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Is A Moral Disposition Rewarded?

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Abstract

This paper explores the conditions under which a moral disposition is rewarded, in the sense of moral people being more prosperous than amoral people. The analytical framework is a general equilibrium model in which production is more lucrative for moral people than for amoral people, but in which amoral people can choose to be predators rather than producers. We find that, regardless of the advantage that moral people have in production, a moral disposition is rewarded if and only if the ratio of amoral people to moral people is large relative to a parameter that embodies the technology of predation.

JEL classification numbers: A13, D63, D74
Keywords: Amoral, Moral, Predator, Prosperity

We have received helpful comments from Thomas Cosimano, Dmitriy Gershenson, Enrico Spolaore, and anonymous referees.

Let us take to be true the popular perception that some people have "moral dispositions" and that other people have "amoral dispositions", these dispositions being exogenously given psychological states. To make these concepts operational, define a person with a moral disposition to be somebody who does not lie, cheat, or steal, no matter how lucrative such behavior might be. In contrast, define a person with an amoral disposition to be somebody who will lie, cheat, and/or steal if, and only if, such behavior is sufficiently lucrative.

On these definitions a moral disposition constrains a person's behavior. Accordingly, one might suppose that moral people are not as prosperous as amoral people. This supposition, however, neglects the possibility that production can be more lucrative for moral people than for amoral people and that this advantage in production can more than offset the constraint not to lie, cheat, or steal.

Why might moral people have an advantage in production? One possibility is that moral people also behave as if they were more foresighted than amoral people. As a result, moral people accumulate on average more human capital than amoral people. Another possibility, which perhaps is more plausible, is that productive activity is less onerous for moral people than for amoral people. As a result, moral people work harder and produce more than amoral people from the same resource endowment. Still another possibility, which probably is even more plausible, is that, with asymmetric information about the quality of goods and services, potential trading partners prefer to deal with moral people, who are constrained to be trustworthy. As a result, moral people have more exchange opportunities and/or obtain more favorable terms of trade than amoral people.[1]

This paper explores the conditions under which a moral disposition is rewarded, in the sense of moral people being more prosperous than amoral people. The analytical framework is a general equilibrium model in which, for whatever reason, production is more lucrative for

[1]See Robert Frank (1988) and James Brickley, Clifford Smith, and James Zimmerman (this issue) for extended discussions of this possibility.

moral people than for amoral people, but in which amoral people can choose to be predators rather than producers. Predators are people who produce nothing, but live by appropriating the product of the producers.[2] The parameters of the model are the gross incomes of moral producers and amoral producers, the ratio of moral people to amoral people, and a parameter that embodies the technology of predation. Our analysis shows how the relative prosperity of moral people depends on these parameters.[3]

1. Analytical Framework

Let A denote the ratio of amoral people to moral people, and let R denote the ratio of predators to producers.[4] Because all moral people choose to be producers, whereas amoral

[2]This abstract analysis models activities as being either predatory, or productive, or a way to guard against predators. In practice, however, some activities, such as litigating, are not easily classified in this way. In applying our analysis the reader is free to classify specific activities according to his or her own inclination. But, we point out that predation is not synonymous with crime. Although many predatory activities, like burglary and robbery, are criminal, many criminal activities, like illegal gambling, prostitution, and drug dealing, although they may entail negative externalities, are productive and not predatory.

[3]This modelling is price theoretic. It focuses on the allocation of resources between productive activities and appropriative activities and on the distribution of the resulting income. A related literature — see, for example, Joel Guttman (2000), who also provides extensive references — models the interaction of amoral people and moral people in a game-theoretic setting in which randomly matched pairs of people play games like the prisoner's dilemma. Another related, and complementary, literature, which includes the seminal work of Dan Usher (1987) as well as our work in Grossman (1998) and Grossman and Kim (2002), analyses models of production and predation in which all people are amoral, in the sense that anybody would choose to be a predator if predation were more lucrative than production, and in which some people actually choose to be predators only because they do not have the productive opportunities that people who choose to be producers have.

[4]The present analysis derives the equilibrium associated with a given value of A. In assuming that moral and amoral dispositions are exogenously given psychological states, we preclude the possibility that amoral people could choose to become moral, or vice versa. Related literature is concerned with the evolution (over generations) of the ratio of amoral people to moral people. See, for example, Grossman and Kim (2000) and Guttman (2000). An interesting extension of the present paper would be to incorporate the evolutionary

people can choose to be either producers or predators, we have $R \leq A$. The fraction of people who are amoral is $A/(1+A)$, and the fraction of people who choose to be predators is $R/(1+R)$.

Let y_{m} denote the gross income of a moral producer, and let y_{a} denote the gross income of an amoral producer, where y_{m} is larger than y_{a}. For simplicity we take y_{m} and y_{a} to be exogenous. The ratio $y_{\mathsf{m}}/y_{\mathsf{a}}$ measures the advantage that moral people have in production for whatever reasons. The larger is $y_{\mathsf{m}}/y_{\mathsf{a}}$ the more lucrative is production for a moral person than for an amoral person.[5]

Let $\overline{y}$ denote potential per capita gross income, where

$$\overline{y} = \frac{1}{1+A}\, y_{\mathsf{m}} + \frac{A}{1+A}\, y_{\mathsf{a}}. \tag{1}$$

Potential per capita gross income would be realized if and only if all people were to choose to be producers.

Let y denote actual per capita gross income. Actual per capita gross income is smaller than potential per capita income because people who choose to be predators rather than producers produce nothing. Because only amoral people can choose to be predators, we have

$$y = \overline{y} - \frac{R}{1+R}\, y_{\mathsf{a}}. \tag{2}$$

Each producer spends a fraction of his (or her) gross income on guarding the rest of his income from predators.[6] Let G denote the ratio of the income that a producer spends on

analysis in Grossman and Kim (2000).

[5]In Grossman and Kim (2000) we abstracted from differences between $\mathsf{y_m}$ and $\mathsf{y_a}$. With $\mathsf{y_m}$ equal to $\mathsf{y_a}$, a moral disposition could not be rewarded.

[6]Guarding against predators includes all actions that are costly but have the effect of decreasing the fraction of income appropriated by predators. Examples of ways of guarding against predators include the locating of production in inconvenient but secure places, the production of things that are harder for predators to appropriate, the installation of locks, the building of walls, the hiring of private security guards,

guarding to the remaining net income that he is guarding. The fraction of his gross income that a producer spends on guarding is $G/(1+G)$. Allowing for spending on guarding, the net income of a moral producer is $y_{\mathsf{m}}/(1+G)$, and the net income of an amoral producer is $y_{\mathsf{a}}/(1+G)$. The social cost of predation consists of the production foregone by people who choose to be predators plus the amount of income spent on guarding against predators.

Let p denote the nonnegative fraction of his net income that a producer expects to retain. Predators appropriate on average the nonnegative fraction $1-p$.[7] Assume that the larger is the ratio of predators to producers the more predators each producer encounters. Also, assume that the larger is the ratio of spending on guarding against predators to net income the less success a predator has in each encounter. Thus, p depends negatively on the ratio of predators to producers, R, and positively on the guarding ratio, G.

To incorporate this story into the analysis, assume specifically that

$$p = \begin{cases} \dfrac{1}{1+\theta R/G} & \text{for} \quad R>0, \quad \theta>0 \\ 1 & \text{for} \quad R=0. \end{cases} \tag{3}$$

In equation (3) the parameter θ, which embodies the technology of predation, determines the effectiveness of predators in appropriating the net incomes of producers for given values of R and G.[8]

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and the organizing of a police force. For simplicity, our analysis focuses only the total amount of resources allocated to guarding, abstracting from different ways of guarding.

[7]For simplicity, we abstract from possible destruction as the result of predation. In Grossman and Kim (1995) we showed how destruction is easily incorporated into an analysis of appropriative conflict.

[8]Although equation (3) is easy to rationalize, it is a generic black box that conceals the process of predation, just as the standard generic production function conceals the process of production. For example, the relation between appropriative inputs and the appropriative outcome described by equation (3) could involve either the application of force or a settlement under the threat of force. Also, although equation (3) assumes, for simplicity, that for each producer p depends only on R and on his own guarding ratio, we could extend the model to allow for a negative externality in guarding. For example, it is possible that,

In this model expected consumption provides a simple index of prosperity. Let c_{m} denote the expected consumption of a moral producer, and let c_{a} denote the expected consumption of an amoral producer. After allowing for guarding and for the fraction of net income lost to predators, we have

$$c_{\mathsf{m}} = \frac{p\ y_{\mathsf{m}}}{1+G}, \tag{4}$$

and

$$c_{\mathsf{a}} = \frac{p\ y_{\mathsf{a}}}{1+G}. \tag{5}$$

Let d denote the expected consumption of a predator. Assuming that each predator obtains an equal share of the total amount that predators appropriate, d equals $1-p$ times per capita net income divided by the fraction of people who choose to be predators. Using the result derived in the next paragraph that moral producers and amoral producers choose the same guarding ratio, per capita net income is $y/(1+G)$. Thus, we have

$$d = \frac{1-p}{R/(1+R)}\ \frac{y}{1+G}. \tag{6}$$

2. Individual Choices

Consider first the decision of each producer to spend a fraction of his gross income on guarding. Taking R as given, a moral producer chooses the ratio G to maximize c_{m}, and an amoral producer chooses G to maximize c_{a}. To analyse these choice problems we substitute equation (3) into equations (4) and (5), and we find that the value of G that satisfies both the condition $dc_{\mathsf{m}}/dG = 0$ and the condition $dc_{\mathsf{a}}/dG = 0$ is

$$G = \sqrt{\theta R}. \tag{7}$$

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if your neighbors build high walls around their properties but you do not build a high wall around your property, then your property becomes a relatively easier target for burglars. In this case, for given values of R and a producer's own guarding ratio, for each producer p would be negatively related to the guarding ratio of other producers. It is easy to show that this effect would cause each producer to choose a larger guarding ratio for any given value of R.

In Figures 1, 2, and 3 the concave positively sloped loci represent equation (7).

Consider next the decision of an amoral person to be a producer or a predator. To decide whether to be a producer or a predator, each amoral person compares the values of c_{a} and d, as given by equations (5) and (6). In taking as given his expected consumption as a producer or as a predator, each amoral person in effect takes as given the choices by other people to be producers or predators, as reflected in R, and the choice by producers to spend a fraction of their gross incomes on guarding against predators, as reflected in G. Each amoral person knows that if he chooses to be a producer, then he will spend the same fraction of his gross income on guarding as other producers.

Using equations (2) through (6) we find that

$$\frac{c_{\mathsf{a}}}{d} = \frac{G/\theta}{\overline{y}/y_{\mathsf{a}} + (\overline{y}/y_{\mathsf{a}} - 1)R}. \tag{8}$$

From equation (8) we see that there are three possibilities to consider.

1. If d is larger than c_{a}, then amoral people have higher expected consumption if they choose to be predators. In this case R equals A. Setting R equal to A in equation (8), and using equation (1), we find that, for d to be larger than c_{a}, G must be smaller than $\theta y_{\mathsf{m}}/y_{\mathsf{a}}$.

2. If d is equal to c_{a}, then amoral people have the same expected consumption whether they choose to be producers or predators. In this case R is equal to or smaller than A. In addition, from equation (8) we see that d equal to c_{a} implies that R equals $(G/\theta - \overline{y}/y_{\mathsf{a}})/(\overline{y}/y_{\mathsf{a}} - 1)$.

3. If d were smaller than c_{a}, then amoral people would have higher expected consumption if they were to choose to be producers. In this case R would be zero. Setting R equal to zero in equation (8) we see that, for d to be smaller than c_{a}, G would have to be larger than $\theta\overline{y}/y_{\mathsf{a}}$.

Summarizing these results we have found that R depends on G according to the following correspondences:

$$R = \begin{cases} A & \text{only if} \quad G < \theta y_{\mathsf{m}}/y_{\mathsf{a}} \\ (G/\theta - \overline{y}/y_{\mathsf{a}})/(\overline{y}/y_{\mathsf{a}} - 1) \leq A & \text{only if} \quad \theta\overline{y}/y_{\mathsf{a}} \leq G \leq \theta y_{\mathsf{m}}/y_{\mathsf{a}} \\ 0 & \text{only if} \quad G > \theta\overline{y}/y_{\mathsf{a}} \end{cases} \tag{9}$$

In Figures 1, 2, and 3 the piecewise linear loci represent equation (9).

3. Equilibria

An equilibrium is a pair of values for R and G that satisfies equations (7) and (9). In equilibrium the producers' choices of G and the choices of amoral people to be predators or producers are mutually consistent.

Equations (7) and (9) imply that in equilibrium R either is equal to A or is positive but smaller than A.[9] Specifically, equations (7) and (9) imply that the equilibrium configuration is either

$$R = A \quad \text{and} \quad G = \sqrt{\theta R} < \theta y_{\mathsf{m}}/y_{\mathsf{a}}, \tag{10}$$

or

$$R = (G/\theta - \overline{y}/y_{\mathsf{a}})/(\overline{y}/y_{\mathsf{a}} - 1) \leq A \quad \text{and} \quad \theta\overline{y}/y_{\mathsf{a}} \leq G = \sqrt{\theta R} \leq \theta y_{\mathsf{m}}/y_{\mathsf{a}}. \tag{11}$$

Which of these two configurations obtains, and, if configuration (11) obtains, whether we have R equal to A or R smaller than A, depends on the values of the parameters, y_{m}, y_{a}, θ, and A. The appendix contains a complete enumeration of possible equilibria.

For the subsequent analysis of expected consumption, it is useful to group the relevant possibilities according to the relation between A and θ. If A is either equal to or smaller than θ, then configuration (10) describes the equilibrium. Hence, if A is either equal to

[9] According to equation (9), R equal to zero would require a large positive value of G. But, according to equation (7), if R were zero, then producers would set G equal to zero. Thus, R equal to zero cannot be a solution to equations (7) and (9).

or smaller than θ, then R equals A. Figure 1 illustrates an equilibrium in which A is smaller than θ, and R equals A.

Alternatively, if A is larger than θ, then either configuration (10) or configuration (11) describes the equilibrium. Hence, if A is larger than θ, then either R equals A or R is smaller than A. Figures 2 and 3 illustrate equilibria in which A is larger than θ. In Figure 2 R equals A. In Figure 3 R equals R_1, which is smaller than A.

These results say that, if A is equal to or smaller than θ, then predation is more lucrative than production for amoral people, and all of the amoral people choose to be predators. Conversely, in order for production to be as lucrative as predation for amoral people, and for some of the amoral people to choose to be producers, A must be larger than θ.

4. Expected Consumption

Consider equilibria in which R is smaller than A. The preceding analysis implies that such equilibria can obtain only if A is larger than θ. With R smaller than A, only some of the amoral people are choosing to be predators, whereas the rest of the amoral people are choosing to be producers. The predators expect to consume d, whereas the producers expect to consume c_{a}. But, importantly, c_{a} and d are equal. Furthermore, equations (4) and (5) imply that the consumption ratio $c_{\mathsf{m}}/c_{\mathsf{a}}$ equals $y_{\mathsf{m}}/y_{\mathsf{a}}$. Thus, as long as y_{m} is larger than y_{a}, with R smaller than A, a moral person consumes more than an amoral person. This reward to a moral disposition exactly equals the advantage that moral people have in production. Figure 3 indicates that in an equilibrium in which R is smaller than A a moral disposition is rewarded.

Now consider equilibria in which R is equal to A. The preceding analysis implies that such equilibria can obtain either with A smaller than θ, or with A equal to θ, or with A larger than θ. With R equal to A, the expected consumption of a predator, d, is equal to or larger than c_{a}, which would be the expected consumption of an amoral producer, and

all of the amoral people are choosing to be predators. Hence, the expected consumption of each amoral person is equal to d, and a moral disposition is rewarded if and only if c_{m}, the expected consumption of a moral producer, is larger than d. Note that it is possible to have both c_{m} larger than d and d larger than c_{a} because y_{m} is larger than y_{a}.

Substituting R equal to A and G equal to $\sqrt{\theta A}$ into equations (4) and (6) for c_{m} and d, and using equations (1) and (2), we find that the consumption ratio c_{m}/d equals $\sqrt{A/\theta}$. This equality implies that c_{m} is larger than d, and a moral disposition is rewarded, if and only if A is larger than θ. Alternatively, c_{m} is smaller than d, in which case we say that an amoral disposition is rewarded, if and only if A is smaller than θ. In addition, the size of the reward either to a moral disposition or to an amoral disposition depends only on the size of A relative to θ. We also can show that the consumption ratio c_{m}/d is either equal to or smaller than the ratio $y_{\mathsf{m}}/y_{\mathsf{a}}$, whether or not a moral disposition is rewarded.

To get more intuition for these results, observe that, because both c_{m} and d are proportionate to y_{m}, the consumption ratio c_{m}/d does not depend on y_{m}. Also observe that, with all of the amoral people choosing to be predators, the ratio $p/(1-p)$ is the ratio of the total income of moral people to the total income of amoral people. Accordingly, whether the expected consumption of a moral person is larger or smaller than the expected consumption of an amoral person depends on whether the ratio $p/(1-p)$ is larger or smaller than $1/A$, the ratio of moral people to amoral people. Equation (3) implies that, with R equal to A, $p/(1-p)$ equals $\sqrt{1/\theta A}$. Thus, whether $p/(1-p)$ is larger or smaller than $1/A$ depends on whether A is larger or smaller than θ.

Figure 1 indicates that in an equilibrium in which R equals A, and A is smaller than θ, an amoral disposition is rewarded. Figure 2 indicates that in an equilibrium in which R equals A, but A is larger than θ, a moral disposition is rewarded.

Assuming that production is more lucrative for moral people than for amoral people, we have found that a moral disposition is rewarded if and only if the ratio of amoral people to

moral people, A, is larger than the parameter θ. With A larger than θ, either all of the amoral people or only some of the amoral people are choosing to be predators. Alternatively, an amoral disposition is rewarded if and only if A is smaller than θ. With A smaller than θ, all of the amoral people are choosing to be predators.

5. Summary

This paper has asked whether a moral disposition is rewarded, in the sense of moral people being more prosperous than amoral people. Our analytical framework was a general equilibrium model in which production is more lucrative for moral people than for amoral people, but in which amoral people can choose to be predators rather than producers. The parameters of the model were the gross incomes of moral producers and amoral producers, the ratio of moral people to amoral people, and the technology of predation. Expected consumption provided a simple index of prosperity.

Given that production is more lucrative for moral people than for amoral people, we found that in equilibrium a moral disposition is rewarded if and only if the ratio of amoral people to moral people is large relative to a parameter that embodies the technology of predation. Interestingly, if production is more lucrative for moral people than for amoral people, then whether a moral disposition or an amoral disposition is rewarded is independent of the size of this advantage.

We also found that in equilibrium either some of the amoral people or all of the amoral people choose to be predators. Parameter values such that all of the amoral people choose to be predators allow for either a moral disposition or an amoral disposition to be rewarded. But, with all of the amoral people choosing to be predators, the relative prosperity of moral people depends on only the ratio of amoral people to moral people and the technology of predation. In this case the relative prosperity of moral people does not depend on the advantage that moral producers have in production. In contrast, if the parameter values are such that only some of the amoral people choose to be predators, then a moral disposition

is rewarded. In this case the relative prosperity of moral people equals the advantage that moral producers have in production.

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Appendix

To enumerate the possible equilibria, let R_1 and R_2 be the roots of the quadratic equation for R implied by $G = \sqrt{\theta R}$, from equation (7), and $R = (G/\theta - \overline{y}/y_{\mathsf{a}})/(\overline{y}/y_{\mathsf{a}} - 1)$, from equation (9), R_1 being the smaller root. These roots exist as real numbers if and only if $\overline{y}/y_{\mathsf{a}}$ is equal to or smaller than $(1 + \sqrt{1 + 1/\theta})/2$. We can easily show that, if these roots exist, then R_1 is larger than θ.

The possible equilibria depend on whether R_1 and R_2 exist as real numbers and, if these roots exist, on how the value of A relates to these roots. There are four distinct cases:

1. Either if R_1 and R_2 do not exist as real numbers, or if these roots exist, but A is equal to or smaller then R_1, then R equal to A is the unique equilibrium. This equilibrium can obtain either with A smaller than θ, or with A equal to θ, or with A larger than θ.

2. If R_1 and R_2 exist as real numbers, and if A is larger than R_1 but smaller than R_2, then R equal to R_1 is the unique equilibrium.

3. If R_1 and R_2 exist as real numbers, and if A equals R_2, then there are two equilibria: R equal to R_1, and R equal to A.

4. If R_1 and R_2 exist as real numbers, and if A is larger than R_2, then there are three equilibria: R equal to R_1, R equal to R_2, and R equal to A.

In the latter three cases, R can be smaller than A. Because R_1 and R_2 are larger than θ, any one of these cases can obtain only if A is larger than θ. Thus, an equilibrium with R smaller than A requires that A be larger than θ. If A is equal to or smaller than θ, then there is a unique equilibrium with R equal to A.

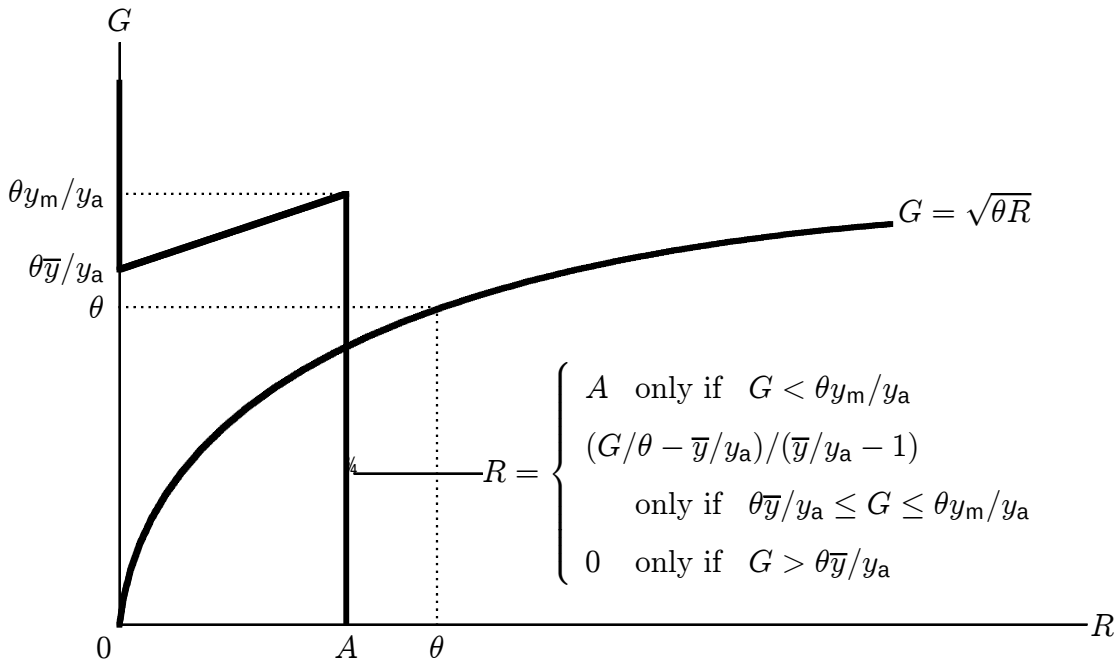

Figure 1: $R = A < \theta$

An Amoral Disposition is Rewarded.

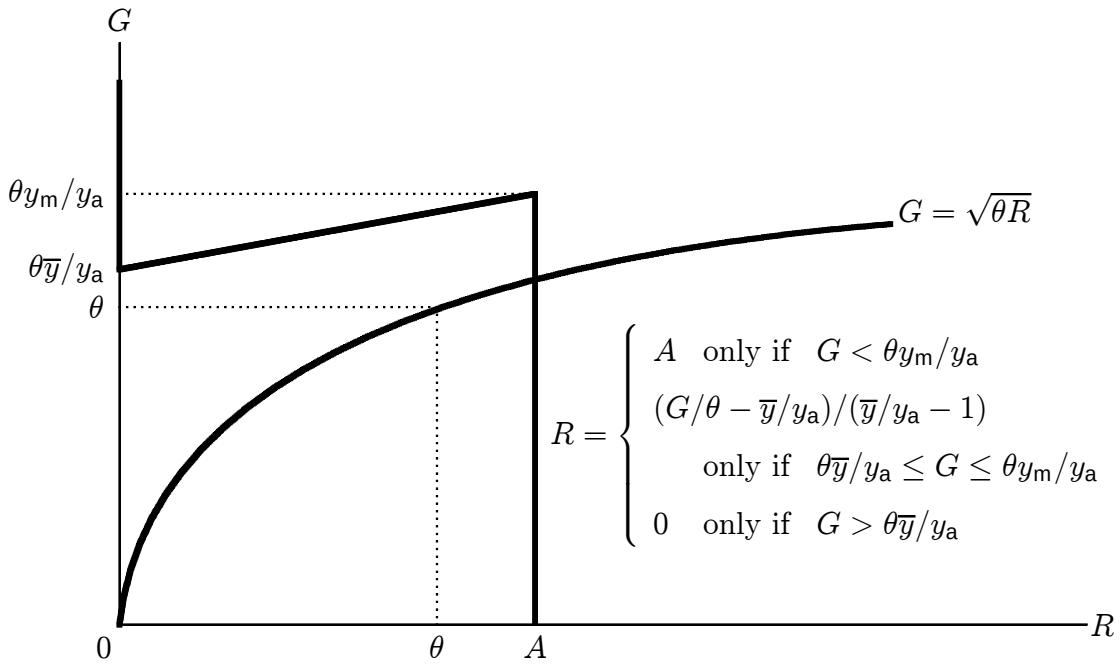

Figure 2: $R = A > \theta$

A Moral Disposition is Rewarded.

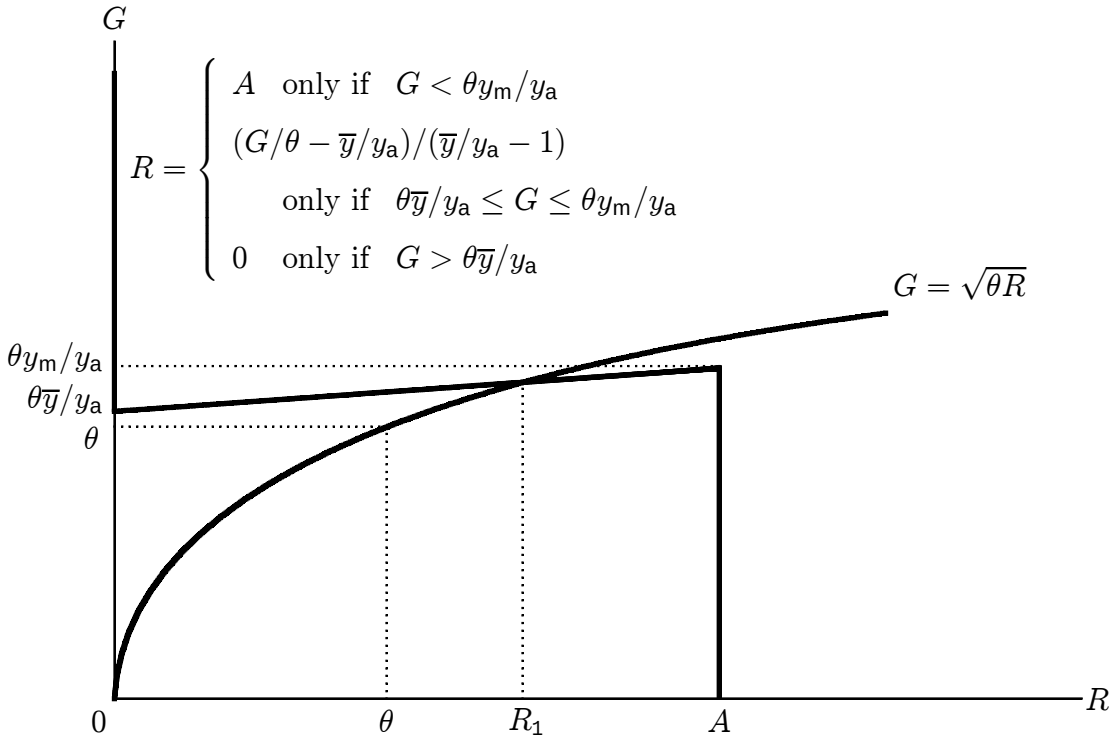

Figure 3: $\theta < R = R_1 < A$

A Moral Disposition is Rewarded.