Education and Development: Moving Beyond Labour Productivity

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Abstract

This paper revisits the relationship between education and development. We argue that the role of education in the production process extends beyond the conventional labour productivity enhancement. Education also plays a complementary role in 'expanding one's horizon'.In particular, education leads to more efficient processing of information. Better processing of information has many important implications for the optimal choices of an agent and are associated with pecuniary and non-pecuniary benefits which may not be directly captured by the conventional labour productivity measurements. In this paper we explore one such aspect, whereby education allows people to appreciate newer varieties of goods thereby expanding their consumption horizon. This suggests that education may enhance welfare of an agent, even if one ignores the productivity gains associated with skill formation. However when operating in conjuction with the productivity aspect of education, this may generate nonlinearities in educational investment resulting in poverty traps. Moreover, this aspect of education may play an important role in shaping the pattern of demand in the aggregate economy.

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"*.......But education is a prime example of a conscious attempt to change preferences, or more broadly, individual personalities. Through schooling, individuals become what they were not.* "- **Herbert Gintis** [1]

1 Introduction

Coventional wisdom suggests that education augments one's skill level. The new growth theory underscores this view by formally establishing the link between education, productivity enhancement and growth. Accordingly, education and schooling have been universally accepted as essential components of development strategies across the world (e.g. United Nation's Millenium Development Goals). Yet, some empirical evidence (Pritchet, 1996; Easterly, 2001) has cast doubt about the contribution of schooling to overall productivity gain and growth, thereby putting a question mark on efficacy of such policies. In this paper we go beyond the conventional labour productivity argument and investigate the education-growth linkage working through channels which are quite independent of, and in fact complementary to, the standard skill formation channel.

To our mind, the role of education is not limited to mere skill formation. We argue that education plays an important role in broadening one's horizon – by enabling an agent to appreciate newer varieties of goods (thereby expanding the consumption possibility frontier) or by enabling him to take more efficient decisions regarding occupational and portfolio choices. Both these activities may be associated with pecuniary and nonpecuniary benefits which are quite unrelated to labour productivity. Moreover, these other aspects of education may have important implications not only for the welfare of an agent but also for the overall pattern of development of the macro-economy. Thus by focussing only on labour productivity, one may underestimate the importance of education in the process of development and growth.

The objective of this paper is to explore alternative avenues through which education impacts on agents' decision-making process and thereby impacts on growth. While the role education in augmenting human capital/skill is well-established in the growth literature, the complementary role of education in other arenas of the decision making process has remained largely unexplored. The idea however is not entirely new; the role of education in adoption of newer technologies has been analysed extensively in the field agricultural economics. In particular, in a relatively old but extremely insightful article, Finish Welch (Welch, 1970)

[1] Gintis, H.: 'Welfare Crietria with Endogenous Preferences: The Economics of Education', *International Economic Review*, 15, 1974.

arugued that education may enter as input in the prduction process in several possible ways. Welch differentiated between the *worker effect* and the *allocative effect* of education: the former refers to the ability of an agent to produce more from the same input bundle, while the latter refers to the agent's abilility to acquire, decode, and sort market and technical information efficiently. Welch's idea has been empirically verified in the cotext of agricultural technology adoption by Huffman (1974).

A slightly different role of education was emphsized by Gintis (1974), who argued that education has a direct influence on preferences. According to Gintis, utility or personal welfare is a function various activities which require development of capacities - cognitive, affective, physical, aesthetic and spiritual - in the relevant directions. These capacities, which mediate between an individual's needs and the activities which satisfy them, must in turn be learned and acquired. "Thus education is not only itself an activity, it is a central means of acquiringthe capacities to perform, or to perform more perfectly, other activities. Education changes preferences structures by expanding, inhibiting the expansion of, or even contracting, individual capacities to undertake and derive welfare from corresponding activities. "

But this other aspect of education and its macroeconomic implications has largely been ignored if the subequesnt literature on growth.[2] A recent study by Lochner (2011) has highlighted various non-production benefits of education, suach as crime, health, voting pattern etc. But a formal analysis linking these benefits to the dynamics of growth and devlopment is missing in the literature. This paper is an attempt in this direction.

In this paper we formalize the ideas of Welch and Gintis in a dynamic general equilibrium set up. We capture one distinct *allocative* aspect of education which entails efficient processing of information regarding the possible consumption choice set. [3] We start from Gintis's basic premise that education not only affects one's ability but also influences one's preferences. There are many goods and services whose utility values are appreciated only if one has a certain degree of education. To fix ideas, take the example of computers. An illiterate person, who does not know how to operate a computer and cannot read the instructions, will be unable to derive any utility from this particular good. On the other hand a reatively more educated person can fruitfully use a computer to satisfy various 'consumption' needs, such as communication, recreation, social networking etc.[4] One could think of other

[2]A notable exception is Nelson and Phelps (1966), who highlighted the role of education in technological diffusion and growth.

[3]In a companion paper, we have examined the role of education in efficient processing of information regarding possible investment and occupation choices.

[4]All these 'consumption' usages are quite independent of the 'production usages' of a computer. Therefore

examples where education limits the consumption choice set of an individual. For instance, a person who is not familiar with western classical music may not be able to appreciate Bach or Beethoven and therefore would not be able to derive any positive utility from these goods/services. One needs to 'learn to appreciate'. In other words, education moulds one's preferences and allows one to appreciate goods and services which were hitherto not a part of the consumption possibility frontier.

The consumption-education interlinakge is captured in our model in the following way. Suppose there exists a large variety of goods which one can potentially consume. However, an agent's ability to derive utility from these goods depends on her level of human capital (education). In particular, the higher is the level of human capital, the greater is the range of commodities that he can appreaciate.

This consumption-education relationship interacts with the productivity-augmenting aspect of education to generate non-linearities in human capital formation for the aggregate economy and results in poverty traps, even when the technology itself is convex. To be more specific, an economy characterized by low initial level of human capital may remain perpetually poor and poorly educated even in the long run. Moreover, if the production of different varieties of commodities are associated with fixed costs, then a country characterized by low average level of education may end up producing only the low-end goods because of insufficient demand for high end products. Thus, quite apart from its usual effect on the macroeconomy working through the productivity channel, education may also play an important role in determining the pattern of demand for various goods and services in an economy.

The organization of the paper is as follows. In section 2 we provide the general micro-theoretic set up and discuss the optimal choices of an agent. Section 3 illustrates the corresponding intergenerational wealth dynamics and shows the possibility of a Galor-Zeira type long run poverty trap arising even without any technological non-convexities. Section 4 poses the problem in the broader context of the aggregate macroeconomy and analyses the general equilibrium consequences of the education-consumption interlinkage. Section 5 offers the final comments and conclusion.

the productivity argument is not relevant here.

2 General Framework

The economy is populated by a continuum of overlapping generations of dynasties, represented by the unit interval, $[0,1]$. Each member of a dynastic household lives exactly for two periods and has a single offspring at the beginning of the second period. Thus total population in the economy remains constant over time.

Agents within a generation and across generations have identical preferences. However they may differ in terms of inherited wealth.

The life cycle of a representative agent of any generation is as follows. The agent is endowed with one unit of labour time in each period of his life. In the first period of his life, he also inherits some resources from his parent as bequest (b). In this period, as a child, he consumes nothing, saves his entire wealth, and optimally decides to spend a proportion of his first-period time endowment to acquire education and [5], which allows him to obtain some skill at the end of the period. If $e \in [0,1]$ time is spent on education today, then the corresponding skill level acquired tomorrow (h) is determined by the following linear skill formation technology:

$$h = 1 + \gamma e; \;\; \gamma > 0. \tag{1}$$

Notice that since $e \leqq 1$ by definition, this imposes an upper limit on skill formation as well. Thus the maximum possible level of human capital in this economy is given by $\bar{h} = 1 + \gamma$.

Depending on the effort spent in acquiring education as a child, the individual enters the labour market upon reaching adulthood (i.e., in the second period of his life) with certain amount of skills which enables him to earn an a proportional wage income wh,where w denotes the wage rate. The agent also earns an interest income on the inherited wealth, given by Rb, where R denotes the gross interest rate. Out of his total income, the agent spends a part (C) on various consumption goods and leaves the rest as bequest $(\tilde{b})$ to his descendant at the end of the second period. He dies thereafter.

We shall assume that w and R are both constants. Without any loss of generality, let us normalize w to unity (which implies that human capital is the numeraire commodity here). Then the lifetime budget constraint of the agent is given by

$$C + \tilde{b} = h + Rb. \tag{2}$$

Notice that there is no capital market imperfection here. Anybody can lend and borrow

[5] Alternatively, one can think of the bequest as the educational investment on children, made directly by the parents.

at the fixed interest rate R[6]. However, since there is no first period consumption requirement in this model, everybody saves in the first period and consumes the gross interest income in the second period.

2.1 Agents' consumption choice set

At any point of time, a continuum of final goods, indexed by $i \in [0, N]$, are potentially available for consumption in the economy. If the agent consumes a subset of these varieties, ranging from a to b, then his total consumption expenditure would be given by $C = \int_a^b p_i c_i di$.

Technology for producing different varieties are identical (we shall characterize the precise technology in detail later). Each variety is is produced by a profit maximizing monopolist who equates his marginal revenue to the marginal cost. Thus under symmetric cost and symmetric demand functions, all monopolists would charge the same price, which we shall denote by p.

The critical assumption of our paper is that the level of human capital aquired by an agent not only determines his wage income, but also determines his consumption choice set. Thus out of the total available variety of final goods, represented by the interval $[0, N]$, an agent with education level h is only able to appreciate goods upto $f(h)$, such that $f(0) = A$, $(0 < A < N)$; and $f' > 0$. In other words, his choice set is given by $[0, f(h)]$ which is a subset of $[0, N]$. We capture this idea in the following 2nd-period utility function:

$$U = \left[\int_0^{f(h)} (c_i)^\beta \, di \right]^\theta \left(\tilde{b} \right)^{1-\theta} - e; \quad 0 < \beta < 1; 0 < \theta < 1, \tag{3}$$

where the first term in the utility function denotes the utility obtained from consuming different varieties; the second term represents utility derived by leaving bequest ('warm-glow' bequest motive); and the last term denotes the disutility from spending effort in acquring education (during childhood).

This specification of the utility function is fairly standard[7]. Notice that the parameter β is closely associated with the elasticities of substitution between any two goods i and i',[8] while the parameter θ measures the relative weightage of consumption vis-a-vis bequest

[6] Nonetheless, we do assume that parents cannot borrow against children's future income.

[7] See for example Murphy-Shleifer-Vishny (1989), Section IV.

[8] In particular, the elasticity of substitution between two goods i and i' is measured by $\frac{1}{(1-\beta)}$, which is also the own price elasticity of any good i.

respectively. The fact that both these parameters are less than unity ensures that all the relevant marginal utilities are diminishing.

Note that since $f(0) = A$, there exists a continuum of goods lying within the interval $[0, A]$ which are appreciated by everybody - irrespective of their education level. These can be thought of as the basic necessities that everybody consumes and derives utility from.

It is also worth noticing that all the varieties that a consumer is able to appreciate enter symmetrically into his utility function of the agent. Thus the demand functions faced by the monopolist producers of different varieties would indeed be symmetric.

2.2 Optimal Choices

The representative agent's optimization problem can be described as a two-stage problem. In the first stage, he take the effort level (and the resulting human capital) as given and maximises (3) subject to (2) to determine his optimal consumption and bequest level. This generates the indirect utility function of the agent as a function of the effort level (e). In the second stage he maximises this indirect utility function to obtain the optimal value of e.

Notice that the bequest and consumption decisions actually happens in the second period, while the effort level is chosen in the first period. This formulation thus presupposes that agents are forward looking and endowed with perfect foresight.

Let us first solve the stage 1 problem. Let the prices charged for different varities be identical, denoted by p. (This assumption is justified in terms of the production structure in the section 4).

With identical prices, all varieties would be consumed in equal amount. Accordingly in the symmetric equilibrium, $c_i = c_{i'} = \bar{c}$, which gives us the following reduced form utility function :

$$U = [f(h)]^{\theta} (\bar{c})^{\alpha} \left(\tilde{b}\right)^{1-\theta} - e, \tag{4}$$

where $\alpha \equiv \beta\theta$. The given parametric restrictions on β and θ implies that $0 < \alpha < \theta < 1$.

With all prices being equal and given by p, the budget constraint of the agent on the other hand is represented by,

$$p\bar{c}f(h) + \tilde{b} = h + Rb. \tag{5}$$

Using the budget constraint (5), we can write the unconstrained problem as:

$$\underset{\bar{c}}{Max} \left\{ [f(h)]^{\theta} (\bar{c})^{\alpha} [h + Rb - f(h)p\bar{c}]^{1-\theta} - e \right\}.$$

From the FONC:

$$\alpha\left[f\left(h\right)\right]^{\theta}\left(\bar{c}\right)^{\alpha-1}\left(\tilde{b}\right)^{1-\theta}-(1-\theta)p\left[f\left(h\right)\right]^{\theta+1}\left(\bar{c}\right)^{\alpha}\left(\tilde{b}\right)^{-\theta}=0 \tag{6}$$

Simplifying,

$$\frac{\tilde{b}}{\bar{c}}=\frac{(1-\theta)}{\alpha}\left[pf\left(h\right)\right].$$

Hence, from the budget constraint,

$$\begin{aligned}\bar{c} &= \mu_1.\left[\frac{h+Rb}{pf(h)}\right]; \\ \tilde{b} &= \mu_2.\left[h+Rb\right],\end{aligned} \tag{7}$$

where $\mu_1 \equiv \left(\frac{\alpha}{\alpha+1-\theta}\right)$, and $\mu_2 \equiv \left(\frac{1-\theta}{\alpha+1-\theta}\right)$ such that $\mu_1+\mu_2=1$.

Substituting (7) back into the utility function, we get the following indirect utility function in terms e and h:

$$V(e,h)=\left(\frac{\mu_1^{\alpha}.\mu_2^{1-\theta}}{p^{\alpha}}\right)\left[f\left(h\right)\right]^{\theta-\alpha}\left(h+Rb\right)^{1-\theta+\alpha}-e. \tag{8}$$

Noting that h itself is a function of e by the skill formation equation (1), we can determine the optimal effort level of the agent by maximizing (8) subject to (1). The corresponding first order condition is given by:

$$\frac{dV(e,h(e))}{de}=K\left[(\theta-\alpha)\left[f\left(h\right)\right]^{\theta-\alpha-1}\left(h+Rb\right)^{1-\theta+\alpha}f'(h)+(1-\theta+\alpha)\left[f\left(h\right)\right]^{\theta-\alpha}\left(h+Rb\right)^{-\theta+\alpha}\right]-1\leqq 0;e\leqq \tag{9}$$

where $K\equiv\gamma\left(\frac{\mu_1^{\alpha}.\mu_2^{1-\theta}}{p^{\alpha}}\right)$ (a positive constant). Notice that the two inequalities in (9) hold with complementary slackness.

Equation (9) along with the skill formation equation (1) determine the optimal effort level for different values of inherited wealth (b). This optimal effort level would be an interior optima or a corner solution, depending on the characterization of the $f(h)$ function[9].

For expositional purposes, henceforth we shall operate with a specific form of $f(h)$; which is linear in h:

$$f(h)=A+Bh;\quad A,B>0. \tag{10}$$

With this specific $f(h)$ function, the relevant first order condition for optimal e is given below.

$$K\left[B\left(\theta-\alpha\right)\left(\frac{A+Bh}{h+Rb}\right)^{\theta-\alpha-1}+(1-\theta+\alpha)\left(\frac{A+Bh}{h+Rb}\right)^{\theta-\alpha}\right]-1\leqq 0;e\leqq 1. \tag{11}$$

[9]Notice that since $V(e,h(e))$ is a continuous function of e, and its domain closed and bounded, given by $[0,1]$, by Weiersstrass theorem, it will always have a global maximum - interrior or corner.

Let

$$B\left(\theta-\alpha\right)\left(\frac{A+Bh}{h+Rb}\right)^{\theta-\alpha-1}+\left(1-\theta+\alpha\right)\left(\frac{A+Bh}{h+Rb}\right)^{\theta-\alpha}\equiv g(h,b).$$

It is easy to verify that $g(h,b)>0$ for all $h,b\geqq 0$. Moreover,

$$g_1(h,b)=-\left(\theta-\alpha\right)\left(1-\theta+\alpha\right)\left(\frac{A+Bh}{h+Rb}\right)^{\theta-\alpha-1}\left[\frac{1}{A+Bh}\right]\frac{\left(BRb-A\right)^2}{\left(h+Rb\right)^2}<0.$$

Using these features, one can easily show that

$$\frac{d^2V(e,h(e))}{de^2}=Kg_1(h,b)\gamma<0.$$

Thus the second order sufficiency condition is always satisfied.

Notice that if there exists an interrior optima $e^*\in(0,1)$, then it will be characterized by the following equation:

$$e^*(b):Kg(h(e),b)=1. \tag{12}$$

The corresponding optimal level of human capital would be given by:

$$h^*(b):h=1+\gamma e^*(b). \tag{13}$$

One would be interested to know how the optimal human capital investment reponds to an increase in the inherited wealth (b). For this purpose, let us plot the $g(h,b)$ function with respect to h for any given value of b.We already know that it will be a downward sloping curve, as shown in Figure 1. One can further verify that at $b=0$, $\lim_{h\to 0}g(h,0)=\infty$ while $\lim_{h\to\infty}g(h,0)=0$. Thus by the Intermediate Value Theorem, there will be a unique point at which $g(h,0)=1$,which will define the optimal $h^*(0)$. By making suitable parametric assumptions, we ensure that $h^*(0)<\bar{h}$.

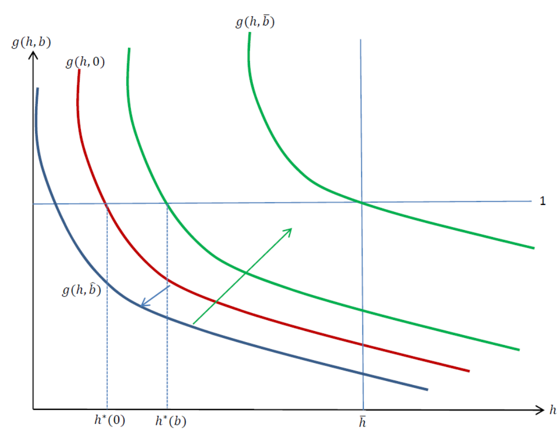

Figure 1

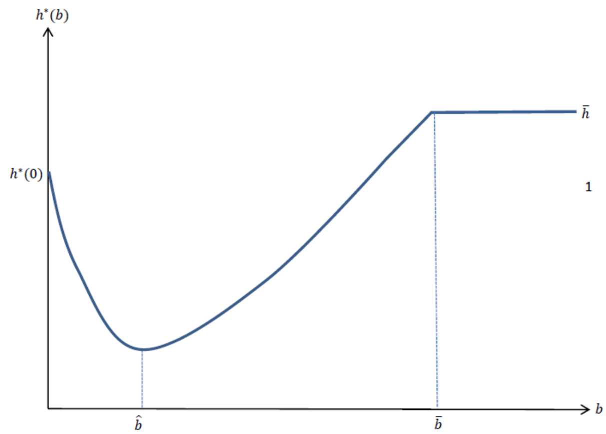

Figure 2

Now, to see what what happens if b increases, notice that

$$g_2(h,b) \quad = \quad B(\theta-\alpha)(1-\theta+\alpha)\left(\frac{A+Bh}{h+Rb}\right)^{\theta-\alpha-1}\frac{R}{(h+Rb)^2}(BRb-A) \gtreqqless 0$$

according as $b \gtreqqless \dfrac{A}{BR} \equiv \hat{b}$.

In other words, as the wealth level increases, optimal human capital accumulation initially falls until the wealth level reaches $\hat{b}$;it increases thereafter. In terms of Figure 1, the $g(h,b)$ line shifts to the left first and then shifts to the right. This rightward shift continues until one hits the upper bound on h, given by $\bar{h}$. Let us define a wealth level $\bar{b}$ as follows:

$$\bar{b} : h^*(\bar{b}) = \bar{h}.$$

Then for $b \geqq \bar{b}$, the optimal human capital investment reamins constant at $\bar{h}$.

Figure 2 traces the optimal human capital investment for various bequest levels, which shows that the $h^*(b)$ curve is initially U-shaped and then becomes horizontal.

Proposition 1 summarises these results.

Proposition 1 *The optimal level of human capital* (h^*) *is a non-monotonic function of the inherited wealth* (b)*. At zero inherited wealth, optimal level of human capitl is positive. At higher wealth levels, it initially decreases, then increases. In particular, there exits a wealth cut-off, defined by,* $\hat{b}$ *such that*

$$\frac{dh^*}{db} \lesseqqgtr 0 \text{ according as } b \lesseqqgtr \hat{b}.$$

There exists another wealth cut off, defined by $\bar{b}$ *(where* $\bar{b} > \hat{b}$*), such that optimal human capital becomes constant at* $\bar{h}$ *for all* $b \geqq \bar{b}$*.*

3 Intergenerational Wealth Dynamics

We now analyse the bequest/wealth dynamics over time. We have already noted that the an agent's human capital acquired upon adulthood depends crucially on the bequest level that he had inherited upon childhood (see Proposition 1). The acquired human capital in turn generates an equivalent wage income (recall that the wage rate is equal to unity). In addition the agent earns an interest income on his inherited wealth. A constant (μ_2) proportion of his total second period income is again left as bequest for the next generation. Thus the intergenerational bequest dynamics is represented by the following difference equation.

$$b_{t+1} = \mu_2 \left[h(b_t) + Rb_t \right].$$

In view of Propositon 1, one could further characterize the difference equation with respect to the wealth cut-off as follows:

$$b_{t+1} = \left. \begin{array}{c} \mu_2 \left[h^*(b_t) + Rb_t \right] \text{ for } b_t < \bar{b}, \\ \mu_2 \left[\bar{h} + Rb_t \right] \text{ for } b_t \geqq \bar{b}. \end{array} \right\} \tag{14}$$

We now show that this difference equation may generate multiple stable steady states such that dynasties move to different long run equilibria depending on their initial level of inheritence. In proving this, first note that

$$\frac{db_{t+1}}{db_t} = \mu_2 \left[\frac{dh^*}{db_t} + R \right].$$

Recall that $h^*(b_t)$ is a non-monotonic function of b_t for all . Thus the b_{t+1} function would either be exactly analogous to the $h^*(b_t)$ function or will be a monotonic with a concave-convex pattern. In other words, the phase diagram for the b_{t+1} function will either be U-shaped or S-shaped. These two possibilities are shown in Figure 3a and 3b respectively.

From Figure 3a and 3b, it is easy to see that under suitable parametric conditions, there can be multiple stable steady states, such that dynasties which start with an initial low level of inherited wealth may not invest enough in human capital and as result may get stuck perpetual poverty.

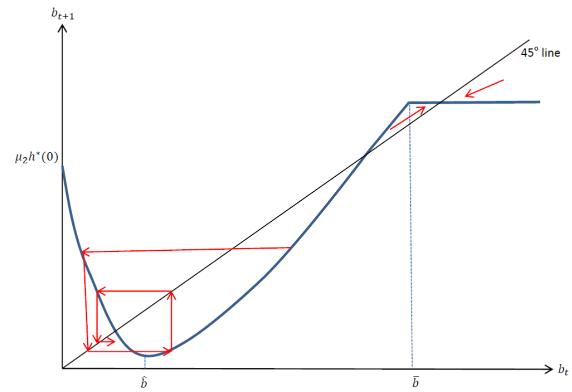

Figure 3a

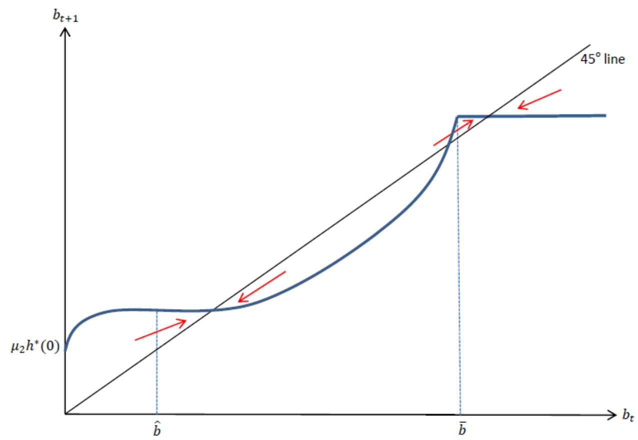

Figure 3b

One interesting possibility that arises here is that the transition to the lower steady state may be not be monotonic. This happens when the phase diagram is U-shaped (See Figure 3a). In this case the lower steady state occurs at the downward sloping part. Therefore the corresponding bequest dynamics may exhibit various kinds of non-monotonic behavious, e.g., converging cycles, limit cycles or even chaos. Thus, not only would the poorer households (or economies) approach a lower steady state in the long run, but in the process they might also face endogenous fluctuations in income and wealth.

4 Implications for Aggregate Economy

We have so far analysed the household dynamics quite independent of the macroeconomy. When all hosehold are identical the macroeconomy will simply mimic the household dynamics. In this section, we now specify the detailed production structure and show that the education-demand interlinkage may have an additional impact on the macroeconomy in terms of the composition of the goods that are actually produced.

The production structure depicted here is somewhat analogous to Murphy, Shleifer and Vishny (1989). Thus consider a small open economy with perfectly mobility of capital across borders, so that the domestic (gross) interest is equal to the foreign (gross) rate of interest, which given by R. At any point of time, there exists a continuum of different varieties of final goods, indexed by $i \in [0, N]$. Each variety is produced in a different sector, and each sector has access to two technologies: (i) a CRS technology operated by a competitive fringe of firms that convert one unit of human capital (h) into one unit of output and involves no fixed costs; (ii) an IRS technology operated by a monopolist firm that involves a fixed cost in terms of capital and after incurring the fixed cost, the mass production technology converts one unit of human capital to produce q units of output, where q is a constant greater than unity. The fixed cost faced by the monopolist the same across sectors and is defined by a fixed k units of capital, for which the monopolist has to pay a rental cost of Rk.

We shall use human capital as the The competitive firms pay a wage equal to 1 and charge a price equal to 1. The monopolist producer is each sector pays a wage equal to and charges a price so as to maximize his profit (given the demand curve for his product). The monopolist in each sector decides to industrialize only if he can earn a non-negative profit; if he abstains then the sector engages in cottage production.

The household-side of the story has already been specified in section 2. If suffices to remind here that an agent with human capital h only consumes goods $[0, f(h)]$. Also recall that the price elasticity of demand for each variety is given by $\frac{1}{1-\beta}$, where $0 < \beta < 1$.

Given the price elasticity of demand, each monopolist would like to charge a mark up of $\frac{1-\beta}{\beta}$ over an above the unit labour cost $\frac{1}{q}$.In other words the monopolist would charge a constant price $p = \frac{1}{\beta}\frac{1}{q} \gtreqless 1$, depending on the values of β and q. We shall however assume that $\beta q > 1$, such that the monopolist actually charges a price less than unity. Thus whenever the monopolist is operating in any sector, households are better off as a consumer because they face a lower price for the same good. This ensures that they will buy from the the monopolist, whenever the monopolist operates. But if the monopolist abstains from production, then the households wil buy the good from the competitive produces at a price exactly equal to unity.

Let us first assume that all agents are identical and each has the same level of human capital h such that $f(h) < N$. Thus the total varieties demanded would only be $[0, f(h)]$. Thus there will no production of goods $(f(h), N]$ in this economy. Moreover, if the initial

h is less than a critical minimum value, then the human capital level will fall over time. Thus the varieties consumed in thsi economy will shrink. This illustrates that education has important consequences for the pattern of demand and the composition of goods produced in an economy. If the human capital level is low enough, then the economy may only produce and consume the necessities $[0, A]$ and nothing else.

The problem becomes more interesting when we allow the households to differ in terms of their inherited wealth and therefore in terms of the acquired level of education. If the households differ in terms of h, then for some high-end goods, the demand may not be sufficient to make the IRS technology viable. Thus some goods in this economy will be produced by the inferrior (CRS) technology and the corresponding prices will also be higher, resulting in welfare as well as efficiency loss for the aggregate economy.

5 Conclusion

This paper captures the role of education in the development process that goes beyond the conventional labour productivity argument. We show that education has important implications for the consumption choice set of an individual. This generates non-linearities in human capital accumuation process, resulting in poverty traps. Moreover, the education-consumption linkage has important implcation for the aggregate pattern of demand in the economy, which in turn has implications for the production process.

This paper does not explore the dynamic consequences of the expansion of varieties over time. It is easy to guess that bringing in such a dynamic perspective will further accentuate the role of education in the pattern of demand and usage of technology - which in turn will have implications for growth. This remains a future research agenda.

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