Human Capital Theory and the Life-Cycle Pattern of Learning and Earning, Income and Wealth

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Abstract

Life-cycle patterns of income, earnings, consumption, labor supply, and wealth vary systematically across educational groups. Human capital theory explains different educational choices in terms of parameters describing tastes and technology. We ask whether differences in these parameters are also consistent with other patterns of behavior. Our preliminary findings suggest that no single form of parameter heterogeneity will be able to account for the joint behavior of life-cycle choices.

1 Introduction

Individuals with different educational backgrounds differ significantly and systematically in their economic behavior over the life-cycle. It is well-known, for example, that well-educated individuals tend to have higher income and earnings throughout most of the life-cycle. Most of their higher earnings are in the form of higher wages, but they also tend to work more. In addition, they tend to consume more and accumulate financial wealth at a faster rate. What accounts for these differences?

Unlike demographic variables such as age, sex, and race, educational attainment (or human capital accumulation in general) is largely a choice variable. From an early age, individuals are taught about the benefits of schooling. Teenagers are warned about the consequences of failing to complete their high-school education and they are generally made aware of the high returns associated with a college degree. Yet, individuals quite clearly make different choices concerning educational attainment; to a first approximation, roughly 25% of the population does not complete high-school, 50% complete high-school, and 25% attain a college degree. Casual empiricism suggests that lifetime learning expenditures and learning efforts devoted to more general human capital accumulation activities are highly correlated with the schooling decision. What determines these choices?

One way to understand the human capital choice is in terms of an optimal investment decision; see Ben-Porath (1967). In the Ben-Porath model, individuals seek to maximize the present value of their lifetime earnings by allocating their time between work and learning activities, and by choosing an appropriate expenditure path for educational goods and services. A key parameter in this model is the 'ability to learn', modeled as the technological efficiency with which learning effort and resources augment the value of human capital.[1] Not surprisingly, the model predicts that more able individuals choose to undertake greater human capital investments, especially early on in the life-cycle, and that learning effort declines over time. During youth, less able individuals

[1] Another way to model learning ability is in terms of initial endowments of human capital.

tend to earn more (as they devote more time to work rather than learning), but more able individuals have rapidly rising earning profiles that soon overtake those of the less able. In addition, dispersion in earnings across educational groups tends to grow over time. These predictions are broadly consistent with the evidence; e.g., see Lillard (1977).

We think that the basic Ben-Porath model featuring differences in learning ability provides a plausible interpretation of why educational attainment differs across individuals as well as explaining how these different human capital accumulation patterns translate into different earnings profiles. However, before one can be confident that ability differences are at the root of inequality, it would be prudent to examine whether the human capital model is consistent with the observed lifetime profiles of other important economic variables, such as consumption, leisure (labor), and financial asset accumulation (capital income). In order to address this question, we augment the basic human capital model along the lines of Blinder and Weiss (1976), Heckman (1976), and Ryder, Stafford, and Stephan (1976), who explicitly model the labor-leisure choice. Judging by what is reported in the recent survey by Neal and Rosen (2000), these versions of the human capital model represent the extent to which theory has currently been developed.

Blinder and Weiss (1976) are primarily concerned with determining the conditions under which the age profiles of human capital, wages, leisure, and learning behave in a 'normal' manner; see their Figure 5. Their main finding is that 'normal' behavior arises when the rate of time preference is sufficiently 'small'.[2] They do not ask how other parameters (in particular, learning ability) affect life-cycle behavior, nor do they comment on consumption and asset accumulation. Ryder *et al.* (1976) also demonstrate that many qualitatively different life-cycle patterns are possible and, in particular, there are cases in which small differences in initial endowments can result in dramatically different behavior. Heckman (1976) reports the results of several comparative dynamics exercises, but does not always provide a full description of behavior. For example, he finds that individuals with greater learning ability have peaks in their hours of work profiles at older ages,

[2] To the extent that schooling entails foregone leisure, very impatient individuals may prefer to postpone their schooling and work effort to later stages of the life-cycle.

but we are not told whether these profiles are generally higher or lower. Similarly, he does not ask how differences in ability affect financial asset accumulation.

The purpose of this paper is to explore the extent to which a modified Ben-Porath model can account for the joint behavior of consumption, leisure, training, earnings, income and wealth across different educational groups. We consider a deterministic general equilibrium model of overlapping generations in which people differ according to parameters that describe their tastes for leisure and time-dated consumption, as well as parameters that describe different aspects of ability. The model features an endogenous labor supply decision and a non-negative net worth restriction. We begin by asking whether any differences in any single parameter describing ability, endowments, or tastes, can account for observed patterns of behavior.[3] The answer to this question appears to be a qualified 'no'. Parameter heterogeneity that can explain some dimensions of the data reasonably well is generally found to be inconsistent with observations along other dimensions.

The paper is organized as follows. In Section 2, we present some stylized facts concerning the life-cycle behavior of income, consumption, savings, and labor supply across different educational groups. In Section 3, we present the model; the model is calibrated in Section 4. Section 5 considers the case of an hypothetical 'representative' individual. Different forms of parameter heterogeneity are then introduced and examined in Section 6. Section 7 offers some preliminary conclusions.

2 Some Stylized Facts

In this section, we describe what 'typical' (median) life-cycle profiles look like across three educational groups (dropouts, high-school, and college) for a number of economic variables. Unfortunately, there is no single data set that measures all that one would like, so we rely on a number of different studies to help us get a general feel for the facts. The reader should keep in mind that there are several practical and (unresolved) conceptual issues relating to the measurement of these

[3] The analysis we propose here is very similar to the one undertaken by Blinder (1974), who considers a model with exogenous wages and perfect capital markets.

variables; see Browning and Lusardi (1996) for details.

2.1 Disposable Income

In Figure 1, we plot median disposable income across three educational groups in the United States for the year 1990.[4] Not surprisingly, more highly educated individuals have significantly more income at each age. The age-income profile for dropouts is essentially flat. Individuals with high-school display a moderate hump-shaped age-income profile, while those with college have a significant hump-shaped pattern.[5] Consequently, income inequality across educational groups is the greatest during the peak income ages of 41–55. Median income for college graduates in the 51–55 age group is 1.67 times that of high-school graduates in the same age group and 2.84 times that of high-school dropouts.

2.2 Consumption

In Figure 2, we plot median consumption expenditure across educational groups; this data is from the same survey in which the income data is recorded. Qualitatively, it appears that consumption tracks disposable income fairly closely in the sense of sharing the same hump-shaped pattern. This fact that has been referred to as the ‘consumption-income parallel’ (see Carroll and Summers (1991)) and is sometimes used as an argument to reject the basic life-cycle model, which predicts a flat age-consumption profile. Attanasio and Browning (1995) argue that the consumption-income parallel largely reflects family-size effects. Using several years of U.K. FES data to follow cohorts through time, they reproduce the finding that consumption and income move together over the life-cycle. However, deflating consumption by an adult-equivalent scale renders a completely flat life-cycle path for adjusted consumption. On the other hand, Gourinchas and Parker (1999) argue that with their adjustments, consumption continues to display a hump-shape.

[4] This data is from Attanasio (1994) and is based on the 1990 Consumer Expenditure Survey.

[5] It is important to keep in mind that this data represents a cross-section. That is, given general productivity growth, the age-income profiles reported here do not represent the actual income profiles expected by any given individual.

2.3 Saving

Figure 3 plots 'saving,' defined here as the difference between median disposable income and consumption measures reported above. The figure here is consistent with the well-known fact that most households save very little; i.e., the vast bulk of the economy's capital stock is owned by a very small proportion of households. According to this data, high-school dropouts have on average zero savings. By their late 20s, individuals with a high-school diploma appear to build up their assets at a modest rate until retirement, but there is little evidence of dissaving during retirement. College graduates, on the other hand, appear to build up their assets at relatively rapid rate and maintain relatively high savings levels until retirement. This is the only group that appears to undertake any significant dissaving during retirement. However, the amount of dissaving during retirement is not enough to deplete the accumulated stock of wealth, a fact that suggests that this group is likely to leave relatively large bequests.

The saving behavior reported in Figure 3 is broadly consistent with SCF and PSID data on wealth accumulation patterns across educational groups. According to Cagetti (1999), median net worth positions (including housing but abstracting from pension entitlements) are very low and similar across individuals at age 30. While all three educational groups tend to save over the entire life-cycle, the rate of asset accumulation is much higher for well-educated individuals. By age 60, the median dropout has accumulated roughly between \$60,000–90,000; the median high-school graduate has between \$125,000–180,000; and the median college graduate has between \$250,000–300,000.[6] In other words, to a first approximation, each level of education is associated with a doubling of net worth in old age.

2.4 Labor Supply

The Consumer Expenditure Survey examined by Attanasio (1994) also has data on labor supply across education groups as well as across various demographic characteristics. In Figure 4, we

[6] The figures are in 1992 dollars. The lower bound is from the SCF; the upper bound is from the PSID.

report roughly what the life-cycle labor supply profile looks like for males; the corresponding diagram for females looks qualitatively similar, but scaled down such annual hours average around 1500 during the peak earning years.[7]

The basic qualitative patterns of the age-work profile are as follows: (1) They are basically flat throughout much of the life-cycle; (2) better educated individuals tend to work more and have a more hump-shaped age-work profile; and (3) labor supply begins to drop rapidly after age 60 for all groups.

2.5 Earnings and Wages

2.5.1 The Return to Education

There is a large empirical literature concerned with measuring the 'return' to education; this literature has recently been surveyed by Card (1999). The standard econometric model taken to the data is usually some variant of Mincer's (1974) 'human capital earnings function' that relates some measure of log earnings ($\log y$) to some measures of educational attainment (S) and work experience (X), together with a statistical residual (ε); e.g.,

$$\log y = a + bS + g(X) + \varepsilon. \tag{1}$$

Apparently, it is now conventional to refer to the estimated parameter b as the 'return to education'. Typically, the return to education is found to vary with certain characteristics of individuals, such as 'ability' and 'family background.' Card argues that the empirical specification above, with g modeled as a third or fourth degree polynomial, provides a reasonably good fit with the data, although, contrary to the specification in (1), there does appear to be some evidence of an interaction between education and experience.

When log annual earnings are regressed on education and other controls, the estimated return to education is the sum of the b coefficients for parallel models fit to the log of wages ($\log w$) and the

[7] We thank Orazio Attanasio for providing us with this data.

log of annual hours ($\log h$). Here, we reproduce Card's (1999) Table 1, which reports the estimated returns to education using (1) fit to the 1994–96 CPS.

	Dependent Variable		
	$\log w$	$\log h$	$\log y$
Men			
b	0.100	0.042	0.142
R^2	0.328	0.222	0.403
Women			
b	0.109	0.056	0.165
R^2	0.247	0.105	0.247

Thus, Card concludes that in the U.S. labour market in the mid-1990s, about two-thirds of the measured return to education in annual earnings data is attributable to the effect of education on the wage rate, with the remainder attributable to the effect on annual hours worked.

3 The Model

Consider an economy populated by overlapping generations of individuals who live for J periods, indexed by $j = 1, 2, ..., J$. The population is assumed to grow at a constant rate n per period, and we denote the share of age-j individuals in the population by μ_j, which is time-invariant and satisfies $\mu_j = (1+n)\mu_{j-1}$ for $j = 2, ..., J$ and $\sum_{j=1}^{J} \mu_j = 1$.

Individuals have preferences defined over deterministic time-profiles of consumption c_j, quality-adjusted leisure z_j, as well as a final net worth position a_{J+1} (bequeathed to the future generation); let preferences be represented by the utility function:

$$\sum_{j=1}^{J} \delta^{j-1}[U(c_j) + \lambda V(z_j)] + \theta B(a_{J+1}).$$

Assume that the functions U, V and B are all strictly concave and that they satisfy standard Inada conditions; we will treat these functions as common across individuals. Preferences are parameterized by the discount factor δ, the taste for leisure λ, and the strength of the bequest motive θ;

individuals may or may not differ along these dimensions.

There are three uses for time: market work n; learning effort e; and leisure l; where $n+e+l=1$ (and the usual non-negativity constraints). Let h denote human capital. People might differ in their initial endowment of human capital (one measure of differences in ability). A person's human capital is assumed to augment time-use in each of the three activities; measured in 'efficiency units', work effort equal hn, learning effort equals he, and leisure output z equals hl.

Following Heckman (1976), the human capital accumulation technology is given by:

$$h_{j+1} = (1-\sigma)h_j + \alpha G(h_j e_j),$$

where G is strictly increasing and concave, σ is the depreciation rate on human capital, and α is a parameter that indexes 'learning ability'. We will assume that G and σ are common across households; however, α may differ. Let v denote the vector of parameters describing a particular individual.

There are two prices in the model. Let ω denote the price of an efficiency unit of labor and let R denote the (gross) real rate of interest. Both of these prices will be determined by market clearing conditions in the general equilibrium. Note that labor earnings are given by ωhn, so that $w = \omega h$ can be interpreted as the real wage.

Individuals can save but cannot borrow against future earnings or bequests; consequently, all saving is used to finance the construction of new capital. For simplicity, we assume that all bequests accrue at some age $i \in \{1,2,...,J\}$ in a person's lifetime. We also assume that type-v parents pass on their parameter vector v perfectly to their children (consequently, the bequest made by each type-v individual a_{J+1} will be exactly equal to the bequest received b at date i. Note that in the absence of perfect capital markets, the timing of the bequest will matter. The asset accumulation equation is given as follows:

$$a_{j+1} = Ra_j + \chi_i b + w_j n_j - c_j,$$

where $\chi_i = 1$ in period $j = i$ (the period of the bequest), and $\chi_i = 0$ otherwise. Optimal decision-making results in a desired profile $\{c_j, n_j, e_j, l_j, a_{j+1}, h_{j+1} \mid b, \omega, R; v\}_{j=1}^{J}$.

Conjecture 1 *There exists an unique b such that $a_{J+1} = b$.*

If the conjecture above is true, then optimal decision-making can be conditioned solely on $(\omega, R; v)$. In the special case of zero bequests (i.e., $\theta = 0$), we have $a_{J+1} = b = 0$ and all individuals begin life with zero net worth (this is the case we consider below). What remains now is the determination of prices.

In a steady-state, the per capita capital stock is given by:

$$K = (1+n)^{-1} \sum_{j=1}^{J} \mu_j \sum_{v} a_j(v)\Lambda(v),$$

where $\Lambda(v)$ represents the fraction of the population with parameter vector v. The per capita level of hours (measured in efficiency units) is given by:

$$H = \sum_{j=1}^{J} \mu_j \sum_{v} h_j(v) n_j(v) \Lambda(v)$$

Output is produced by a constant returns to scale production technology $Q = F(K,H)$. Equilibrium prices are determined by the usual marginal conditions:

$$\begin{aligned} \omega =& F_H(K,H) \\ R =& F_K(K,H) + 1 - \phi, \end{aligned}$$

where ϕ is the depreciation rate of physical capital. Finally, goods-market clearing requires:

$$C + (n+\phi)K = Q,$$

where,

$$C = \sum_{j=1}^{J} \mu_j \sum_{v} c_j(v)\Lambda(v).$$

3.1 Parameterization

Functional forms are required for U, V, B, G and F.

$$\begin{aligned}
U(c) =& \frac{c^{1-\gamma}-1}{1-\gamma} \\
V(z) =& \frac{z^{1-\eta}-1}{1-\eta} \\
B(a) =& \frac{a^{1-\rho}-1}{1-\rho} \\
G(x) =& x^{\zeta} \\
F(K,H) =& K^{\pi}H^{1-\pi}.
\end{aligned}$$

4 Calibration

At this stage, we do not have the time to calibrate or estimate the model as precisely as we would like. So, we will content ourselves with a rough calibration. We calibrate first to a 'representative' individual; the parameters are chosen as follows.

4.1 Demographics

Let the number of periods be $J = 11$; the length of a period is five years (think of people beginning their economic life at age 20 and living to 70). The population growth rate is set to $n = 0$, so that $\mu_j = 1/J$ for all j.

4.2 Preferences

The curvature parameter on U is chosen to be $\gamma = 1$ (a standard choice). The curvature for V is also chosen to be $\eta = 1$. We will abstract from the bequest motive; i.e., $\theta = 0$ (so the curvature parameter for B does not matter). The weighting factor for leisure is chosen to be $\lambda = 1.75$; this generates the result that roughly $1/3$ of available time is devoted to the labour market. The discount factor is chosen to be $\delta = 0.86$, which implies an annual discount rate of 3%.

4.3 Technology

The learning ability parameter is set to $\alpha = 0.4$; this implies that young people spend around 10% of their available time in learning activities. The curvature of the learning technology is taken from Heckman (1976); $\zeta = 0.70$. The share of physical capital in total output is set to $\pi = 0.33$. Physical capital depreciates at an annual rate of 13.5%; set $\phi = 0.48$. Assume that human capital does not depreciate; $\sigma = 0$.

4.4 Endowments

The human capital endowment is normalized to $h_1 = 1$.

5 Representative Individual

In Figure 5 we plot the life-cycle behavior of the representative individual; i.e., the equilibrium based on the parameterization above.

As Figure 5 reveals, the model does a very nice job of replicating 'typical' life-cycle behavior, with the possible exception of the very aged. In particular, the model predicts that consumption continues to rise throughout the life-cycle; the data suggests otherwise. As well, in the model, individuals dissave in old age much more rapidly than in the data. This last feature could presumably be rectified by incorporating the bequest motive.

6 Evaluating Alternative Sources of Heterogeneity

In this section, we consider four separate sources of heterogeneity and evaluate how each, in isolation, is predicted to affect life-cycle behavior. The four parameters we consider are: (1) the ability to learn, α; (2) the initial endowment of human capital, h_1; (3) the discount factor, δ; and (4) the taste for leisure, λ. For each case, we will model three types, representing high, medium, and low values, with 50% of the population taking on the medium value, and the other 50% evenly divided across the two extreme values.

6.1 Heterogeneous Learning Ability

Suppose that individuals differ only in their ability to learn; e.g., $\alpha = 0.3, 0.4, 0.5$. The results are plotted in Figure 6 (high ability types are associated with college graduates and low ability types are associated with dropouts).

Observe that the earnings profiles take the expected shape in the sense that those with low learning ability have higher earnings when young (relative to high learning ability types), and relatively lower earnings when old. This basic qualitative pattern is also highlighted in Neal and Rosen (2000), Figure 4.2, who remark that this U-shaped relationship between cohort earnings variance and cohort age is an important theme in the literature on human capital.

But as Figure 6 reveals, differences in learning ability alone cannot account for life-cycle behavior. In particular, the model has wildly inaccurate predictions concerning the rate at which financial assets are accumulated across education groups. According to the model, individuals with low learning ability (dropouts) will accumulate financial assets rapidly, while those with high learning ability (college) will not even begin accumulating assets until age 40.

The model's logic is perfectly clear. Wealth takes two forms in this model: human wealth and financial wealth. Low ability individuals naturally wish to substitute into the accumulation of financial wealth, while high ability individuals allocate their resources toward accumulating human capital. Later on in the life-cycle, those who are rich in human capital work harder to exploit their relatively high skill levels, while those who are rich in financial wealth can afford to consume more leisure.

6.2 Heterogeneous Human Capital Endowment

An alternative notion of ability is in terms of a person's endowed human capital stock, possibly inherited at an early age by parental teachings. Unlike learning ability, which is specific to accumulation of human capital, the ability represented in the endowed human capital stock makes the individual more skillful in all three time uses: work, learning, and leisure. Figure 7 plots the model's prediction with differences in this type of ability.

According to the model, people who are born with high skill levels do not spend much time learning (the model would associate these individuals with dropouts). The amount of time spent learning measured in *efficiency units* (i.e., *eh*) is very similar across different types, but the amount of raw time spent learning is not.

The dispersion in cohort earnings is predicted to be greatest during youth, which is counterfactual. Furthermore, the highly-skilled individuals work relatively hard in youth and display a steeply declining hours-age profile; this too is counterfactual. On the positive side, the model does fairly well at replicating consumption and asset accumulation patterns (except for the fact that 'dropouts' have the higher profiles).

6.3 Heterogeneous Discount Rate

The idea that people differ in their degree of 'patience', and that this might explain much economic behavior, is an old one; see Rae (1834). Here we consider the three (annualized) discount rates equal to 0.0275, 0.03 and 0.0325, corresponding to the 'Very Patient', the 'Patient', and the 'Impatient', respectively. The results are plotted in Figure 8.

With perfect capital markets, differences in the rate of pure time preference would have no impact on the schooling decision.

According to Figure 8, this hypothesis actually shows some promise in replicating observed life-cycle patterns, especially in regard to wealth accumulation. But there are some problems here as well. In particular, as cohorts approach mid-life, the earnings of the well-educated begin to drop off steeply as they come to rely more on their capital income. Earnings drop off because of labour supply behavior; the patient have sacrificed consumption and leisure when young for higher levels of consumption and leisure in the future. The sharp drop off in hours worked reflects the fact that these prudent and (now) wealthy individuals can afford to consume more leisure. In the data, however, the well-educated tend to work harder throughout the entire life-cycle.

6.4 Heterogeneous Taste for Leisure

Here we consider the hypothesis that people differ in the relative weights they place on 'market-based' consumption versus 'home-based' consumption. Before proceeding, we should emphasize that the framework we have adopted here is from Heckman (1976), where human capital is assumed to be equally productive in producing either output or leisure. An alternative specification (one which we will explore) would have human capital improving productivity only in the market sector.

The three parameter values we use are $\lambda = 1.25, 1.75, 2.25$, which correspond to 'Workaholics', 'Normal', and 'Leisure-Lovers', respectively, in Figure 9.

This hypothesis also shows some promise in explaining some patterns of behavior. In particular, the qualitative positioning of the profiles for earnings, income, hours and consumption look not too bad, except possibly for very early on in the life cycle. However, under the specification considered here, this hypothesis predicts identical schooling and saving behavior across the three groups of individuals. Under the current specification, 'lazy' individuals are motived to accumulate human capital as rapidly as anyone else; the reason being that human capital augments the production of leisure (measured in efficiency units). Again, we conjecture that by altering the Heckman specification to the more traditional one in which human capital augments only market-based activity (and schooling), the hypothesis of heterogeneous tastes for leisure might do very well in replicating all patterns of life-cycle behavior reasonably well.

7 Preliminary Conclusions

In this paper we have reviewed some stylized facts concerning the life-cycle behavior of individuals distinguished by their human capital investments. We have attempted to interpret these differences in the context of a modified Ben-Porath human capital model that featured individuals who differed in the parameters that describe tastes, ability and endowments. We discovered that no single parameter seems capable of describing the heterogeneous patterns of economic behavior that arise in the data (an exception may turn out to be the taste for leisure parameter in a suitably modified environment). However, there is a possibility that some combination of parameters may do the trick and we plan an estimation exercise in order to discover whether this might be the case.

One of two things will come out of this exercise. Either we will discover that a suitably parameterized version of the human capital theory can account reasonably well for the facts, or we will discover otherwise. In either case, we will have a valuable result. In the latter case, we will have provided a challenge for the human capital theorists, which will presumably send them back to the drawing board. In the former case, we can begin to use the model to explore its implications for policy. The source of parameter heterogeneity can matter for the optimal design of policy; see Blackorby and Donaldson (1988) and Andolfatto (2000). At this stage, it would also be appropriate to ask the deeper questions of what exactly is it that determines differences in tastes and ability.

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Figure 1: U.S. Median Disposable Income, 1990

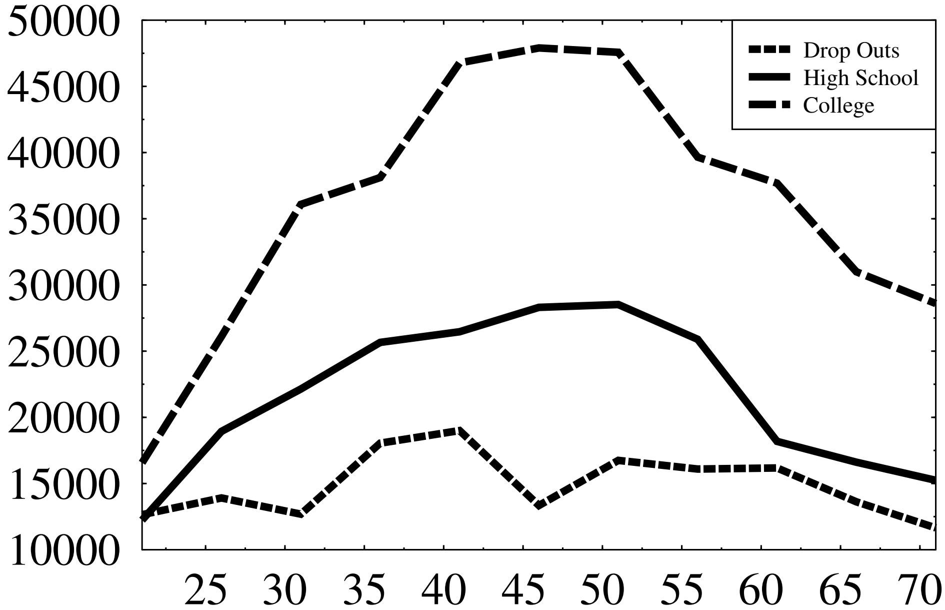


Figure 2: U.S. Median Consumption, 1990

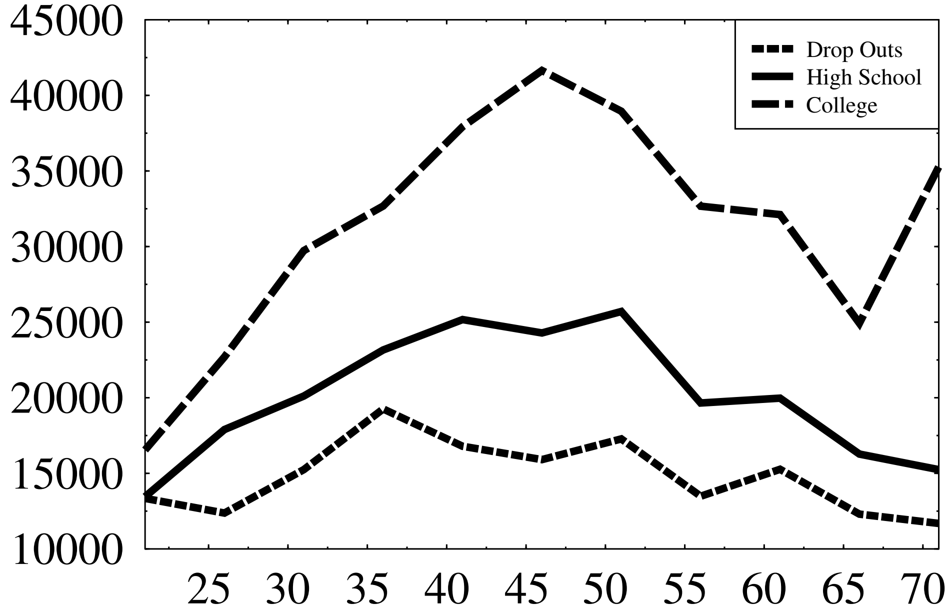


Figure 3: U.S. Median Saving, 1990

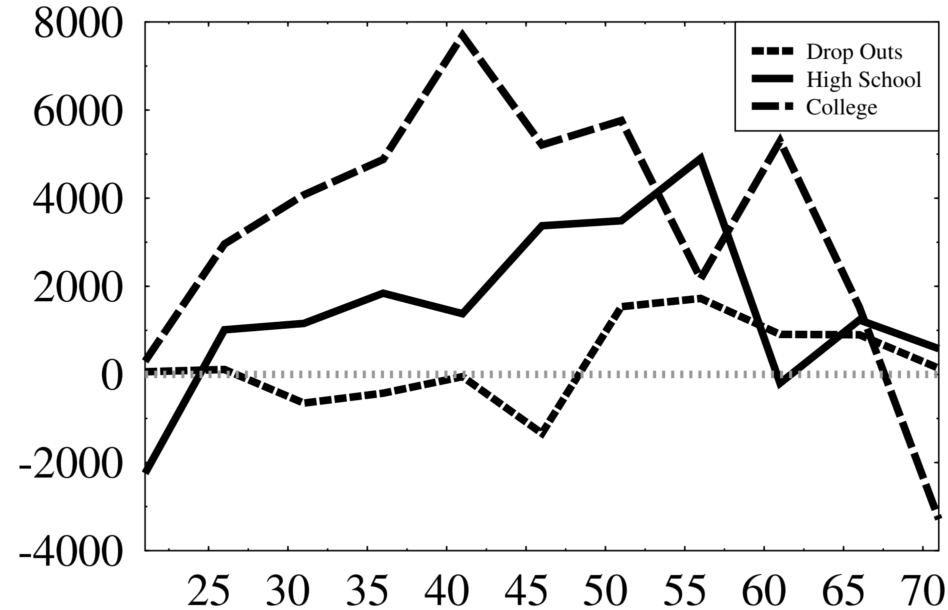


Figure 4: U.S. Male Labor Supply

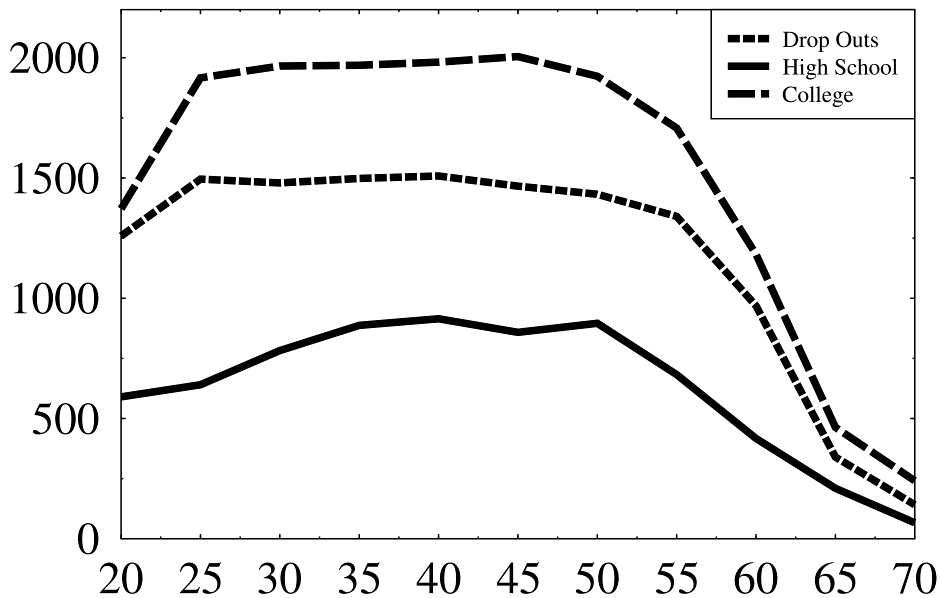


Figure 5: Representative Agent

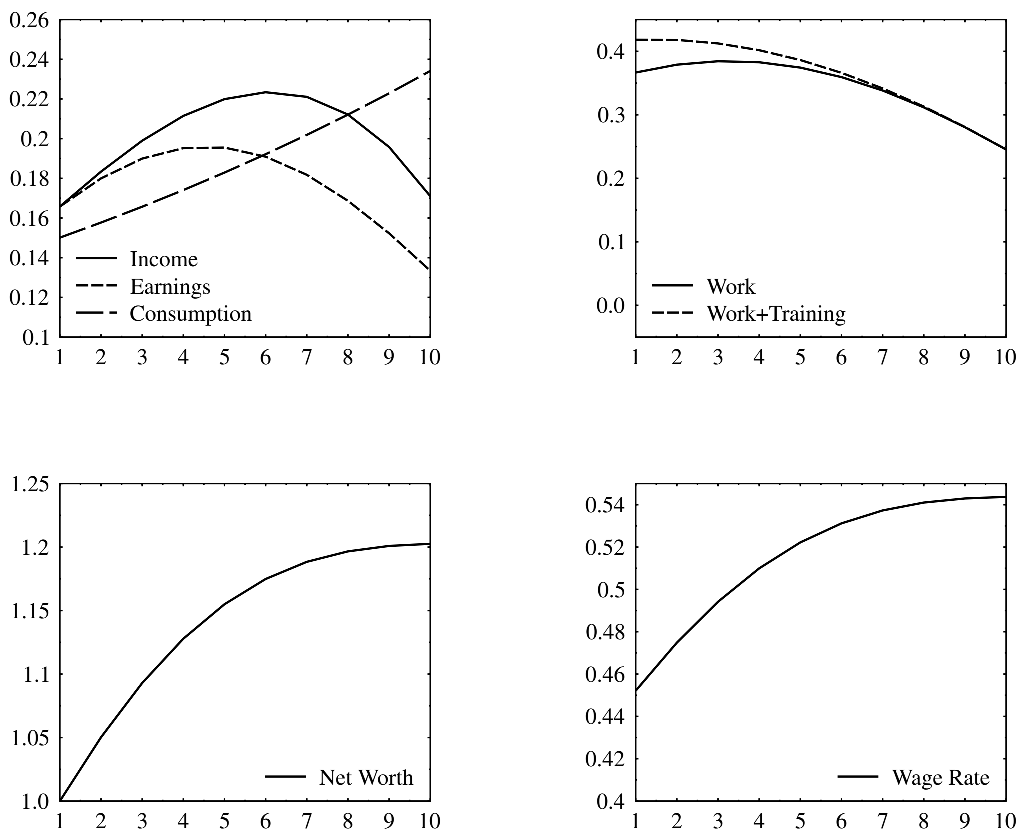
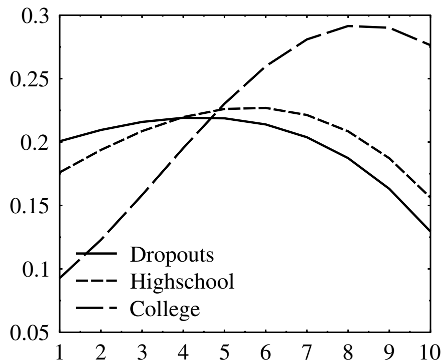
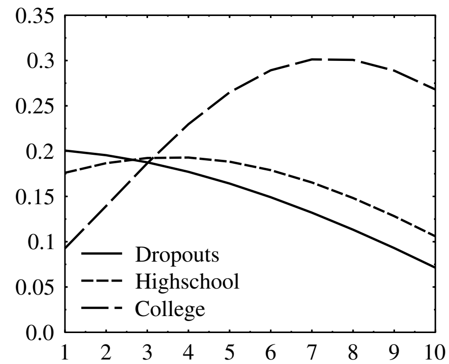


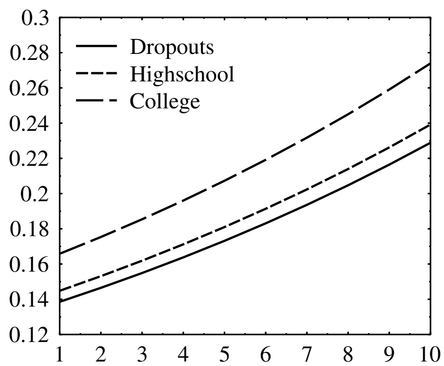
Figure 6: Differences in Learning Ability



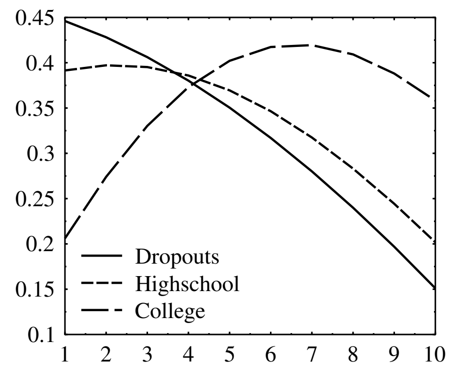
(a) Income



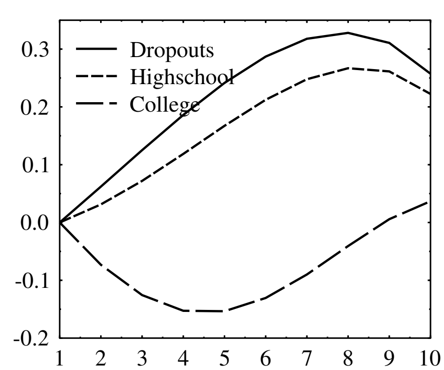
(b) Earnings



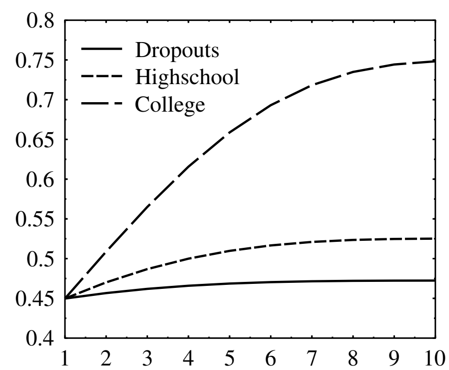
(c) Consumption



(d) Hours Worked

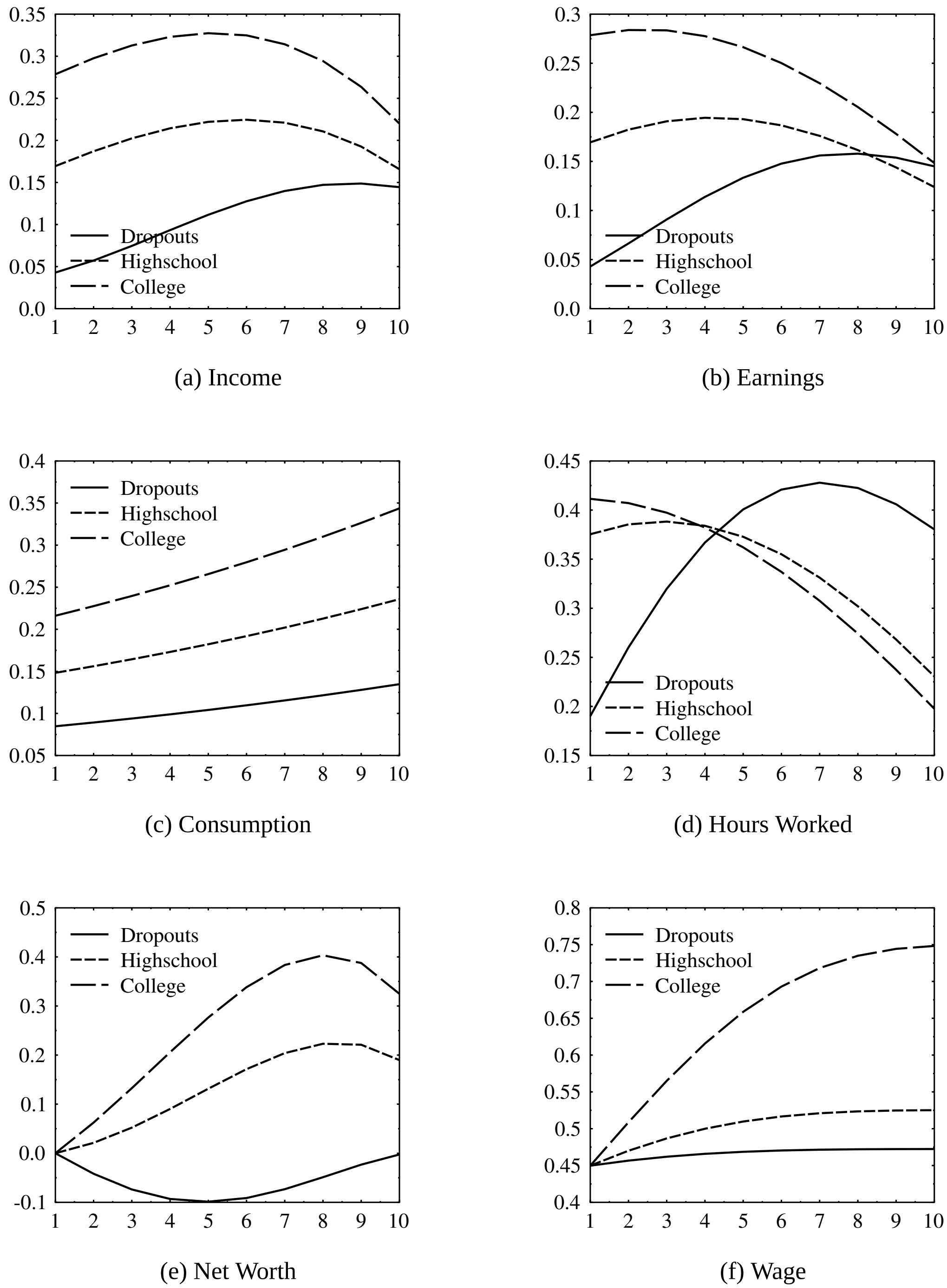


(e) Net Worth



(f) Wage

Figure 7: Differences in Initial Human Captial



(a) Income

(b) Earnings

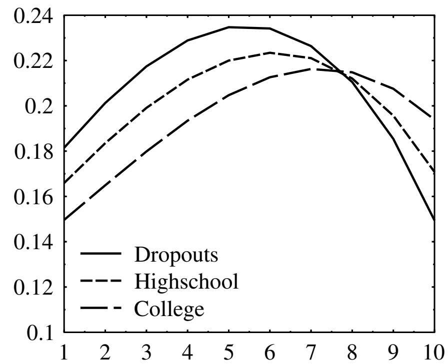
(c) Consumption

(d) Hours Worked

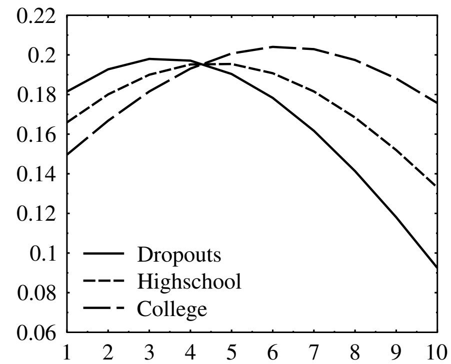
(e) Net Worth

(f) Wage

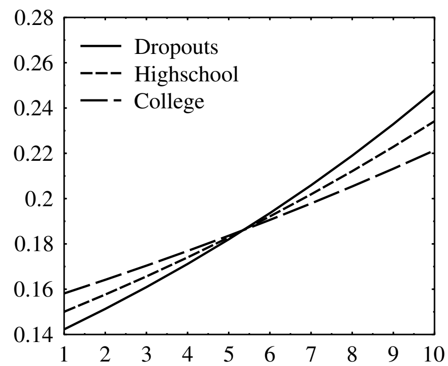
Figure 8: Differences in Time-Preference



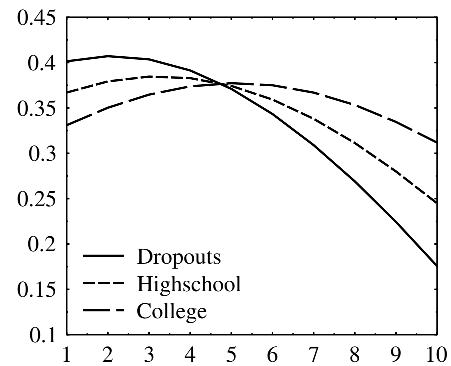
(a) Income



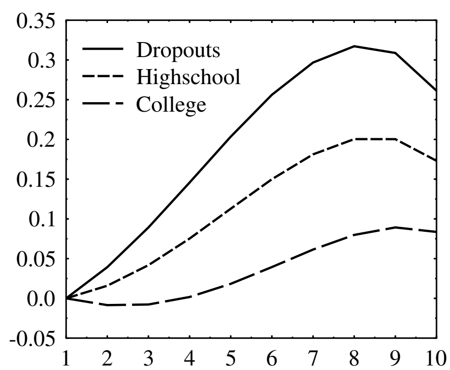
(b) Earnings



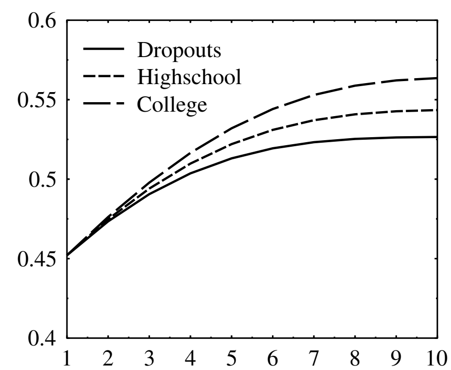
(c) Consumption



(d) Hours Worked

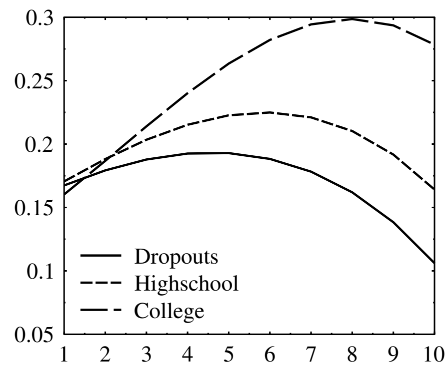


(e) Net Worth

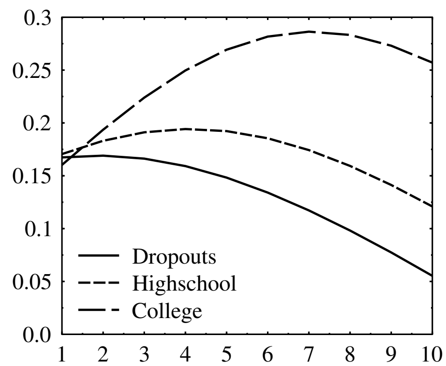


(f) Wage

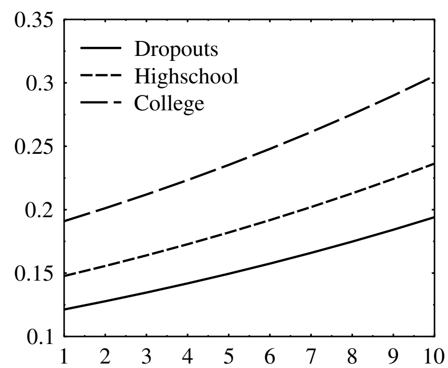
Figure 9: Differences in the Taste for Leisure



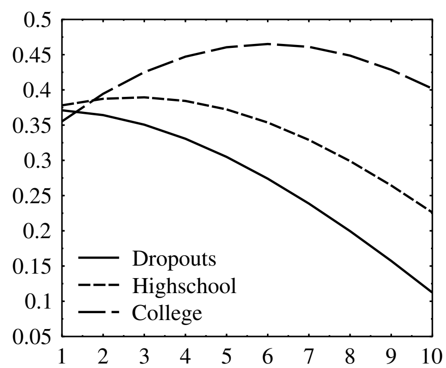
(a) Income



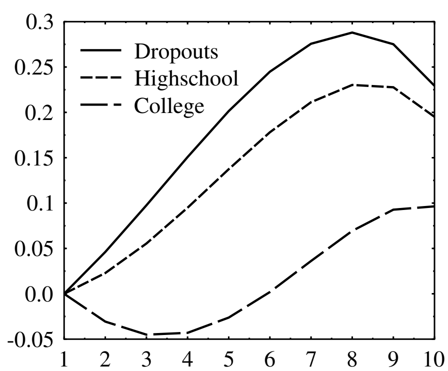
(b) Earnings



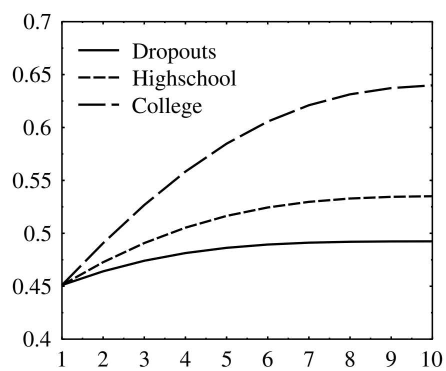
(c) Consumption



(d) Hours Worked

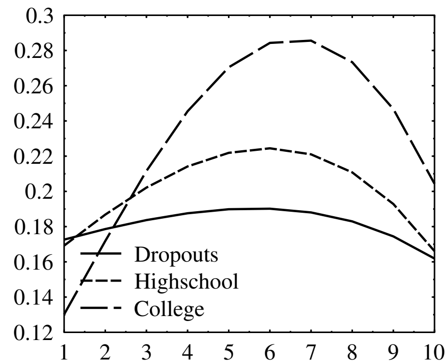


(e) Net Worth

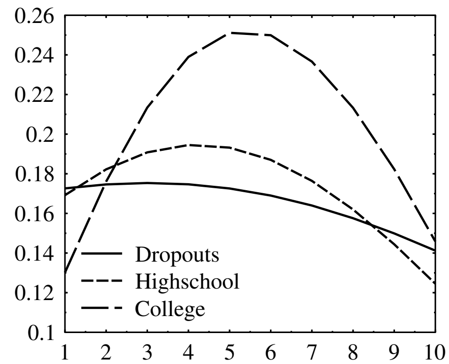


(f) Wage

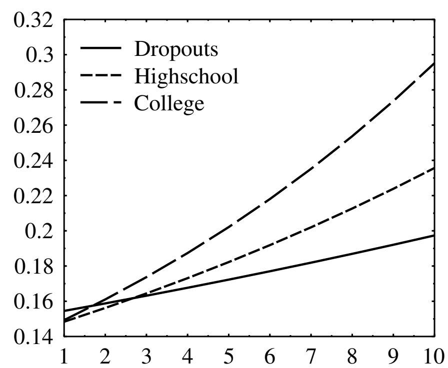
Figure 10: Negative Correlation Between the Rate of Time-Preference and the Ability to Learn



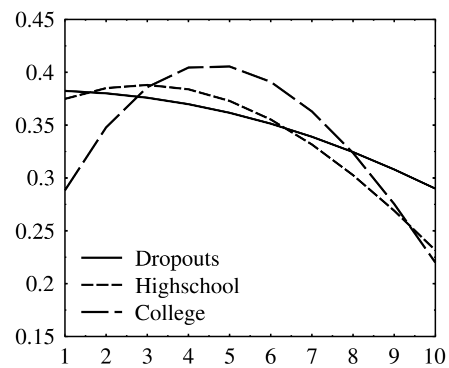
(a) Income



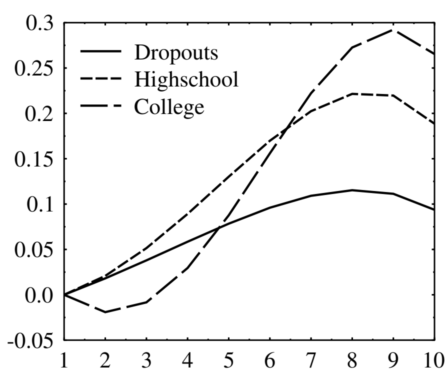
(b) Earnings



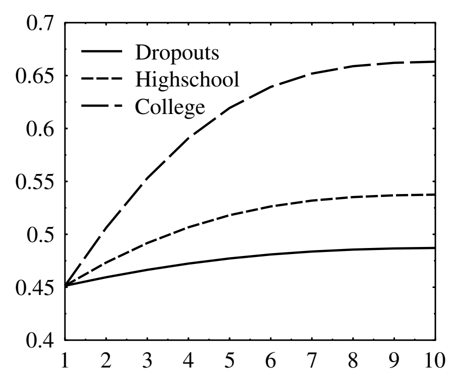
(c) Consumption



(d) Hours Worked

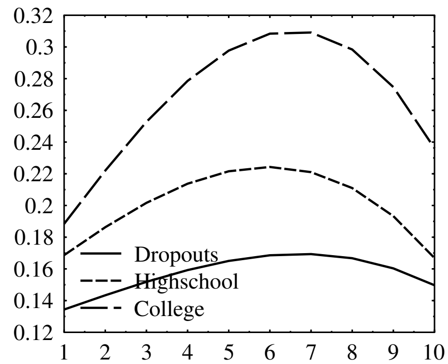


(e) Net Worth

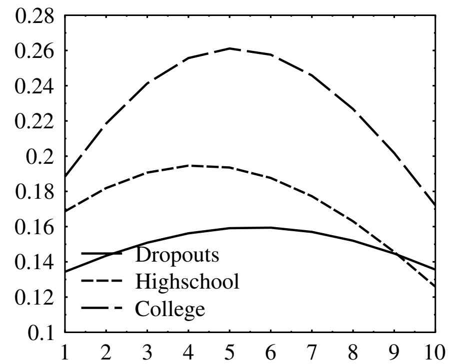


(f) Wage

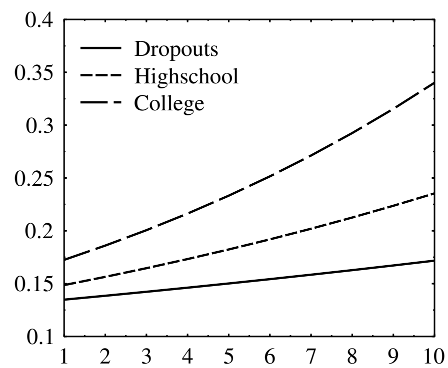
Figure 11: Positive Correlation Between the Rate of Time-Preference and the Taste for Leisure



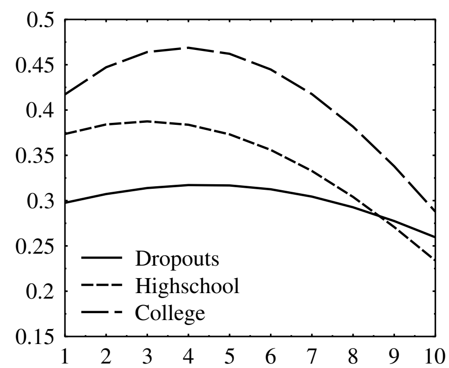
(a) Income



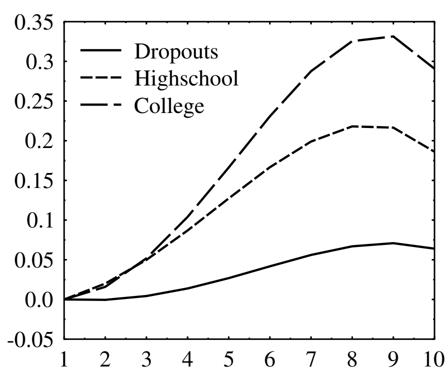
(b) Earnings



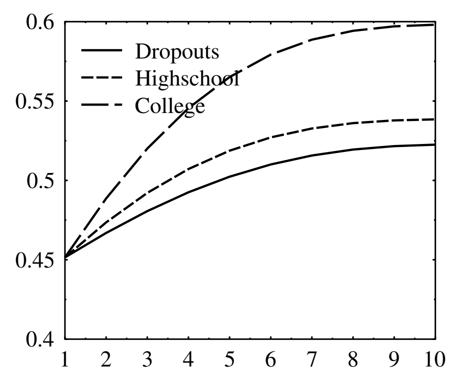
(c) Consumption



(d) Hours Worked



(e) Net Worth



(f) Wage