An Economic Approach to Cultural Capital

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Abstract

This paper introduces a sociological notion of cultural capital into economics. This is modeled as an infinitely repeated game in which the likelihood of future play (i.e. discount factor) is a function of group specific human capital investments made by the agents before the interactions begin. It is shown that: (1) some individuals expected to make group-specific human capital investments are worse off because their observed investment behavior is used as a "cultural identifier" vis-à-vis the endogenous probability of continuation play; (2) equilibria exhibit bi-polar human capital investment behavior by individuals of similar innate ability; (3) as social mobility increases, this bi-polarization increases; and (4) popular policy prescriptions such as educational interventions and affirmative action designed to encourage human capital acquisition can have adverse results in the cultural capital model.

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> "I got there [Holy Providence School in Cornwall Heights, right outside Philadelphia] and immediately found that I could read better than anyone else in the school. My father's example and my mother's training had made that come easy; I could pick up a book, read it aloud, pronounce the words with proper inflections and actually know what they meant. When the nuns found this out they paid me a lot of attention, once even asking me, a fourth grader, to read to the seventh grade. When the kids found this out, I became a target....
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> It was my first time away from home, my first experience in an all black situation, and I found myself being punished for everything I'd ever been taught was right. I got all A's and was hated for it; I spoke correctly and was called a punk. I had to learn a new language simply to be able to deal with the threats. I had good manners and was a good little boy and paid for it with my hide."
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> ——Abdul-Jabbar, et. al., 1987, p.16.

1 Introduction

Much has been made of the social "otherness" of some minority groups. Nearly six decades after Myrdal's account of race relations in the United States, and nearly a half century past Jim Crow, social life in the United States, and elsewhere, continues to be characterized by significant racial and cultural inequality. Many economic indices prove as much: wages, unemployment rates, income and wealth levels, ability test scores, incarceration rates, health and mortality statistics, and home ownership all differ substantially across racial and cultural divisions (see Loury 2002).

More recently, however, this "otherness" has been illustrated in discussions surrounding blacks' academic achievement and the "burden of acting white" (Fordham and Ogbu 1986; and Austen-Smith and Fryer 2002). In this literature, blacks are seen as antagonizing other blacks for investing in behaviors that are deemed as the prerogatives for whites (i.e. making good grades, having white friends, showing interest in classical music or ballet, etc.). The limitations of the discussion, to date, is the microcosmic concentration on differences between blacks and whites. If indeed there is an identifiable phenomenon, one would expect it to apply more generally. For example, in some Hispanic communities, women are discouraged from higher education and encouraged to be domesticated. In some traditional Amish communities, education is uniformly discouraged. In the Italian immigrant community in Boston's West End circa 1957, those who invested in education were labeled "sissies[1]." In the Latino community of greater Los Angeles, those who do not invest in sufficient amounts of local culture are labeled "Pocha." However, these latter examples do not occupy much space in the current economics literature involving racial and ethnic differences, and perhaps more importantly, the interaction between particular cultural environments and economic success in the larger society[2]. In fact, the literatures involving social stratification and inequality between and among racial groups in economics, sociology, and anthropology, unfortunately, seem to have different theories for each racial and ethnic group. These theories endeavor to explain differences in various social statistics (i.e. wages, unemployment rates, ability test scores, etc.) by bringing to bear contextual and group specific accounts that are rarely applicable to other minority groups. What is needed is a simple, empirically tractable, theoretical specification that is broad enough to encompass many culturally diverse groups, but simple enough to have empirical content. This notion suggests a theory that encompasses the historic work on Italian immigrants in Boston (Gans 1962) and blacks on the South Side of Chicago in the 1930's (Drake and Cayton 1945) as well as recent work on 'acting white' (Fordham and Ogbu 1986) and the ultra-orthodox jews (Berman 2000), but applies more generally to many ethnic and racial groups.

With these ambitions in clear view, I present a simple infinitely repeated game-theoretic model encompassing the sociological notion of cultural capital (defined as "skills, habits, and styles" (Swidler 1986)) that can be applied to many diverse communities. In particular, the theory applies to any culture that requires its members to make costly community specific investments needed to facilitate cooperation with members of the community, but may run in conflict with economic success in the larger society. Examples of these communities include, but are not limited to, African-Americans, Hispanics, West Indian immigrants, the Maori of New Zealand, some Indians of South America, the Sephardic Jews of Israel, the Buraku Outcastes of Japan, and the coastal communities of Papua New Guinea. Consider a stylized illustration of a community with many agents, set in Catalonia, Spain, which captures some of the basic ideas. Each agent decides whether to invest

[1] I am grateful to Edward Glaeser and Lawrence Katz for pointing me to Gan's work.

[2] This is not meant to overlook the contributions by Greif (1994), Iannacone (1992), Lazear (1995), and Berman (2000) which examine the intersection of culture and economic outcomes. The model to be presented is quite complementary to their work.

their time in learning Catalan (a romance language spoken mainly by the local population) or computer programming. Investments in computer programming are valued in the global labor market, whereas, Catalan is only valued in the small local community. Agents observe each other's investment portfolio, and can calculate the conditional probability of any agent being in the community in the future. Investments in Catalan yield a relatively high probability of being in the community in the future, since it is not valued elsewhere, and investments in computer programming yield a relatively low probability. The agents, then, play an infinitely repeated prisoner's dilemma with varying opponents, deciding whether or not to cooperate or defect in any given period, knowing their reputation of play will be common knowledge. Cooperation, in this framework, can be interpreted as community interaction, the benefit of which is increasing in the time allocated to learning Catalan. In this stylized illustration, the prisoner's dilemma payoffs are quite natural. One can envision that agents will only cooperate if they observe sufficient investment in Catalan skills (i.e. the likelihood of being in the community in the future is relatively high).

The general results are simple and intuitive. There are three basic categorizations of equilibria, the existence of which depends on particular parameter values. (1) There exists equilibria in which the most talented agents in a community refuse to invest in their cultural capital in an effort to maximize their potential in the larger society, while less talented individuals invest in cultural capital in sufficient amounts to differentiate themselves from the high ability agents. This allows low ability agents to benefit from cooperation in lieu of labor market success. (2) There also exist equilibria in which everyone, regardless of innate ability, invests only in their specific cultural capital, and refuse to invest in human capital, even when they know that it is highly valued in the market. This is likely to happen when agents believe that the probability of interacting with members in their community in the future is highly non-responsive to investments in human capital. (3) There exists equilibria with the property that agents either invest all of their energies into human capital, or they do not invest anything. Analytically, this bi-polarization follows from a highly non-concave objective function. This leads to the unexpected conclusion that two agents, with slightly different innate ability, can have drastically different optimal human capital investments. Further, it is shown that these differences are exaggerated as social mobility out of a community increases.

The theory, therefore, provides a simple analytic framework that helps explain *inter* and *intra* group differences, without relying on differences in exogenously distributed tastes or innate ability.

The only difference between groups (if any) is in the specificity of the cultural capital investments needed to facilitate cooperation within a given community or group and its ability (or lack thereof) to stimulate human capital investments, and the likelihood of continued group interaction as a function of human capital acquisition. This theory should be held as an addition to human capital, as it stands, and a rigorous and analytical way of incorporating the important sociological notion of cultural capital into economics. Throughout the text, I give special emphasis to the education of African Americans in the U.S., though I envision much broader implications. This is not a theory narrowly tailored to the experience of African Americans. It is motivated by ethnographies highlighting similar behaviors of lower class communities across the world and trying to understand these behaviors in a simple equilibrium model.

The next sections briefly explain two popular theories of educational attainment found in the economics and sociology literatures. I then integrate these two views to construct the analytical framework. The exposition is organized as follows: Section 2 introduces and formally solves the cultural capital model; section 3 provides specific applications of the basic theory; this section is comprised of four parts: historical applications, earnings and inequality, educational achievement, and social policy. Section 5 concludes.

Human Capital

Although at one time quite controversial, the notion of human capital has become standard language among academicians and "policy wonks". The basic theory posits that present consumption and competing investments may be foregone in order to reap a later reward, similar to investment in capital equipment (Becker 1964). As is standard in price theory, optimizing agents engage in trading off different activities based on formulaic rate of return calculations. In particular, rational–atomistic agents choose optimal levels of human capital investments, based on their exogenously given tastes and endowments of innate ability. Within the human capital school of thought, observed differences in educational attainment or training is attributed to group differences in exogenous innate ability or tastes, differences in rate of return, or market imperfections (i.e. discrimination). This is the basic structure of human capital theory: atomistic individuals maximizing expected payoffs by investing in human capital so long as the cost of doing to is less than the rate of return, with little (if any) attention given to group interactions or the institutional structure of society. This approach is rejected by many sociologists[3].

Cultural Capital

There are many sociologists, and other social scientists, who emphasize group membership and the "shared" understanding that constitute group culture. The "conflict synthesis" paradigm is one version of this view. The key feature to this paradigm is what sociologist refer to as the theory of cultural capital. This theory encompasses and extends Weber (1968). Weber's notion of society is composed of status groups, each with its own status culture controlling access to the rewards and privileges of group membership. This perspective puts emphasis on culture as a key determinant of social stratification. Collins (1979) presents a cultural capital paradigm that runs in direct conflict with human capital theory[4]. He views economic stratification as a result of credentialing systems wherein the cultural hegemony of middle and upper class status groups "operate through school and workplace reward systems that are only loosely, if at all, tied to actual productivity." This stands in stark contrast to the economic approach. Whereas, the traditional view among economists is an open meritocratic competition in which individuals invest in their own skills and productivity, so that those receiving greater economic "fruits" are simply receiving their just deserts, when academicians within the conflict synthesis look at different economic "fruits" among multiple groups, instead of meritocracy they see ascriptive criteria in the service of Anglo, middle class cultural hegemony. Instead of the undefiled meritocratic competition that describes the economic view, conflict view sociologist envision a cultural battleground within which agents from minority and poverty stricken groups are fundamentally disadvantaged.

Integrating the Views

There are obvious and important objections to the current theories of human capital and cultural capital, a few of which are particularly germane here. The persistent and drastic difference between groups, with regard to educational achievement, begs for an extension of human capital theory as we know it. Empirical evidence suggests that the rate of return to education is actually higher for blacks relative to whites (Neal and Johnson 1996). Thus, it is somewhat puzzling to decipher

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[3] Although, sociologist with the "status attainment" view, have a position very similar to human capital theory.

[4] See also Bowlus and Gintis (1976).

(assuming identical innate ability) why blacks and other minority groups seemingly under invest in human capital relative to whites[5]. For cultural capitalists, the notion that schooling and other human capital investments have little to do with productivity is a major flaw. To date, there have been no studies within economics that attempt to reconcile the conflict between human and cultural capital[6]. To be sure, economist interested in social phenomena have long pondered the impact of cultural differences on economically relevant decisions, but this intuition has not been formalized, incorporated into economic analysis, and its implications worked out. I now intend to do just that, placing special interest on the broader economic implications, while being general enough to encompass many racial, ethnic, and religious groups, not just myopically concentrated on blacks and whites. In what follows, I present a very simple model that highlights the trade-offs between cultural capital and human capital and illustrates the basic subtleties of the general phenomenon. It is an abstraction, and not meant to capture every subtle point in the motivating ethnographies in sociology and anthropology.

INSERT FIGURE 1

2 A Simple Model of Cultural Capital

Let there be one agent referred to as a "student" and one agent referred to as a (suitably anthropomorphized) "community[7]." Nature moves first and distributes a type to the student. The type, denoted $\theta \in \left[\underline{\theta}, \overline{\theta}\right]$, represents the student's innate ability, where $\overline{\theta}$ denotes a student with relatively high ability, $\underline{\theta}$ denotes a student with relatively low ability, and $F(\cdot)$ is the $c.d.f.$ of θ. Then, the

[5] Another explanation, not formally explored here, is what psychologists refer to as Cognitive Dissonance. For a nice economic interpretation of this psychological phenomenon, see Akerlof and Dickens 1982. In a typical Cognitive Dissonance model, blacks might not invest in education because they believe the return is lower (due to discrimination) and any contradictory evidence (observing others succeed) is explained away so they are not forced to update their priors. This could also come about through a model of confirmatory bias (Rabin and Schrag 1999).

[6] See Swidler (1986) and Farkas (1996) for a sociological interpretation.

[7] The conception that a student is interacting with a community may seem odd at first. This modeling strategy is a reduced form of a more general model in which there exists a large set of agents that are randomly grouped in pairwise matches in every period; if one assumes that the actions in any given match are common knowledge. Specifically, in a more elaborate model with random matching, any student i, behaves as if he were facing the average characteristics of the set of agents with whom he is interacting. This is treated, formally, in section 4.

student, knowing his private ability, makes a cultural capital investment decision $c \in [0,1]$. Think of c as the fraction of time that the student spends on culturally specific investments. Hence, $h = 1-c$ denotes the student's human capital investment[8]. The community, then, observes the student's cultural capital investment, c, and plays an infinitely repeated prisoner's dilemma (hereafter referred to as the social interaction game) with the student, where both the student and the community decide whether to cooperate or defect in each period. This interaction can continue indefinitely, but can also end in any period with probability $(1-\delta(h))$, where $\delta : [0,1] \rightrightarrows [0,1]$ denotes the probability that a student with human capital h will be in the community next period[9].

Strategies and Payoffs

A strategy for a student specifies, for each type, the fraction of their time to be invested in human and cultural capital, and a sequence of decisions in the social interaction game. To represent these strategies more formally, let $A = \{\text{cooperate}, \text{ defect}\}$ denote the set of realized choices in the social interaction game, with typical element $a^j \in A$, and let γ^0 denote the null history. Let $\Gamma^t = (A)^t$ be the space of possible period t histories, and for $t \geq 1$, let $\gamma^t = (a^0, a^1, ..., a^{t-1})$ be a sequence of realized choices of actions at all periods before t. A strategy for a student, then, is a function $I : [\underline{\theta}, \overline{\theta}] \to [0,1]$ and a sequence of maps $\varphi_s^t : \Gamma^t \times [0,1] \times [\underline{\theta}, \overline{\theta}] \to [0,1]$. The community's strategy is a sequence of decisions in the social interaction game, denoted $\varphi_n^t : \Gamma^t \times [0,1] \to [0,1]$ for all t. I focus on "grim trigger" strategies. In words, any player who deviates from cooperation will be min-maxed (player j will force upon player i the lowest possible payoff) in every subsequent period. This is without further loss of generality. If cooperation can be supported by any strategy, it can also be supported by grim trigger strategies.

INSERT FIGURE 2

The stage game payoffs of the social interaction game are represented in figure 2. Consistent with the prisoner's dilemma, I assume $\alpha > 0$, $\beta < 0$, and $\mu > \alpha$. There are several specifications of payoff functions found in the repeated game literature. I will focus on the case where players discount future utilities using $\rho\delta(h) \leq 1$, for all h, where ρ represents a standard discount rate. Finally,

[8] This does not presume, *a priori*, that human capital and cooperation are necessarily in conflict with one another in one's community.

[9] The functional form of $\delta(h)$ is common knowledge among the agents.

let $v_j(h,\theta)$ denote the value of being in community j (i.e. labor market earnings), conditional on being a type θ student who invested human capital h, where $v_p(h,\theta)$ (resp. $v_r(h,\theta)$) denotes the value of being in a "poor" (resp. "rich") community. I assume that $\frac{\partial v_j(h,\theta)}{\partial \theta} > 0$, $\frac{\partial v_j(h,\theta)}{\partial h} > 0$, $\frac{\partial v_r(h,\theta)}{\partial \theta} > \frac{\partial v_p(h,\theta)}{\partial \theta}$, and $v_j\left(h, \underline{\theta}\right)$ is normalized to zero, all h, j[10].

Equilibrium

I shall focus on pure strategy equilibria, in which each agent makes a deterministic choice and all individuals of the same type make the same choice. The solution concept for this game, per usual for repeated games, is Nash equilibrium. It is well known in the vast literature on repeated games that when the players are sufficiently patient, any finite gain from deviation of cooperation (defecting when the other player cooperates) is outweighed by even a small loss in utility in every future period, given the strategies are of grim trigger form. This implies, in the current framework, there exists δ^* such that for any $\delta(h) \geq \delta^*$, cooperation can be sustained. This is the subject of the first result. All technical proofs have been relegated to Section 6, the appendix.

Proposition 1 *If $\delta(\cdot)$ is decreasing, grim trigger strategies constitute a cooperative SPNE of the infinitely repeated game if and only if $h \leq h^*$, where h^* satisfies*

$$\delta\left(h^*\right) = \frac{1}{\rho}\left[1 - \frac{\alpha}{\mu}\right] \tag{1}$$

One can think of Proposition 1 as separating communities into two basic groups: those in which human and cultural capital are diametrically opposed, and others for which they need not be. If the conditions of the proposition hold, the former categorization is applicable. To fix ideas, suppose there exists two types of communities: rich and poor. In the poor community, a student with high human capital is likely to leave (δ decreasing). In the rich community, a student with high human capital is likely to stay[11] (δ increasing). It follows that human capital and cooperation are in competition with each other in the poor community, but not in the rich.

[10] Similarly, if $\delta(\cdot)$ is a function of θ, we also get the same results–so long as it is non-increasing. In this case, however, one must assume that the community knows the student's ability in order to solve the model.

[11] Individuals in the rich community with high human capital may not be likely to stay in the same neighborhood, literally. The point is that the likelihood of future interactions with members of the rich community increases with human capital, whereas the likelihood of interactions with members of the poor community decreases with human capital accumulation.

INSERT FIGURE 3

It is clear that there is "nerd bashing" behavior in most neighborhoods, regardless of race. However, the tolerable level of human capital can be quite different across communities[12]. Consider figure 3, which illustrates a plausible δ for a hypothetical middle income neighborhood. It assumes that those with extreme levels of human capital (high or low) are likely to leave. Students in these communities cannot benefit from cooperation if they invests too little (are likely to move to poor neighborhoods) or too much (are likely to move to rich neighborhoods). In this case, the student cooperates in social interactions only if he invests $h \in \left[\underline{h}, \overline{h}\right]$. So, students in middle class neighborhoods can face dis-incentives of investing in human capital similar to those endured by students in low income neighborhoods. Again, however, h^* will differ between these communities as $\delta(\cdot)$ differs. This captures a very nice feature of the model which warrants further emphasis. Namely, the model of cultural capital is flexible enough to investigate antagonizing behavior and underinvestment in education in many communities.

I proceed under the assumption that the conditions of Proposition 1 are met and there are indeed exactly two communities. Therefore, the forthcoming analysis is directly applicable to the categorization of the poor community, but can be used to understand general investment behavior when the assumptions are relaxed. Let $c^* \equiv 1 - h^*$, where h^* is defined by equation (1). If the community observes $c \geq c^*$, cooperation can be sustained and if they observe $c < c^*$ it cannot. For simplicity and transparency, I assume that the community (resp. student) will cooperate if and only if $c \geq c^*$.[13] Thus, the student knows if he invests $c \geq c^*$ in his cultural capital, his peers will cooperate, and if not they won't. Let $\widehat{\alpha} = \alpha$ for all $h \leq h^*$, and $\widehat{\alpha} = 0$ for all $h > h^*$. Then, the students' objective is to maximize

$$\widehat{U}(h, \theta) \equiv \frac{\widehat{\alpha} + \delta(h) v_p(h, \theta) + (1 - \delta(h)) v_r(h, \theta)}{1 - \rho\delta(h)} \tag{2}$$

This leads to the following concise characterization of student behavior.

[12] In a more elaborate model in which the severity of punishment depends on the size of the group who are not investing, punishments across neighborhoods could also be quite different – further pushing down h^*

[13] There are many other equilibria in the social interaction game, even when agents are patient. However, cooperation yields the payoff dominant equilibrium.

Proposition 2 *A type θ student chooses* $\max\left\{\widehat{U}\left(\widehat{h},\theta\right),\widehat{U}\left(1,\theta\right)\right\}$, *where*

$$\widehat{h}\left(\theta\right)\equiv\underset{h\in[0,h^{*}]}{\arg\max}\left\{\frac{\alpha+\delta\left(h\right)v_{p}\left(h,\theta\right)+\left(1-\delta\left(h\right)\right)v_{r}\left(h,\theta\right)}{1-\rho\delta\left(h\right)}\right\} \tag{3}$$

There are two cases to consider, which depend on how the student's utility function varies with h when he opts for cooperation. For convenience, let $MB(h;\theta)$ denote the marginal benefit of investing an additional unit in human capital, for a talent θ student, when the student opts for cooperation, and $MC(h;\theta)$ denote the marginal cost. $MB(h;\theta)$ and $MC(h;\theta)$ are derived by differentiating $\widehat{U}\left(h,\theta\right)$ with respect to h and taking the positive elements of the resulting equation to be $MB(h;\theta)$ and the negative elements to be $MC(h;\theta)$. In symbols,

$$MB(h;\theta)\equiv\frac{\frac{\partial v_{r}(h,\theta)}{\partial h}}{1-\rho\delta\left(h\right)}\left(1-\delta\left(h\right)\right)-\delta^{'}\left(h\right)\frac{v_{r}(h,\theta)}{1-\rho\delta\left(h\right)}\left[1-\frac{\left(1-\delta\left(h\right)\right)\rho}{1-\rho\delta\left(h\right)}\right]+\delta\left(h\right)\left[\frac{\partial v_{p}(h,\theta)}{\partial h}\right] \tag{4}$$

and

$$MC(h;\theta)\equiv\frac{\delta^{'}\left(h\right)}{1-\rho\delta\left(h\right)}\left[\alpha\rho+v_{p}(h,\theta)\left(1+\frac{\delta\left(h\right)\rho}{1-\rho\delta\left(h\right)}\right)\right] \tag{5}$$

The marginal benefit of investing an additional unit of human capital, when the student opts for cooperation, is comprised of two parts. First, additional human capital increases the value of being in both communities. Second, when a student in the poor community invests more, he increases the likelihood of exit – yielding higher expected payoff. On the other hand, the marginal cost of investing in h consists of the lower likelihood of receiving utility α from the social interaction game and the value $v_p(h,\theta)$. This highlights the basic economics of the student's investment decision.

INSERT FIGURE 4

Suppose that the objective function is increasing in human capital for all students who opt for cooperation ($MB(h;\theta) > MC(h;\theta)$ for all $h \in [0, h^*]$). This will be the case when the payoff to cooperation in social interactions, α, is sufficiently small. In this scenario, figure 4 represents the students choice problem. We know that any student who opts out chooses $h = 1$, and any student who opts for cooperation chooses $h = \widehat{h}$. These points are labeled in figure 4. It is imperative to note that whether or not a student chooses $h = \widehat{h}$ or $h = 1$, depends on his ability (θ). In particular, figure 4a represents a student with relatively low θ and figure 4b represents a student with relatively high θ. One can envision, then, situations in which large differences in human capital can occur among individuals in the same community who have very similar innate ability. Given the continuity assumptions and noting that the marginal value of opting out is increasing in θ, relative to opting for cooperation, we know there exists a student of ability θ^* who is just indifferent between investing a lot ($h = 1$) or investing substantially less ($h = \widehat{h}$). Formally,

$$\theta^* \text{ solves } \frac{\alpha + \delta(\widehat{h})v_p(\widehat{h}, \theta^*) + \left(1 - \delta\left(\widehat{h}\right)\right) v_r\left(\widehat{h}, \theta^*\right)}{1 - \rho\delta\left(\widehat{h}\right)} = \frac{v_r\left(\widehat{h}, \theta^*\right)}{1 - \rho}. \tag{6}$$

The left hand side of (6) is strictly greater than the right hand side for θ sufficiently small. This, coupled with the fact that the marginal value of an increase in θ is greater for those who opt out, proves the existence of such a θ^*. Now consider the student who has ability $\theta^* - \varepsilon$. In this case, an agent with slightly less ability, invests substantially less in human capital. Further, let

$$S = \left\{ \theta \in \left[\underline{\theta}, \overline{\theta}\right] : \frac{\alpha + \delta(\widehat{h})v_p(\widehat{h}, \theta) + \left(1 - \delta\left(\widehat{h}\right)\right) v_r\left(\widehat{h}, \theta^*\right)}{1 - \rho\delta\left(\widehat{h}\right)} = \frac{v_r\left(\widehat{h}, \theta^*\right)}{1 - \rho} \right\}$$

denote the set of ability types that opt for cooperation. Notice: if the probability of being in the community in the following period ($\delta(\cdot)$) is relatively inelastic (i.e., relatively non-responsive to h); then the equilibrium exhibits bipolar investment behavior with small differences in innate ability, leading to large human capital differences. These are qualitative predictions that cannot be found in the sociology and anthropology literatures.

INSERT FIGURE 5

Things are a bit different when the student's objective function is decreasing in human capital for those who opt for cooperation ($MB(h; \theta) < MC(h; \theta)$ for all $h \in [0, h^*]$), which is the case when α is sufficiently large. Two prototypical examples are depicted in figure 5. This produces an even stronger endogenous bipolarization; students in effect choose $h \in \{0, 1\}$. It is imperative to note, however, that if the model were extended to allow students to decide whether or not to leave once they received an offer in the rich neighborhood, this case would be eliminated. With this extension, students would opt for cooperation and invests $\widehat{h} = h^*$, even if α were large because they would simply choose to stay even if offered a job outside the community and it would be optimal to choose $\widehat{h} = h^*$, since $\frac{\partial v_p(h,\theta)}{\partial h} > 0$. For this reason, I hereafter concentrate on equilibrium in which $\widehat{h} = h^*$.

3 Applications

In this section, I explore a variety of examples and applications of the basic theory. Although it is simple, its empirical predictions and testable implications are quite accurate. The evidence is not meant, however, to *prove* whether or not cultural capital is an important economic phenomenon, as most of the theoretical implications are consistent with other models of self selection. More modestly, I endeavor to show that the model's predictions are consistent with empirical facts in several areas of economics.

Historical Applications

From American Chattel slavery through Jim Crow, it was virtually impossible for African Americans in the U.S. to opt out. Barring fatal illness, the probability of "continuation play" within black communities was very close to one. During this time, investing in human capital was not seen as a threat of leaving the community because $\delta(\cdot)$ was highly inelastic due to institutional barriers. In a typical black community, doctors, lawyers, postmen, and others with lower occupational status, lived in the same vicinity. With the decrease in institutional discrimination and the increase in housing integration came many new opportunities, including the choice of opting out. Game theoretically, this integration changed the game from a infinitely repeated game in which the probability of continuation play with other individuals was near one, to a repeated game in which agents leave with a probability that depends on their human capital investments. With this change, community monitoring of agents' cultural/human capital became an important predictor of their future behavior. Wilson (1978), for example, argues that the African American community was splitting into two, with middle class blacks increasing their position relative to whites, and poor blacks becoming even more marginalized. Wilson's conjecture is that the plight of the black inner cities was due to the erosion of their social networks. This element of self-selection is readily seen in the framework presented here, as $\delta(\cdot)$ changes over time. There are, however, some subtle differences. Whereas Wilson argues that networks are to blame, I argue that the very presence of high ability blacks and institutional barriers allowed those on the margin to invest more in human capital without loosing cooperation. This is represented, formally, in the next proposition.

Proposition 3 *If* $\delta_1(h) > \delta_2(h)$ *for all* $h \in [0, h^*]$, *then* $S_2 \subseteq S_1$, $\overline{h}_1 \geq \overline{h}_2$, *and* $\int_{S_2} \widehat{h}_1(\theta)\, dF(\theta) >$

$\int_{S_2} \widehat{h}_2(\theta)\, dF(\theta)$ *where* $\overline{h}_i = \int_{S_i} \widehat{h}(\theta)\, dF(\theta)$.

As empirical evidence to this effect, Fryer and Levitt (2003) provide a striking time series pattern that shows a bifurcation in the distribution of African American first names, circa 1970. Two years after the Fair Housing Act, which reduced the barriers to integration, blacks living in predominantly black neighborhoods start to adopt distinctively "black" names, whereas blacks living in predominantly white neighborhoods give traditional white names[14]. These data provide a direct test of the cultural capital model, if one assumes that the choice of a first name is a cultural investment.

Earnings and Inequality

Suppose there is a premium for skills (i.e. 1980's) and the probability of getting out, as a function of human capital, increases. The consequence of this change in opportunity bears different fruit across different agents. It has absolutely no effect on agents who opt out. For those who are constrained by the "cultural capital effect," $\widehat{h}(\theta) = h^*$, one might expect the following prognostication: more individuals opt out, and those who opt for cooperation invests less in human capital. Recall, this was illustrated in Proposition 3.

Empirically then what one should observe, when the cultural capital effect is present and the probability of leaving the community as a function of human capital increases, is a distinct separation in the distribution of wages for blacks. In particular, the wages of those who get out increase, given the premium on skills, and those who opt for cooperation suffer in their wages because they invest more in unproductive (monetarily speaking) cultural capital when there is a premium for skill. For recent empirical evidence regarding separation within the distribution of wages for blacks in the 1980's, see Rubinstein (2002). He reports that between 1960 and 1980, there was little wage heterogeneity among blacks. However, after 1980 (when there is a distinct demand for skilled labor) we have observed a distinct separation among blacks in which those at the high end of the distribution are converging towards that of whites and the agents in the bottom of the distribution are diverging[15].

[14] See Figure 8a in Fryer and Levitt (2003)

[15] The same phenomenon is found in achievement test scores, see Cook and Evans (2000). Blacks in majority white schools gained considerably relative to whites from 1970-1990 and those in predominantly black schools have lost ground over the same time period.

Educational Achievement

There has been renewed interest among social scientists in regard to a phenomenon entitled 'acting white.[16]' The 'acting white' hypothesis suggests that children within some communities can have tremendous disincentives to invest in human capital due to the fact that they may be deemed as a person who is trying to act like a white person (Fordham and Ogbu (1986) and Austen-Smith and Fryer (2002))[17]. Such a label, in some communities, can carry penalties that range from being deemed a social outcast, to being beaten or killed. Even in middle-class communities, blacks can endure the same litmus test, with lower probability (see Pattillo-McCoy, 1999 and Pertroni and Hirsch, 1970). Fordham and Ogbu (1986) insist that 'acting white' is a special case of a more general behavioral phenomenon referred to as the oppositional culture hypothesis[18]. They posit

[16]A similar situation manifests itself within groups outside of the U.S. too. These groups include, but are not limited to, Australian Aborigines, the Buraku Outcastes in Japan, some Indians of South America, and the Maoris of New Zealand (Ogbu, 1986). For the sake of brevity, I only consider 'acting white', with the intention that most accounts are applicable to the other groups mentioned.

[17]Tangentially, there is a phenomenon that manifests itself in international communities in which American born individuals of Asian decent (or Indian, etc.) are ridiculed by others born in their native country for not speaking the native language fluently or properly. Consider the following thought experiment: if foreign Korean students take language as an investment that predicts whether or not a Korean American will leave their community, then it is straightforward, within the basic model, to see that cooperation may not be sustained.

[18]There have been several studies that fail to find empirical justification for an oppositional culture (Cook and Ludwig 1998; Darnell and Downey 1998; and Ferguson 2001). Cook and Ludwig's work ask three critical questions: (1) Do African-American adolescents report greater alienation from school than non-Hispanic whites? (2) Does academic success lead to social ostracism among black adolescents? (3) Do the social costs or benefits of academic success differ by race? For each question, their answer based on analysis of nationally representative data is, "apparently not." Further, sociologists Darnell and Downey analyzed the same national data and came to essentially similar conclusions. However, their findings support the additional hypothesis that blacks have more problems than whites in a category they call "skills, habits and styles." They find that variables in this category, as distinct from oppositional attitudes about achievement, help in a small way to explain the achievement gap in the data that they analyzed. One important contribution in this literature is Ferguson (2001). In a beautifully detailed investigation of the academic achievement disparities within an integrated school in Shaker Heights, Ohio, he also suggests that the oppositional culture hypothesis is mis-placed, though his argument is more subtle. He believes that the opposition, if any, is not directed towards whites specifically as individuals, however, the opposition is directed toward white supremacy as an ideal–in which stigmas are kept alive and from which insinuations of black inferiority can persists. Black collective identity then serves as a mechanism of mutual validation and shields off the rumors of genetic inferiority.

that the oppositional culture frame of reference is applied by minorities in selective situations. From their perspective, the target areas appear to be those traditionally defined as prerogatives of white Americans, both by white people themselves and by minorities. This hypothesis states that the observed disparity between blacks and whites stems from the following factors: (1) white people provide them with inferior schooling and treat them differently in school; (2) by imposing a job ceiling, white people fail to reward them adequately for their academic achievement in adult life; and (3) black Americans develop coping devices which, in turn, further limit their striving for academic success. Fordham and Ogbu propose that this problem arose partly because white Americans traditionally refused to acknowledge that black Americans were capable of intellectual achievement, and partly because black Americans subsequently began to doubt their own intellectual ability, began to define academic success as white people's prerogative, and begin to discourage their peers, perhaps unconsciously, from emulating white people in academic striving (i.e. 'acting white'). These arguments are preference based. One can generate, *endogenously*, the same "oppositional culture" like behavior in the ethnographic evidence reported in Fordham and Ogbu (1986), Fordham (1996), and Ogbu (1986), if $\delta(\cdot)$ is relatively inelastic. In the current model, there are no preference based punishment mechanisms employed by the community. Instead, I employ a standard repeated game framework, in which there is optimal defection, but no intrinsic satisfaction for punishing other agents. There are differences between these two ideals. As the presence of institutional discrimination decreases, social mobility increases, and minorities attain high level positions in society, oppositional culture should decrease and peer pressure should become more acute; allowing minorities to more fully engage in educational pursuits. The current model, however, has the exact opposite prediction (see Proposition 3). As institutional discrimination decreases and the "barriers to entry" are broken down, the model predicts that the acting white phenomenon will become more profound. This is purely a result of the dynamics involved in the social interaction game discussed throughout. As the probability of leaving the community increases, those who opt for cooperation invests less in human capital.

While the acting white hypothesis may explain sub par academic performance in low-income black neighborhoods, one potential puzzle is the black middle-class. It is well documented that blacks in middle class neighborhoods are not achieving, academically, at the same rate as their white counter parts (Pattillo-McCoy, 1999). This has puzzled many, since presumably, blacks and whites in these neighborhoods have similar environmental conditions. To understand this, one has to consider the impact of racial segregation in housing. Due to a peculiar history, the black middle class are much more likely to live in neighborhoods that border poor black neighborhoods[19]. Jargowsky and Bane (1991) show that black middle class neighborhoods are much more likely to create a buffer zone between the black poor and white non poor. Massey and Denton (1993) report that blacks with college educations have more than a 20 percent chance of coming in contact in their neighborhood with someone receiving welfare, whereas college-educated whites have an 8 percent chance. This pattern was repeated for interaction with blue-collar workers, high school drop-outs, and the unemployed. This makes the cultural investment of middle class blacks meaningful–given the social interaction game–which would explain lower achievement of middle class blacks students relative to their white peers.

Educational Interventions

Educational interventions describe any program that seeks to differentiate and improve the educational environment for inner-city or poor youth by on-site or remote training. To date, most of the focus on educational interventions have been on early childhood development. Model programs of this kind include the Milwaukee Project (Garber, 1988), Early Training Project (Gray et. al., 1983), High/Scope Perry Pre-school Project (Schweinhart, 1993), and the Carolina Abecedarian Project (Campbell and Ramey, 1994). There are fewer programs that target secondary school students. Interventions include gifted and talented programs within schools, counseling/mentoring programs, and remote training. Offering separate courses or co-curricular organizations for high achieving students is equivalent to adding non-random matching into our basic model in an effort to induce sorting on ability. Offering remote training can also induce sorting or (perhaps more importantly) change the functional form of $\delta(\cdot)$, depending on which type of program is pursued. I discuss each of these programs in turn within the context of the basic model and tangential extensions.

Honors courses, co-curricular activities (i.e. math club, upward bound, etc.), and counseling/mentoring programs are a common component of many secondary schools. A simple extension of the basic model allows us to investigate the implications of such interventions in particular com-

[19] See Pattillo-McCoy (1999), chapter 2, for a nice discussion on the evolution of the black middle class.

munities where the cultural capital model is being played. Consider the following extension of the basic model. Students can choose to join one of two groups: the cool group or the smart group, with an epsilon cost of joining the cool group. After observing their talent, students choose their cultural investment decision, c, and are randomly matched with members within their group with probability $\gamma > \frac{1}{2}$. Students' expected payoff of investing c_i, in the social interaction game, if they choose to cooperate is then α. Solving the model with this simple extension proves that all individuals in the smart group invest $h = 1$ and all individuals in the cool group invest $h = \widehat{h}$. This is an equilibrium, since no cool students want to join the smart group, given they will get no value out of the social interaction game, and no smart students want to join the cool group–given the epsilon cost[20]. Indeed, in some cases, all agents are weakly better off under this assortative matching type equilibrium.

Remote training programs are another form of educational intervention for secondary school students, though less common. They involve taking students out of their classroom environments and engaging them in educational programs away from their communities. This usually takes one of two forms: students are removed from their community for a fixed amount of time (day, summer, etc.), or students are removed from their community permanently. The former characterization is equivalent to the sorting type equilibrium previously described. A version of the latter characterization is the well known A Better Chance Program[21]. In this intervention, students leave their families and live with a host family to attend better schools. Consider the following quote from a student in the A Better Chance Program.

> "I felt I could be more involved with my studies here [in the host family]. At home, I would be distracted by peer pressures to hang out, smoke and drink. Here, I can focus on the academics. You face peer pressure wherever you go, but at Radnor there are more kids into their studies.[22]"

The cultural capital model predicts that programs such as A Better Chance, would have a

[20] Obviously, this follows from the fact that there are no human capital externalities in the model from interacting with students in the smart group. In general, we know that learning begets learning (see Heckman, 2000). However, this complicates matters and does not take away from the qualitative insights of the result.

[21] To read more about this program, visit http:\\www.abetterchance.org

[22] "Going 'Away' to School in Radnor: A Better Chance for Teens Who Put Their Schooling First." The Suburban and Wayne Times, September 23, 1999.

larger marginal effect on students' educational achievement because it changes $\delta(\cdot)$. Whereas other interventions induce sorting, which has an ambiguous effect on the marginal student. The available evidence suggests that this is indeed the case. 65% of the students in the A Better Chance program come from single parent families and 33% of them are beneath the poverty threshold, however, 99% of the A Better Chance seniors immediately enroll in College. This is significantly larger than any other secondary educational intervention. However, there are thorny selection issues to consider before one can truly test the programs effects.

Affirmative Action

Suppose affirmative action increases the probability of getting out, for a given h, which in turn increases the fragility of cooperative relationships with a community. This too is treated in Proposition 3. In addition, one might hope that allowing more of the talented students to escape would induce investment by younger cohorts of students in the community (tipping). This would be the case in a typical recurring game (Jackson and Kalai, 1997) or herding model (Banerjee, 1992). This is not the case, however, in the current model. Increasing the probability that a high human capital student leaves can actually be preferred by the community because they gain more from their social interactions, given the random matching assumption.

4 Extensions and Generalizations

INSERT FIGURE 6

The basic model presented in section 2 involved several simplifications, of which the most displeasing is the assumption that the payoff for cooperation in the social interaction game is constant. In this section, I present a more general model in which the value of cooperation in the social interaction game is endogenously determined; to ensure the reader that the simplifications are without loss of content and that the basic intuitions go through. The sequence of actions in the extended model are identical to those in the basic model, but consider the following changes to the payoff structure. Let the payoffs to the social interaction game be represented by figure 6, where $\overline{c}$ denotes the average cultural investment in the community which is determined in equilibrium. Consistent with the prisoner's dilemma, I assume $\alpha(c,\overline{c}) \geq 0$, $\beta < 0$, and $\mu > \alpha(c,\overline{c})$, for all $c, \overline{c}$. I also assume that $\alpha_1(c, \overline{c}) \geq 0$. Finally, let the value of being in the poor neighborhood be normalized to zero and simplify the value of getting out from $v_r(h, \theta)$ to $v(\theta)$. This is solely for simplicity in the formulae to come and is without loss of generality.

Intuitively, one might conjecture that endogenizing the payoff of cooperation could produce multiple equilibria. In essence, if no one in the community is investing in group specific human capital then the payoff for any agent to unilaterally deviate is low, given s/he has no one to cooperate with. To verify whether there can be an equilibrium in which all agents invest everything in human capital, one need only check whether the lowest ability agent finds it profitable to do so; given all his peers are opting out. In symbols, the lowest ability type will find it profitable to deviate only if

$$\frac{\alpha\left(c,0\right)+\left(1-\delta\left(\widehat{h}\right)\right)v\left(\underline{\theta}\right)}{1-\rho\delta\left(\widehat{h}\right)}>\frac{v\left(\underline{\theta}\right)}{1-\rho} \tag{7}$$

Therefore, an equilibrium exists in which all agents opt out if $v\left(\underline{\theta}\right)$ is sufficiently large relative to $\alpha\left(c,0\right)$. Let $\underline{v}$ denote the value of $v\left(\underline{\theta}\right)$ for which inequality 7 holds with equality.

Similarly, if there is a large measure of agents investing in cultural capital, then the payoff to cooperation increases. To check whether there can be an equilibrium in which all agents opt for cooperation, one need only check whether the highest ability agent finds it profitable to do so; given all his peers are opting for cooperation. In symbols, the highest ability type will opt for cooperation only if

$$\frac{\alpha\left(c,1\right)+\left(1-\delta\left(\widehat{h}\right)\right)v\left(\overline{\theta}\right)}{1-\rho\delta\left(\widehat{h}\right)}>\frac{v\left(\overline{\theta}\right)}{1-\rho} \tag{8}$$

Therefore, an equilibrium exists in which all agents opt for cooperation if $v\left(\overline{\theta}\right)$ is sufficiently small relative to $\alpha\left(c,1\right)$ or $\delta\left(\cdot\right)$ is relatively "flat" (i.e. inelastic). Let $\overline{v}$ denote the value of $v\left(\overline{\theta}\right)$ for which inequality 8 holds with equality. An interesting question, from a policy perspective, is whether or not these two equilibria exists for a fixed set of parameter values. If this is indeed the case, then temporary policies that make it worthwhile for everyone in a community to invest, could shift agents from the "bad" equilibrium (low human capital-high cultural capital) to the "good" equilibrium (high human capital–low cultural capital)[23]. This intuition is captured in the next proposition.

[23] This needs to be interepreted with some care here. Moving agents from a low human capital–high cultural capital equilibrium to a high human capital–low cultural capital equilibrium need not be a pareto improvement. The adjectives "good" and "bad" are merely labels and have no content.

Proposition 4 *If $\rho > \frac{1}{2}$ and $v(\theta) \in [\underline{v}, \overline{v}]$, all θ, then multiple equilibria exists (for a fixed set of parameter values) in which $\overline{c} = 0$, $\overline{c} = 1 - \overline{h}$, and $S = [\underline{\theta}, \overline{\theta}]$.*

More generally, computing the steady state equilibrium proves quite difficult. Before stating the formal result, consider a simple example.

A Dynamic Example

Consider a stark example. Let $\alpha(c, \overline{c}) = 1 + \overline{c}$; $\mu = 3$; $\beta = -1$; $v(\theta) = 30 \times \theta$; and $\delta(h) = 1 - h$. Then, cooperation can be sustained if and only if $\delta(h) \geq \frac{1}{\rho} - \frac{1+\overline{c}}{3\rho}$. That is, if $h \leq h^* \equiv 1 - \frac{1}{\rho} + \frac{1+\overline{c}}{3\rho}$.

Suppose there are infinitely many periods. Each period, k new agents are born, which is taken to be exogenous, and the distribution of θ among the newly born is F, support $[\underline{\theta}, \overline{\theta}]$. I look for steady states with the following properties: there is a θ^* such that all agents with $\theta < \theta^*$ choose $h = h^*$, and all agents with $\theta > \theta^*$ choose $h = 1$. The person who has $\theta = \theta^*$ is indifferent between investing $h = 1$ and $h = h^*$. If he invests $h = 1$ he gets

$$v(\theta^*) = 30\theta^*$$

If he invests $h = h^*$ he gets

$$\begin{aligned}
& (1+\overline{c}) + (1-\delta(h^*))v(\theta^*) + \rho\delta(h^*)\left((1+\overline{c}) + (1-\delta(h^*))v(\theta^*) + ...\right) \\
= \; & (1+\overline{c})(1 + \rho\delta(h^*) + (\rho\delta(h^*))^2 + ...) + (1-\delta(h^*))v(\theta^*)\left(1 + \rho\delta(h^*) + (\rho\delta(h^*))^2 + ...\right) \\
= \; & \frac{1+\overline{c}}{1-\rho\delta(h^*)} + \frac{(1-\delta(h^*))v(\theta^*)}{1-\rho\delta(h^*)} \\
= \; & \frac{1+\overline{c}}{1-\rho(1-h^*)} + 30\frac{h^*\theta^*}{1-\rho(1-h^*)}
\end{aligned}$$

The indifference condition is, therefore,

$$30\theta^* = \frac{1+\overline{c}}{1-\rho(1-h^*)} + 30\frac{h^*\theta^*}{1-\rho(1-h^*)}$$

so that the cut-off value of θ is

$$\theta^* = \frac{1+\overline{c}}{30(1-h^*)(1-\rho)} \tag{9}$$

Since $\delta(1) = 0$, the only people in the community that have $\theta \geq \theta^*$ are new-born, and there are $k(1 - F(\theta^*))$ of those. (Any old person who had $\theta \geq \theta^*$ invested $h = 1$ and left the community already). So every period, there are $k(1 - F(\theta^*))$ people in the community with $\theta \geq \theta^*$.

Now figure out how many people in the community have $\theta < \theta^*$ in the steady state.

Let n_t denote the number of agents in the community that have $\theta < \theta^*$ at time t. Then, at time $t+1$,

$$n_{t+1} = kF(\theta^*) + n_t\delta(h^*) = kF(\theta^*) + n_t\,(1-h^*) \tag{10}$$

because $kF(\theta^*)$ such people are born every period, and of the n_t old people with $\theta < \theta^*$, a fraction $1-\delta(h^*)$ leave but the rest stay.

At a steady state, $n_{t+1} = n_t = n$, so from (10),

$$n = kF(\theta^*) + n\,(1-h^*)$$

so

$$n = \frac{kF(\theta^*)}{h^*}$$

Therefore, the steady state population in the community is

$$N = n + k(1-F(\theta^*)) = \frac{kF(\theta^*)}{h^*} + k(1-F(\theta^*))$$

The fraction of people who have $\theta < \theta^*$ in steady state is

$$\frac{n}{N} = \frac{F(\theta^*)}{F(\theta^*) + (1-F(\theta^*))h^*}$$

and the fraction who have $\theta \geq \theta^*$ is

$$\frac{k(1-F(\theta^*))}{N} = \frac{(1-F(\theta^*))h^*}{F(\theta^*) + (1-F(\theta^*))h^*}$$

The average cultural capital in the community will be

$$\frac{(1-F(\theta^*))h^*}{F(\theta^*) + (1-F(\theta^*))h^*} \times 0 + \frac{F(\theta^*)}{F(\theta^*) + (1-F(\theta^*))h^*}\,(1-h^*) = \frac{F(\theta^*)\,(1-h^*)}{F(\theta^*) + (1-F(\theta^*))h^*}$$

Thus,

$$\bar{c} = \frac{F(\theta^*)\,(1-h^*)}{F(\theta^*) + (1-F(\theta^*))h^*} \tag{11}$$

But we know that

$$h^* \equiv 1 - \frac{1}{\rho} + \frac{1+\bar{c}}{3\rho} \tag{12}$$

and, from (9)

$$\theta^* = \frac{1+\bar{c}}{30\,(1-h^*)\,(1-\rho)} \tag{13}$$

Suppose, to simplify, θ has support $[0,1]$ and is uniform, $F(\theta)=\theta$ for all θ, and

$$\rho = 0.9$$

Then, (25) implies

$$\bar{c} = \frac{\theta^* (1-h^*)}{\theta^* + (1-\theta^*)h^*} \tag{14}$$

and

$$h^* \equiv 1 - \frac{1}{\rho} + \frac{1+\bar{c}}{3\rho} = 0.370\,37\bar{c} + 0.259\,26 \tag{15}$$

Thus, I have to solve the following three equations simultaneously:

$$\begin{aligned} \theta^* &= \frac{\bar{c}+1.0}{3.0-3.0h^*} && (16)\\ \bar{c} &= \frac{\theta^* (1-h^*)}{\theta^* + (1-\theta^*)h^*} && (17)\\ h^* &= 0.370\,37\bar{c} + 0.259\,26 && (18) \end{aligned}$$

The solution is:

$$\begin{aligned} \theta^* &= 0.934\,57 \\ h^* &= 0.454\,91 \\ \bar{c} &= 0.528\,26 \end{aligned}$$

which provides the steady state values.

Furthermore, we have the following general characterization of a steady state.

Proposition 5 *A steady state is a vector* $\left(\bar{c}, \widehat{h}, \theta^*\right)$ *that solves*

$$\bar{c} = \frac{F(\theta^*)\left(1-\delta\left(1\right)\right)\left(1-\widehat{h}\right)}{F(\theta^*)\left(1-\delta\left(1\right)\right) + \left(1-F(\theta^*)\right)\left(1-\delta\left(\widehat{h}\right)\right)}, \tag{19}$$

$$\widehat{h}\left(\theta, \bar{c}\right) = \underset{h\in[0,h^*]}{\arg\max} \left\{ \frac{\alpha\left(c,\bar{c}\right) + \left(1-\delta\left(h\right)\right)v\left(\theta\right)}{1-\rho\delta\left(h\right)} \right\}, \tag{20}$$

$$\theta^* \textit{ solves } \frac{\left(1-\delta\left(1\right)\right)v\left(\theta^*\right)}{1-\rho\delta\left(1\right)} = \frac{\alpha\left(c,\bar{c}\right) + \left(1-\delta\left(\widehat{h}\right)\right)v\left(\theta^*\right)}{1-\rho\delta\left(\widehat{h}\right)}, \tag{21}$$

If (19), (20), and (21) have multiple solutions, then there are multiple steady states.

5 Concluding Remarks

Blacks antagonize fellow blacks for not being "black enough," whites ridicule other whites for "trying to act black," and Italian immigrants mock other Italian immigrants for being "sissies." An anthropologist or sociologist observes these behaviors and concludes that those who ridicule others are punishing them because they have formed an oppositional culture against behaviors of other cultures, have an intrinsic preference for seeing them suffer, or some unspecified social forces have led to such behavior. The economic explanation, however, is quite different. By using a simple model of repeated interaction with an endogenous probability that the interaction will end at the end of each period, it is easy to see that cooperation can only be sustained with those members of the community who are anticipated to be around in the next period. There is no preference based punishment mechanism needed, just "rational defection" when an agent's probability of being around next period is too low. This causes agents in these communities to optimally trade off cooperation with community and economic success. Using this simple approach, I have shown that some individuals subject to culturally specific unproductive investments, are worse off because these observable investments are used, in equilibrium, as cultural identifiers vis-à-vis the endogenous discount rate. I have also shown that as the value of human capital increases, the inter and intra group wage inequality can increase. This is a direct result of the discontinuity and non-concavity in the student's objective function. Further, as social mobility increases the acting white phenomenon should become even more profound and not, as the leading sociological theory would suggest, die out. Finally, is has been shown that popular policy prescriptions such as educational interventions, affirmative action, and diversity programs can have non intuitive results when cultural capital is brought into economic reasoning.

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6 Appendix

Proof of Proposition 1.

A student will deviate in any period $\tau \geq t$ if the expected discounted payoff from deviation is greater than the expected discounted returns for cooperating. The expected payoff for deviating in any period t can be written as: $\mu + \frac{\delta(h)v_p(h,\theta)+(1-\delta(h))v_r(h,\theta)}{(1-\rho\delta(h))}$. The expected discounted payoff from cooperation can be seen as: $\frac{\alpha+\delta(h)v_p(h,\theta)+(1-\delta(h))v_r(h,\theta)}{(1-\rho\delta(h))}$. Therefore, the student wants to cooperate if and only if $\delta(h) \geq \frac{1}{\rho}[1 - \frac{\alpha}{\mu}]$, which crosses once, given the assumptions on $\alpha(\cdot)$ and $\delta(\cdot)$. *Q.E.D.*

Proof of Proposition 2

The community's choice problem is trivial: cooperate if and only if they observe $c \geq c^*$. Expecting this, any student who optimally invests $c < c^*$, chooses $c = 0$ $(h = 1)$, since they derive no benefit from cooperation and cultural capital is costly. Let $\widehat{h} \equiv \arg\max_{h\in[0,h^*]} \left\{ \frac{\alpha+\delta(h)v_p(h,\theta)+(1-\delta(h))v_r(h,\theta)}{1-\rho\delta(h)} \right\}$ denote the student's optimal level of human capital, conditional on ensuring cooperation from the community. The students' choice problem can then be summarized as choosing to either: "opt for cooperation" $\left(h = \widehat{h}\right)$ or "opt out" $(h = 1)$. In symbols, the student chooses $\max\left\{\widehat{U}\left(\widehat{h},\theta\right), \widehat{U}(1,\theta)\right\}$. *Q.E.D.*

INSERT FIGURE 7

Proof of Proposition 3

We know from equation (1) that if δ increases, h^* decreases, and subsequently, c^* increases. It follows directly that $S_1 \supseteq S_2$. To specifically extrapolate the implications of this effect, figure 7. In this, the agents whom opt for cooperation (depicted in (A)), must choose a lower level of human capital $\widehat{h} = h^{**}$ in order to gain cooperation. In this sense, increasing the fragility of the relationship by increasing the probability that one can leave the community has the effect of suppressing the human capital of those who opt for cooperation. However, as pictured in case (B), sufficiently talented agents are not effected by this, given they invest all of their energies into human capital, regardless. The Proposition follows directly. *Q.E.D.*

Proof of Proposition 4

Let's begin with $\overline{c} = 0$. In this case, the agent with the most incentive to deviate is agent $\underline{\theta}$. So, if the equilibrium is such that s/he does not find it profitable to deviate, then the proposed equilibrium holds. To ensure that agent $\underline{\theta}$ will not deviate from the candidate equilibrium, it must be that

$$\frac{\alpha(c,0) + \left(1 - \delta\left(\widehat{h}\right)\right) v(\underline{\theta})}{1 - \rho\delta\left(\widehat{h}\right)} < \frac{v(\underline{\theta})}{1-\rho}$$

After some manipulation, this reads

$$v(\underline{\theta}) > \frac{(1-\rho)\left[\alpha(c,0) + \left(1 - \delta\left(\widehat{h}\right)\right) v(\underline{\theta})\right]}{1 - \rho\delta\left(\widehat{h}\right)} \equiv \underline{v}$$

which holds if $v(\underline{\theta})$ is sufficiently large. Now consider the candidate equilibrium in which $\overline{c} = 1 - \overline{h}$. In this case, the agent with the most incentive to deviate is agent $\overline{\theta}$. Agent $\overline{\theta}$ does not find it worthwhile to deviate from the candidate equilibrium so long as

$$\frac{\alpha(c,1) + \left(1 - \delta\left(\widehat{h}\right)\right) v\left(\overline{\theta}\right)}{1 - \rho\delta\left(\widehat{h}\right)} > \frac{v\left(\overline{\theta}\right)}{1-\rho}$$

After some manipulation, this reads

$$v\left(\overline{\theta}\right) < \frac{(1-\rho)\left[\alpha(c,1) + \left(1 - \delta\left(\widehat{h}\right)\right) v\left(\overline{\theta}\right)\right]}{1 - \rho\delta\left(\widehat{h}\right)} \equiv \overline{v}$$

which holds if $v\left(\overline{\theta}\right)$ is relatively small. So, all agents opt for cooperation. Therefore, by definition, $S = \left[\underline{\theta}, \overline{\theta}\right]$. Finally, we must show that $\underline{v} < \overline{v}$. After some tedious algebra, one can verify that this is indeed the case if $\rho > \frac{1}{2}$.

Proof of Proposition 5

By Proposition 1, cooperation can be sustained if and only if $\delta(h) \geq \frac{1}{\rho} - \frac{\alpha(c,\overline{c})}{\mu\rho}$.

I look for steady states with the following properties: there is a θ^* such that all agents with $\theta < \theta^*$ choose $h = \widehat{h}$, and all agents with $\theta > \theta^*$ choose $h = 1$. The person who has $\theta = \theta^*$ is indifferent between investing $h = 1$ and $h = \widehat{h}$. If he invests $h = 1$ he gets $v(\theta^*)$. If he invests $h = \widehat{h}$

he gets

$$\begin{aligned}
& \alpha\left(c,\overline{c}\right)+(1-\delta(\widehat{h}))v(\theta^{*})+\rho\delta(\widehat{h})\left(\alpha\left(c,\overline{c}\right)+(1-\delta(\widehat{h}))v(\theta^{*})+...\right) \\
= \; & \alpha\left(c,\overline{c}\right)(1+\rho\delta(\widehat{h})+\left(\rho\delta(\widehat{h})\right)^{2}+...)+(1-\delta(\widehat{h}))v(\theta^{*})\left(1+\rho\delta(\widehat{h})+\left(\rho\delta(\widehat{h})\right)^{2}+...\right) \\
= \; & \frac{\alpha\left(c,\overline{c}\right)}{1-\rho\delta(\widehat{h})}+\frac{(1-\delta(\widehat{h}))v(\theta^{*})}{1-\rho\delta(\widehat{h})}
\end{aligned}$$

The indifference condition is, therefore,

$$v(\theta^{*})=\frac{\alpha\left(c,\overline{c}\right)}{1-\rho\delta(\widehat{h})}+\frac{(1-\delta(\widehat{h}))v(\theta^{*})}{1-\rho\delta(\widehat{h})} \tag{22}$$

so that the cut-off value of θ solves (22).

Let y_t denote the number of agents in the community with $\theta<\theta^{*}$, and x_t denote the number of agents in the community with $\theta>\theta^{*}$. Then at time $t+1$,

$$y_{t+1}=kF\left(\theta^{*}\right)+y_t\delta\left(\widehat{h}\right) \tag{23}$$

because $kF(\theta^{*})$ such people are born every period, and of the y_t old people with $\theta<\theta^{*}$, a fraction $1-\delta(h^{*})$ leave but the rest stay, and

$$x_{t+1}=k(1-F\left(\theta^{*}\right))+x_t\delta\left(1\right) \tag{24}$$

by similar logic.

At a steady state, $y_{t+1}=y_t=y$, so from (23),

$$y=kF(\theta^{*})+y\delta\left(\widehat{h}\right)$$

so

$$y=\frac{kF(\theta^{*})}{1-\delta\left(\widehat{h}\right)}$$

and

$$x=\frac{k(1-F(\theta^{*}))}{1-\delta\left(1\right)}$$

Therefore, the steady state population in the community is

$$N=x+y=\frac{kF(\theta^{*})}{1-\delta\left(\widehat{h}\right)}+\frac{k(1-F(\theta^{*}))}{1-\delta\left(1\right)}$$

The fraction of people who have $\theta < \theta^*$ in steady state is

$$\frac{y}{N} = \frac{F(\theta^*)\left(1-\delta\left(1\right)\right)}{F(\theta^*)\left(1-\delta\left(1\right)\right)+\left(1-F(\theta^*)\right)\left(1-\delta\left(\widehat{h}\right)\right)}$$

and the fraction who have $\theta \geq \theta^*$ is

$$\frac{x}{N} = \frac{\left(1-F(\theta^*)\right)\left(1-\delta\left(\widehat{h}\right)\right)}{F(\theta^*)\left(1-\delta\left(1\right)\right)+\left(1-F(\theta^*)\right)\left(1-\delta\left(\widehat{h}\right)\right)}$$

The average cultural capital in the community will be

$$\begin{aligned} & \frac{\left(1-F(\theta^*)\right)\left(1-\delta\left(\widehat{h}\right)\right)}{F(\theta^*)\left(1-\delta\left(1\right)\right)+\left(1-F(\theta^*)\right)\left(1-\delta\left(\widehat{h}\right)\right)} \times 0 + \frac{F(\theta^*)\left(1-\delta\left(1\right)\right)}{F(\theta^*)\left(1-\delta\left(1\right)\right)+\left(1-F(\theta^*)\right)\left(1-\delta\left(\widehat{h}\right)\right)}\left(1-\widehat{h}\right) \\ = \; & \frac{F(\theta^*)\left(1-\delta\left(1\right)\right)\left(1-\widehat{h}\right)}{F(\theta^*)\left(1-\delta\left(1\right)\right)+\left(1-F(\theta^*)\right)\left(1-\delta\left(\widehat{h}\right)\right)} \end{aligned}$$

Thus,

$$\bar{c} = \frac{F(\theta^*)\left(1-\delta\left(1\right)\right)\left(1-\widehat{h}\right)}{F(\theta^*)\left(1-\delta\left(1\right)\right)+\left(1-F(\theta^*)\right)\left(1-\delta\left(\widehat{h}\right)\right)} \tag{25}$$

But we know that

$$\widehat{h}\left(\theta\right) \equiv \underset{h \in [0,h^*]}{\arg\max} \left\{ \frac{\alpha\left(c,\bar{c}\right)+\left(1-\delta\left(h\right)\right)v\left(\theta\right)}{1-\rho\delta\left(h\right)} \right\} \tag{26}$$

and, from (22)

$$\theta^* \text{ solves } v(\theta^*) = \frac{\alpha\left(c,\overline{c}\right)}{1-\rho\delta(\widehat{h})} + \frac{(1-\delta(\widehat{h}))v(\theta^*)}{1-\rho\delta(\widehat{h})} \tag{27}$$

Solving these three equations simultaneously provides a steady state. This concludes the proof. *Q.E.D.*

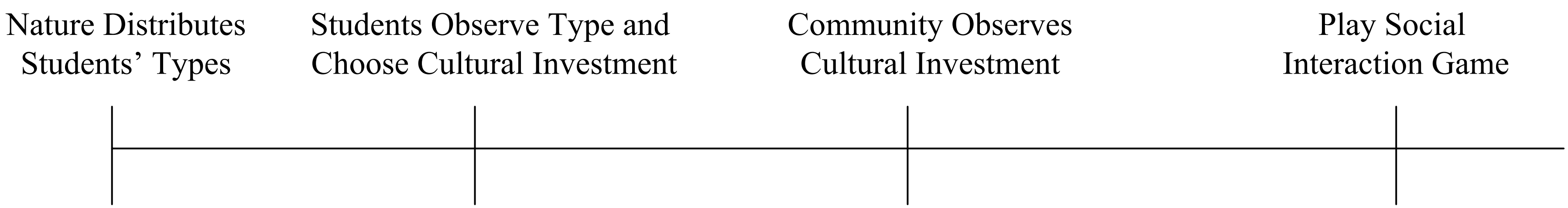
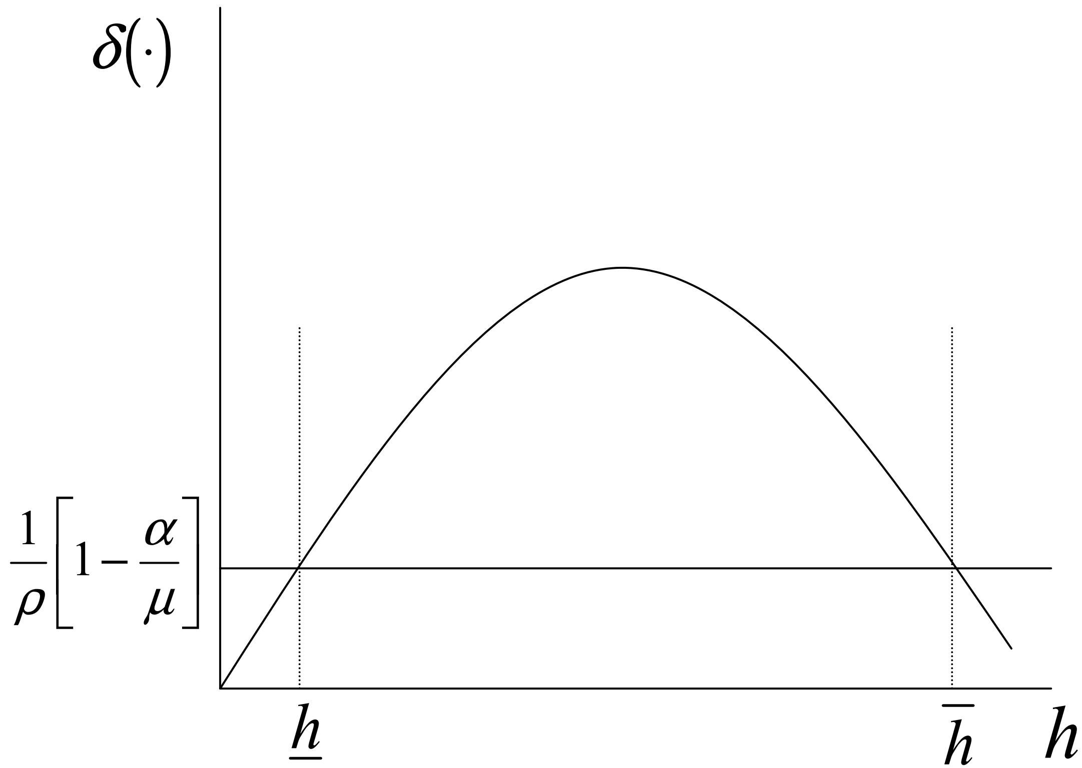

Nature Distributes Students' Types
Students Observe Type and Choose Cultural Investment
Community Observes Cultural Investment
Play Social Interaction Game

Figure 1

Payoffs

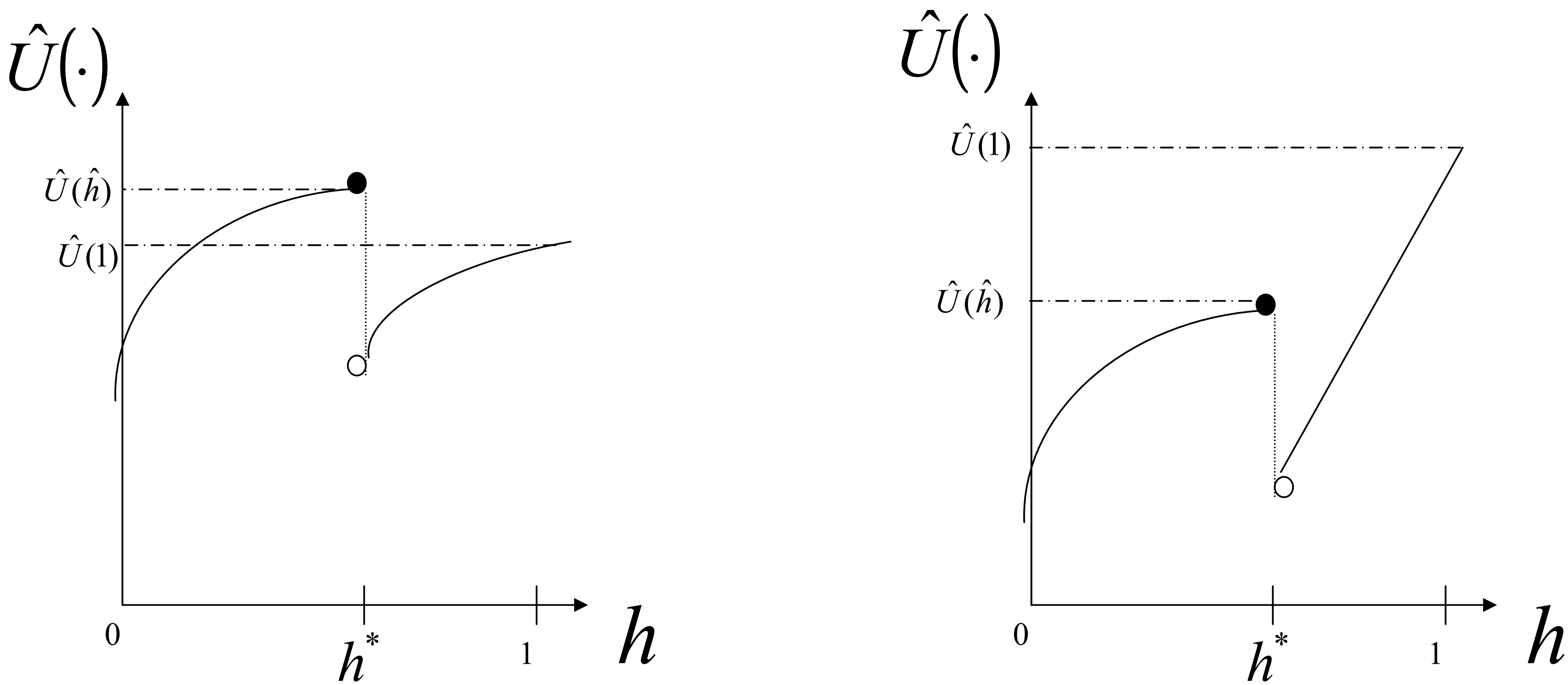
	Coop	Defect
Coop	α,α	β,μ
Defect	μ,β	0,0

Figure 2



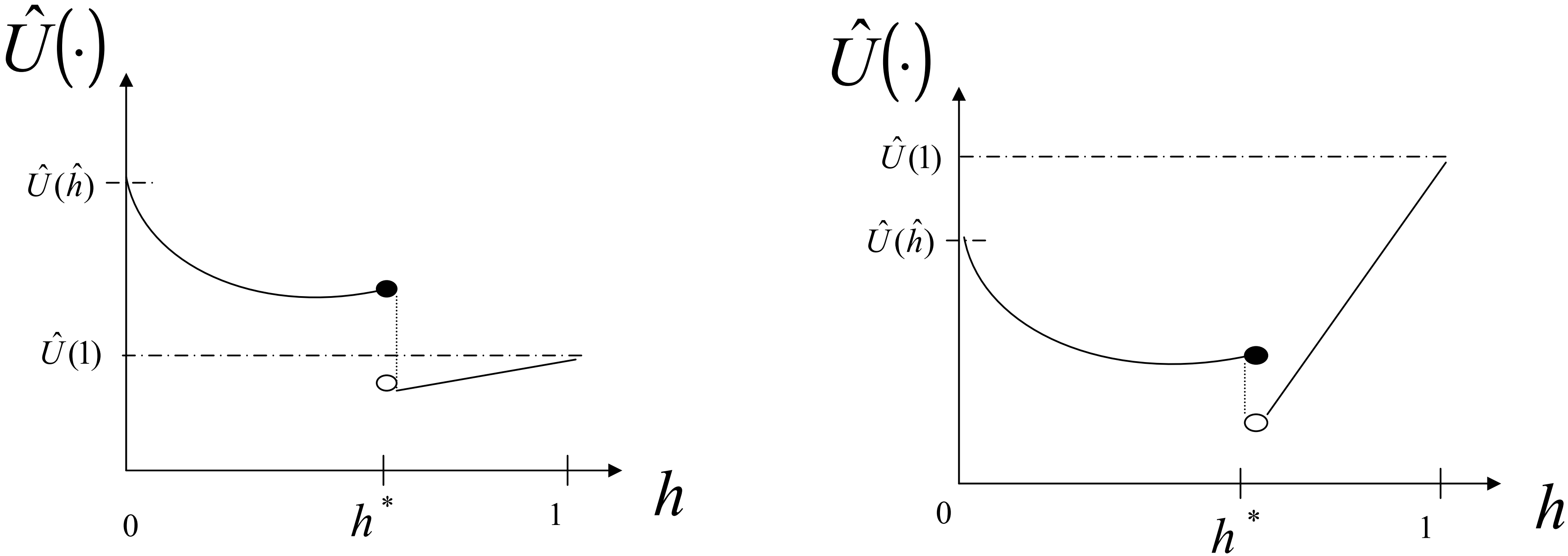
$\delta(\cdot)$
$\frac{1}{\rho}\left[1-\frac{\alpha}{\mu}\right]$
$\underline{h}$
$\bar{h}$
h

Figure 3



Low Ability High Ability

Figure 4



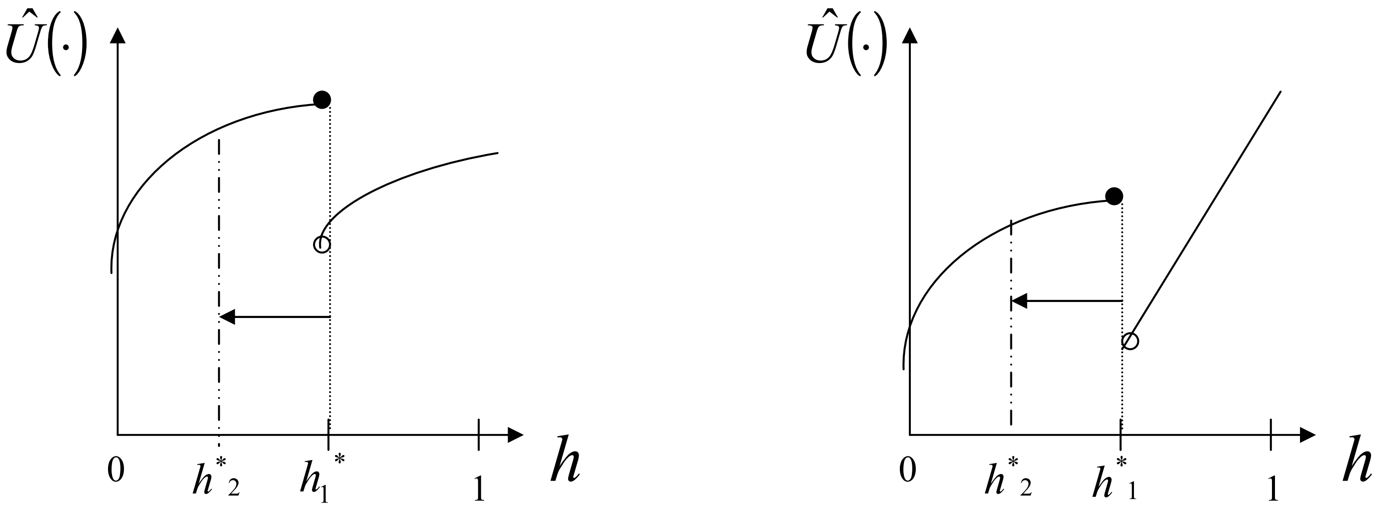
Low Ability

High Ability

Figure 5

	Coop	Defect
Coop	$\alpha(c,\overline{c}),\alpha(c,\overline{c})$	$\beta,\ \mu$
Defect	$\mu,\ \beta$	$0,0$

Figure 6



Low Ability

High Ability

Figure 7