AN ECONOMIC ANALYSIS OF SLAVERY*

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INTRODUCTION

THIS paper seeks to explain certain observations pertaining to slavery. Several of the implications will be tested against data provided in Fogel and Engerman's recent work on the subject,[1] in conjunction with a scattering of information from numerous other sources.

In a nonslave economy, an individual determines the amount of labor he is willing to supply simultaneously with his consumption decisions. In this respect, labor differs from any other factor of production. In a slave economy, however, both the amount of labor to be extracted from a slave and his consumption or "feeding" are determined by the slave owner. Thus, the labor market for slaves differs from that for freemen by the decision-making unit through which options are exercised.

In what follows I postulate that in his labor-supply decision a freeman will take into account nonpecuniary dimensions of his work and of his leisure time. On the other hand, the slaveowner is assumed to act as a wealth maximizer in deciding what amount of labor to demand from his slaves. Thus we abstract from any nonpecuniary aspects in master-slave relationships. At the same time, we recognize that while the slave is subject to the dictates and enforcement of his owner's will, his action also depends on his own preferences for pecuniary as well as nonpecuniary goods.

Under these postulates, how would slaves be treated? How would their performance differ from that of free workers, and from that of such other factors of production as machines?

The following section compares the work effort and consumption levels of slaves with those of freemen, largely under an assumption of zero policing

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[1] Some of the hypotheses advanced in this paper are not new. In particular, see Robert William Fogel & Stanley L. Engerman, Time on the Cross (2 vols. 1974) [hereinafter cited as Fogel & Engerman]; Paul A. David & Peter Temin, Slavery: The Progressive Institution?, 34 J. Econ. Hist. 739 (1974).

costs. The effects of positive costs for policing are then considered in the remainder of the paper.

Effort and Consumption

A major tool in our analysis is a modified model for labor-leisure choice. A central proposition of the conventional model for allocating time between work and leisure is that an individual will choose that amount of work which equates his wage rate to his subjective marginal rate of substitution between leisure and goods. This is tangency Point E in Figure I between an indiffer-

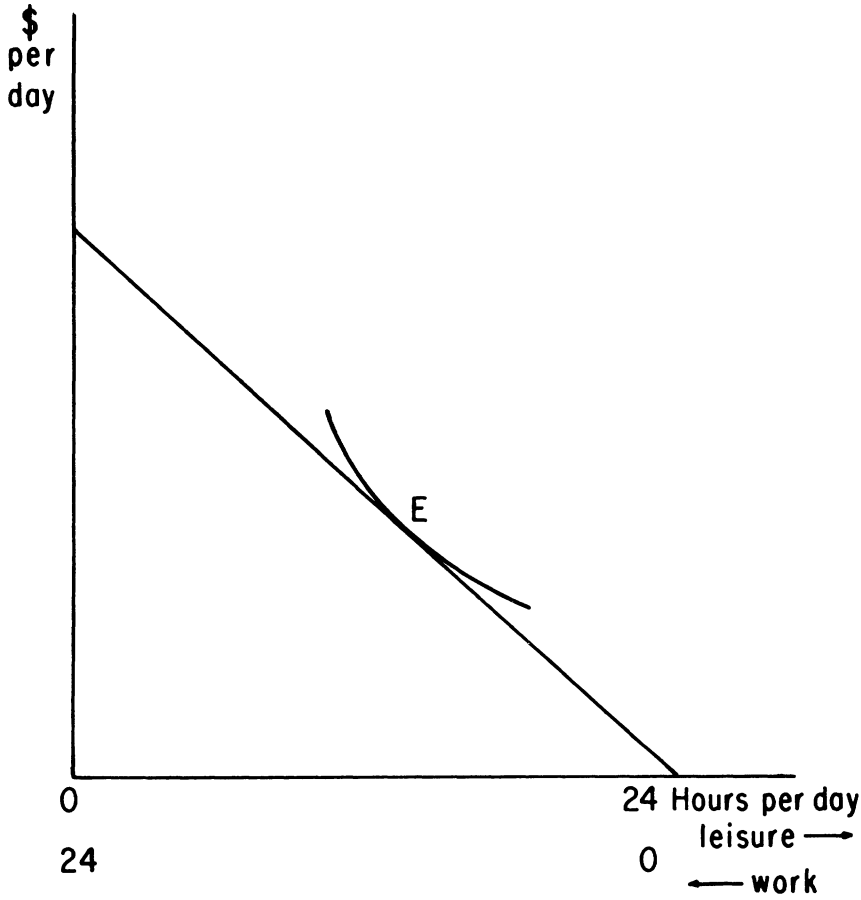

FIGURE I

ence curve and the "wage line" he faces. To serve our purpose, the conventional model has to be further articulated and somewhat modified.

The (competitive) wage rate facing an individual should not be viewed as just a technological datum, but rather as a result of choice. Implicit is the notion that the individual paces himself optimally to satisfy two distinct objectives. One is to properly distribute work effort over his career. The other is to insure that available leisure time, and possibly the working day itself, may be pleasurable. Equalization will take place with respect to each of the margins.

A wealth-maximizing owner, while obviously concerned with proper pacing, does not benefit from his slave's inactive time or leisurely work. He has no incentive to reduce the work-effort requirement to provide leisure or pleasant working conditions. For any given number of working hours, then, a slave will be held to a more intense work pace than a freeman would choose. As a result, the wage line for a slave will *necessarily* lie above that of an equally productive, but free, man. Indeed, except for the optimal distribution of effort over time, a slave's wage line is a technological datum.

For both a freeman and a slave, some consumption is requisite to any given work effort. In conventional analysis this is implicitly incorporated into the utility function, probably because it is both difficult and usually unnecessary to separate "productive consumption" from other consumption. Such separation is desirable, however, in the present analysis; we assume merely that productive consumption increases with the level of effort.

As a final point in modifying the conventional approach, we consider the issue of daily hours. The height of the wage line in a model for labor-leisure choice represents what the employer is willing to pay, which is proportional to the individual's contribution to output. In Figure I, that contribution is highest at twenty-four hours a day. An owner will not force his slave to work that long, however, because, as hours of work increase, fatigue causes the (absolute) slope of the wage line to decline until it eventually reaches zero, which is the point of its maximum level.[2]

In Figure II, GP_S and GP_F relate the value of the gross product associated with different numbers of hours worked by a slave and by a freeman, respectively. The two individuals are assumed to possess identical skills and to be equal in every other relevant aspect. The heights of the curves differ only because the slave is forced to pace himself harder than the other would choose. The line PC_S is the value of productive consumption of a slave who is required to produce on GP_S whereas PC_F is the line for the freeman; the latter is lower because of the lower per-hour work effort. Finally, NP_S and NP_F are

[2] For a more detailed discussion of this point, see Yoram Barzel, The Determination of Daily Hours and Wages, 87 Q.J. Econ. 220 (1973).

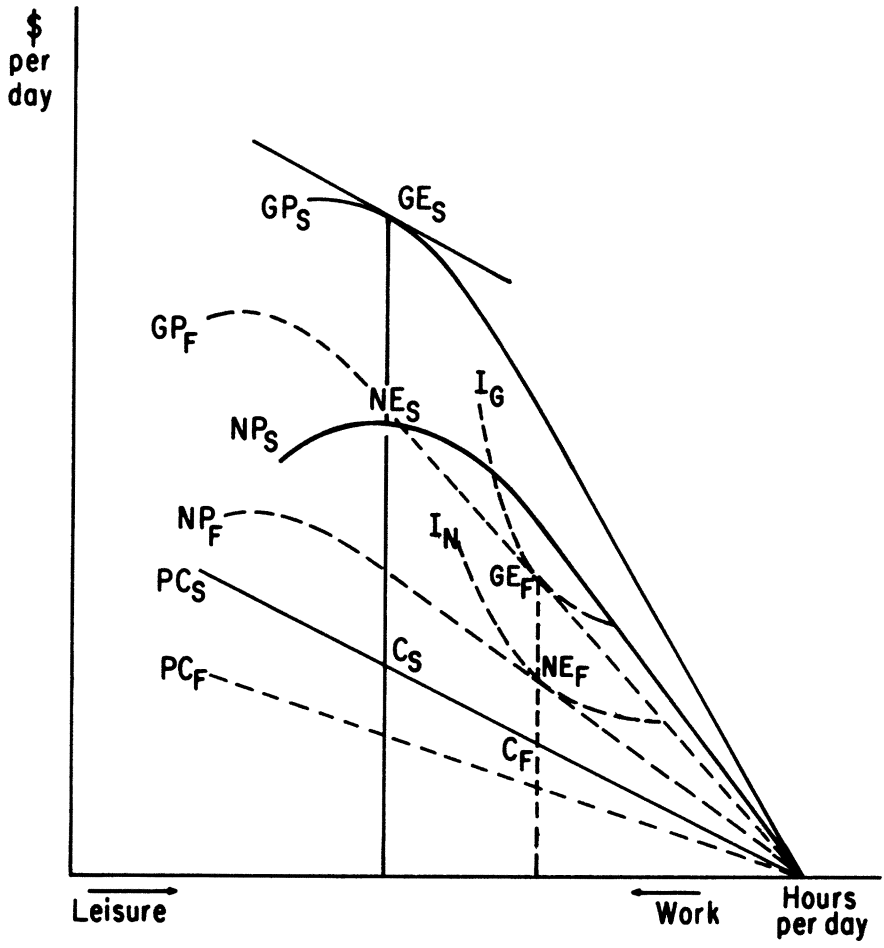

FIGURE II

the respective net product curves—the gross product curves from which productive consumption is netted. NE_S is the equilibrium point for a slave, since there his net output is highest. The consumption associated with this level of effort is C_S; NE_F is the equilibrium point for a freeman.[3]

Let us look at the problem from a different angle. In the analysis underlying Figure II, it is implicitly assumed that the nonhuman wealth of the free individual is zero; he owns no assets, neither is he a debtor. Thus, the curve

[3] I_G and I_N represent a single utility level; productive consumption is netted from the former to obtain the latter.

GP_F represents his entire market-opportunity set, from which he chooses Point GE_F. Consider, however, a net debtor who has to repay an amount $NE_S = GE_S - C_S$—the maximum net output for a slave.[4] To be able to pay that amount *and* to stay alive, the individual has to exert himself to the limit; he has to produce at Point GE_S on GP_S and to consume at C_S. At any other point on GP_S (or any of the others requiring less effort) the value of output would not suffice to meet both loan payment and productive consumption need. It is clear that due to his extreme poverty, his "choice" is limited to a single point. Note that at NE_S, the NP_S curve is horizontal and the net marginal product of his time is zero.

More generally, the move from GP_S to GP_F and the move of the equilibrium points associated with these curves can be viewed as continuous, and dependent on the level of wealth. As wealth declines, the individual chooses to operate on higher curves. Equating on the margin takes place constantly as GP_S is approached. PE_S is the limiting point of the process where the individual operates under conditions of the most extreme poverty.[5]

In the absence of policing costs, it is immaterial whether we designate the individual as a freeman who chooses to be at GE_S and to consume at C_S, or whether we call him a slave whose owner forces him to operate at Point GE_S and supplies him with consumption goods at C_S. If the foregoing is correct, and if policing cost is the only relevant aspect absent in the above analysis, then the determination whether the poorest individual will be a slave or a freeman rests entirely on the costs of policing.

It will later be pointed out, however, that in the presence of policing costs the distinction is substantive. A person who borrows an amount as large as $GE_S - C_S$ could not remain free under the prevailing institutional arrangements. Thus empirically a quantum gap exists between the wealth status of "slaves" and that of "freemen." The term "slave" seems cogent, then, not only to characterize a worker under a particular kind of contract, but also to differentiate him in terms of wealth from even the poorest freeman who will not, in general, be nearly as destitute.

Returning to the comparison between the two classes of workmen, two immediate and major implications appear. (1) The total output and, therefore, the measured "productivity" of a slave will be higher than that of an equally productive free worker. Equilibrium for the former is at GE_S; the latter will choose Point GE_F. (2) The productive consumption of a slave will be correspondingly higher, at C_S, while that of a freeman will be at C_F. It will

[4] To simplify, the analysis is confined to one period.

[5] The same basic notion underlies the derivation of the supply of labor when asset holdings decline to the minimum consistent with survival; this point is made by Yoram Barzel & Richard J. McDonald, Assets, Subsistence, and the Supply Curve of Labor, 63 Am. Econ. Rev. 621 (1973).

be shown below that these two implications still hold when the assumption of zero policing costs is dropped.[6] Therefore, it is not inappropriate to examine the evidence right here.

The findings of Fogel and Engerman strongly confirm these two hypotheses: they found both that slaves were more productive and that they consumed more calories. With respect to productivity, the main finding is that "southern slave farms were 28 per cent more efficient than southern free farms,"[7] where efficiency is measured in terms of *total* factor productivity. The findings on productivity are for whole farms, in which some free labor joined that of slaves. However, where slaves provide a greater proportion of a farm's labor the measured productivity also rises.[8]

Our model predicts a higher output per man, but not necessarily both more effort and more hours: it is only necessary that one of the two be higher. With respect to hours, the evidence is ambiguous. Although Fogel and Engerman did not find longer daily hours for slaves, they did discover more time-input along a whole array of other margins: earlier age for starting

[6] The perspective in interpreting observed behavior, however, will change rather sharply.

[7] 1 Fogel & Engerman 142. The findings on productivity are by no means universally accepted. A number of reasons indicating a bias in the findings are given by (among others) Paul A. David & Peter Temin, *supra* note 1; and by Gavin Wright, Prosperity, Progress and American Slavery, in Reckoning with Slavery 302 (1976). They do not, however, provide a comprehensive recomputation to show that the results would be reversed. Wright also offers a critique of the Fogel and Engerman economies-of-scale argument. I find it even less persuasive than that on productivity.

[8] Indeed, the measured "economies of scale to farm size" may simply be due to the increasing proportion of slaves on the larger plantations. Assume quite arbitrarily that a slave works twice as hard as a freeman. Then the measure of labor input has to be doubled for its slave component. This would affect the productivity measure by a factor of $[(L_s \times 2 + L_f)/(L_s + L_f)]^{0.58}$ where L_s and L_f are the respective shares of slaves and of free labor and 0.58 is labor share in total input (2 Fogel & Engerman 132). In the table below, data on the share of slave labor by farm size is read from 1 *id.* at 195, fig. 44. The third column is the calculated correction of the productivity measure.

Persons per Farm	Per cent Slaves	Productivity Correction Factor
1–10	11%	1.062
11–20	48%	1.255
21–30	73%	1.374
31–40	81%	1.411
41–50	86%	1.433
51–100	91%	1.455
100+	95%	1.473

Since the ratio of slaves to total labor increases with farm size, the correction factor for productivity is correlated with farm size and therefore is not easy to distinguish from Fogel and Engerman's estimate of the scale economy to farm size.

Indirect support for this relation and for the productiveness of slaves is given by the observation that capital/man ratio rises with productivity as would be predicted by a conventional factor proportions analysis. "[O]n large plantations slaves generally worked on better land than free southern farmers and had more equipment." 1 *id.* at 210.

work, higher labor force participation by women, more work by the "disabled," and longer working life.[9]

The intensity of work is just one of the factors affecting the desirability of a job. The conclusion that slaves worked more intensively than freemen leads, by analogy, to the corollary that work assigned to slaves would have offered fewer amenities than the tasks performed by freemen.[10]

Consider now some of the large-scale activities in cotton plantations which required coordinated effort by a large number of workers. Such effort yielded, according to the evidence in Fogel and Engerman, most impressive results. "[T]he slave plantations of the newer southern states exceeded the average efficiency of free northern farms by 53 per cent."[11] The number of slaves in these plantations was large. "[T]he county average in the alluvial regions of short-staple cotton production ranged as high as one hundred twenty-five slaves per holding."[12] In spite of the higher productivity and the implicit higher wages accompanying such intensely coordinated effort, freemen did not choose to work in these plantations. "Economies of scale were achieved only with slave labor. There were no large scale southern farms based on free wage labor."[13] The reason is not hard to find. Olmsted, for instance, notes that the "stupid, plodding, machine-like manner in which they labor, is painful to witness"[14] and elsewhere cites an owner saying, "You never could depend on white men, and you couldn't *drive* them any; they wouldn't stand it."[15] Little wonder that freemen refused to pay the psychic price apparently necessary to maintain the large "efficient" scale. There was no reason, of course, for slave owners to spare their slaves such a regimen.[16]

[9] 1 *id*. at 207-09. More recently, Olson and Fogel have suggested that annual hours for slaves were shorter than for free northern farmers. If this is so, our model implies a more intense effort. Their findings, however, are based on a mixture of observations on slaves and freemen and are not entirely satisfactory. John Olson & Robert William Fogel, Clock Time vs. Real Time: A Comparison of the Length of the Work Years in Northern and Southern Agriculture (1974) (unpublished paper at U. of Rochester).

[10] A related prediction is that a slave with a comparative advantage in performing a job where amenities are important would have been more likely to buy his own freedom than other slaves. As a slave, his consumption of job amenities relative to other goods was high. When freed, however, he would have been willing to work harder to get more market goods. Note that this argument hinges on the initial presence of costs of policing him as a slave. (See discussion on "self-purchase" pp. 18-21 *infra*).

[11] 1 Fogel & Engerman 200.

[12] *Id*. at 200.

[13] *Id*. at 194.

[14] 2 Frederick Law Olmsted, Cotton Kingdom 202 (1861) [hereinafter cited as Olmsted].

[15] 1 *id*. at 83 (italics in original); 1 Fogel & Engerman 205 also cite this and the preceding quotation.

[16] In the U.S. South the comparison was often by color. The fundamental distinction, however, is between freemen and slaves. " 'It is a known fact,' wrote a leading member of the

The attempt by Fogel and Engerman to extol the "superiority of the plantation system of organization," and to conclude that the slaves' labor was of "superior quality" is entirely meaningless. There is no reason to think that white slaves would have performed differently or that freed slaves would have been willing to maintain that effort. The "special quality" of plantation labor was simply "slave quality."[17]

Carrying forward the hypothesis that slaves would have been expected to perform the less desirable tasks, consider now a broader interpretation of the term "amenities" to include the health conditions of different locations. Engerman notes that "the healthier areas apparently attracted more whites relative to blacks [i.e. slaves], leaving the relatively unhealthier areas with almost completely black populations."[18] This is consistent with the prediction that freemen will have more job amenities than slaves can obtain.[19]

Another dimension is the amount of leisure. A major difference between northern and southern agriculture is that little agricultural work can be accomplished during the winter months in the North. Even indoor work was formerly limited by the paucity of artificial light, therefore labor alternated with large amounts of leisure. In the South, however, the winter days were relatively long and the soil was workable. This difference may explain why slavery, at least within agriculture, was confined to hot climates and seldom played a role in the northern United States or in other less temperate regions.[20] More direct evidence relates to the production of sugar, where seasonal variation in labor requirements seemed low: "During slavery [in British Guiana] field and manufacturing operations were carefully timed and co-ordinated with one another and with the weather to permit the produc-

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plantocracy, 'that without compulsion . . . [manumitted slaves] will not engage in agricultural labor. Wages will not induce them to undertake it . . . A state of slavery alone can ensure such labor from them.' " Jerome S. Handler, The Unappropriated People: Freedmen in the Slave Society of Barbados 117 (1974).

[17] Fogel himself makes the same point, Robert William Fogel, Three Phases of Cliometric Research on Slavery and its Aftermath, 65 Am. Econ. Rev., pt. 2, at 37 (Papers & Proceedings, May 1975).

[18] Stanley L. Engerman, Comments on the Study of Race and Slavery, in Race and Slavery in the Western Hemisphere: Quantitative Studies 200 (Stanley Engerman & Eugene Genovese eds. 1975).

[19] A distinction should be drawn between, on the one hand, the ability to come up with evidence consistent with a hypothesis and, on the other hand, the specification in advance of what evidence will be sought that could refute the hypothesis. The former procedure is inferior since the researcher may, consciously or otherwise, bypass evidence inconsistent with the hypothesis. Some of the evidence presented here is, unfortunately, of the former kind.

[20] The higher level of schooling in the northern farm sector of the United States, as compared with the southern, may also be explained partly by the long, severe winters which reduced the alternative cost of time. That slavery was also unimportant in the northern parts of the Roman Empire is noted by William L. Westermann, The Slave Systems of Greek and Roman Antiquity 131 (1955).

tion of two full crops of sugar every twelve months. Emancipation and the increasingly irregular nature of the labor supply, however, gradually forced planters to abandon this practice in favor of single cropping."[21]

To analyze some aspects of consumption by slaves, we begin with the question of energy. A slaveholder who starved his workers would be comparable to a truck owner who deprived his truck of gasoline. So long as owners required higher effort than they could obtain from freemen, the energy input for slaves had to be correspondingly higher. Fogel and Engerman conclusively demonstrate that slaves' diet contained substantially more calories—in excess of 10 per cent—than freemen's.[22] The fact bears directly on their more intensive effort regardless of whether it constituted "good treatment."

Calories, of course, can be obtained in a variety of ways. Abstracting for a moment from other dietary considerations, to the extent that a freeman will select any food at a price above a basic minimum per calorie, we should observe a difference between his diet and a slave's, since poverty will constrain slaves to the least expensive choice. Fogel and Engerman's data show that such differences did exist. "Much has been made of the fact that corn was the principal grain consumed by slaves, while wheat was the principal grain in the free diet. Yet from a nutritional standpoint, both are excellent foods. . . ."[23]

It would be expected that the diet of slaves would be high in just such nutritional qualities as well as in calories, since food "good for them" by contemporary standards would keep up their productive strength. Like children, they would have been forced to swallow their pills but they would not be given a lollipop as reward.[24] Freemen, on the other hand, would not concern themselves merely with diet optimization. Here, also, the evidence points to a difference in consumption behavior. "[B]oth slaves and freemen ate large quantities of potatoes, slaves consumed virtually nothing but sweet potatoes, although most of the potatoes consumed by freemen were white. The significance of this dichotomy is that sweet potatoes are much better food than white potatoes."[25] So the empirical observation that slaves were fed a "better" diet has little bearing on the question of how well they were treated in general.

[21] Michael Moohr, The Economic Impact of Slave Emancipation in British Guiana, 1832-1852, 25 Econ. Hist. Rev. 588, 599 (2d ser. 1972).

[22] 1 Fogel & Engerman 109-15. It is likely that (within the relevant range) the income elasticity of calories is positive. Given their higher income, freemen are expected to consume more calories. Fogel and Engerman's finding, then, is in spite of this factor.

[23] *Id.* at 113.

[24] The element of compulsion indicated here and in the next paragraph has to do with policing costs to be discussed in the next section.

[25] 1 Fogel & Engerman 113.

There is no need to dwell on the medical treatment and hygienic conditions of slaves; the situation completely parallels that of diet.[26] The distinction between slaves and freemen, however, is most strikingly illustrated by the following: "The *punishment* for slaves who failed to keep themselves personally clean was a *forced* scrubbing by the driver and two other blacks,"[27] and "sometimes the negroes were told at night that any one who came into the field the next morning without being clean would be whipped."[28]

The Policing of Slaves

Slaves, as pointed out earlier, were extremely poor. This was obviously so of forced slaves, most of whose possessions were stolen from them. It was also true of voluntary slaves who were enslaved when unable to repay loans obtained with their own persons as collateral.

As an alternative to slavery one may conceive of conditions where a borrower would have been allowed to remain free, sell his services in the labor market, and use his earnings to provide for his own consumption and for loan payments to his creditor. That this did not occur implies that creditors insisted on (voluntary) slavery because it entailed sufficiently lower policing costs. Since policing costs seem pivotal throughout the institution of slavery, various aspects of such costs are examined below.

In a world in which policing (and transacting) is costless, joint maximization of output will prevail, as demonstrated by Coase.[29] Not only is income maximized, its distribution is also clearly determined by the pattern of ownership. As shown earlier, under such conditions the net income of forced slaves would be zero.

Consider now a world in which policing is costly, and maximization takes place only subject to the additional constraint. Any given method of policing slaves will consume some resources. Moreover, if diminishing returns prevail, the optimal use of resources will necessarily fall short of that required to eliminate all policing problems. Therefore, slaves will not produce to their capacity, and even gross output (prior to subtraction of policing costs) will be less than if policing were costless.

[26] On the ground of striving for productivity, slaves' medical care would be better than freemen's, but for wealth considerations the reverse is true. So we can predict neither a differential in health levels nor in life expectancy for slaves compared with freemen. The evidence presented in Fogel and Engerman shows little difference between the two. The ambivalence of slaves towards their own health is illustrated by the following: "They [slaves] conceal pills . . . and declare that they have swallowed them . . . [as they] were loth to be made quite well enough to have to go to work again." 1 Olmsted 118-19.

[27] 1 Fogel & Engerman 122 (emphasis added).

[28] 1 Olmsted, *supra* note 14, at 200.

[29] R. H. Coase, The Problem of Social Cost, 3 J. Law & Econ. 1 (1960).

But now the income of slaves is no longer zero. First, since policing is optimized, a certain amount of "shirking" and similar behavior will take place. Second, "policing" may take the form of directly remunerating slaves. The value of the *net* output of a slave, however, has to exceed the pay of freemen providing the same kind of services, otherwise the incentive to hold slaves will disappear. Under these conditions, some positive remuneration to a slave is consistent with maximization, even though it would be a contradiction in terms were policing costs zero.

The costs of policing a slave consist of identifying, in terms of Figure II, the curves GP_S and PC_S (and particularly Points GE_S and C_S on them) and then enforcing the appropriate performance. Errors in overestimating productive capability and in underestimating the requisite consumption are costly both to the owner and to the slave. Errors in the opposite direction, however, while costly to the owner, constitute a transfer favorable to the slave.[30] Since it is argued that policing costs are at the heart of the entire institution of slavery, we wish to derive and test implications of their presence. Several specific policing problems are discussed in the following pages.[31]

A. *Policing of Consumption*

One class of observations with regard to slavery is so universal that it is routinely taken for granted with no attempt at explanation: provision for consumption at whatever level was *in kind*. Housing was on plantation grounds, clothing was distributed periodically, medical care as required, and food rations usually weekly. Why did owners not hand out the value of these goods in cash, to be used as the slaves pleased? Payments in kind, particularly when distributed according to a simple formula, are often explained as a way to reduce the cost of transacting. In my view, that was not the fundamental motive for this practice. The explanation rather lies in the distinction between slaves maximizing their own utility and owners maximizing their slaves' (net) productive capacity. Because a slave would be highly unlikely to consider the maximization of his productivity as a prime goal in spending any money he might have, his freedom of choice would almost certainly result in output loss. An owner directly controlling allocation would obviously come closer to maximizing the value of that net output. As Olmsted noted, one owner who pondered whether to rent out some of his hands "did not know whether he ought to let them go, though. They were worked hard, and had too much liberty, and were acquiring bad habits.

[30] This asymmetry, however, would make the term of the contract less favorable to a freeman when offering himself as a slave.

[31] The attention to various policing devices is not according to their importance but rather to my ability to advance explanations.

They earned money by overwork, and spent it for whisky, and got a habit of roaming about and *taking care of themselves*."[32]

Slaves quite often were able to earn extra income by means such as "moonlighting," raising food on their allotted patches, hunting, or stealing. To the extent that this income was used to supplement their food intake, owners had no reason to object; if anything, productiveness would be enhanced. Quite another matter was the acute problem cited by Olmsted; alcohol is notorious for its adverse effect on productivity. Our prediction therefore would be that masters would have spent resources to prevent slaves from obtaining it. Fogel and Engerman do not dwell on alcohol consumption, but the subject is mentioned about a dozen times by Stampp.[33] His discussions center on how owners attempted to deny slaves access to liquor with the single exception of Christmas drinking, which was condoned.

Olmsted time and again refers to the matter. He tells of a planter who "has a store, usually well supplied with articles that they [the slaves] most want, which are purchased in large quantities, and sold to them at wholesale prices; thus giving them a great advantage in dealing with him rather than with the grog-shops."[34] He describes other practices which are clearly inconsistent with minimizing transaction costs, as owners spent resources to prevent slaves from trading. For instance, "the general allowance of food . . . is distributed to them . . . on the better managed plantations, sometimes on Wednesday, to prevent their . . . selling it for whiskey on Sunday."[35] And, "they [slaves] generally save from their ration of meal . . . too often the exchange was for whiskey, which, against his [the owner's] rules, they obtained of some rascally white people in the neighborhood, and kept concealed. They were very fond of whiskey, and sometimes much injured themselves with it."[36] Finally, "the manager endeavours to encourage this practice [of buying flour]; and that they may spend their money for flour instead of liquor, he furnishes it to them at rather less than what it costs him at wholesale . . . each [of the white liquor sellers] have a standing offer of much more than the intrinsic value of their land, from the manager, to induce them to move away."[37]

The hypothesis is here refuted that goods were given to slaves merely to reduce transaction costs. Rather, observed behavior is consistent with the hypothesis that where slaves' desired consumption patterns conflicted with their productivity, masters acted to induce the latter.[38]

[32] 1 Olmsted 60.

[33] Kenneth M. Stampp, The Peculiar Institution (1956).

[34] 1 Olmsted 254-55.

[35] *Id.* at 102.

[36] *Id.* at 103.

[37] 2 *id.* at 196.

[38] It may appear that some constraints on drinking imposed under the British Truck System

B. *Self-Purchase*

The costliness of policing the effort and consumption of slaves has additional important implications. Consider, hypothetically, capital markets in which, first, future labor earnings are not discounted more heavily than earnings of other kinds of capital and, second, where costs of policing work effort are zero. Under these conditions a slave should be able to buy out his "contract," but his subsequent performance would not change one iota.[39] The value of a forced slave to his owner reflects conditions where he is driven to the limit (Point GE_S in Figure II) and every ounce of productiveness is squeezed out of him. The amount he will have to pay his owner to buy his freedom is the present value of his output under these most adverse circumstances. Being a slave, he has no capital and can finance himself only through the loan market; to repay his loan he will have to work precisely as hard as when he was a slave.

When policing costs are positive, slaves will not always be more productive than freemen. Net of these costs, the GP_S curve in Figure II is not necessarily higher than GP_F since the former will in general require more policing. Only in a subset of activities, then, will slaves be more productive. To economize on the costs of policing, owners may sell their contracts to slaves whose comparative advantage is in other activities. Granted that capital market forces pull in the opposite direction—the discount rate facing a slaveholder (based in part on placing a lien on slaves' output) is likely to be lower than that facing a freed slave who has only his own future earnings as collateral for securing a loan. Nevertheless, when occupations or activities are compared, the narrowing of the difference between GP_S and GP_F reduces the profitability of slavery. Thus the observed "greater productivity of slaves" occurs not because slavery is more productive per se[40] but because slavery endured only where it proved to be more productive.

We are unable to predict what types of slaves would be expected to buy their freedom.[41] Available evidence, however, is consistent with the notion that policing costs were high for slaves who subsequently bought their own contracts. As indicated earlier, in the absence of policing costs a forced slave would need his entire working life to pay for his freedom. In actual cases,

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are of similar nature. These are discussed in George W. Hilton, the British Truck System in the Nineteenth Century, 65 J. Pol. Econ. 237 (1957). These, however, were by voluntary arrangement. A possible explanation is that the absenteeism associated with drinking decreased the firm's output by an amount greater than the lost wages of the absentees.

[39] Note that if these conditions were to apply universally, *forced* slavery would never emerge.

[40] This is the position Fogel and Engerman take.

[41] Note, however, that "in the West Indies, . . . slave domestics and tradesmen generally had greater chances for manumission than did field slaves. This was so not only because domestics and artisans had more personal contact with their masters but also because they had relatively greater opportunities to acquire cash resources to effect self-purchase." Jerome S. Handler, *supra* note 16, at 53.

payments sometimes extended over two or more decades, although "[s]ome skilled slaves were able to accumulate enough capital to purchase their freedom within a decade."[42] In such a case, the sum of payments made within a decade provided a higher net present value than the individual's remaining lifetime potential as a slave.

A somewhat different arrangement, pointing however to the effect of the same set of forces, allowed a slave to sell his own labor and to take care of himself while paying his master an annual fee. Full freedom was eschewed by these slaves, perhaps because of the precarious status of free blacks and the loss of the master's protection. The master, on his part, reduced the costs of collecting his fee by retaining formal ownership in his slave. In any case, the observation that "most slaves eagerly accepted that arrangement when it was offered to them"[43] attests the advantage of reduced policing.

In the United States, the number of slaves who actually redeemed themselves does not seem to have been substantial. Although free blacks lived throughout the South, their numbers were small and their freedom was constrained in various ways. The presence of large enclaves of free blacks in the South would have made escape by slaves much easier. (Indeed, as a corollary, the earlier disappearance of white servitude may have been due largely to the difficulty in identifying escaped bond servants.) It is not surprising that the selling or giving of freedom to slaves was frowned on both by public opinion and often by state legislation.[44]

The individual slave owner could have used the lure of manumission to induce higher output. On the other hand he had an incentive to let it be known that under no circumstances would he sell his slaves their contracts, since he thereby forestalled any effort on their part to reduce their own value to him. It was not unheard of for slaves to risk acts of insubordination or malingering in the hope of lowering the costs of buying their freedom.[45]

[42] 1 Fogel & Engerman 151.

[43] Kenneth M. Stampp, *supra* note 32, at 73.

[44] " 'It was admitted to be a rule,' observed a parliamentary commission which investigated Barbado's legal and judicial system in 1823, 'that every Negro is presumed to be a slave unless he can legally prove the contrary.' " Jerome S. Handler, *supra* note 16, at 59. Manumission fees (*id.* at 39-44) might have been imposed for the same reason.

[45] Olmsted tells of an estate executor who had "one very smart man, who, . . . ought to be earning for the estate $150 a year, . . . yet those wages for a year, . . . had amounted to but $18, while he had paid for medical attendance upon him [$] 45. Having failed in every other way to make him earn anything, he proposed to him that he should purchase his freedom and go to Philadelphia where he had a brother. He told him if he would earn a certain sum ($400 I believe), and pay it over to the estate for himself, he would give him his free papers. The man agreed to the arrangement, and by his overwork in a tobacco factory, and some assistance from his free brother, soon paid the sum agreed upon, and was sent to Philadelphia." 1 Olmsted 99.

Self-purchase took place at a small, but steady, rate in Barbados (and elsewhere in the West Indies). One reason for the resistance to self-purchase given by the archdeacon of Barbados was that "the slave will lessen his value by willful misconduct, with a view to obtain his freedom at a low price." Jerome S. Handler, *supra* note 16, at 36; see also his tables at 51-52.

C. *Life Expectancy*

The mortality rate in childbearing was higher for southern white women than for slaves, but the death rate among infants to age one was higher for slaves. This leads Fogel and Engerman to note the "strange paradox of planters who treated pregnant [slave] women and new mothers quite well while abusing their offspring."[46]

But compare the market value of a female slave at the childbearing age to that of an infant: about tenfold.[47] The mother's market value of some $400 to $500 implied that a slave owner would be willing to spend up to that amount to save her life, whereas the high discount rate on human capital and the prohibition of voluntary white slavery might well have precluded a poor, but free, white family from raising such an amount to protect the mother. On the other hand, a slave owner would spend only up to $50 or so to save an infant slave, while the family of a white infant might be able and willing to spend considerably more.

In some respects the slave status offered an advantage. It is possible to show that under certain conditions a free man will, if permitted, sell himself into slavery.[48] For instance, given that same high discount rate to human capital, a change in economic conditions might turn the present value of a "free" child negative, although as a slave he might command a positive price.[49] Under such conditions, the legal prohibition on white slavery put freemen at a disadvantage. One indication may be the higher maternity death rate among whites than among slaves, as just noted. A more dramatic case in point relates to crimes punishable by death. "In cases such as murder, the sentences of slaves who would otherwise have been executed were frequently converted to severe whipping, coupled with exportation to another state or a foreign country" so that "the state could recover a substantial part of the value of a slave that would have been lost through his execution."[50] This avenue was foreclosed to freemen.[51]

[46] 1 Fogel & Engerman at 123.

[47] Values are read from *id.* at 72, 76, Fig. 15, 18.

[48] This apparently was observed at times in the U.S. See Kenneth M. Stampp, *supra* note 32, at 92. It was common practice in the ancient world and until recently in Africa.

[49] "Famine . . . encouraged an intermediary variety of slave: . . . children, sold into slavery by their families in times of need . . . This resort, to the sale of children, may have been widespread in cases of extreme dearth . . . ." And again, "a British official, attempting to check the traffic, intercepted and freed 200 children in less than three months!" Allan G.B. Fisher & Humphrey J. Fisher, Slavery and Muslim Society in Africa 62-63 (1970). (One wonders how the term "freed" may be interpreted).

[50] 1 Fogel & Engerman 144-45. Consider also the following: "In many cases, he [a Portuguese official] asserted, the slave owed his very life to slavery, for some of the slaves brought from the interior were prisoners of war, and would have been executed but for the profitable market ready to receive them." Henry W. Nevinson, A Modern Slavery 54 (1st Schocken ed. 1968) (1st ed. 1906). Notice, however, that the number of prisoners is not independent of slavery.

[51] This was not always so. For a long period, English convicts were sent to the colonies as indentured servants.

D. *The Policing of Performance*

Certain plantation activities involved the simultaneous work of large numbers of slaves, and frequently such work was assigned under a "task system" of uniform daily quotas.[52] That such a policy was followed despite obvious disparities in strength and capability among workers allows the derivation of additional implications regarding both life expectancy and policing costs.

Consider the occasional reference to slaves expiring from exhaustion. Since they were valuable assets, it might appear that only sadism on the part of the owner would allow such an outcome. However, a possible alternative explanation is consistent with a policy of wealth maximization.

Two questions arise. Instead of the task system, why was not each individual assigned a task commensurate with his ability? And, how was the size of any uniform quota determined? An answer to either query would certainly rest largely on the costs of policing. Had it been apparent that the quota would be set to the perceived ability of any particular slave, that individual would have had incentive to understate his capability. But where the quota was set at some "customary" level, no such incentive was present. A standard could, of course, be imposed only on a uniform basis. The less able slave might be driven to exhaustion in a vain attempt to meet the quota, and the signal to abler workers would be clear.

An implication of the model, then, is that occasionally slaves of wealth-maximizing owners would die of exhaustion.[53] One statement supporting the hypothesis is: "Continuously, or at least for long intervals, they [masters] drove their slaves at such a pace that was bound, sooner or later, to injure their health. Such hard driving seldom occurred on the smaller plantations and farms in urban centers; it was decidedly a phenomenon of the large

[52] The decision as to when to monitor output rather than input is of considerable interest. Monitoring inputs requires continuous policing while monitoring output requires policing only after the job is completed but must be supplemented by control of output quality. A hint of how the choice was made is given in the following. "The main object of this operation is to kill all the seeds of weeds, or of rice, on the ground. Ordinarily it is done by tasks—a certain number of small divisions of the field being given to each hand to burn in a day; but owing to a more than usual amount of rain having fallen lately, and some other causes, making the work harder in some places than others, the women were now working by the day, under a direction of a 'driver,' a negro man, who walked about among them, taking care that they left nothing unburned. Mr. X inspected the ground they had gone over, to see whether the driver had done his duty. It had been sufficiently well burned, but not more than a quarter as much ground had been gone over, he said, as was usually burned in task-work—and he thought they had been very lazy, and reprimanded them for it. The driver made some little apology, but the women offered no reply, keeping steadily, and it seemed sullenly, on at their work." 1 Olmsted 243. (*Id.* at 245 brings up the issue of monitoring quality).

[53] Owners had to be careful, however, not to err in imposing too high a quota. A mechanism was provided to correct such an error. "If after a hard day's labor, he [the driver] sees that the gang has been overtasked, owing to a miscalculation of the difficulty of the work, he may excuse the completion of the tasks; but he is not allowed to extend them." *Id.* at 249.

plantation."[54] In quite different circumstances, owners were less subtle. "It was the usual fate of such laggards [in slave caravans] to be killed by their disappointed masters, anxious to discourage any thought of feigning incapacity as a means of escape, just as in the Congo area it was usual to kill slaves who fell ill while carrying ivory."[55]

Some variability may be present among machines also. As the notion of "shirking" does not apply to machines, we would not expect a machine to be driven to destruction. The maximizing behavior of slaves, in the above instance, is the source of their plight.

The hypothesis has a couple of closely related implications. One is that slaves who fulfilled their quota early in the day would not have been required to perform additional tasks. "Short hours" for the abler slaves were, indeed, occasionally observed.[56] Any variation in ability around a required performance level involves a cost (which constitutes a lower bound of the saving in policing costs required to operate individual quotas); the larger this variability, the larger the cost. Another implication, then, is that within a plantation, uniformity of productive ability among the slaves would be highly valued. On this issue several rather scanty pieces of evidence are present in Olmsted. For instance, he observed that "on [large] plantations on the Mississippi, . . . the laborers were, to a large degree, tall, slender, sinewy, young men. . . ."[57] Elsewhere he says, "twenty men, or boys, for none of them looked as if they were full-grown, were ploughing, . . . Their task was nominally an acre and a quarter a day. . . ."[58]

More important was the system of classification of slaves. "The field-hands are all divided into four classes, according to their physical capacities; the children beginning as 'quarter-hands,' advancing to 'half-hands,' and then to 'three-quarter hands'; and, finally, when mature, and able-bodied, healthy and strong, to 'full hands.' "[59]

The monitoring of a slave's effort could relate either to his output or to his effort. In regard to the latter, the apparent contradiction between observations pointing respectively to the "hard work" performed by slaves and to their "laziness" in performing their "duties" may simply reflect the views of outsiders observing different degrees and forms of supervision.[60] In some

[54] Kenneth M. Stampp, *supra* note 32, at 81.

[55] Allan G.B. Fisher & Humphrey J. Fisher, *supra* note at 48, at 78.

[56] 1 Fogel & Engerman 206. Also, "The more industrious and active hands finish them [their tasks] often by two o'clock." 1 Olmsted 248.

[57] *Id.* at 13-14.

[58] *Id.* at 244. See also 2 *id.* at 146.

[59] 1 *id.* at 246. He then describes additional elements in the classification system and, on the following page, several specific tasks.

[60] If output can be monitored, the *threat* of the whip will be an incentive to perform. If only inputs are monitored, when the whip is not immediately present all effort will cease. Note also

cases, slaves were rewarded with positive payments for increased output. In others, the only incentive to work was the whip, and effort predictably tended to fall to zero when the overseer was not at hand.[61]

It is puzzling why Fogel and Engerman so assiduously resist the notion of "laziness" and try to impute to slaves the "Protestant ethic."[62] Granted that owners had reason to encourage such an attitude, the slaves had at least as strong incentive to violate it.[63] Fogel and Engerman's castigation of Stampp for not recognizing the slave's "superior" work attitude seems wholly misplaced. Idleness rather than adherence to the work ethic would have been the rational behavior.[64] Indeed, as suggested earlier, slaves would be kept only where the cost of extra supervision coupled with remaining uncontrolled shirking was less than the productivity due to the policing effort.

Voluntary Slavery

The institution of voluntary slavery poses two major problems. Why would a free individual commit himself as a slave? And, given that he does so, in what ways, if at all, will his status differ from that of a forced slave?[65]

Most of what can be said on the first question is embodied in previous sections and requires here only a brief summary. The rate of interest one has to pay for a loan depends on the security that he can offer, including future labor earnings. As the fraction of future earnings to be assigned as lien increases, the lender tends to require a contract securing not only the flow of labor earnings but also the capital asset—the person himself. The reason seems to be that the increasing cost of policing the loan makes possession of the asset preferable to a mere claim on the income flow it generates—itself an

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that if equipment failure will increase leisure, an incentive is present to induce it. "Sabotage" was a constant complaint by owners.

[61] "[A]s often as he [the overseer] visited one end of the line of operations, the hands at the other end would discontinue their labor, until he turned to ride towards them again." 1 Olmsted 208.

[62] "The logic of his [Stampp's] position made it difficult to acknowledge that ordinary slaves could be diligent workers, imbued like their masters with a Protestant ethic."

[63] Olmsted records the explicit reaction of one owner as follows: "Slaves never really felt under any moral obligation to obey their masters. Faithful service was preached to them as a Christian duty, and they pretended to acknowledge it, but the fact was that they were obedient just so far as they saw that they must be to avoid punishment. . . ." 2 Olmsted 101. This notion is captured well by Stampp. "Masters measured the success of their methods by the extent to which their interest in a maximum of work of good quality prevailed over the slaves' predilection for a minimum of work of indifferent quality." Kenneth M. Stampp, *supra* note 32, at 54. See also *id.* at 75, 100.

[64] Note that we have no reason to expect idleness to be carried over from slavery to freedom—from conditions where remuneration does not depend on performance to those where it does.

[65] A third question is: Why do all modern societies (and many ancient ones) ban such an arrangement?

object of choice to the borrower. The borrower, presumably, could have avoided the possibility of enslavement by paying a higher interest while offering inferior security. Obviously some, viewing these latter costs as excessive, chose instead to offer themselves as security.

What can be said regarding the condition of voluntary slaves? In Figure II the curve GP_S is drawn for a person who owes an amount $GE_S - C_S = NE_S$ and the curve GP_F for a person who is neither a debtor nor a creditor. A person who is not a net debtor does not have to submit to slavery. A person who owes a small fraction of NE_S perhaps can maintain his freedom, but presumably he will lose the status before the fraction becomes unity. Abstracting from a person's legal status, suppose he owes some fraction of NE_S. At that level of wealth, the corresponding productivity curve is somewhere between GP_F and GP_S and the equilibrium point between GE_F and GE_S. Such a person's net income exceeds his subsistence requirement; he could, for instance, accumulate assets.

If we now consider the entire set of individuals who, having posted themselves as security are unable to pay their debts, it seems clear that we can anticipate a whole spectrum of degrees of default and an equally broad range in the severity of their slave contracts. On average, we would expect their contracts to be more lenient than those of forced slaves who, by the very nature of their position, lose all the income that can be extracted from them.

One would expect, for example, that voluntary slaves should obtain more consumption goods than forced slaves, should be allowed more freedom of action (as their incentive to escape is less), should be able to work in occupations with more amenities, and should more easily be able to buy their freedom.

Westermann's description of slavery in Greece and Rome lends support to the last three expectations. With respect to the first, too little is said to permit inference. A difficulty with Westermann's description is that most of the time he does not differentiate voluntary and forced slavery. Nevertheless, the overall impression is that voluntary slaves were engaged in a wide range of crafts, were allowed considerable freedom of movement, and could manumit themselves readily.[66] Associated particularly with the right of self-purchase was the quasi-legal right to own property that could be used for manumission.[67] Indeed, Westermann observes that "manumissions had constantly occurred upon a wide scale and the barrier between slavery and freedom had

[66] In Athens in the years 349-329 B.C., out of 79 *former* male slaves only 12 were occupied in agriculture; and out of 56 females, none. Most females were in manufacture and most males in manufacture and distributive service. William L. Westermann, *supra* note 20, at 13. See also *id.* at 35, 68-74. With respect to freedom of movement, it may be observed, for instance, that slaves were often used as messengers.

[67] *Id.* at 83; see also 25.

never been a rigid one."[68] In a few cases, a distinction was made between slaves employed on plantations (*latifundia*) and those employed elsewhere. The treatment of the former seems similar to that of slaves in the American South, including the difficulty of manumission and the way slaves were driven.[69]

In a monograph on slavery in Ptolemaic Egypt, Westermann briefly but explicitly discusses "debtor slaves." Their status ranged from the mild form of "debtor bondage" to full-fledged slavery. In general, slavery terminated when the debt was paid. During slavery, various restrictions were placed on the owner, customarily including a ban on sale abroad, presumably to prevent the imposition of forced slavery.[70]

In Africa, where both voluntary and involuntary slavery were common, some evidence points to different treatment of the two groups. In a brief survey of slavery in five African areas late in the nineteenth century and early in the twentieth, the societies are divided between those that practiced voluntary slavery—Ibo, Ila, and ("to a lesser extent") Ashanti—and those that did not—the Kanuri and the Zanzibaris. "The manumission, or freeing of slaves, was an automatic process among the simpler societies such as the Ila, Ibo, and even among the Ashanti." . . . "Only in the more complex states like the Bornu [where, presumably, lived the Kanuri] and Zanzibar was slavery a status inherited over a number of generations." "In Zanzibar the bulk of the slaves worked on the farms and were an economic benefit just as they were in the southern United States."[71]

The comparison between forced and voluntary slaves makes it clear that indentured servitude is simply one step down in the severity of the "slave contract." Indeed, the indenture contract was not designed to recover past loans but rather to assure increased earning potential to the recipient, secured by a few years of slavelike service (and often accompanied by a substantial severance pay). Similarly, "serfdom" can be viewed as a step away from slavery in that the rights of the lord over his serfs were more constrained, as in the matter of what they might own.[72]

[68] *Id.* at 120. Note also that slaves and freedmen had often the same legal status. See *id.* at 119. One cited instance of limited slavery is that of an indentured son who was to work for the creditor until his father's debt was repaid. *Id.* at 137.

[69] Westermann himself makes this comparison. *Id.* at 154. See also his citation of Cato the Elder. *Id.* at 76.

[70] William L. Westermann, Upon Slavery in Ptolemaic Egypt 48 (1929).

[71] Ronald Cohen, quoted from his introduction to a special supplement, Slavery in Africa, in Trans-action, Jan.-Feb., 1967, at 45. At 54 in the same supplement, Victor Uchendu, Slavery in Southeast Nigeria, explicitly states that for debtor slaves, "the period of their servitude depended on the time it took their primary owners to redeem them."

[72] Slavery is also often compared with conscription and with imprisonment. The assumption of owners' wealth maximization, however, does not seem fruitful in those cases. Another

Some Speculation on Necessary Conditions for the Existence of Slavery[73]

Slave trade usually involved the capture and the enslavement of previously free men. Such capture is an act of stealing. Although theft is a most pervasive phenomenon, organized stealing among states is usually confined to short periods. The normal course is for looting to be quickly converted into some form of tribute—and the explanation for this is straightforward. Like other objects of theft, loot has greater value to the victim than to the thief, otherwise it would already have been sold to him. Once a relationship of conqueror and conquered has been established, it is advantageous for both parties to transform tribute into cash payments to minimize the resource cost of the transfer. The persistence of forced African slavery therefore poses a puzzle.

In the Roman Empire, slaves were acquired only from border and transborder areas; districts ruled by Rome paid tribute and were sheltered from raids. Thus as the size of the empire expanded the number of new slaves declined. In Africa, however, the thefts of humans continued on a large scale and in a highly organized form for several centuries. Why was the process not converted into tribute? And why was Africa the main source of slaves? The answers, it seems, lie in the uniqueness of the human factor, on the one hand, and in the absence of territorial rights in the African interior, on the other.

As just suggested and as Coase[74] demonstrated, the greater value of an item to its owner than to a thief provides an incentive for a bribe. Moreover, in Coase's own illustration where cattle "steal" the farmer's crop, as long as the farmer's net market value is increased by keeping the cattle away, the means for the bribe payments can be readily found.

With the theft of humans the issue is more problematic. In general, a prospective slave possessing only his human capital *cannot* bribe his captor and still keep his freedom. His pecuniary return, as indicated earlier, may well be higher as a slave than as a freeman. Even if he were willing while remaining free to work as hard as a slave, capital market constraints might still prevent a sufficiently alluring bribe to his captor.

Moreover, slave raiders did not keep control of the invaded territory; rather it was under constant threat of raids from others. In other words, prospective slaves were in the "public domain" and were unable to offer

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distinction is that although the individual's wealth may exceed NE_S, no direct, legal mechanism is provided for manumission.

[73] Several of the points in this section can be found in Stanley L. Engerman, Some Considerations Relating to Property Rights in Man, 33 J. Econ. Hist. 43 (1973).

[74] R. H. Coase, *supra* note 29.

their raiders an acceptable alternative based on their future local earnings. Thus the relative value of the stolen item loses its meaning in this context. By the same token, the action *does* depend on who is liable for the damage. This is not because the Coase Theorem is incorrect; rather, in this case the distributional effects and transaction costs are essential, and the results obtained by abstracting from them are not applicable. If the slave is fully compensated, he will simply repurchase his freedom and stay in his former activity. But if a freeman is permitted to bribe his captor not to enslave him, in general he will be unable to raise the bribe and so will be enslaved.[75] His "behavior" will, of course, be drastically changed. We conclude, then, that a condition for the emergence of slavery is that the captives be unable to "bribe" their captors to maintain their freedom; that their *pecuniary net* present value as freemen must be lower than their price as slaves.

The value of a slave, obviously, would depend on his skills; but because of policing costs, the valuation of skills in freedom may differ greatly from their value under slavery. Free Europeans possessed market skills much more valuable than those of Africans; but apparently due to the differential in cost of policing, an African slave could command a price almost as great as that of the type of white European who might have been captured. On the other hand, in the era of the transatlantic slave trade the pecuniary net present value when free was in all likelihood considerably higher for a European than for an African, both because of the more valuable skills possessed by the former and because the latter faced a greater threat of recapture. A white man was thus in a better position to compensate a captor for his freedom,[76] and European raids resulted in loot and in various kinds of tribute but not in slavery.

Let us return to the issue of theft. Since transaction costs are not zero, theft does occur, and the state undertakes various measures to curtail the loss it generates. When an asset is stolen from a person, the legal machinery of the state is available to help him attempt recovery. But suppose a human being is stolen within the jurisdiction of a state? In any slave society, the legal status of a slave is almost invariably that of an object; he is not recognized by law as a person. Thus if the "stolen" person is deprived of his legal status by enslavement, how is he to go about reclaiming his "asset"?

States that permitted slavery as a general policy often imposed heavy penalties on forcible enslavement inside their borders.[77] The costs arising

[75] The capital market constraint is fundamentally due to positive "transaction costs." If these costs were zero, the Coase Theorem would apply.

[76] An in-between situation occurred when some war prisoners were freed after ransom was paid for them (which often they became obligated to repay) while other prisoners were sold as slaves. William L. Westermann, The Slave System of Greek and Roman Antiquity, *supra* note 20, at 7, 63, 65, 70.

[77] See, for instance, *id*. at 6.

from theft within the state and with measures to reduce it have to be assessed against benefits from "legitimate" slavery. In the U.S. South, the restriction of slavery to blacks served to retain the bulk of benefits, while the cost to whites of forcibly enslaving free blacks could not have been large. Where the distinction between "genuine" freemen and slaves was more costly to make[78] there was greater incentive to abolish slavery altogether; freemen otherwise were in constant hazard of being snatched inside their own areas.

Concluding Remarks

Slavery is a complex institution marked by greatly varied practices across societies in which it was found. To properly derive hypotheses in this area requires thorough knowledge of the institution. Because of the historical diversity of slavery and of the varying constraints across them, inference about any one society drawn from observations about another is risky. It is difficult, then, to find data for testing a hypothesis which are independent of those used in its formulation.[79] Thus the tests provided here have less power than one would hope.

Forced slavery and, to a lesser degree, voluntary slavery can be viewed as an extreme form of poverty. To keep alive, a slave had to work harder than a freeman, and to be able to maintain the more rigorous work pace he had to be fed more as well and to be provided with adequate "maintenance" such as medical care. The observed high levels of nourishment and of health of American slaves, then, does not necessarily mean that they were well treated; rather it is consistent with their required higher performance level which is also observed.

As a maximizer, a slave would be expected to "malinger," and since policing is costly, some malingering should be observed. Indeed, slavery endured only in areas and occupations where their productivity net of policing costs still exceeded that of freemen; otherwise, selling slaves their freedom was more advantageous. Slavery was viable neither in occupations in which supervision is costly, nor in temperate zones where due to climate much "leisure" was consumed in winter. Where slavery was practiced, the importance of policing costs was demonstrated by the deliberate monitoring of consumption to maintain the slaves' productive capabilities. The task system is another instance where some potential output was sacrificed in order to reduce the cost of supervision.

The whole institution of slavery seems to have hinged on the question of policing costs. In their absence, a slave could always have bought his freedom and involuntary slavery would have disappeared. Voluntary slavery was also the consequence of policing costs, evolving when personal debt

[78] In such instances, the costs of preventing the escape of slaves were also higher.

[79] This problem seems common to much economic history.

became large and the costs of collecting it appeared to be reduced by the enslavement of the debtor.

Since, on the whole, voluntary slaves were not as poor as forced slaves, the former were observed to enjoy more freedom and more amenities than the latter. They also redeemed themselves more readily. Finally, where it was difficult to distinguish slaves from freemen, both the cost of preventing escape and the cost of preventing free people from being forcibly turned into slaves were high. Under these conditions, the viability of the whole institution was lessened.