PARENTAL MALINCENTIVES AND SOCIAL LEGISLATION

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Over the past couple of centuries numerous countries have implemented a set of policies regarding the welfare of children and the aged. These are primarily laws against child abuse, restrictions on child labor and minimum wage laws, compulsory and free public elementary education, and social security and medicare programs.[1/] This set of laws, often terms "social legislation," is so widespread across different political systems and so well-entrenched that it would seem unreasonable to view the set as a significantly inefficient response to the narrowly conceived special interests of certain political pressure groups. Rather, it would appear to be much more reasonable to infer either that such legislation is merely a useful form of "window dressing" with few real allocative effects or that its political success is based on its ability to correct what otherwise would have been significant misallocations.

Numerous empirical studies appear to rule out the former possibility. Recent studies by Sanderson, Mitchell and Clapp, and Welch (1978) indicate a substantial effectiveness of child labor and minimum wage laws in the U.S. in reducing the labor of children. A recent study of Kotlikoff indicates that, aside from redistribution effects, the U.S. social security system significantly reduces pre-retirement consumption. The study of Chiswick

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1/See, for example, United Nations Educational, Scientific, and Cultural Organization, U.S. Department of Health, Education and Welfare, and Friedlander.

indicates a very significant effect of free public education on the quantity of education adopted in a country.[2/]

Therefore, by elimination, the hypothesis that social legislation tends to cure basic economic inefficiencies appears to be the most believable. However, while many arguments have been put forth to support such legislation, it is quite apparent, as has been cogently argued by West, 1965, that the welfare-economic foundation for these arguments has been extraordinarily weak. Perhaps the most promising, but also the least popular, of these arguments points to the almost universal imperfection in property rights structures which gives a parent authority over his young children but does not give him rights to the benefits he creates for the children.

[2/] While the empirical studies of the effectiveness of compulsory education laws display a substantial positive correlation between school attendance and the extent of the laws, the authors of most of these studies have argued that the independent effect of compulsory schooling laws in multivariate models is relatively small. This is clearest in the classic study of Stigler, which standardizes for per capita income and racial characteristics. But, since the method by which states with higher per capita incomes achieve higher levels of education may well be the imposition of stiffer compulsory laws, it is not really legitimate to infer the insignificance of such laws from their small independent statistical effect. These estimated effects are likely to appear small because of the relatively large errors of observation on the compulsory education variable and the fact when the letter of the law does not match its spirit (measured in this case by per capita income), the application of the law is bent toward the spirit.

Subsequent studies by Folger-Nam and Landes-Solmon, testing Stigler's conjectured explanation for the simple correlation, indicated that previous growth in enrollment has been a common factor explaining both current enrollment growth and the emergence of compulsory education laws. However, these studies do not effectively control for the growth in demand for public education such as would be picked up by adequate measures of state per capita income or per capita expenditures on education. While this prevents us from making inferences from these studies regarding the independent effect of compulsory education laws, even if state demand were effectively controlled for, a statistically insignificant regression effect of change in compulsory education laws on changes in school enrollments would not be conclusive due to the same kind of multicollinearity-measurement error problem which makes the original Stigler results inconclusive.

Most recently, Edwards, using a later, probably more statistically reliable sample, obtains statistical results indicating a much more effective control for demand factors. Correspondingly, she finds a significant independent effect of compulsory education laws on school enrollment rates in a single equation model. (While she also develops a simultaneous equations model whose estimation points faintly back to the original Stigler hypothesis, her non-linear specification clearly magnifies the errors of observation on the compulsory education variable, thus probably restoring much of the original bias.)

The earliest economic statement of this parental malincentive argument is apparently Alfred Marshall's discussion of the peculiar incentives facing the parents of a given worker:

> Those who bear the expenses of rearing and educating him receive but very little of the price that is paid for his services in later years. (pp. 560-561).

While Marshall felt that policies to encourage investment in children are justified by this imperfection, he neglected to derive a set of policies which would be an efficient response to the imperfection. A central purpose of this paper is to derive such a set and, at the same time, to offer a qualitative, welfare-economic rationalization for the observed set of policies regarding the welfare of children and the aged.

To derive the implications of the above property rights imperfection, Section I of this paper presents a simple model in which a child's resources can be devoted to leisure, work, or the development of future skills. His parent, who enjoys some satisfaction from the child's well-being, is responsible for how the youngster's resources are employed and can devote some of his own resources to the child's training. But lacking private property rights to any benefits he creates for the child, the parent can not collect material rewards from his grown youngster unless the child has developed a sense of filial loyalty and therefore shares some of his adulthood production with his aged parent. In this environment the parent may be led to overvalue investments that allow him to appropriate some returns from his childbearing endeavors and to undervalue those employments whose benefits accrue solely to the youngster. It is shown, though, and this is our central theoretical result -- that these inefficiencies do not occur in families for which the parents plan to give their grown youngsters lump-sum transfers.

Section II argues that while these results indicate a case for a certain form of government intervention, they do not suggest any simple tax/subsidy solution to achieve a Pareto optimum. Rather, the results suggest the combination of quantity and quality restrictions commonly observed. Hence, if the property rights imperfection discussed here is significant, its neglect may have led many economists to give inappropriate critiques of observed policies. It may be, for example, that many economists have been too quick to argue for parental freedom of educational choice for their youngsters, for the removal of legal barriers to teenage employment, and for the relaxation of compulsory participation in the social security system.

Section III indicates how the analysis also directly applies to the rarely discussed, but potentially very important, issue of whether the competitive rate of population growth is Pareto optimal. The competitive non-optimalities which we find will suggest a subsidy to childbearing by nonwealthy parents in developed economies. This we observe in the form of government subsidies to primary and secondary education, support which is relatively insignificant for children of the wealthy.

Section IV first points out that within the physical environment of Section I-III, an internally efficient political system comprised of voting adults and non-voting children would not impose greater sacrifices on the adults for the benefit of the children than the adults would privately choose for themselves (see, e.g., West 1965, pp. 11-12). For the same kind of property rights imperfection which characterizes the private system also characterizes an internally efficient democracy. Current, adult voters do not have the power to command full compensation for the benefits they collectively provide the younger generation. Nevertheless, we show that if adults are just slightly benevolent to individuals outside their own families, then a rational democratic system will provide a greater level of investment in children than will a private, laissez faire system. However,

extending our basic theoretical results of Section I to an internally efficient democratic collective, it remains a definite theoretical possibility that benevolence toward other families is insufficient for the internally efficient democratic system to increase investment in children all the way up to a Pareto optimal level. If collective benevolence were sufficient to induce voluntary, collective, lump-sum transfers to younger generations, the under-investment possibility would not exist. But such transfers are not observed. Additional, statistical evidence uniformly indicates that benevolence toward other families, even in the United States, has been insufficient for observed democratic systems to produce Pareto optimal levels of investment for the benefit of their children. If there is a substantial underinvestment in children even after the response of the internally efficient democratic system, then a pure Pareto optimum is still theoretically achievable, but only by replacing the democratic political system or the property rights system with an authoritarian system in which compensatory transfers to sacrificing parents can be ordered.

I. THE MODEL

The Technological Environment

Our model involves a youngster and his adult parent in a two-period world. During the first period the youngster is a child. When the second period arrives, the youngster becomes a young adult, a status technologically characterized by the youngster's loss of his previous informational inferiority, and the adult becomes elderly. Ending after the second period, the model rules out the possibility of later generations in the interest of expositional simplicity.

The human capital associated with each individual is the only productive resource formally considered. As a child and later as a grownup, the youngster's natural supplies of human capital are Y_1^*, and Y_2^*, respectively. Leisure represents one use for this capital, a youngster devoting Y_1^L to this activity as a child and Y_2^L to it as an adult. During each period, some of the offspring's resources, Y_1^Q and Y_2^Q respectively, may be employed to produce Q, a transferable consumption commodity. His adult production of this commodity depends both on the amount of his childhood resources devoted to developing his adulthood work skills, Y_1^W, and on the amount of his parent's resources devoted to this purpose, A_1^W. In summary, the conservation constraints in using the child's resources in each period are, respectively,

$$\text{(a)} \quad Y_1^* = Y_1^L + Y_1^Q + Y_1^W \text{ and}$$

(1)

$$\text{(b)} \quad Y_2^* = Y_2^L + Y_2^Q,$$

while the production functions using the youngster's inputs are

$$(2)\quad \begin{aligned} &(a)\quad Q_1^y = Q_1^y(Y_1^Q) \text{ and} \\ &(b)\quad Q_2^y = Q_2^y(Y_2^Q, Y_1^W, A_1^W), \end{aligned}$$

where Q_1^y and Q_2^y are the youngster's respective childhood and adulthood outputs. The production functions are quasi-concave, monotone increasing, differentiable, and have the property that $f(0) = 0$. The youngster's lifetime utility function is $U^y(C_1^y, C_2^y, Y_1^L, Y_2^L)$, where the C's indicate quantities of the commodity consumed (while the Q's represented the quantities produced).

The adult parent's natural supplies of human capital for each period are respectively, A_1^* and A_2^*. The adult's first-period supply can be devoted to work, leisure, the development of his child's skill, or the development of a sense of gratitude or indebtedness in the youngster. The adult's second-period supply of human capital is, more simply, spent on work or leisure. In symbols,

$$(3)\quad \begin{aligned} &(a)\quad A_1^* = A_1^L + A_1^Q + A_1^W + A_1^G \\ &(b)\quad A_2^* = A_2^L + A_2^Q, \end{aligned}$$

and

$$(4)\quad \begin{aligned} &(a)\quad Q_1^a = Q_1^a(A_1^Q) \\ &(b)\quad Q_2^a = Q_2^a(A_2^Q), \end{aligned}$$

where Q_1^a and Q_2^a are the adult's production in periods 1 and 2, respectively. A parent's utility depends on the welfare of his child

so that the parent's utility function is $U^a = U^a(C_1^a, C_2^a, A_1^L, A_2^L, U^Y(\cdot))$. All the utility functions are increasing, differentiable, and quasi-concave.

Conservation relationships for the distribution of the consumption commodities are, of course,

$$\text{(a)} \quad C_1^y + C_1^a = Q_1^y + Q_1^a \text{ and}$$

(5)

$$\text{(b)} \quad C_2^y + C_2^a = Q_2^y + Q_2^a.$$

Finally, none of our individuals can ever have negative commodity consumption or ever devote negative amount of resources to any activity.

The asymmetry in the utility functions, wherein the parent is naturally benevolent toward his offspring but not vice versa, is assumed for several reasons. The first is biological. While the survival of a species of higher animals typically requires parental benevolence, this survival is, if anything, hampered by benevolence of grown children toward their aging parents. The second is empirical. The values of observed voluntary transfers of goods and services in the U.S. from parents to children far exceeds that from children to parents. The third is technical. Allowing the offspring to have sufficient natural benevolence towards his parents that he will voluntarily share his adult output with them introduces additional notation without substantially altering our conclusion.

The other unusual feature of our technological environment is that a parent may devote resources to train his child to feel grateful toward his parent when he is grown and therefore to feel guilty if he does not transfer sufficient resources to his aging parent. This appears to be a

waste of the society's resources, and indeed, as we shall soon see, it is such a waste. The reason A_1^G appears in our model is that certain institutions of empirical interest will induce parents to adopt positive values while others will induce zero values.

Pareto Optimal Childrearing Decisions

The conditions for a Pareto optimum in the above environment are obtained by maximizing the following Lagrangian function subject to the nonnegativity constraints:

$$(6)\quad U^y(C_1^y,C_2^y,Y_1^L,Y_2^L) + \mu[U^a(C_1^a,C_2^a,A_1^L,A_2^L,U^y(C_1^y,C_2^y,Y_1^L,Y_2^L) - U^{a*}]$$
$$+ \lambda_1[Q_1^y(Y_1^Q) + Q_1^a(A_1^Q) - C_1^y - C_1^a] + \lambda_2[Q_2^y(Y_2^Q,Y_1^W,A_1^W) + Q_2^a(A_2^Q) - C_2^y - C_2^a]$$
$$+ \gamma_1[Y_1^* - Y_1^L - Y_1^Q - Y_1^W] + \gamma_2[Y_2^* - Y_2^L - Y_2^Q] + \gamma_3[A_1^* - A_1^L - A_1^Q - A_1^W - A_1^G]$$
$$+ \gamma_4[A_2^* - A_2^L - A_2^Q].$$

To facilitate the discussion, we can assume with one exception that the Pareto optimal allocation requires that positive amounts of the productive resources are devoted to each activity and that each individual's consumption is always positive. The important exception involves the employment of A_1^G. The Kuhn-Tucker conditions applicable to this variable are

$$(7)\quad \gamma_3 \geq 0 \text{ and}$$
$$A_1^G\gamma_3 = 0.$$

Since γ_3 is the joint marginal utility of childhood human capital, the nonsatiation condition on the utility functions implies that $\gamma_3 > 0$.

Therefore, (7) implies that $A_1^G = 0$ in the optimum. Instilling filial loyalty in the child by making him indebted to the parent uses valuable resources, yet the only return is a pure transfer to the parent. As pure transfers are costless within our optimality model, devoting resources to producing these transfers is clearly Pareto nonoptimal.

Setting the first derivatives of (6) with respect to all the variables except A_1^G equal to zero yields

$$(8)\quad (a)\quad \frac{\partial U^y/\partial C_1^y}{\partial U^y/\partial C_2^y} = \frac{\partial U^a/\partial C_1^a}{\partial U^a/\partial C_2^a}$$

$$(b)\quad \frac{\partial U^y}{\partial Y_1^L} = \frac{\partial U^y}{\partial C_1^Y}\frac{dQ_1^y}{dY_1^Q}$$

$$(c)\quad \frac{\partial U^y}{\partial Y_2^L} = \frac{\partial U^y}{\partial C_2^Y}\frac{\partial Q_2^y}{\partial Y_2^Q}$$

$$(d)\quad \frac{\partial U^y}{\partial C_2^Y}\frac{\partial Q_2^y}{\partial Y_1^W} = \frac{\partial U^y}{\partial Y_1^L}$$

$$(e)\quad \frac{\partial U^a}{\partial A_1^L} = \frac{\partial U^a}{\partial C_1^a}\frac{dQ_1^a}{dA_1^Q}$$

$$(f)\quad \frac{\partial U^a}{\partial A_2^L} = \frac{\partial U^a}{\partial C_2^a}\frac{dQ_2^a}{dA_2^Q}$$

$$(g)\quad \frac{\partial U^a}{\partial C_2^a}\frac{\partial Q_2^y}{\partial A_1^W} = \frac{\partial U^a}{\partial A_1^L}\,.$$

These seven equations together with the seven constraint equations represent fourteen generally independent equations which determine the Pareto optimal

values of the fourteen variables other than A_1^G, which equals zero.

These conditions are identical to the conventional private-good conditions that arise with no interdependence. This is no surprise. Instead, it reinforces the conventional economic presumption that under pure benevolence, i.e., when utility is for another's utility rather than for his specific activities, a Pareto optimal transfer has no effect on the conventional marginal conditions for allocative efficiency.

Property Rights and Privately Optimal Childrearing Decisions

Among the considerations underlying the institutions assumed in this paper is the disadvantage children would suffer if left to make certain decisions for themselves. Since superior adult information often cannot be economically communicated to a child prior to decision time, more knowledgeable adults emerge as decisionmakers for the youth. In our model, these adults are the child's natural parents.[3/] After designating the decisionmakers, there remains the problem of describing their incentive systems, or property rights. Comprehensive private property rights represent a conceivable system. Under such a system, parents would collect remuneration (or avoid assessment) according to the value of the benefits provided for the youngsters. Such extensive private property rights seldom appear though, and their absence probably reflects prohibitive costs associated with their delineation and enforcement. Rather, a parent in the

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[3/] The major empirical presumptions in support of this arrangement are that ordinarily (a) a natural parent's utility depends more heavily on his child's welfare than the utility of other adults, and (b) a parent's genetic similarity to his child gives him an information advantage regarding the preferences and natural abilities of his offspring. Empirical support for the former presumption is found in the willingness of parents to incur costs of childbirth which have historically exceeded the costs of adoption. (See, e.g., Atkinson on Bentham.) Evidence on the latter presumption is superabundant.

real world, and in the model below, has rights to the youth's childhood output but no rights to the child's adulthood output. When the youngster becomes an adult, he acquires all rights to his own resources and their product. The grown offspring may, of course, give part of his output to his parent; and it is also possible that the parent will give his adult offspring an unconditional gift, such as a bequest. These possible transfers and the property rights are reflected in the parent's income constraints:

$$C_1^a + C_1^y = Q_1^a + Q_1^y$$

(9)

$$C_2^a + T = Q_2^a + G,$$

where T represents the gift or bequest, a real lump-sum transfer from the parent to the grown youngster, and G a gratuity from the grown youngster to his parent. Although the provision of T uses no net resources, obtaining positive gratuity from his grown offspring requires a positive level of A_1^G. Of course, $G \geq 0$ and $T \geq 0$. The offspring's adulthood income constraint is

$$C_2^Y = T + Q_2^Y - G. \quad (10)$$

With these property rights, a parent assigning his child's human capital to leisure or skill development does so at the expense of his own income, because of the attendant reduction in the youngster's current output. Similarly, any of the parent's capital used to develop the child's adulthood work skills decreases the resources available for the parent's immediate gratification. Part of the reward for incurring these costs comes from

the parent's psychic association with the child, who enjoys some of the benefits. But material compensation accrues only if the youngster feels indebted to the parent and arises only from the output the youngster chooses to produce when grown. Therefore, in considering possible compensation, the parent must anticipate his child's adulthood decision. The problem gains interest because the parent -- given his knowledge and his authority over the youth's childhood activities -- can purposefully affect the offspring's choice of G. For example, promoting childhood work will in general influence the valuation the grown youngster places on work relative to leisure and thus on his willingness to work to provide goods for his aging parent. Most generally, the adult offspring's choice of G will depend on arguments in his utility and production functions, arguments which will be parameters from the youngster's standpoint but are currently variables under the parent's control. This means that in anticipating his share of the youngster's adulthood transfer, the parent must recognize that all of the variables he controls in the first period may influence G and consider the function:

$$G = G(C_1^a, C_1^y, Y_1^L, Y_1^Q, Y_1^W, A_1^L, A_1^Q, A_1^W, A_1^G).$$

Using the first period conservation equations, (1a), (3a) and (5a), this can be simplified to:

$$G = G[C_1^y, Y_1^Q, Y_1^W, A_1^Q, A_1^W, A_1^G] = G[x], \tag{11}$$

where the partial derivatives of G[x] are computed from G(·) by varying the omitted variables when it is necessary to satisfy the conservation equations. While these derivatives can be assumed to be non-zero

for positive values of A_1^G, they are all zero when $A_1^G = 0$. For when $A_1^G = 0$, $G = 0$ regardless of the values of the other variables. Gratitude can be instilled only by teaching it; but once taught, it can be exploited in many ways.

As an adult, the offspring will choose, besides G according to the G-function described above, the values of three variables, C_2^y, Y_2^L, and Y_2^Q. This choice, $(C_2^{y*}, Y_2^{L*}, Y_2^{Q*})$, can be found by varying the three values so as to maximize

$$(12) \quad U^y(C_1^y, C_2^y, Y_1^L, Y_2^L) + \lambda^y[Q_2^y(Y_2^Q, Y_1^W, A_1^W) + T - G[x] - C_2^y] + \gamma^y(Y_2^* - Y_2^L - Y_2^Q).$$

Assuming that this choice entails positive values for all three variables, it is easily derived to be that characterized by equation (8c) above, along with the two constraint equations implied in (12). The resulting value of U^y is written $U^y[x]$.

Note that since $C_2^{y*} > 0$, the maximization in (12) implies that

$$(13) \quad \frac{\partial U^y(\cdot)}{\partial C_2^y} = \lambda^y = \frac{\partial U^y[\cdot]}{\partial T} = -\frac{\partial U^y[\cdot]}{\partial G}.$$

We can now represent the parent's utility-maximizing decision as that which, accepting the U[x] and G[x] functions, uses the six first-period variables in x and (C_2^a, A_2^L, A_2^Q, T) to maximize the Lagrangian expression,

$$(14) \quad U^a(Q_1^a(A_1^Q) + Q_1^y(Y_1^Q) - C_1^y, C_2^a, A^* - A_1^Q - A_1^W - A_1^G, A_2^L, U^y[x]) +$$
$$\lambda^a[Q_2^a(A_2^Q(A_2^Q(A_2^Q)) + G[x] - T - C_2^a] + \gamma^a[A_2^* - A_2^L - A_2^Q].$$

The solution is written: $(x^*, C_2^{a*}, A_2^{L*}, A_2^{Q*}, T^*)$. The respective Kuhn-Tucker conditions with respect to T and A^G are, using the parent's optimality condition for C_2^a, or $\lambda^a = \partial U^a/\partial C_2^a$,

(15) $$\frac{\partial U^a}{\partial U^y}\cdot\frac{\partial U^y}{\partial T} - \frac{\partial U^a}{\partial C_2^a} \leq 0; \quad T^*\left[\frac{\partial U^a}{\partial U^y}\cdot\frac{\partial U^y}{\partial T} - \frac{\partial U^a}{\partial C_2^a}\right] = 0 \quad \text{and}$$

(16) $$\frac{\partial U^a}{\partial U^y}\frac{\partial U^y}{\partial A_1^G} + \frac{\partial U^a}{\partial C_2^a}\frac{\partial G}{\partial A_1^G} - \frac{\partial U^a}{\partial A_1^L} \leq 0; \; A_1^{G*}\left[\frac{\partial U^a}{\partial U^y}\frac{\partial U^y}{\partial A_1^G} + \frac{\partial U^a}{\partial C_2^a}\frac{\partial G}{\partial A_1^G} - \frac{\partial U^a}{\partial A_1^L}\right] = 0.$$

It follows, as we shall now show, that T^* and A_1^{G*} cannot both be positive. Using (13), we can rewrite (15) as:

(15') $$\frac{\partial U^a}{\partial U^y}\frac{\partial U^y}{\partial C_2^y} - \frac{\partial U^a}{\partial C_2^a} \leq 0: \quad T^*\left[\frac{\partial U^a}{\partial U^y}\frac{\partial U^y}{\partial C_2^y} - \frac{\partial U^a}{\partial C_2^a}\right] = 0.$$

We can also rewrite (16), using the fact that $\frac{\partial U^y}{\partial A_1^G} = \frac{\partial U^y}{\partial G}\frac{\partial G}{\partial A_1^G}$ and (13),

(16') $$-\frac{\partial U^a}{\partial U^y}\frac{\partial U^y}{\partial C_2^y} + \frac{\partial U^a}{\partial C_2^a} \leq \frac{\partial U^a}{\partial A_1^L} \Big/ \frac{\partial G}{\partial A_1^G}; \; A_1^{G*}\left[\frac{\partial U^a}{\partial U^y}\frac{\partial U^y}{\partial C_2^y} - \frac{\partial U^a}{\partial C_2^a} + \frac{\partial U^a}{\partial A_1^L} \Big/ \frac{\partial G}{\partial A_1^G}\right] = 0.$$

In view of the second part of (15'), if $T^* > 0$, $\frac{\partial U^a}{\partial U^y}\frac{\partial U^y}{\partial C_2^y} = \frac{\partial U^a}{\partial C_2^a}$. Substituting this equation into the second part of (16'), we see that $T^* > 0$, implies $A_1^{G*}\left[\frac{\partial U^a}{\partial A_1^L} \Big/ \frac{\partial G}{\partial A_1^G}\right] = 0$. Since, by our prior assumptions, the multiplicand of A_1^{G*} is positive, it follows that A_1^{G*}, and thus G^*, must be zero. So $T^* > 0$ implies $G^* = 0$. It follows, of course, that if G^* is positive, then T^* must be zero. T^* and G^* cannot be both positive. No rational parent will <u>both</u> develop an inefficient sense of filial loyalty in his children and plan to give them lump-sum transfers.

To describe the remainder of the parent's maximization in (14) in terms of our basic behavioral functions, we must first identify the derivatives of $U^y[x]$ resulting from the grown offspring's rational decisions. Differentiating (12), which equals $U^y[x]$ when y optimizes, by the respective arguments of x and

using 13:

$$(17)\quad (a)\quad \frac{\partial U^y[\cdot]}{\partial C_1^y} = \frac{\partial U^y(\cdot)}{\partial C_1^y} - \frac{\partial U^y}{\partial C_2^y}\cdot\frac{\partial G[\cdot]}{\partial C_1^y}$$

$$(b)\quad \frac{\partial U^y[\cdot]}{\partial Y_1^Q} = \frac{-\partial U^y(\cdot)}{\partial Y_1^L} - \frac{\partial U^y}{\partial C_2^y}\cdot\frac{\partial G[\cdot]}{\partial Y_1^Q}$$

$$(c)\quad \frac{\partial U^y[\cdot]}{\partial Y_1^W} = \frac{-\partial U^y(\cdot)}{\partial Y_1^L} + \frac{\partial U^y}{\partial C_2^y}\left(\frac{\partial Q_2^y}{\partial Y_1^W} - \frac{\partial G[\cdot]}{\partial Y_1^W}\right)$$

$$(d)\quad \frac{\partial U^y[\cdot]}{\partial A_1^Q} = \frac{-\partial U^y}{\partial C_2^y}\cdot\frac{\partial G[\cdot]}{\partial A_1^Q}$$

$$(e)\quad \frac{\partial U^y[\cdot]}{\partial A_1^W} = \frac{\partial U^y}{\partial C_2^y}\left(\frac{\partial Q_2^y}{\partial A_1^W} - \frac{\partial G[\cdot]}{\partial A_1^W}\right)$$

$$(f)\quad \frac{\partial U^y[\cdot]}{\partial A_1^G} = \frac{-\partial U^y}{\partial C_2^y}\frac{\partial G[\cdot]}{\partial A_1^G}.$$

Using these equations, the remaining first-order conditions for the parent's maximization problem are easily seen to be:

$$(18)\quad (a)\quad \frac{\partial U^y/\partial C_1^y}{\partial U^y/\partial C_2^y} = (1+E)\frac{\partial U^a/\partial C_1^a}{\partial U^a/\partial C_2^a} - E\frac{\partial G[x]}{\partial C_1^y}$$

$$(b)\quad \frac{\partial U^y}{\partial Y_1^L} = (1+E)\frac{\partial U^y}{\partial C_1^y}\frac{\partial Q_1^y}{\partial Y_1^Q}\left(\frac{\partial U^a/\partial C_1^a}{\partial U^a/\partial C_2^a}\cdot\frac{\partial U^y/\partial C_2^y}{\partial U^y/\partial C_1^y}\right) + E\frac{\partial U^y}{\partial C_2^y}\frac{\partial G[x]}{\partial Y_1^Q}$$

$$(c)\quad \frac{\partial U^y}{\partial C_2^y}\frac{\partial Q_2^y}{\partial Y_1^W} = \frac{\partial U^y}{\partial Y_1^L} - \frac{\partial U^y}{\partial C_2^y}\frac{\partial G}{\partial Y_1^W}E$$

$$(d)\quad \frac{\partial U^a}{\partial A_1^L} = \frac{\partial U^a}{\partial C_1^a}\frac{\partial Q_1^a}{\partial A_1^Q} + \frac{\partial U^a}{\partial C_2^a}\frac{\partial G}{\partial A_1^Q}\left(\frac{E}{1+E}\right)$$

$$(18)\quad (e)\quad \frac{\partial U^a}{\partial C_2^a}\frac{\partial Q_2^y}{\partial A_1^W} = \frac{\partial U^a}{\partial A_1^L}(1+E) - \frac{\partial U^a}{\partial C_2^a}\frac{\partial G}{\partial A_1^W}E \quad \text{and}$$

$$(f)\quad \frac{\partial U^a}{\partial A_2^L} = \frac{\partial U^a}{\partial C_2^a}\frac{\partial Q_2^a}{\partial A_2^Q},$$

where

$$(g)\quad \frac{\dfrac{\partial U^a}{\partial C_2^a} - \dfrac{\partial U^a}{\partial U^y}\dfrac{\partial U^y}{\partial C_2^y}}{\dfrac{\partial U^a}{\partial U^y}\dfrac{\partial U^y}{\partial C_2^y}} = E.$$

From (15), we know that $E \geq 0$ and that $E = 0$ when $T^* > 0$.

We first consider the case in which $T^* > 0$. Since $E = 0$ and $A_1^{G*} = 0$ so that the above derivatives of G[x] are all zero, this simplifies (18 a - f) to a set of equations which, when combined with the grown offspring's marginal condition, (8c), is <u>identical</u> to the set of marginal conditions of Pareto optimality expressed in (8 a - g).

Since the sum of the adult's and youngster's budget constraints expressed in (8) and (9) are identical to the social conservation conditions in (5), the private system satisfies all of the conditions of a Pareto optimal system. The only difference between our two systems is that while equation (18g) with $E = 0$ and the additional budget constraints for the period are used to determine T and thus the distribution of utility in the private system, the given $U^a = U^{a*}$ constraint was used to determine the utility distribution in the system used to compute a Pareto optimum. Of course, we can set U^{a*} equal to the private system's solution level and thus obtain an equivalency between the two solutions.

Summarizing the results for the first case: <u>Parent's bestowing unconditional gifts or bequests on their grown children render Pareto optimal childrearing</u>

decisions even though they receive no compensation for their contribution to the child's development.

Now consider the general case in which $T^* = 0$. First consider the subcase in which it remains true that $A_1^{G*} = G^* = 0$. Nevertheless, in this case, the above optimality conclusion would, in general, fail to hold. For if $T^* = 0$, it may, from (15), be that $E > 0$. That is, even though the parent is sufficiently benevolent that he does not devote resources to developing filial loyalty in his child so as to obtain support later in life, he may still not be sufficiently benevolent to be indifferent between his grown offspring's consumption and his own future consumption. Then, while four of the seven marginal conditions for Pareto optimality are satisfied in that (18 c, d, f) are equivalent to (8 d, e, f) when $A_1^{G*} = 0$ and the adult youngster's optimality condition is equivalent to (8 c), three of these necessary conditions are not satisfied. In particular, conditions 18 a, b, and e become, respectively,

$$(18\ a') \quad \frac{\dfrac{\partial U^y}{\partial C_1^y}}{\dfrac{\partial U^y}{\partial C_2^y}} = (1+E)\,\frac{\dfrac{\partial U^a}{\partial C_1^a}}{\dfrac{\partial U^a}{\partial C_2}}$$

$$(18\ b') \quad \frac{\partial U^y}{\partial Y_1^L} = (1+E)\frac{\partial U^y}{\partial C_1^y}\frac{\partial Q_1^y}{\partial Y_1^Q}\,\frac{\dfrac{\partial U^y}{\partial C_2^y}}{\dfrac{\partial U^a}{\partial C_2^a}}\cdot\frac{\dfrac{\partial U^a}{\partial C_1^a}}{\dfrac{\partial U^y}{\partial C_1^y}}$$

$$(18\ e') \quad \frac{\partial U^a}{\partial C_2^a}\frac{\partial Q_2^y}{\partial A_1^W} = (1+E)\frac{\partial U^a}{\partial A_1^L}\,.$$

In view of (8 a), (18 a') describes a parental undervaluation of his young child's consumption relative to his own consumption.

Once childhood consumption is improved so that (18 a') is replaced with the optimality condition (8 a), (18 b') describes a parental overvaluation of his child's working rather than enjoying of leisure. Lastly, (18 e') describes a parental undervaluation of investments of his own resources in his child's education.

Consequently, an economic policy which obviously suffices to remove these three inefficiencies in the private system is one which provides for minimum childhood consumption, maximum childhood labor, and minimum parental expenditures for the education of his child. We will return to this subject later in the paper.

The third and final possible parental solution has $A_1^{G*} > 0$. The additional positive variable is matched by the extra equation described by the second part of (16). Using (17 f) and (18 g), this equation amounts to:

$$(18\ h)\quad \frac{\partial U^a}{\partial U^y}\frac{\partial U^y}{\partial C_2^y}\frac{\partial G}{\partial A_1^G}\cdot E = \frac{\partial U^a}{\partial A_1^L}\,.$$

The resulting private system, (18 a - h) and (8 c), is an allocative disaster. All of the first-period efficiency conditions are violated as the G-derivatives are all non-zero on top of the fact that the coefficients of the positive E's imply the allocative inefficiencies already discussed.

For example, the new interpretation of the first condition is that not only is the parent insufficiently benevolent to grant his youngster a sufficient

amount of consumption relative to himself, he has the child underconsume to prevent him from developing habits of luxury consumption so as to facilitate the later, second-period transfer from his grown children, (i.e., it is plausible that $\frac{\partial G[\cdot]}{\partial C_1^y} < 0$.)

For another example, supposing that the C_1^y is set so that, using the second period's consumptive equilibrium conditions, (8 a) rather than (18 a) is satisfied, condition (18 b) implies: (1) a parental overvaluation (by E) of the first-period product of his youngster's labor and (2) a parental overvaluation, assuming $\frac{\partial G[\cdot]}{\partial Y_1^Q} > 0$, of his youngster's labor in that such labor (by making the child accustomed to working for the benefit of his parent or by establishing cognitive dissonance in the child's mind) will increase the transfer which an aging parent receives from his grown child.

II. INSTITUTIONS ALTERING PARENTAL INCENTIVES

Considering the above results, the most immediate policy suggestion would be to identify those parents for whom $T^* = 0$ and then to institute a tax/subsidy program which makes their solution equations satisfy the optimality conditions. This would include taxing or subsidizing all of the decision variables of parents of young children. Realistically, such an approach faces problems besides the obvious one of determining which parents plan no future lump-sum transfers and setting up a highly discriminatory tax-subsidy system. For the taxes would depend significantly on A_1^G, E, and the derivatives of G, all of which are largely unobservable. An alternative set of policies, based on the similarity of one child to another and the fact that there is a substantial group of parents--viz., those with $T^* > 0$--who adopt Pareto optimal quantities, is one which dictates minimum standards to parents.[4/] This latter approach closely resembles the arrangements we commonly observe. We identified such a set above for the case in which $(T^*, G^*) = 0$. The standards, of course, are obtained from observations on the efficient choices of parents for whom it is observed that $T^* > 0$. But the case that $G^* > 0$ is much more difficult, for A_1^G and G are not practically observable. Furthermore, as we would certainly include some benevolence, or natural gratitude, toward one's parents in a general model, **it would probably be highly inefficient, even if it were achievable, to simply outlaw transfers to one's aging parents.**

[4/] If the model were generalized to admit non-quasi-concave functions, then there would be a general superiority of quantity controls over a tax-subsidy system even if there were no costs of discovering the appropriate tax rates and the tax system. For, unlike voluntary exchange systems such as the free market, Pigovian tax systems do not enable <u>all</u> of the affected parties to freely choose quantities under the fixed tax rates and therefore permit equilibria in which local <u>but not global</u> optimality conditions are satisfied (See Thompson-Batchelder.)

Nevertheless, the myriad of parental misallocations during his child's youth due to the positivity of G^* can be dealt with if we can find a method of reducing parental incentives to gratitude training to insignificance. We believe that compulsory participation in an old age pension program accomplishes this. Such a system forces parents to save for their old age and thereby prevents overconsumption during pre-retirement years so as to gain customary subsistence support from sympathetic offspring upon retirement. Without this technique for inducing transfers it is unlikely that parents can acquire significant income from their grown children. For we observe, albeit casually, that the only historically important transfers from grown offspring to their aging parents are those which provide for the normal subsistence of their otherwise suffering parents. We have not observed grown children to support lavish improvements in the standard of living of their aging parents. Thus it seems likely that for many families a social security-medicare system depresses the productivity of gratitude training, the G-function, to a point where it may be ignored. In fact, the U.S. social security-medicare program benefits approximate old age subsistence. While parents for whom $T^* > 0$ also participate in the social security program, this is inconsequential. Such people normally plan to leave bequests and therefore have sufficient assets that they can borrow against these assets and achieve the same lifetime consumption pattern they would elect in the absence of their social security participation. Only parents lacking sufficient assets of this kind, i.e., parents for whom $T^* = 0$, are affected by the social security-medicare system. The system thus appears to be a

remarkable device for selecting out those parents for whom $T^* = 0$ and forcing them to save just sufficiently that they will not be a burden to their grown children in their old age. So we assume the system induces $G = 0$.

Since, even if $G = 0$, parents giving their children no lump-sum transfers generally underprovide their own resources to childhood training and force childhood underconsumption and overwork on their youngsters, policies of compulsory childhood education, anti-child labor laws, and anti-child abuse are still in order in order to reduce the corresponding inefficiencies.

Since quantity restrictions are avoidable by various parentally determined quality reductions, additional intervention is justified. Regarding education, public production (or accreditation of private suppliers of a certain quality) serves to ameliorate these problems. At the same time, it works against parents for whom the social security system is insufficient to prevent the overdevelopment of filial loyalty through the educational system.[5/] The provision of <u>free</u> public education adds to the ease of en-

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5/ Consistent with this argument is the casual observation that much of parents' discontent with local school curricula focuses on programs which can be regarded as augmenting the students' leisure to the neglect of developing the children's marketable skills.

The quality restrictions on schools attended by youngsters from wealthy families is not implied by the analysis in this paper, nor is the unavailability of voucher systems to these families. The absence of completely laissez faire policy in wealthy areas may be explained by recognizing the existence of some inappropriabilities outside of the family. With these property right imperfections, a parent acting in his child's best interests would educate him to disregard the consequences of actions for which he is not compensated or charged. Since these property right imperfections lead benevolent parents to overvalue childhood training which teaches the child to recognize only his compensated actions, achieving a social optimum involves discouraging such training. In terms of formal training, while a parent would otherwise choose to send his child to a private school which does not adequately develop a sense of social responsibility, the availability of quality-restricted public schools with zero tuition raises the cost of enrollment in those private schools. The interaction among students from differing backgrounds and the unwillingness of public school personnel to perpetuate the interests of one class (reflecting in part the incentives of not-for-profit organizations) reduces the student's socially inefficient identification with his background group. For statistical evidence, see Ruhter.

forcing these quantity restrictions. Indeed, as noted in footnote 2, the subsidy may have worked in the U.S. to the extent that quantity restrictions in the U.S. have been largely redundant. However, as pointed out by Buchanan, the replacement of a simple quantity restriction with free public education of a given quality amounts to a fixed payment for having a child, a subsidy to child bearing. The Pareto optimality of such a subsidy is discussed more fully in Section III below.

Regarding childhood consumption standards, numerous social workers in the U.S. regularly press poor, welfare-dependent families to improve the quality of housing and food consumed by the children instead of spending their welfare income on adult-specific consumption goods. Finally, while child labor laws are normally fairly easily and uniformly enforced for younger children, quantity restrictions are impracticable for older, teen-age, children owing to the substantial variations in their abilities. For these children, we have observed the evolution of minimum-wage laws as part of our general child labor law. Such laws have the desirable effect of preventing low productivity teen-agers from working while allowing more productive teen-agers a few hours of labor. For those exceptional children, such as those in the entertainment field, who are clearly not protected by the minimum wage, a special law, the "Coogan Law", has evolved in the U.S. This law forces the parent to dedicate most of his youngster's income to a trust for the benefit of his child, thereby substantially reducing, and perhaps eliminating, the overvaluation of a youngster's high-income labor by insufficiently benevolent parents while having no substantial effect on the choices of those parents for whom $T^* > 0$.

III. A PARETO OPTIMAL POPULATION

The above model applies in a fairly straightforward way to the important, but neglected, issue of a Pareto optimal population. Allow the first period in our model to include a preconception state in which the "youngster" is simply a group of living sex cells. If the parent does not devote resources above a critical level, $\underline{A}_1^W$, to the development of the "youngster's" future, then the "youngster" can be said to remain "unborn" and the corresponding "population" lower than if $A_1^W > \underline{A}_1^W$. The result of such a choice is a negligible output of an unborn youngster, with correspondingly negligible consumptions. A Pareto optimal level of "childbearing" and "population" can thus be characterized by a Pareto optimal choice of A_1^W.

Applying our central optimality result, if parents are sufficiently benevolent that they transfer lump-sums to their grown youngsters, then they will choose Pareto optimal levels of A_1^W for their youngsters and, therefore, a Pareto optimal population of them. Intuitively, sufficiently benevolent parents will bear a Pareto optimal number of children because they bear a child when and only when they estimate that their "youngster's" utility is higher in a born than an unborn state, taking compensation for their childbearing expenditures out of their lump-sum transfers to the born youngsters when they become adults.[6/]

6/ An apparent problem arises in that while we observe that certain types of parents do indeed transfer lump-sums to their born offspring we do not observe transfers to their unborn "offspring." This suggests that benevolence may be limited to born offspring, so that the parent may make decisions which are insensitive to reductions in the utility of his unborn "offspring". However, if unborn "offspring" are not the subject of parental benevolence, it would make little sense to assume that they are subjects of the benevolence of others. Hence, it seems realistic to exclude the utilities of the unborn "offspring" from the underlying social welfare function and therefore from the entire model. Nevertheless, <u>any</u> offspring's increment in utility from being born is included in the model because the adult sensitivity to the utility of human offspring carries with it a sensitivity to the utility which the offspring would receive from being a person. Hence, the only preferences excluded from the model would be the preferences which unborn "offspring" have between alternatives which arise for them in their <u>given</u> unborn state.

But where lump-sum transfers to grown youngsters are not observed, childbearing and population are generally Pareto nonoptimal. Two special cases are of particular interest. First we consider the case in which a social security system, child labor laws, anti-child-abuse laws, and compulsory elementary education laws exist. This corresponds fairly closely to a policy set observed in virtually all developed countries of the world. Applying our results for the corresponding $G^* = 0$ case, an adult for whom $T^* = 0$ generally undervalues investments for the benefit of his youngsters and, consequently, undervalues childbearing. This is seen in equation (18 e'); since there is no quantity minimum set on A_1^W by the act of childbearing, i.e., no quantity minimum on childbearing, there will generally be an underprovision of human offspring. Since childbearing minima are clearly impractical due to the large and unknown differences in the parental costs of childbearing and childrearing, a subsidy system seems to be in order.[7/] In fact, we observe a heavy subsidy of this kind in most developed countries in that the compulsory level of education is financed to a large degree out of general revenue. That the absence of direct user charges for public education amounts to a subsidy to childrearing for most adults is also pointed out by Buchanan. Whether these subsidy rates, or the magnitudes of the quantity restrictions described above, can be expected to be Pareto optimal will be discussed in Section IV.

The second case of interest is one with neither a social security system, a child labor law, a child abuse law, nor compulsory education. This

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7/ This argument does not rule out a tax for bearing fewer than a certain, positive number of children. Nevertheless, the subsidy obviously dominates such a tax in a political system where (a) a citizen's initial liabilities to the government do not include a particular number of born offspring and (b) changes are only acceptable if they make everyone better off. The question of who *is* willing to pay the subsidy is treated in Section IV below.

corresponds to some of our lesser developed societies in the current real world and also to most societies existing before the Industrial Revolution. In this case, the first term on the right of (18 e), still indicates a tendency toward undervaluation of A_1^W and thus of childbearing. But there is also, from the second term on the right of (18 e), a counter-tendency toward the overvaluation of childbearing. For the term, $\frac{\partial G[x]}{\partial A_1^W}$, is positive. Evidence for the quantitative importance of the latter effect is the widespread belief that some poor societies are overpopulated because the profitability of having children outweighs the parent's disutility resulting from the child's disutility for living in such a miserable state. However, even if we knew the relative size of the opposing effects, the second-best nature of the problem, due to the fact that several necessary conditions for Pareto optimality are violated, would prevent us from inferring unambiguous under or overpopulation in these societies.

IV. A PROBLEM IN DEMOCRATIC ALLOCATION

A. Theory

Although the potential inefficiencies resulting from the absence of property rights in the value of childrearing decisions appear to provide an explanation for a number of observed public policies, there remains the question of how the political process has generated these qualitatively efficient institutions. While Pareto optimality can be understood as a positivistic concept, a force guiding actual political decisions in response to the interests of the citizenry (Thompson, 1971), why would politicians formulate programs to aid youngsters who have no current political power? Obviously they would if present adults could later tax the grown young for the assistance provided earlier. A dictator could, of course, impose such charges on younger adults and achieve our Pareto optimum. However, a democracy lacks the institutional arrangements to enforce such charges. When subject to such levies, the young adults can repudiate them by a simple vote.

That is, given the above-assumed absence of benevolence other than toward one's own offspring, there will be no policy response whatsoever to the above Pareto nonoptimalities in an internally efficient democratic state. For such a state adopts institutions which are jointly efficient only among current voters. The young would suffer from the same insufficiency in attention to their preferences in the political arena that they suffer in a laissez faire system. (For a similar argument, see West, pp. 11-12.)

While such a political system may generate intergenerational transfers between voters, such as the transfers to the elderly which arise from deficit financing (Thompson, 1967), the lump-sum form of such trans-

fers precludes a social security-medicare system, a system which forces natural borrowers to lend to the government and thereby induces savings out of the gross income of working adults who would otherwise overconsume out of their gross income and rely on their mistrained, grown children for support during their retirement.[8/] So no element of the optimal policy set would be adopted by an internally efficient democracy under our assumptions regarding the nature of preferences.

We now relax the assumption that the only benevolence in the system is for one's own offspring. That is, we now introduce a slight amount of benevolence by each voting adult for others outside their own families and consider its implications for the model.

First, the presence of such benevolence establishes a collective good

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[8/] The deviation of such a social security system from an apparently more efficient system of deficit financing is quite apparent. While a social security system has the effect of forcing debt purchases on a group of illiquid borrowers with already abnormally high rates of time preference, a standard system of deficit financing has the same debt sold to liquid lenders who have abnormally low rates of time preference. Of course, as noted above, regarding those workers who are efficiently benevolent towards their children to save up an inheritance for them, the social security system loses its extreme "perversion." For such individuals merely reduce their private asset purchases dollar-for-dollar with their social security taxes. Therefore, as we have already mentioned, the social security system serves to substantially reduce the consumption only among those whose consumption should be substantially reduced.

The fact that the consumption of individuals who plan to leave bequests is not affected by a tax-financed increase in national debt (even when the policy generates intergenerational redistributions) has been recently emphasized by Barro. However, he goes too far by claiming that essentially all individuals are this benevolent (and, correspondingly, that there should never be any real effect of deficit financing with perfect capital markets.) This peculiar claim is based on the incorrect inference that parental support for the education of their children which is almost universal, implies sufficient benevolence that the parents are willing to transfer lump-sums to their children. This error is also pointed out in a recent paper by Drazen. Correcting this error in Barro leads back to the more standard approach to deficit financing under rational expectations (e.g., Thompson, 1967) and also raises the question of why we tolerate the apparent inefficiencies in a social security system, a question addressed in the present paper.

in the giving of support to children. For both the parent and the adults outside of the child's family simultaneously benefit from the support. Assuming that several adults possess such benevolence, the familiar argument favoring public provision running in terms of the high exclusion or contract costs of private provision take hold. It is therefore reasonable to assume that governmental support of investments for the benefit of children would occur in an efficient democratic state. This is not to say that we have adopted the conventional economic argument for public provision of education that "education is a public good." For without private underprovision due to parental malincentives, there would be no reason for public support of education. Benevolence would imply only lump-sum transfers to children. Transfers to children -- not education, milk for children, etc. -- is the public good. Nevertheless, in the absence of such a public good, i.e., without extra-familial benevolence, a democratic state would not respond to the parental underincentive to provide benefits for their children.

Second, extra-familial benevolence, no matter how small, implies that there will always be net social gains to adults from transfering to children more than is in the self-interest of the parent. The reason is a simple application of our model of parental allocation: A rational parent sacrifices for his child until another dollar of sacrifice brings the parent an arbitrarily small amount, say δ, less than a dollar's worth of additional psychic benefits; but if individuals outside the family each receive a given, positive amount of benefits from an increase in the child's utility resulting from the one-dollar expenditure, where the amounts aggregate to, say, 10¢, then they will clearly benefit by supporting the

additional expenditure for the child. For 10¢ exceeds δ.[9/]

Even if the outsiders have a somewhat higher collective marginal utility for the utility of the adults -- say because children have a greater expected wealth than their parents --- the transfer will still go to the children.[10/] For extra-familial transfers to children are complemented by significant transfers from parents but not vice versa. In the above example, the 10¢ maximum contribution from the outsiders are matched by a $1-δ contribution from the parent. Even if the outsiders preferred a transfer to the adults nine times as much as a transfer to their children, their willingness to contribute 90¢ towards a $1.00 transfer to adults would go unmatched by other contributions, and so the transfer would not occur and would not be Pareto optimal.

[9/] Since extra-familial benevolence toward the children of the wealthy can be plausibly assumed to be nonexistent, the above argument should concentrate on the children of nonwealthy parents. But these latter children are the only potential victims of the parental malincentives described here. So the fact that extra-familial benevolence toward the wealthy is, if anything, extremely weak does not disturb our argument that extra-familial benevolence creates government support for children who receive insufficient private support from their parents.

[10/] This result contradicts the widely accepted result of Sen (1961, 1967). Sen's result is based on an assumption that adults will vote to collectively transfer an extra dollar to children if and only if each adult's positive increment in utility from the transfer exceeds his decrement in utility from seeing the other adults lose their share of the dollar transfer. Implied in this assumption is that each adult believes that the <u>other</u> contributing adults lose utility when they lose money. In fact, there is a component of utility gain to these parents in that they too benefit from the transfer to youth. In the democratic equilibrium, this component of utility gain equals the utility loss from the monetary transfer. So Sen's condition, adjusted to reflect correct beliefs on the part of the utility-interdependent adults, reads: adults will vote to transfer an extra dollar to children if and only if each adult's change in utility from the transfer exceeds zero. This is essentially the condition of Marglin. However, neither Marglin nor Sen recognize the parental malincentive problem. Consequently they fail to recognize that educational subsidies and other non-lumpsum policies of redistribution -- policies already in existence -- take priority over savings subsidies. They also do not use Pareto optimality as an optimality standard and hence do not recognize the weakness of democracy which we are about to point out.

Finally, the additional level of investment due to extra-familial benevolence may still be insufficient in our democratic system. The reason is essentially the same as that which occurs for private provision: The collective benevolence of the adult generation may be insufficient. This result can be obtained as a straightforward extension of our basic model of Part I by simply replacing the "parent" in that model with the collection of all adults. The corresponding central optimality result is that the collectively chosen allocation of resources is Pareto optimal if lump-sum transfers to younger generations are part of the rational collective choice. If such transfers are not observed, then there will generally be a collective underevaluation of the benefits of investments for children and an authoritarian government decision will be required for the attainment of a Pareto optimum. Again, the advantage of the authoritarian solution is that the dictator or judge can force the young to compensate their elders for investing in them when they were children and so satisfy Pareto conditions that democracy cannot.

So whether an internally efficient democratic system (in which parents do not have property rights to their grown children) can achieve a Pareto optimum is an empirical question which turns on whether we observe collective lump-sum transfers given to younger generations. The absence of observed, unconditional, collective subsidies to young adults -- especially when contrasted to the frequently observed private transfers by wealthy parents to their young adult offspring -- leads us to conclude that sufficient benevolence does not exist for modern democracies to produce Pareto optimal allocations even if these democracies are internally efficient.[11/] Evidence for the internal

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[11/] While collective "bequests" via inheritance and estate taxes are observed, these can hardly be considered voluntary transfers by the elderly. Also, these taxes clearly are not lump sum as they are notoriously avoidable. Inheritance, estate, and gift taxes are perhaps best viewed as part of a system of efficient, non-lumpsum, capital taxes based on a national defense externality rather than an inefficient redistribution (Thompson, 1974).

efficiency of the U.S. democratic system is found in several studies by Thompson (esp. 1974, 1979). Evidence for its internal efficiency in mitigating the parental malincentive problem, of course, is the existence of significant, effective programs of social legislation with efficient qualitative properties. So once again, accepting the internal efficiency hypothesis and the absence of observed, collective lump sum transfers to young adults, our analysis implies that the U.S. has been producing suboptimal levels of investment for its children. Tests of this important implication are clearly in order.

B. Tests

An implication of the above underinvestment hypothesis is that investment in children, unlike other investment, is substantially affected by the extent of benevolence in a nonauthoritarian society. Observed expenditures on primary and secondary education should, therefore, vary much more closely with aggregate charitable transfer payments than observed expenditures on other investments. In fact, observed expenditures on primary and secondary education in the United States have risen secularly relative to GNP along with charitable transfers while nonhuman investment expenditures have declined secularly relative to GNP. A much more precise indication is obtained by regressing the fraction of U.S. income devoted to primary and secondary education on the fraction of U.S. income devoted to charitable transfers, and comparing the resulting regression coefficient to that obtained by regressing the fraction of U.S. income devoted to nonhuman investment expenditures on the fraction of U.S. income devoted to charitable transfers. Using a logarithmic specification, these coefficients can be interpreted as benevolence elasticities. While the benevolence elasticity of nonhuman investment expenditure is expected to be near zero and statistically insignificant, the benevolence elasticity of expenditures on primary and secondary education expenditures is expected to be significantly positive and close to unity given the observed absence of collective lump-sum transfers to young adults. The results of our regression analysis for the years of available data from 1890 to 1976 are reported below:[12/] (The sources and methods used to construct these time series are described in Appendix A).

[12/] Similar results were obtained with specifications using the data in original, nonlogarithmic form and omitting subsets of dummy variables. The dummy variables and logarithmic forms reported below served to life R^2 and Durbin Watson statistics.

Dependent Variable	Constant	(Welfare ÷ GNP)	(Dummy For Late Depression Years) (Welfare ÷ GNP)	Dummy for WWII	(POP 5-17÷ Total POP)	R^2	D.W.
Ln (Cur. Ed. Expend. ÷ GNP)	-6.59 (-7.26)	+0.91 (14.29)	-0.32 (-7.76)	-0.40 (-4.11)	+2.00 (7.19)	0.93	1.38 [1.31]
Ln (Invest. ÷ GNP)	+5.11 (1.31)	-0.06 (-0.23)	-0.26 (-1.47)	-1.20 (-2.91)	-0.75 (-0.63)	0.34	1.42 [1.39]

Notes: 1. t values are shown in parentheses below coefficients.

2. Bracketed Number is D.W. Statistic adjusted for 2 gaps in the data.

The results reinforce the trend information in indicating that education is much more significantly determined by the extent of societal benevolence than is other investment. Again, education would not behave in this manner if societal benevolence had reached the point that collective lump-sum transfers to young adults were observed and Pareto optimality achieved.

Second, a direct implication of the underinvestment hypothesis is that the typical child of the poor receives a lower level of benefits than the typical child of the wealthy. While the empirical validity of this implication is so widely accepted that statistical evidence for it seems redundant, we did gather some data. In particular, current education expenditures per enrolled child in public U.S. elementary and secondary schools in 1976 was $1,251 while the corresponding figure for private, nonparochial, coeducational day schools for students from grades K-12 is $2,453.[13/]

[13/] The source of the private school data is the National Association of Independent Schools while the source of the public school data is the U.S. Census Bureau.

However, while such observations are implied by the hypothesis of insufficient benevolence toward the children of the nonwealthy, they do not imply the hypothesis. Expenditures on education for children of the nonwealthy could be much less than for children of the wealthy and Pareto optimality still result. For education is partly a consumption good so that the higher level of observed expenditures on education for the children of the wealthy could merely reflect the higher level of consumption which is appropriate to the higher wealth of these children. However, available studies show a significant positive effect of educational expenditures on the investment value of educational output at high as well as low levels of parental income (e.g., Johnson-Safford, Morgan-Sirageldin Perl, Welch (1966), Hanushek).

Finally, since authoritarian societies are free from the democratic constraints discussed above, our analysis does not imply any systematic underinvestment for children in such societies. So the analysis suggests that a government which is relatively more authoritarian and less democratic has a higher expected level of investment for the benefit of its children. To test this implication of our theory, we ran two logarithmic regressions using a fairly recent international cross section sample of 91 countries.

Following our theory, the first one made the fraction of a country's population represented by child laborers depend on (a) the country's per capita income, (b) an index of the degree of political freedom or democracy of the country and (c) the multiplicative

interaction of per capita income and democracy. The second regression equation made each country's per capita educational expenditures depend on the same set of independent variables. The data sources are described in Appendix B. The results are as follows:

$$\text{Ln}\ \frac{\text{Child Labor}}{\text{Pop.}} = \underset{(0.97)}{.4} - \underset{(-1.2)}{.08}\text{Ln}\ \frac{\text{GNP}}{\text{Pop}} + \underset{(3.69)}{.2}\ \text{Ln Dem.} - \underset{(-2.77)}{.22 \times 10^{-5}}\ \frac{\text{GNP}}{\text{Pop}} \times \text{Dem.}$$

$$\text{Ln}\ \frac{\text{Ed. Expend.}}{\text{Pop.}} = \underset{(-13.3)}{4.14} + \underset{(23.2)}{1.16}\ \text{Ln}\ \frac{\text{GNP}}{\text{Pop}} - \underset{(-.84)}{.033}\ \text{Ln Dem.} + \underset{(1.06)}{.66 \times 10^{-6}}\ \frac{\text{GNP}}{\text{Pop}} \times \text{Dem.},$$

where Dem. is one plus a Freedom House index of democracy and runs from 1 to 101.

The signs of the regression coefficients systematically reinforce our hypothesis.[14/] The more democratic a country (with a per capita income no more than two standard deviation above the mean) pected extent of its child labor and the lower is the expected expenditure on education. And the effect of per capita income in decreasing child labor and increasing education is larger the more democratic the country.

While the coefficients of the democracy variables in the education equation are not highly significant by usual econometric standards, our general approach does not suggest an extremely tight fit. For the approach says that the cost of non democratic systems is, through their greater reliance on socioeconomic theories rather than decentralized political forces, their greater susceptibility to decision error. (This effect also shows up in the

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14/ We also tried linear and quadratic variants of the same relationships and found similar results, although slightly lower R^2s. We also controlled for the degrees of socialism in the various countries and found little effect of this additional variable. Our only disturbing result came from trying a much smaller, 36-country sample which had data on the fraction of the country's GNP in agricultural activities. The effects of the agricultural variables systematically swamped all others, indicating significant measurement errors or omitting variables bias in the complete sample.

unusually high variance of the residuals for the less democratic countries, which a casual examination of the residuals clearly indicates. In addition, a standard test for heteroscedasticity reveals a significantly negative correlation between the absolute size of the residuals and the index of democracy.) But regardless of their statistical significance, the regression coefficients appear to be economically significant. For the point estimates reveal that a move from the least to the most democratic existing governmental form in a typical country (one with, say, a $400 per capita annual income), a move which changes the Dem. Index from 0 to 100, is expected to yield about a 12% reduction in expenditures on education and an 84% increase in the amount of child labor.

IV. CONCLUSION

An elaboration of Marshall's parental malincentive argument provides a qualitative rationalization of observed social legislation. However, an extension of the argument to political decision-making together with several empirical tests, provide a uniform picture of the U.S. as a system which, despite its internal efficiency, historically has provided too few benefits for its youth. Despite the clarity of our empirical results, they do not suggest any changes in domestic policy in the developed democracies of the world. Internally efficient democracies would reject any suggestion to invest more for their children based on merely the Pareto nonoptimality of their current levels of investment. And the impressive internal efficiency of these governments would be lost if they were converted to authoritarian systems, even though these latter systems would not be expected to provide optimal benefit levels for their children.[38]

Our political analysis, by introducing extra-familial benevolence, is related to previous studies (especially those of Marglin and Sen) of the effects of public-good benevolence on the efficiency of private investment within a democracy. While these other studies have been inconclusive as to the qualitative effects of such benevolence, our theory, being based on the observation that parents devote some private resources to the benefit of their children, generates less ambiguous results. More importantly, our analysis, by pointing to the specific areas of potential private misallocation due to intergenerational public-good benevolence, rationalizes the observed framework of social legislation and therefore leaves little left for democracy to do in the way of responding to such benevolence. That is, the private "undersaving" within a democracy which is supposed to result from public-good benevolence toward future generations is merely a private underprovision of benefits for children and is

already responded to in an internally efficient form by observed democracies. However, the democratic assumptions underlying these other studies are too confining. The achievement of pure Pareto optimality would require an authoritarian allocation, either through the removal of the political constraint of democracy or through constitutionally allowing parents to have judicially determined compensation for the benefits they create for their children.

An important policy suggestion arising out of this study is that we, the developed democracies of the world, should recognize a significant cost of imposing our form of government on poorer, less democratic, countries. Since these countries can afford significantly less extra-familial benevolence than the inefficiently low levels that we ourselves possess, not only does the imposition of more democratic forms reduce their expected levels of investments for the benefit of children to inefficiently low levels, but the underinvestment is significantly larger in their countries than in developed countries.

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APPENDIX A

This appendix describes the data sources for our time series test.

We could not find a single time series on current (i.e., non-capital) expenditures on elementary and secondary education. To construct one, we first developed a series on total expenditures on elementary and secondary education. This series for even years from 1930 to 1976 was obtained by subtracting, from the series of total educational expenditures (1930-1976) in the Digest of Educational Statistics, p. 23, the sum of estimates of current and capital expenditures on higher education for the period, obtaining the former from Historical Statistics of the U.S., Colonial Times to 1970, p. 384, and the Digest of Educational Statistics, p. 134-5, and obtaining the latter from Historical Statistics..., p. 385, for 1930-1966, from Projection of Education Statistics, 1974, for the year, 1968, p. 89, from the Digest of Educational Statistics, p. 23, for the years 1970 and 1976 and from the 1976 edition of the Digest of Educational Statistics, p. 25, for the years 1972 and 1974. Total educational expenditures on elementary and seconday education for the years 1890 and 1913 were estimated by multiplying total public elementary and secondary school expenditures for 1890 and 1913 (from Historical Statistics..., p. 374) times the respective ratios of the number of total students enrolled in all elementary and secondary schools to the number enrolled in public schools (obtaining these ratios from Historical Statistics, pp. 368-9.) The resulting series on

total primary and secondary education for 1890-1976 was then multiplied by the ratio of current to total expenditures on public elementary and secondary schools from Historical Statistics..., ibid., pp. 373-74 and the Digest of Education Statistics, 1977, p. 71. This gave us our 1890-1976 time series of current expenditures on primary and secondary education.

We encountered similar problems in attempting to find a series on total, private and public, welfare payments. For 1930-1970, public welfare ("Public Aid," Health and Medical Programs," "Housing," and "Other Social Welfare") and private philanthropy indices were combined to form our charitable transfer, or welfare expenditure, index from 1930 to 1970. The 1972-1976 data came from the Statistical Abstract of the U.S., pp. 340-41 for public welfare and from Giving, U.S.A., 1976, p. 26 and 1977, p. 6, for the private welfare data. For 1890 and 1913, Historical Statistics,... ibid., p. 341, provided a public welfare estimate. For 1913, the 1914 World Almanac (p. 616) provided an estimate of private welfare, or "Philanthropy." But for 1890, no data was available. So we applied the 1913 ratio of private to public welfare to public welfare in 1890 to estimate private and total welfare in 1890 and complete our total welfare series.

The sources of the nonhuman investment (or "Gross Private Domestic Investment") expenditures and GNP data were the National Income and Product Accounts, 1929-1974, pp. 2, 3, and 344, the Survey of Current Business, p. 18, for 1974-1976, and Historical Statistics ..., ibid., p. 231, for the 1890 and 1913 approximations.

The percentage of the population of ages 5 to 17 was obtained from Historical Statistics..., p. 10, for 1913 to 1960, from the Digest of Educational Statistics, p. 36, for 1890 and from Current Population Reports, Series P-25, #614, pp. 14, 16, for 1970-1972 and #643, pp. 7, 9, for 1972 through 1976.

APPENDIX B

This appendix describes the data resources for our international cross section test. The source of the child labor statistics was the Yearbook of Labor Statistics, 1977, e.g. the source of the per capita educational expenditures data was the UNESCO Statistical Yearbook, 1977, pp. 535-554. The source of the population and GNP data was the Stockholm International Peace Research Institute Yearbook, 1974, pp. 205-229. Finally, the source of the Democracy Index (and the Socialism Index mentioned in footnote 14) was the Freedom House's Comparative Survey of Freedom.