equilibrium that is the same as in the no corruption case, that is $(n_t^\star)^B$.

Therefore, for $\hat{q} < q_t < 1$

$$\begin{aligned} n_t^\star &= 0 && \text{for} \quad A_t \leq \underline{A}^L(q_t) \\ &= (n_t^\star)^L && \text{for} \quad \underline{A}^L(q_t) < A_t < \tilde{A}^L(q_t) \\ &= (1 - q_t) && \text{for} \quad \tilde{A}^L(q_t) < A_t < \tilde{A}^H(q_t) \\ &= (n_t^\star)^B && \text{for} \quad A_t > \tilde{A}^H(q_t) \end{aligned}$$

8 Temporary Equilibria : Results

Note that the equilibrium values for the proportion of population who are choosing to be entrepreneurs is same in this case with $\hat{q} < q_t < 1$ and for the case where $\frac{1}{2-\alpha} < q_t < \hat{q}$ derived in section 7.2. Though there is a difference between the two in terms of it's implications for the growth rates. Recall that the rate of growth is increasing in the proportion of population who are choosing to be entrepreneurs $n_t^\star$. Any economy requires a minimum threshold level of productivity given by $\underline{A}^L(q_t)$ to move on a positive growth path. Consider the case where suppose we start with $A_t > \underline{A}^L(q_t)$. The corresponding $n_t^\star$ is positive irrespective of the value of q_t. Therefore the aggregate productivity in the economy keeps on increasing and as that happens for high enough q_t, we transit to higher growth path. We can say this because

$$(n_t^\star)^L < 1 - q_t < (n_t^\star)^B$$

$$\Rightarrow f\left((n_t^\star)^L\right) < f(1-q_t) < f\left((n_t^\star)^L\right)$$

So an economy first grows at a low and increasing rate given by $f\left((n_t^\star)^L\right)$. As it continues to grow it goes to a constant growth path with rate of growth of $f(1-q_t)$ and eventually it goes to the highest possible growth path with a growth rate of $f\left((n_t^\star)^L\right)$ which increases over time and goes to the limiting growth rate of $f\left(\frac{1-\alpha}{2-\alpha}\right)$. The transition to the constant growth path happens much earlier since the threshold is lower if q_t is high, that is there are more moral agents in the economy. Recall that the threshold at which the transition happens is $\tilde{A}^L(q_t)$ and for high values of q_t, that is $q_t > \tilde{q}$, this threshold is much lower than for lower values of q_t. An economy with more moral types goes to a constant high growth much earlier than one with fewer moral types and also stays there longer. The rate of growth for the economy for various values of q_t can therefore be summarized as follows and represented in the figures that follow

For $0 < q_t < \frac{1}{2-\alpha}$

$$\begin{aligned} g_t^A &= 0 && \text{if} \quad A_t \leq \underline{A}^L(q_t) \\ &= f\left((n_t^\star)^L\right) && \text{if} \quad A_t > \underline{A}^L(q_t) \end{aligned}$$

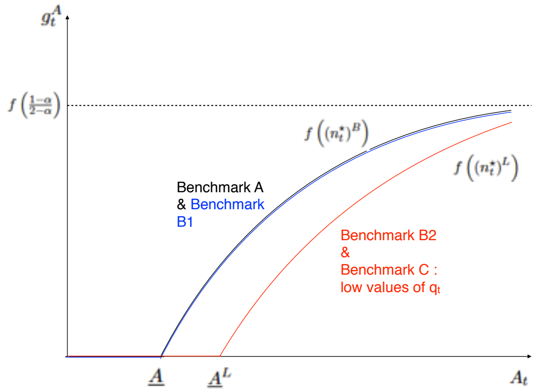

Figure 3: Growth Rate for an economy with low q_t

For $\frac{1}{2-\alpha} < q_t < \hat{q}$

$$\begin{aligned}
g_t^A &= 0 && \text{if} \quad A_t \leq \underline{A}^L(q_t) \\
&= f\left((n_t^\star)^L\right) && \text{if} \quad \underline{A}^L(q_t) < A_t < \tilde{A}^L(q_t) \\
&= f(1-q_t) && \text{if} \quad \tilde{A}^L(q_t) < A_t < \tilde{A}^H(q_t) \\
&= f\left((n_t^\star)^B\right) && \text{if} \quad A_t > \tilde{A}^H(q_t)
\end{aligned}$$

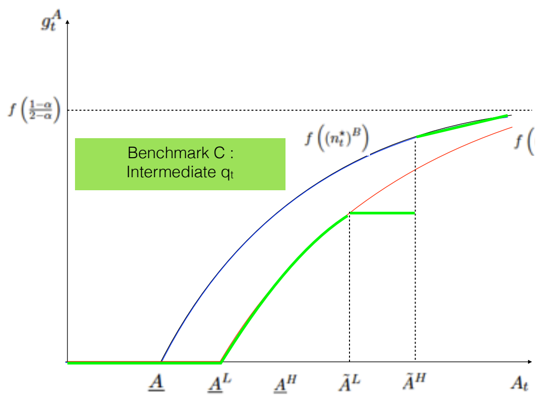

Figure 4: Growth Rate for an economy with intermediate values of q_t

For $\hat{q} < q_t < 1$

$$
\begin{aligned}
g_t^A &= 0 && \text{if} \quad A_t \leq \underline{A}^L(q_t) \\
&= f\left((n_t^\star)^L\right) && \text{if} \quad \underline{A}^L(q_t) < A_t < \tilde{A}^L(q_t) \\
&= f(1-q_t) && \text{if} \quad \tilde{A}^L(q_t) < A_t < \tilde{A}^H(q_t) \\
&= f\left((n_t^\star)^B\right) && \text{if} \quad A_t > \tilde{A}^H(q_t)
\end{aligned}
$$

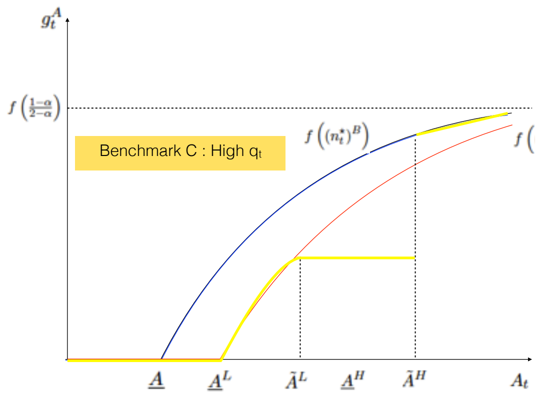

Figure 5: Growth Rate for an economy with high values of q_t

Proposition 2. *An economy with very low productivity stays there in the long run with a zero growth rate. Those with a minimum aggregate productivity continue to grow over time. The growth rate for such economies increases over time and eventually reaches the highest possible rate. Moreover, economies with higher proportion of moral types goes on the higher growth path earlier than those with relatively fewer moral agents*

9 Endogenous Types

Until this section, we have considered multiple benchmark cases all with a given q_t. This cultural trait is however not exogenously given. It is passed on from one generation to another through the parental choices. Parents act as a role model to their children and very often parental actions directly and also unconsciously influence the traits that the child eventually acquires. With this kind of a vertical cultural transmission, we argue that the parents who pay the bribe, their children who are otherwise naive learn that paying a bribe is acceptable and therefore become of an amoral type. Note that those who are paying a bribe are all entrepreneurs. Therefore the more is the number of entrepreneurs in any generation, the more will be the increase in the proportion of the amoral types (decrease in the moral types) in the next generation. This is to say that

$$q_{t+1} - q_t = -h\left(n_t^\star\right) \tag{37}$$

Note that here $h'(.) > 0$

Therefore, now as $n_t^\star$ increases, the aggregate productivity grows over time using equation 15 but at the same time now the proportion of moral agents falls as the growth rate increases.

9.1 Initial Values: Low q_t and Low A_t

Consider an economy that starts with very few moral types and low productivity. That is , $q_t < \frac{1}{2-\alpha}$ and $A_t \leq \underline{A}^L(q_t)$. In this we know that in equilibrium $n_t^\star = 0$ Therefore,

$$q_{t+1} = q_t$$

$$A_{t+1} = A_t$$

$$g^A = 0$$

Such an economy is therefore stuck in a low moral, low productivity and a no growth trap.

9.2 Initial Values : Low q_t and High A_t

In an economy with few moral types $q_t < \frac{1}{2-\alpha}$ and high enough productivity $A_t > \underline{A}^L(q_t)$, we know that in equilibrium $n_t^\star = (n_t^\star)^L$. Since this is always positive, q_t decreases over time and A_t increases and we continue to remain on a growth path where moral types become fewer and productivity keeps on increasing. So the economy stays in a perpetual low moral and high productivity trap.

The growth rate of the economy may however change over time in a non linear manner. Recall that $(n_t^\star)^L$ also depends on q_t and A_t. As q_t falls over time ceterius paribus $(n_t^\star)^L$ decreases and as A_t increases, $(n_t^\star)^L$ increases. The net effect therefore depends on the magnitude of the changes in the two variables. To be able to analyze, the growth rate for such an economy, we assume the following functional forms for the $h(n_t^\star)$, $f(n_t^\star)$ and $\hat{B}(q_t)$

We assume that $h(n_t^\star) = a_1 n_t^\star$

$$f(n_t^\star) = a_2 n_t^\star$$

$$\hat{B}(q_t) = \bar{B}(1 - q_t)$$

Under the above functional forms assumed for simplified analytical tractability, we get that as long as the ratio $\frac{a_1}{a_2}$ that is the magnitude of relative responsiveness of changes in q_t and A_t to changes in n_t lies in a certain range, the economy first grows at an increasing and then grows at a decreasing rate. As q_t and A_t simultaneously change, so does C_t^L and therefore $n_t^\star$ and consequently the growth rate g_t^A.

One can derive the expression for the change in C_t^L and check for the direction of change. The direction of movement in C_t^L is as follows

$$dC_t^L \gtreqqless 0 \quad \text{according as} \quad q_t \gtreqqless \tilde{q} \equiv \frac{a_1\alpha}{a_2} - \left(1 + \frac{1}{\bar{B}}\right)$$

So for $q_t < \tilde{q}$, $dC_t^L < 0 \Rightarrow n_t^\star$ rises $\Rightarrow g_t^A$ increases over time.

Similarly, if $q_t > \tilde{q}$, $dC_t^L > 0 \Rightarrow n_t^\star$ falls $\Rightarrow g_t^A$ decreases over time.

Assumption 2. $\left(1 + \frac{1}{\bar{B}}\right)\frac{1}{\alpha} < \frac{a_1}{a_2} < \left(\frac{1}{2-\alpha} + \left(1 + \frac{1}{\bar{B}}\right)\right)\frac{1}{\alpha}$

Proposition 3. *If assumption 2 holds then, for such an economy which starts with low moral and high enough productivity, over time has fewer moral people and higher productivity. The growth rate for such an economy first increases over time and then decreases.*

9.3 Initial Values : High q_t and High A_t

Now consider an economy which starts with high proportion of moral types and a high aggregate productivity. So $q_t > \tilde{q}$ and $A_t > \tilde{A}^H(q_t)$. Note that for such an economy, even though there are some agents who are entrepreneurs, the bribe payment for such an economy is driven down to zero. As a consequence, the aggregate productivity remains high and since the bribe payment amount has gone down to zero, the next generations continue to have a high proportion of moral types. Such an economy continues to be on a high growth path with the growth rate given by $(n_t^\star)^B$

Proposition 4. *Economies which start with low moral and low productivity continue to stay there with no economic growth. Those with high moral and high productivity are in a good long run equilibrium with perpetually high and increasing growth rate. Economies which start with low moral but high enough productivity also continue with low moral but their productivity increases over time. The growth rate for such an economy is initially increasing and then decreases over time.*

10 Conclusion

The issue of corruption has been well analyzed in the economic analysis. But apart from the way it works in the economic sphere, corruption also as an act linked to moral attitudes needs to be analyzed in conjunction with the social sphere. In this paper, we develop a growth model, with individuals who vary in the degree of their acceptance towards corrupt activity. This individual trait interacts with the occupational choices and gives us interesting implications for economic growth. We show that economies with majorly high moral individuals go on a higher growth path much more quickly than the ones with fewer moral agents. In a model with endogenous types being determined through parental actions, we show a possibility of a low moral, low productivity and no growth trap and under certain conditions also show a possibility of a high productivity low moral economy which initially grows at a faster rate and later the growth rate of such an economy declines over time.

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