

**PARENTAL MALINGENTIVES, SOCIAL LEGISLATION**

**AND DEFICIT FINANCING**

**PART I: THE ECONOMICS OF THE MATTER**

by

Earl A. Thompson  
University of California, Los Angeles

and

Wayne E. Ruhter  
University of Texas at Dallas

UCLA Department of Economics  
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## ABSTRACT

This paper rationalizes the commonly observed pattern of social legislation. Building upon our first optimality theorem -- that parents Pareto optimally raise their children under laissez faire if and only if they plan to later provide the fully grown children with lump-sum transfers -- we show that four complementary laws produce a Pareto optimum. The laws provide: (1) minimum consumption and leisure levels for children; (2) minimum childhood education levels; (3) subsistence support for elderly parents; and (4) subsidies to childbearing. Non-legislative thought systems solving the parental malincentive problem are, going backwards through the history of civilization, church-based religion, humanism, local ancestor worship, gerontocracy, and matriarchy.

A second optimality theorem, which concerns the achievement of a complete social welfare maximum and correspondingly determines political institutions generating quantitatively efficient social legislation, will be provided in a subsequent, companion paper.

The last couple of centuries has witnessed a worldwide legislative evolution of a particular set of statutes regarding the welfare of children and the aged. These are primarily: (1) child abuse and child labor laws, (2) compulsory education laws, (3) social security and medicare laws, (4) laws providing for essentially free public education and childhood subsistence.<sup>1</sup> Often termed "social legislation," this set of laws is so widespread across different political systems and so well-entrenched that it is unreasonable to view the set as a significantly inefficient response to the purely redistributive interests of favored political pressure groups. It is much more reasonable to infer either that such legislation serves merely as a politically useful form of window dressing with few real allocative effects or that the legislation actually serves the collective interest of the members of the state.

Numerous empirical studies cast doubt on the window-dressing theory. In the case of child labor, studies by Sanderson, Mitchell and Clapp, and Welch indicate that U.S. child labor and minimum wage laws substantially reduce youngsters' labor force activity. In the case of social security, Kotlikoff finds that, aside from redistribution effects, the U.S. social security system significantly reduces pre-retirement consumption. With respect to public education, Chiswick reports a very significant effect of free public education on the quantity of education adopted in a country.<sup>2</sup>

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<sup>1</sup>See, for example, UNESCO, U.S. Department of Health, Education and Welfare, and Friedlander.

<sup>2</sup>While empirical studies of the effectiveness of compulsory education laws display a substantial positive correlation between school enrollment and the extent of the laws, most of these studies' authors have argued that the independent effect of compulsory schooling laws in multivariate models is relatively small. This is clearest in Stigler's seminal study, which standardizes for per capita income and racial characteristics, and is also reflected in the subsequent studies by Folger and Nam and by Landes and

Therefore, by elimination, the hypothesis that social legislation tends to serve the collective interest of the members of the state becomes the most believable. However, as West has cogently argued, the many arguments put forth to support such legislation have extremely weak welfare-economic foundations. Among these arguments, the least popular, but probably the most economically reasonable, points to an almost universal property rights imperfection wherein a parent has authority over his young children but no rights to the benefits he creates for the children.

An early economic statement of this parental malincentive argument is 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. 560-61).

While Marshall inferred that this imperfection justified policies to encourage investment in children, he neglected to theoretically derive or establish conditions for the alleged laissez faire inefficiency, to develop a complete set of policies correcting the inefficiency, and to compare the resulting policy set to real-world policies. The purpose of the first of this pair of papers is to perform these chores. We consider underlying social institutions of both the modern, legislative, variety and the various pre-modern varieties working through myth or religion, thought systems whose overall economic efficiency has not heretofore been seriously evaluated.

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Solmon. But the partial effect of compulsory education is biased toward zero because of the relatively large errors of observation on the compulsory education variable and the fact that when the letter of the law (measured by the years of required education) fails to match its spirit (measured in this case by per capita income), the actual application of the law (school enrollment) is bent toward the spirit. Indeed, using later, probably more reliable, data, Edwards (1975, 1978) finds a fairly significant, positive, independent effect of compulsory education laws on school enrollment rates.

Section I of the paper presents a two-period model with a single parent and his child in which each parent's resources can be devoted to leisure, work, the development of the child's future skills, or the psychic training of the child. The parent gains utility from his child's own lifetime utility and decides how his child's first-period resources are employed. Lacking private property rights to benefits he creates for the child, the parent collects no material rewards from his grown-up child unless he has trained a sense of filial gratitude into the child. In this environment, there are two classes of parents. In one class, each parent both Pareto-undervalues resource employments that provide real benefits for the youngster and Pareto-overvalues resource employments that increase the parent's share in their youngster's future income. The second class consists of those parents who plan to give lump-sum transfers to their young adult children.<sup>3</sup> Such parents make Pareto optimal child-rearing decisions.<sup>4</sup>

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<sup>3</sup> A peculiar tradition has built up, at least since the frequently cited paper of Barro (1974), regarding bequests to be unconditional lump-sum transfers reflecting pure parental benevolence. We originally made the same error (Thompson, 1974, fn. 15; Ruhter, 1976). In fact, a substantial portion of, if not most, observed bequests are merely final transfers of funds used to purchase favors from the potential recipients. As grown children are relatively much less liquid when they are young adults than when their parents are expected to die, mere bequests would, to purely benevolent parents, represent an inferior form of transfer. Indeed, only a small fraction of parents leaving bequests to their children are sufficiently benevolent to also grant their children broad-based transfers when the children become young adults. The existing tradition, which misleadingly overvalues parental benevolence and undervalues the empirical importance of parental malincentives and related intergenerational distribution problems (Thompson, 1967), will obviously not be followed in this paper.

<sup>4</sup> This should not be confused with the "Rotten Kid Theorem," of Becker [1976], which states that a selfish child currently making independent production decisions for his family will -- under the extreme technological condition that the child suffers no current disutility from his production efforts -- make Pareto optimal production decisions for the family if he expects future lump-sum transfers from his parents. In our model, parents are never subject to the independent production decisions of their young children. Parents or the government dictate the various consumption and

Hence, under laissez faire, parents Pareto optimally raise their children if and only if they plan to provide them with lump-sum transfers when they become young adults. This is our first optimality theorem.<sup>5</sup> It concerns only Pareto optimality. Our second optimality theorem, which concerns the achievement of an optimal intergenerational utility distribution and thus a complete welfare optimum, is discussed in the second of this pair of papers.

Section II of this paper argues that while our first optimality theorem suggests government intervention, it does not suggest a standard tax/subsidy

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investment decisions of young children. Fully grown children, who do make independent decisions, do not make production decisions for the parents. Grown children may make only simple transfers of resources to their aged parents. If the grown children in our model did make some family production decisions, we would not follow Becker in artificially preventing elderly parents from cooperating with their grown children regarding these decisions (see Tullock's discussion of Becker's Theorem). Such cooperation would be typically necessary for a family optimum despite Becker's theorem because the theorem only holds, as we have noted, for highly unrealistic technologies.

<sup>5</sup> A very recent paper of Becker and Murphy, like an earlier, 1980, referee report, claims that our first optimality theorem (which appears first in a 1974 paper of Thompson (fn. 15) and a corresponding 1976 Ph.D. dissertation of Ruhter and which we circulated in the form of a lengthy manuscript well over a decade ago), was contained in Becker's classic book on human capital [1975]. We could not find anything like this result anywhere in the book, and consider the claim quite peculiar in that, throughout the text of the book, parents and children mysteriously act as an efficient cooperative requiring no government intervention of any kind.

Becker and Murphy specifically cite an Appendix in the book, Becker's 1967 "Woytinsky Lecture," as a source of the theorem. Although the central theoretical exercise there has only the grown child -- not the parent -- making the decisions and therefore could not possibly be a model of a parental malincentive problem, the Appendix does contain a brief, informal, discussion of the structure of rational parent-child transfers (pp. 132-33). In particular, Becker inserts conditional bequest variables in his young-adult's human and non-human investment demand functions and goes on to heuristically argue that the forms of real-world investment demand and supply functions are such that the portion of a rational parent's total bequest devoted to supporting educational investment will be large for small total bequests and small for large total bequests. However, Becker neither states nor implies anything whatever about either lump-sum transfers or Paretian efficiency between parent and child. No policy implications follow from his argument; and none are claimed. Becker and Murphy have grossly misrepresented Becker's original argument.

solution. Rather, regarding the under-provision of real benefits for children, the result suggests minimum quantity and quality standards based upon the observed choices of lump-sum-granting parents. Such standards are, in fact, commonly observed in the form of child abuse, child labor, and compulsory education laws. Minimum wages and similar legal barriers limiting the employment of teenage children and other such dependents are similarly justified. Regarding the parental overdevotion of resources to attitude-training that serves to increase their future transfers from their grown children, the result suggests compulsory participation in a social security-medicare system. By forcing the typical worker to save sufficiently to assure himself a tolerable retirement, the government is preventing the worker from overconsuming during his middle years and then leaning on his guilt-trained children for support during retirement. Those workers who are sufficiently benevolent to their children that they would not adopt child-dependent retirement programs are not affected by social security. Such workers save to fully support their own retirement, and possibly subsequent transfers to their children, so that forcing social security savings on them simply induces them to correspondingly reduce their private savings for their retirement and results in no change in their real economic behavior (Thompson, 1967, Barro, 1974). Social security thus provides a personally tailored, necessary complement to the above quantity-constraints on observable parental decisions. In summary, the widespread, "basic needs" mentality of social activists, which economists have traditionally attributed to a naive ignorance of basic price theory, is

rationalized as a necessary part of a Pareto optimal policy framework.<sup>6</sup>

The same economic argument applies in a technology broadened to include life-risk decisions by adults. An adult who does not make lump-sum transfers to his children -- or to other beneficiaries of his somewhat benevolent existence -- takes too many chances with his life. Risking his life for a high consumptive return will impose external costs on this collective of would-be beneficiaries, whom he does not fully compensate with bequests and insurance for the increase in his life-risk. The result is a theoretically equivalent economic rationalization for a whole set of additional, otherwise-unjustifiable, governmental agencies enforcing minimum amounts of safety on the job (OSHA), in the consumption of both food (FDA) and manufactured durable goods (CPSC), and in the provision of both transportation services (FAA and NTSB) and buildings (local building and safety commissions).

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<sup>6</sup> A similar analysis applies to any benevolent, but temporary, owner of the human capital of others. In fact, our parent-child analysis generalizes standard principle-agent analysis by introducing benevolence on the part of the principal. Moreover, modern capitalism has imitated nature by evolving a way to introduce sufficient benevolence into real-world principle-agent problems to allow our model to apply: Employers, as independent owner-managers, would waste substantial resources in attempts to exploit workers, at least those not protected by a labor union, in bilaterally monopolistic, post-contract, relations. Such employers would face correspondingly high initial contract costs in the form of high wages. As a result, huge partnerships of employers have evolved so that the actual manager of the typical employee has such a small interest in the profit of the company that his small amount of natural benevolence towards the worker is magnified to where he efficiently treats the worker as he would his own child. By correspondingly reducing his own future exploitation incentive, the manager lowers his future labor costs to where he can survive. In companies where the most magnification takes place, employers even grant lump-sums, or unconditional bonuses, to workers. Such firms serve as models determining "due-care" standards and "reasonable man" criteria for the labor contracts of less benevolent firms. The same analysis holds when the principal is a customer and the agents are independent firms whose product qualities are not determined by a trade association. Huge firms are then seen to arise to solve the customer deception ("lemons") problem through an efficient magnification of the benevolence of their clerks or store managers, who then set the "reasonable man" standards for smaller firms. (These points are developed in the UCLA Ph.D. dissertations of Ensminger and Hickson.)



Section III introduces a variable population growth rate and applies the theoretical analysis of Sections I and II to the heretofore untreated question of whether the laissez-faire rate of population growth is Pareto optimal. Where the three optimal policies of Section II are all in place, we find that a substantial subsidy to childbearing by typical parents is also required in order to induce them to have a Pareto-sufficient number of children. This policy is also commonly observed. It comes in the form of heavy government subsidies to education and welfare assistance to low-income families. Where governments fail to provide for child abuse, child labor, and compulsory education laws, children may easily be overbred in that they may easily make a net positive pecuniary contribution to the parents. Here, the second-best policy is to reduce the birth rate, a policy currently observed in agrarian societies where our regulatory policies are impractical and traditional family values have severely decayed.

Section IV identifies, in historical context, alternative institutional solutions to the parental malincentive problem, solutions other than social legislation with its corresponding welfarist bureaucracies. In particular, we find that matriarchy, gerontocracy, local ancestor worship, humanism, and church-based religion have each provided civilizations with an alternative solution to the parental malincentive problem. Since the exaggerations underlying these alternative institutional systems, like the Enlightenment exaggeration underlying modern legislative system, must also induce both internal order and protection from external aggression, the issue of which particular set of exaggerations provides an overall Pareto optimum requires us to consider the whole problem in a broader social context. We find, in accord with the basic result of Thompson-Faith (1981), that each type of

society has evolved what is, for it, an efficient set of exaggerations.<sup>7</sup> Enlightenment-type exaggerations thus not only provided the intellectual basis for the effective democracies of the past -- including those in Babylonia of around 4,000 years ago and Greece of around 2,500 years ago, societies promptly legislating a four-element policy set essentially identical to our own -- but the Enlightenment-type exaggerations themselves evolved as efficient ideological responses to a common physical environment.

We shall not supply formal derivations of the underlying institutions from explicitly exaggerated belief sets, although Section IV does provide some informal arguments. Rather, we adopt here the shortcut of assuming the existence of such institutions. Thus, for our legislative solution, we assume, in addition to a natural set of economic rights from which our mal-incentive problem stems: (1) either an autocratic or a democratic legislative decision mechanism; and (2) exaggerations sufficient to induce generalized obedience to the resulting rules. Nevertheless, the rules themselves are based upon objective rather than exaggerated beliefs.

To be more specific, we distinguish between law-making and law-enforcing -- or "legislative" and "administrative" -- information. Legislative information is assumed to be, and should be, wholly objective. It is the kind of information ideally produced by economists, suppliers of information to law-makers. In contrast, administrative information is

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<sup>7</sup>This efficiency will be seen to hold, however, only in a formal sense in "primitive meritocracies", where there is no mythology strong enough to enforce large interpersonal differences in unearned wealth endowments. In such societies, a Pareto optimum among existing adults implies a serious, intergenerationally Pareto non-optimal, underinvestment in the education of potential future rivals to the offspring of the current leaders.

The efficiency also exists only in a purely formal sense in more mythologically advanced, or "civilized," societies, because it does not correct for teacher-favoring biases in the political-economic educations of the future leaders of such societies (Thompson, 1989; Hickson-Thompson).

necessarily non-objective. Because of "last-period-problems", exaggerations are required to induce continually rational individuals to administer their announced, privately optimal and socially efficient, committed reactions to the behavior of others (Thompson-Faith, 1981, and Section IVA below). In particular, an effective democracy requires, at least among the society's bureaucracy, exaggerations sufficient to enforce any feasible set of legislative enactments. We label this enforcement-assuring belief system "civil reverence". Civilly reverent beliefs are generally required for the execution of democratic laws because such laws are generally counter-intuitive, being the result of political compromise rather than bureaucratic social wisdom. The Enlightenment exaggeration stressed above, by sufficiently exaggerating the power or wisdom of the common man, provides a democracy with a civilly reverent belief system.

## I. THE MODEL

### A. The Technological Environment: Determining a Pareto Optimum

Our model involves a youngster and his adult parent in a two-period world. Throughout the first period, the youngster is a child. When the second period arrives, the youngster has grown into a young adult, a status technologically characterized by the youngster's loss of previous informational inferiority vis-à-vis the parent.

The human capital associated with each individual is the only productive resource formally considered. Leisure represents one use for this capital. For the youngster,  $Y_1^L$  and  $Y_2^L$  represent the successive portions of the youngster's human capital devoted to leisure, first as a child and later as an adult. Work is another use, where  $Y_1^W$  and  $Y_2^W$  are the successive portions of the youngster's human capital employed to produce

the single output,  $Q$ , a transferable perishable good. Finally, childhood work-skill development (schooling), denoted  $Y_1^S$ , is a third and final alternative use of the youngster's human capital. It is only available when the youngster is a child. In symbols, the successive conservation constraints in using the youngster's resources are

$$(1a \text{ and } 1b) \quad 1 - Y_1^L + Y_1^W + Y_1^S \quad \text{and} \quad 1 - Y_2^L + Y_2^W,$$

while the successive production functions using the youngster's inputs are

$$(2a \text{ and } 2b) \quad Q_1^Y = Q_1^Y(Y_1^W) \quad \text{and} \quad Q_2^Y = Q_2^Y(Y_2^W, Y_1^S, A_1^S),$$

where  $Q_1^Y$  and  $Q_2^Y$  are the youngster's successive childhood and adulthood outputs and  $A_1^S$  is the portion of the adult parent's human capital devoted to the child's schooling. 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 consumed. All functions in the model are quasi-concave, increasing and differentiable; and all quantities are non-negative.

The adult parent's first-period supply of human capital can be devoted to leisure, work, the development of his child's skill, or the development of a sense of gratitude in the youngster; his second-period supply of human capital is, more simply, spent on leisure or work. In symbols,

$$(3a \text{ and } 3b) \quad 1 - A_1^L + A_1^W + A_1^S + A_1^G \quad \text{and} \quad 1 - A_2^L + A_2^W;$$

$$(4a \text{ and } 4b) \quad Q_1^a = Q_1^a(A_1^W) \quad \text{and} \quad Q_2^a = Q_2^a(A_2^W),$$

where  $Q_1^a$  and  $Q_2^a$  are the adult's respective outputs in periods 1 and 2.

The adult parent's utility depends in part on the simple welfare of the child so that  $U^a = U^a(C_1^a, C_2^a, A_1^L, A_2^L, U^Y(\cdot))$ .

Successive family conservation relationships for the distribution of the perishable commodities are, of course,

$$(5a \text{ and } 5b) \quad C_1^y + C_1^a = Q_1^y + Q_1^a \quad \text{and} \quad C_2^y + C_2^a = Q_2^y + Q_2^a.$$

Our assumptions on the natural form of utility independence between parent and child find support from both biological theory and empirical observation. The biological rationale for making a parent's utility depend upon his child's actions only through the effect of the actions on the child's utility is -- in the absence of childhood actions that significantly affect the survival probability of the parent -- simply that the parent biologically should feel a benefit from his child's actions only insofar as the actions affect the child's own genetic objective, viz., the child's utility. Empirically, wealthy parents generally choose broad, lump-sum-type, transfers to their young adult children over specific subsidies to a narrow subset of young adult actions.<sup>8</sup> The biological rationale for the asymmetry in our utility functions, wherein the parent is naturally benevolent toward his offspring but not vice versa, is that although the survival of a family of animals typically requires substantial parental benevolence, family survival is not significantly aided by benevolence of grown children toward their aging parents (see, e.g., Hirshleifer). Empirically, the values of observed voluntary transfers of goods from parents to

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<sup>8</sup>Nevertheless, purely lump-sum transfers, even from obviously benevolent, wealthy parents to their young adult offspring, are seldom observed. Rather, we observe gifts among a long list of "worthwhile" assets (business investments, higher education, beautiful objects, quality housing, etc.) This is because young adults consume in a manner that is too life-risky, taking into account the "death externality" described in the Introduction (and Thompson, 1979, fn. 7). A wealthy parent's way of forcing his grown youngster to internalize this externality, at least to the parent, is to condition his otherwise lump-sum support by transferring only suitably safe, what he calls "worthwhile", assets.

children far exceeds those from children to parents. Finally, none of our results are razor's-edge-dependent on the assumed form of utility-interdependence; both of the assumptions can be relaxed quite significantly before even beginning to affect our conclusions.

Necessary and sufficient conditions for Pareto optimal child-rearing decisions in the above environment are described in Appendix A. These conditions are obtained by maximizing the utility of the child for a given utility of the parent, assuming, wherever possible, positive solution quantities. An obvious feature of the Pareto optimum, as shown in the Appendix, is that  $A_1^G$  must equal zero. Training a child to feel guilty for failing to transfer resources to an aging parent is a pure waste of the society's resources.  $A_1^G$  is included in the model because only certain economic institutions will induce parents to rationally choose zero values. All of the other solution quantities in the optimum are positive.

#### B. Privately Optimal Childrearing Decisions

The problem of specifying the parent's natural incentive system remains.<sup>9</sup> Comprehensive private property, wherein a parent would somehow collect remuneration (or avoid assessment) according to the value of the benefits provided for the youngster, would be a conceivable system. Such systems have yet to appear, their absence probably reflecting universally prohibitive costs associated with their delineation and enforcement. Rather, a parent in a natural environment, and in the model below, has authoritarian control over the youth's childhood behavior but no such

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<sup>9</sup>The "parent" here can be assumed to be a biological parent of the child. An empirical presumption that will be seen to support the efficiency of this ordinarily observed arrangement is that a biological parent's utility ordinarily depends much more heavily on his own child's welfare than on the welfare of the children of others. The parent is best thought of as a father for reasons that will become obvious as we apply the theory.

control over the child's adulthood behavior. When the youngster becomes an adult, he acquires control over his own resources and their product. The grown offspring may, of course, voluntarily give part of his output to his aging parent; and it is also possible that the parent will voluntarily transfer a lump-sum to his adult offspring. These possible transfers can be displayed once we write down the various income constraints. The grown youngster's income constraint is:

$$(6) \quad C_2^y + G = Q_2^y + T,$$

where  $T$  represents a lump-sum transfer from the parent to the grown youngster, and  $G$  a gratuity from the grown youngster to his parent. Of course,  $G \geq 0$  and  $T \geq 0$ . Although the provision of  $T$  uses no net resources, inducing a positive gratuity from the grown offspring requires a positive level of  $A_1^G$ . The parent's successive income constraints are:

$$(7a \text{ and } 7b) \quad C_1^a + C_1^y = Q_1^a + Q_1^y \quad \text{and} \quad C_2^a + T = Q_2^a + G.$$

With these natural income constraints, a parent who allocates his child's human capital to leisure or skill development rather than ordinary production, or allocates his own capital to develop the child's adulthood skills, does so at the expense of his own current income and consumption. Material compensation for these sacrifices may accrue, but only if the youngsters will later feel indebted to the parent and choose to transfer some of their adult outputs to the elderly parent. Therefore, in considering possible compensation, the parent must anticipate a child's adulthood choice of  $G$ , which will depend on future parameters in the grown youngster's utility and production functions, parameters that are currently variables under the parent's control. This means that in anticipating a

gratuity from his child, the parent must consider the function:

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

Using the conservation equations, (1a), (3a), and (5a), this simplifies to:

$$(8) \quad G = G[C_1^y, Y_1^W, Y_1^S, A_1^W, A_1^S, A_1^G] = G[x],$$

where the partial derivatives of  $G[x]$  are computed from  $G(\cdot)$  by varying the omitted variables to satisfy the conservation equations. While these derivatives can be assumed to be non-zero for positive values of  $A_1^G$ , they are zero when  $A_1^G = 0$ . For when  $A_1^G = 0$ ,  $G = 0$  regardless of the values of the other variables. Filial gratitude cannot be expected unless it is taught. Once taught, however, 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  $Y_2^W$ . This choice,  $(C_2^{y*}, Y_2^{L*}, Y_2^{W*})$ , is that which maximizes the Lagrangian

$$(9) \quad U^y(C_1^y, C_2^y, Y_1^L, Y_2^L) + \lambda^y [Q_2^y(Y_2^W, Y_1^S, A_1^S) + T - G[x] - C_2^y] + \gamma^y (1 - Y_2^L - Y_2^W).$$

Given  $x$ , the set of first period choices, the maximization of (9) is easily seen to be characterized by Pareto optimality condition (A3) in Appendix A, along with the two conservation equations, (1b) and (6), used in (9). The resulting value of  $U^y$  is written  $U^y[x]$ . For the purpose of future demonstrations, note that since  $C_2^{y*} > 0$ , the maximization in (9) implies that

$$(10) \quad \frac{\partial U^y}{\partial C_2^y} = \lambda^y = \frac{\partial U^y[\cdot]}{\partial T} = \frac{-\partial U^y[\cdot]}{\partial G}.$$

The parent, in view of the  $U[x]$  and  $G[x]$  functions, varies  $x$  and  $(C_2^a, A_2^L, A_2^W, T)$  so as to maximize the Lagrangian expression,



$$(11) \quad U^a(C_1^a, C_2^a, A_1^L, A_2^L, U^y[x]) + \lambda^a [Q_2^a(A_2^W) + G[x] - T - C_2^a] + \gamma^a [1 - A_2^L - A_2^W].$$

The solution is written  $(x^*, C_2^{a*}, A_2^{L*}, A_2^{W*}, T^*)$ . The respective Kuhn-Tucker conditions with respect to  $T$  and  $A_1^G$ , using the parent's optimality condition for  $C_2^a$  (i.e.,  $\lambda^a = \partial U^a / \partial C_2^a$ ) and then (3a), are

$$(12) \quad \frac{\partial U^a}{\partial U^y} \cdot \frac{\partial U^y}{\partial T} - \frac{\partial U^a}{\partial C_2^a} \leq 0; \quad T^* \left[ \frac{\partial U^a}{\partial U^y} \cdot \frac{\partial U^y}{\partial T} - \frac{\partial U^a}{\partial C_2^a} \right] = 0 \quad \text{and}$$

$$(13) \quad \frac{\partial U^a}{\partial U^y} \frac{\partial U^y}{\partial A_1^G} + \frac{\partial U^a}{\partial C_2^a} \frac{\partial G}{\partial A_1^G} - \frac{\partial U^a}{\partial A_1^L} \leq 0; \quad A_1^{G*} \left[ \frac{\partial U^a}{\partial U^y} \frac{\partial U^y}{\partial A_1^G} + \frac{\partial U^a}{\partial C_2^a} \frac{\partial G}{\partial A_1^G} - \frac{\partial U^a}{\partial A_1^L} \right] = 0.$$

It follows, as we now show, that  $T^*$  and  $A_1^{G*}$  cannot both be positive. Using (10), we rewrite (12) as

$$(12') \quad \frac{\partial U^a}{\partial U^y} \frac{\partial U^y}{\partial C_2^y} - \frac{\partial U^a}{\partial C_2^a} \leq 0; \quad T^* \left[ \frac{\partial U^a}{\partial U^y} \frac{\partial U^y}{\partial C_2^y} - \frac{\partial U^a}{\partial C_2^a} \right] = 0.$$

Dividing (13) by  $\partial G / \partial A_1^G$ , noting that  $\partial U^y / \partial A_1^G = (\partial U^y / \partial G)(\partial G / \partial A_1^G)$ , and using (10), we have

$$(13') \quad - \frac{\partial U^a}{\partial U^y} \frac{\partial U^y}{\partial C_2^y} + \frac{\partial U^a}{\partial C_2^a} \leq \frac{\partial U^a}{\partial A_1^L} / \frac{\partial G}{\partial A_1^G}; \quad A_1^{G*} \left[ \frac{\partial U^a}{\partial U^y} \frac{\partial U^y}{\partial C_2^y} - \frac{\partial U^a}{\partial C_2^a} + \frac{\partial U^a}{\partial A_1^L} / \frac{\partial G}{\partial A_1^G} \right] = 0.$$

In view of (12'), if  $T^* > 0$ ,  $(\partial U^a / \partial U^y)(\partial U^y / \partial C_2^y) = \partial U^a / \partial C_2^a$ . Substituting this equation into (13'), we see that the multiplicand of  $A_1^{G*}$  then reduces to  $(\partial U^a / \partial A_1^L) / (\partial G / \partial A_1^G)$ , which is always positive. It follows that  $A_1^{G*}$ , and thus  $G^*$ , must be zero. So  $T^* > 0$  implies  $G^* = 0$ . No rational parent will both develop an inefficient sense of filial loyalty in his children and plan to give them lump-sum transfers.

The remaining marginal conditions for the parent's maximization of (11) are described in Appendix B. All of the conditions describing first-period

choices contain the expression,

$$(14) \quad \left( \frac{\partial U^a}{\partial c_2^a} - \frac{\partial U^a}{\partial U^y} \frac{\partial U^y}{\partial c_2^y} \right) / \frac{\partial U^a}{\partial U^y} \frac{\partial U^y}{\partial c_2^y} = E^*.$$

$E^*$  is positive if and only if the parent values prospective consumption in old age more than he does his grown youngster's prospective consumption.

From (12), using (10):  $E^* \geq 0$ ; and, whenever  $T^* > 0$ ,  $E^* = 0$ .

### C. Comparing Pareto Optimal and Privately Optimal Childrearing Decisions

First, consider the case in which  $T^* > 0$ . Then, with both  $E^* = 0$  and  $A_1^{G^*} = 0$ , the marginal conditions for a Pareto optimum described in Appendix A are identical to the marginal conditions for a private optimum described in Appendix B. The only possible difference between the two systems is distributional. While the private budget constraints and equation (14) with  $E^* = 0$  are used to determine  $T^*$  and thus the distribution of utility in the private system, an arbitrarily given parental utility,  $U^{a*}$ , was used to determine the Pareto optimum. Setting  $U^{a*}$  equal to the private system's solution level, we obtain an equivalency between the actual solution and a Pareto optimum. However, as elaborated in the second of this pair of papers, a  $U^{a*}$  that maximizes a utilitarian social welfare function is always less than the parentally chosen value.

Nevertheless, summarizing the results for the first case: Parents who plan to give unconditional gifts to their grown children make Pareto optimal childrearing decisions even though they receive no material compensation for their sacrifices.

We now examine the case in which  $T^* = 0$ . Although the parent may still easily be sufficiently benevolent that  $A_1^{G^*} = 0$ , parental choices will almost always be Pareto nonoptimal. In particular, with a continuous

distribution of parental preferences, (12) and (14) can be used to show that the probability that  $E^* > 0$  is unity. This is done, starting from preferences for which  $T^* > 0$  so that the equality in (12) holds and  $E^* = 0$ , by first letting  $T^*$  decrease as the parent becomes continuously less generous until the inequality in (12) just starts to hold so that  $T^* = 0$ , and then noting that any further decrease in  $\partial U^a / \partial U^y$  will simultaneously maintain the inequality and an  $E^* > 0$  because the difference in (12) is also the numerator of  $E^*$  in (14).  $T^* = 0$  and  $E^* = 0$  hold simultaneously only at a singular point. Thus, with  $T^* = 0$ , even though the parent may easily be sufficiently benevolent that he does not devote resources to developing filial gratitude in his child so as to obtain support later in life, the probability is zero that the parent is indifferent between his grown offspring's consumption and his own future consumption. With  $E^* > 0$  but  $A_1^{G^*} = 0$ , three and only three Pareto conditions fail to be satisfied. In particular, conditions B1, B2 and B5 from Appendix B obviously become,

$$(B1') \quad \frac{\partial U^y}{\partial C_1^y} / \frac{\partial U^y}{\partial C_2^y} = (1+E^*) \frac{\partial U^a}{\partial C_1^a} / \frac{\partial U^a}{\partial C_2^a}$$

$$(B2') \quad \frac{\partial U^y}{\partial Y_1^L} = (1+E^*) \frac{\partial U^y}{\partial C_1^y} \frac{\partial Q_1^y}{\partial Y_1^W} \left( \frac{\partial U^y}{\partial C_2^y} / \frac{\partial U^y}{\partial C_1^y} \right) \frac{\partial U^a}{\partial C_1^a} / \frac{\partial U^a}{\partial C_2^a}, \text{ and}$$

$$(B5') \quad \frac{\partial U^a}{\partial C_2^a} \frac{\partial Q_2^y}{\partial A_1^S} = (1+E^*) \frac{\partial U^a}{\partial A_1^L}.$$

In view of (A1), (B1') describes a general parental undervaluation of his young child's consumption relative to his own consumption. Once childhood consumption is increased so that (B1') is replaced with the optimality condition (A1), (B2') simplifies to a general parental overvaluation of his

child's working rather than enjoying leisure. Lastly, in view of (A7), (B5') describes a general parental undervaluation of investments of his own resources in his child's education. Note that the non-observability of  $E^*$ , together with its variability across families for whom  $T^* = 0$ , precludes a standard tax-subsidy solution to the above set of inefficiencies.

Finally, with  $T^* = 0$ , we can also easily have  $A_1^{G^*} > 0$ . The additional positive variable is then matched by the extra equation described in (13) above. The resulting private system is an allocative disaster. All of the first-period efficiency conditions in Appendix A are violated in an ambiguous way, as the private marginal conditions in Appendix B are now all infected by ambiguously signed G-derivatives. Moreover, since both  $A_1^{G^*}$  and its highly variable effects are, like  $E^*$ , practically unobservable and unique to each family, it is again practically impossible to implement a standard Pigouvian tax/subsidy policy to correct the misallocation.

## II. NON-PIGOUVIAN LEGISLATION REPAIRING PARENTAL MALINGENTIVES

Returning to the inefficiencies resulting when  $A_1^{G^*} = 0$  but  $E^* > 0$ , because of the a priori physical similarity of one young child to another, we can use our first optimality theorem to rationalize institutions establishing minimum standards for all parents.<sup>10</sup>  $B1'$ ,  $B2'$ ,  $B5'$  and the subsequent argument tell us the direction of the optimal child-rearing standards. In particular, a Pareto optimal policy provides for minimum

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<sup>10</sup> If the model were generalized to admit non-quasi-concave functions, then quantity controls could easily be superior to a standard Pigouvian tax/subsidy system even if there were no costs of discovering the appropriate tax rates. For, unlike voluntary exchange systems such as the free market, standard Pigouvian tax systems do not enable all of the affected parties to freely choose quantities under the fixed tax rates and therefore permit equilibria in which local but not global optimality conditions are satisfied (See Thompson-Batchelder).

childhood consumption, minimum childhood leisure, and minimum parental expenditures for the child's education. This requirements-policy closely resembles the arrangements we commonly observe. The standards, of course, are obtained by observing the efficient choices of those similarly wealthy parents for whom it is observed that  $T^* > 0$ .

Optimal policy for the general case in which insufficiently benevolent parents may also have  $A_1^{G^*} > 0$  is a potentially much more difficult problem because government officials cannot practically observe either  $A_1^G$ ,  $G$ , or the several derivatives of  $G(\cdot)$ . Nevertheless, the myriad of parental misallocations can be eliminated by rendering insignificant the parent's economic incentives to train gratitude into their children. We believe that compulsory participation in an old age pension program accomplishes this. Such a system forces insufficiently benevolent parents to save for their old age and thereby prevents them from overconsuming during pre-retirement years so as to gain subsistence support from sympathetic offspring after retirement. Without this technique for inducing transfers, it is unlikely that parents can acquire significant income from their grown children. The only empirically important transfers from grown offspring to their parents appear to be transfers providing normal subsistence to elderly parents who otherwise would suffer in destitution or ill-health. We have seldom observed grown children supporting lavish standards of living for their aging parents. Thus it seems likely that, for most families, a social security-medicare system depresses the productivity of indebtedness training to a point where the equilibrium level of  $A_1^G$  becomes zero.

In fact, the benefits paid by the U.S. social security-medicare program approximate old age subsistence. While parents for whom  $T^* > 0$  also participate in the social security program, this is inconsequential: With

$G^* = 0$ , such people borrow against the assets they have accumulated for their retirement in order to offset their social security payments and achieve the same lifetime consumption pattern they would select in the absence of their social security participation. A similar argument applies to childless parents, who have little choice but to save in some fashion for their old age. Only parents for whom  $T^* = 0$  may be affected by the social security-medicare system. The system thus appears to be a remarkable device for selecting out just those parents for whom  $T^* = 0$  and forcing them to save just sufficiently that they will not burden their grown children in their old age. Accordingly, we assume the system works to make  $A_1^{G^*} = 0$ .

As legislated quantity restrictions are avoidable by various parentally determined quality reductions, additional intervention may be justified. Regarding education, public production without vouchers serves to ameliorate these problems. At the same time, it works against parents for whom the social security system does not fully prevent the overdevelopment of filial loyalty, thrift, and work attitudes, which could be easily promoted and exploited through a private educational system.<sup>11</sup>

Making public education free also adds to the ease of enforcing compulsory education quantities. Similarly, state welfare payments to poor families tied to their total expenditures on food, clothing and shelter for children greatly facilitates the achievement of minimum childhood consumption standards. However, as pointed out by Buchanan, subsidies to education

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<sup>11</sup>The federal-tax-induced absence of completely private education in wealthy areas of the U.S. may be explained by recognizing the existence of some inappropriabilities outside of the family. With such 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 make parents overvalue childhood training leading the child to recognize only his compensated actions, achieving a social optimum involves discouraging such training.

and childhood consumption amount to a subsidy to childbearing. A variable rate of childbearing will be introduced into our analysis in Section III.

Regarding minimum childhood leisure laws, pre-teens are usually protected by rigid anti-child labor laws. Teenagers, for whom simple quantity prohibitions are impractical owing to their substantial ability variations, are protected in the U.S. by a Minimum Wage Law (a Subsection of the basic U.S. Child Labor Law), which has had the desirable effect of preventing low-productivity teenagers -- and similar dependents -- from working while allowing relatively productive dependents a few hours of labor. For those exceptionally productive children, such as those in the entertainment field, who are clearly not protected by a minimum wage, 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 child's benefit, thereby protecting the youngster from overzealous, insufficiently benevolent parents while leaving in tact the efficient choices of those parents for whom  $T^* > 0$ .

New legislation can be developed to deal with new childhood activities. For example, parents for whom  $T^* = 0$  choose overly low quality childhood entertainment and pre-schools (V. Thompson, 1977). Regulatory legislation has recently expanded to cover these now-substantial childhood activities.

### III. A PARETO OPTIMAL POPULATION

The above model has a fairly straightforward application to the important, but historically neglected, issue of a Pareto optimal population. Allow the model's first period to include a pre-birth state in which the "youngster," or "offspring," is simply a group of living cells, perhaps just separate sex cells. If the "parent" does not devote resources above a critical level,  $A_1^S$ , to developing the "youngster's" future, then we can say

that the "youngster" remains "unborn" and the corresponding "population" is lower than if  $A_1^S > \bar{A}_1^S$ . Thus, a Pareto optimal level of "childbearing" and "population" is equivalent to a Pareto optimal choice of  $A_1^S$ .

Applying our first optimality theorem, if parents have sufficient benevolence that they transfer lump-sums to their grown youngsters, then they will choose Pareto optimal levels of  $A_1^S$  for their youngsters and, therefore, a Pareto optimal population, or quantity of born youngsters. 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.<sup>12</sup>

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. The first case has all of our minimum-requirement laws in effect. Applying equation (B5'), an insufficiently benevolent parent for whom requirements-policies result in both  $A_1^{G*} = 0$  and levels of  $C_1^Y$  and  $Y_1^L$  satisfying (B1') and (B2') respectively, will unambiguously undervalue  $A_1^S$ . Since we are also assuming an efficient level

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<sup>12</sup>A problem arises in that while we observe certain types of parents transferring lump-sums to their born offspring, we, of course, do not observe transfers to unborn "offspring." This suggests that parental benevolence may be limited to born offspring, so that the parent may make decisions that are insensitive to reductions in the utility of his unborn "offspring." While any offspring's increment in utility from being born is included in the model because adult sensitivity to the utility of a born offspring carries with it a sensitivity to the net utility that the offspring would receive from being born and living as a person, preferences that unborn "offspring" have between alternatives arising for them in their given, unborn state, say aborted children, are ignored here. If, for example, parents who give their born children lump-sum transfers are observed to have lots of aborted children, we could not infer a Pareto optimal ratio of conception to abortion for this family.



of compulsory education, this undervaluation of  $A_1^S$  implies an undervaluation of childbearing. Since childbearing minima are clearly impractical due to the large and unknown differences in the parental costs of childbearing, a regressive subsidy is in order. In fact, we observe a heavy subsidy of this kind in most developed countries in that the compulsory level of education and subsistence consumption for the children of the poor is financed almost entirely by the government.

The second case arises in environments containing no social legislation. Several, lesser developed, regions come to mind, especially those whose religious heritage has decayed. Central China, especially since the "Cultural Revolution", is a prime example. In this case, while the first term on the right of (B5) still represents, in view of (A7), a tendency toward an undervaluation of  $A_1^S$  based upon uncompensated parental resource cost of childbearing, the second term now indicates a counter-tendency toward the overvaluation of childbearing, since this revenue term,  $\partial G[x]/\partial A_1^S$ , is now positive. The occasional predominance of the latter term is indicated by the widespread belief that some rural societies admit a positive net parental profit to having additional children. Our model then implies Paretian overpopulation under laissez faire and a tax on childbearing because it implies that the parent suffers a marginal disutility from generating children, who by implication are expected to live under conditions that are not worth being born into.

#### IV. NON-LEGISLATIVE SOLUTIONS TO THE PARENTAL MALINCENTIVE PROBLEM<sup>13</sup>

##### A. The Church-Based Solution

Just prior to the 18th and 19th century spread of an "Enlightenment" philosophy that exaggerated the bargaining power of the average man in the expanding West, and the consequent spread of popular democracy and social legislation, virtually all Western governments actively supported a Christian church.<sup>14</sup> Such churches typically worked towards solutions to the parental malincentive problem in the same four ways as has modern social legislation. In particular, they worked (1) to provide parents with a belief system leading them to exaggerate the value of working and sacrificing their own consumption in order to benefit their children, (2) to educate young children, instilling in them socially as well as privately valuable belief systems, (3) to provide sustenance for the destitute and infirm, and (4) to encourage childbearing. These systems are obviously still relied upon, for example, among the Catholics in Ireland, the Pennsylvania Dutch, and the Mormons in Salt Lake City. Modern democracies have, of course, continued to support these socially productive, substitute institutions through the use of both tax and antitrust exemptions. However, most of them have been appropriately fading in our modern democracies because the increasing complexity of efficient allocation rules in an

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<sup>13</sup>This section, which is unavoidably jarring, is based on a new theory of biologically efficient, or individually rational, exaggerations, and a corresponding theory of ethics and civilization cycles developed elsewhere (Thompson, 1989). Nevertheless, we have attempted to write the section so that the ethical and historical argument proceeds intuitively and heuristically, in a way that hopefully keeps the reader's demand for an explanation of the underlying psychological and social theory down to a level that will keep him reading until he has caught on to the form of the argument.

<sup>14</sup>The transfer of welfare and education activities from the Church to the Government during the French Revolution is frequently taken to mark the birth of modern social legislation (e.g., Godehot, et al.)

expanding economy makes a church's organizational self-perpetuation of simple allocation rules increasingly costly (Thompson, 1989).

Remarkably, these same four functions were provided by local Egyptian priests going all the way back to the mature Old Kingdom (Clemen). Indeed, the prototype for the highly successful 6th century Benedictine, and subsequent, Christian monasteries came directly from ancient Egypt (Butler).

Overall social efficiency requires that the society's exaggerations also provide solutions to it's "last period problems" regarding both internal cooperation and security from foreign aggressors.<sup>15</sup> A church-based system does furnish a mature economy with a set of exaggerations sufficient for efficient internal cooperation. In particular, by leading the public to exaggerate the abilities of priests to evaluate the non-observable, spiritual causes or consequences of human behavior, a church-based system gives priests and their followers the ability to enforce a property rights system efficiently reducing internal crime rates and various other forms of private rent-seeking (Thompson, E., 1977, Thompson-Faith, 1981). Regarding military efficiency, the same exaggeration also aids top military leaders in establishing a defense commitment by inducing a high degree of priestly involvement in high-level, fight-or-flight, military decisions despite a disproportionately low priestly involvement in the costs of warfare. However, for the system to defend large aggregate capital stocks, a less passive value system is required of the middle and lower level military

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<sup>15</sup> Dynamically rational individuals see that, once a society has reached its last passive decision period, it will pay all of its objective members to forgive all criminals and avoid all battles. The same therefore holds true in the next-to-the-last decision period, etc., down to the present, implying that society can neither internally cooperate nor defend itself without exaggerated, non-objective views of the world to enforce the appropriate commitments (see Thompson-Faith, 1981 and Thompson, 1979, resp.)

decisionmakers. Before discussing possible solutions to this defense problem, we should describe a related solution to the parental malincentive problem.

#### B. The Humanism Solution

During the five or six centuries just prior to the 6th century development of Europe's church-based system, the leaders of the Roman Empire gradually popularized a belief system exaggerating the private value of humanistic benevolence. This system, stemming from the philosophers of the Greek Golden Age and moving to the Roman aristocracy largely through the influences of Cicero and the Senecan Stoics (Heichelheim, Chs. 21 and 30), eventually spread to the masses by using Jesus as a moral teacher-hero just as earlier, Eastern governments had used Vishnu, Zoroaster, and Buddha and similar to the way in which later Middle Eastern governments would come to use Mohammed (see, e.g., Macdonnell, pp. 48-190). Applying our first optimality theorem, creating a sufficient degree of generalized benevolence will indeed solve the parental malincentive problem. Humanistic benevolence extended beyond one's immediate family is also socially beneficial in a private-property system in that it serves there to reduce the internal crime rate and the incentive to overdevote resources to private, inter-familial rent-seeking. In fact, these benevolent value systems did not arise until soon after private property in inputs was, also probably efficiently (Thompson-Faith, 1981), extended to civilian families on a large scale during the world-wide centralizations of the 6th-2nd centuries B.C.

Nevertheless, an attitude of unconditional brotherly love toward strangers militates against a soldier's carrying out his part of his nation's defense commitment. A humanistic religion is therefore appropriate -- and indeed has survived -- only in those areas of the world possessing,

in addition to a separate private property ethic, either: (a) a militant xenophobia conditioning the benevolence (the Islamic and Sikh regions of the Middle East and Northern India), (b) a severe degree of asceticism complementing the benevolence, thereby generating extremely low equilibrium stocks of coveted capital and leaving the area safe from foreign aggression (the world-denying Hinduism of Southern India and Theravada Buddhism of Southeast Asia), or (c) a separate military caste. The unconditional benevolence of the widely spreading humanistic thought systems of Zoroaster, Buddha, and Jesus are indeed commonly regarded as substantial contributors to the respective collapses the wealthy empires of ancient Persia, Asia, and Europe.

Because church-based systems instill the same values in their priest-teachers that humanistic systems instill in their adult lay members, although in a more extreme form because priests lack the biologically endowed benevolence of natural parents, world religions have evolved to offer both humanistic and church-based solutions to their client states. A successful state adopting a non-xenophobic and non-aescetic world religion -- church-based or not -- must also develop a military caste to prevent its priests from creating an overly benevolent military. Therefore, while Egypt and the Near East began their recoveries under the xenophobic humanism of Mohammed and most of Eastern Europe and Southern Asia was becoming increasingly aescetic, Western Europe evolved a special class of conditional, or "feudal," land-owners. They were allowed to maintain control of their valuable land only so long as they could maintain both capable armies and exaggerated views of the private value of defending the interests of the overlord in conjunction with other such noble warriors. The West, where heroic epics had long been employed to create sacrificial values, thus gradually evolved legends to induce this new attitude of "chivalry" among

its meritorious vassals (see, e.g., Joyce, Prestage.) No such ideological novelty was evolved in the non-aescetic, non-zenophobic, sections of the East because classical Hinduism contained an established military caste (the Kshatryas), while the natural obedience ethic dominant in Northern China, Korea and Japan (discussed in subsection E below) allowed their extensive feudal systems and military castes of the 17th-19th centuries to function without any change in basic values.

Western Europe obviously grew very rapidly for several centuries subsequent to their achievement, by the end of the 10th century, of both external defensibility through chivalry and internal efficiency through a blending of chivalry with church-based religion in their expanding urban oligarchies (Hickson-Thompson). Soon after the invention of gunpowder and the mobile canon late in the 14th century ended the ability of feudal lords to defend their localities, and expansive nation-states began to emerge, the chivalry required of the church-based feudal system in the West quickly withered (Kitchin, Ch. IV) and gradually evolved into our modern, democratic value system.<sup>16</sup> Besides providing a psychological foundation for modern

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<sup>16</sup>In particular, the chivalric exaggeration of the private value of competing with one's fellow man on a level playing field and winning prizes to display one's relative superiority was, as in early Classical Greece, converted into a popular demand for political and legal equality together with a correspondingly protected form of private property by the expanding gentries. This new class of urban "gentleman" substantially retained chivalry (see e.g., Reed) by retaining its benevolently competitive value system. Regarding the values of the military leaders and the bureaucracy, the chivalric exaggeration of the private value of confederated sacrifice for the wishes of the king was, through early mainline Protestantism, eventually converted into an "enlightened" exaggeration of the value of honoring the "rights" of all people favored by the king or analogous civil authority.

The former, benevolently competitive, value was clearly reflected in the thought system of the Arminian Protestants in Holland, the "New Believers" in the U.S., and the Anglicans in England, wherein one's cumulative unconsumed earnings were considered a sign of divine favor as well as human excellence. Indeed, Max Weber combined this competitive element of chivalrous values with the egalitarian values of traditional, Old Testament, predestinarian

Western democracy and its complex legislation, chivalric values directly influence the ability of democratic legislatures to attain a complete welfare optimum, as we shall elaborate in the second of this pair of papers.

### C. The Local Ancestor Worship Solution

Just prior to the popularization of the unconditionally humanistic philosophies and religions that brought forth the long decline of the Roman

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Calvinists into a single, internally inconsistent value that he called the "Protestant ethic", arguing that regions that had this "ethic" had a unique ability to steadily sacrifice (work, save, and calculate) and therefore to economically prosper. He used the argument to explain the exceptional economic performances turned in by the previously predestinarian Calvinist states that were politically tolerant enough to admit churches adopting chivalrous values, which were then popularly called "Arminian heresies" (see e.g., Hyma).

Subsequent scholars have pointed out that Weber's economic argument, relying as it does on work, savings, and diligent calculation, applies as well to the economically unsuccessful, purely Calvinist and Lutheran areas as well as the more successful, partially Arminian, areas (Viner); while other authors have pointed out that most successful Protestant families had very similar acquisitive traditions dating back to when the families were solidly Catholic (Trevor-Roper). Such observations imply that private attitudes toward money-making could not possibly explain the unique economic success of Holland, England, and the North American Colonies. The real change was in governmental operation (Thompson, 1989). What was happening to these burgeoning economic giants, as we have already suggested, is that relatively successful people were being allowed to organize as separate political interest groups to protect their accumulations from their less fortunate compatriots (the latter being the original, predestarian Calvinists in Holland, the "Old Believers" in America, and the "diggers and levellers" in England).

With competing political groups, the sudden pressure to tailor political platforms to the interests of the voters quickly transformed these stagnant, only formally democratic, theocracies into modern-type, adversarial democracies. Given, in addition, their basic Anglo-Saxon civil reverence, as reflected in their genuine Protestant ethic exaggerating the value of governmental law over church-based or other ideological law, these areas (early 17th century Holland, late 17th century America, and early 18th century England) predictably took-off (Thompson 1989), suddenly outperforming their less democratic neighbors. Once the economic success of these Northwest European democracies was established, other states began to imitate them, finally coming to adopt the "Enlightenment" values described above. Weber's "Spirit of Capitalism" was thus, in fact, the "spirit of adversarial democracy", the inconsistency within his "Protestant ethic" being a necessary part of such a democracy, not a part of some pseudo-scientific mystique admitting non-existent thought systems by labelling them "ideal types".

Empire, an entirely different kind of religious solution had dominated the region. This was the ancient Indo-European religion of local ancestor worship in which each family's father-priest taught his sons to exaggerate the likelihood that the male leader of a family had a soul that would leave his body after death, reside near his gravesite, and require both warmth and occasional bits of food for its continual well-being (Coulanges, Bk. I). As a result, dominant sons would both supply small ritual sacrifices to their father's soul (Heichelheim, et al. pp. 42-45) and raise productive sons of their own to carry out the requisite sacrifices to their future souls (Coulanges, Bk. II). Similar types of local ancestor worship independently developed both in the ancient Near East in agrarian Southern India and Iran (Schmidt, pp. 67-71) and the Far East among the similarly successful, similarly agricultural, Shang civilization (e.g., Saunders) long before it began being absorbed by the more northern, more nomadic, Mongol-Turkic, Chou culture in the 11th century B.C.

While initially providing the defense function simply by inducing family members to exaggerate the importance of maintaining full control of their family territory, local ancestor-worship required, under later, more cooperative levels of inter-family interaction, the superimposing of pantheonic mythologies on the basic system, wherein idealized, role-model ancestors (e.g., Heracles, Romulus, and Indra) subordinated their narrow interest to the ostensible interests -- both internal and external -- of other families in their tribe. Pantheonic ancestor worship was thus the dominant religion in the West just prior to humanistic philosophy and Christianity (Coulanges, Bks. III-V). With one or the other present to solve the parental malincentive problem, Ancient Rome had little use for social legislation, and, in sharp contract to her otherwise extremely



sophisticated legal system, supplied almost no such legislation.

The similarly Indo-European, pre-classical Greeks living on the relatively heterogeneous lands to the east came to augment their old pantheonic ancestor-worship system with the intensely competitive value system revealed in the behavior of the Achaean heroes of Homer's Iliad. Reflecting the unusual problem of defending the densely populated, highly valuable Greek centers (at Elis, Pylos, and Eastern Thessaly) from the invasive Dorians, the Aoleans of the Greek Dark Age (11th-8th centuries, B.C.) thus developed a mythology exaggerating the value of competitive achievement (Grote) and a correspondingly feudal property rights system (Bury and Meiggs, p. 53) in exactly the same way as did the Western Europeans of their own Dark Age (6th-10th centuries A.D.) The result of the popularization of this competitive value system, once the light-iron age came to dictate much larger armies in the 6th century B.C., was the development of democracy in their integrating, expanding regions strictly analogous to the above-described development of modern democracy out of the chivalrous values of medieval Western Europe.

Classical Athens correspondingly solved its parental malincentive problem in the same four ways as do modern legislatures (Holm), the social security function being handled in a theoretically equivalent manner by legally requiring grown children to support their elderly parents. Thus Xenophon, in the first tract ever to be entitled "Economics", both anticipates the parental malincentive problem (as he does so many other ideas in British economics) and indicates the Athenian solution when he off-handedly points out to his new wife:

If, then, the gods should ever grant children to be born to us, we shall then consult together, with regard to them, how we may bring them up as well as possible; for it will be a common

advantage to both of us to find them of the utmost service as supporters and maintainers of our old age.

#### D. The Matriarchy Solution

Going still further back in European history, back to the Neolithic, when defense of tribal capital from external aggression was a relatively insignificant problem because of the predominance of a horticultural, non-animal using, technology (Schmidt, p. 11), Old Europe was dominated by local matriarchies achieving internal order through a magical belief system exaggerating the ability of goddesses to control the environment through the use of nature-spirits (e.g., Gimbutas.) The same was true of the relatively secure Minoan Crete of the early Bronze-Age (Guthrie.) Such a belief system is efficient for small, secure tribes because of the relatively low degree of parental malincentives in maternal preferences (Dawkins).

These ideas were retained in an altered form in Northwestern Europe, where the invading Indo-European patriarchies of the 4th millenium BC found a relatively hunter-oriented technology, one lending itself to a greater level of independent household control by mothers. The related glorification of young wives and mothers in the subsequently evolved mythologies of Northwestern Europe (e.g., Stern, Ch. IV) largely freed it from the reliance on the local ancestor worship and humanistic systems of the South. By retaining a good part of the old mother-worship in its mythology in order to solve its parental malincentive problem, the Northwest was free to develop a relatively simple mythology exaggerating the values of military sacrifice and obedience to civil authorities, what later became the genuine Protestant ethic of civil reverence (see note 15), in order to establish both external and internal order.

The resulting small-scale Germanic societies were quite stable and successful for thousands of years before Christ (Starcke). After the misguided Roman attempt to switch from local ancestor worship to a humanistic solution without creating a separate military caste, these Germanic tribes confederated to where they were able to conquer the weakened South but were too few to be able to defend the relatively valuable West until the evolution of the chivalrous value system discussed above.

#### E. The Gerontocracy Solution

Moving East, where the more nomadic, but still necessarily militaristic and therefore patriarchal, Mongol-Turks were expanding during the 4th and 3rd millenia, the localistic solution to the parental malincentive problem of the neighboring Indo-Europeans was much less practical. The Mongol-Turk solution was a mythology exaggerating the value of familial experience and wisdom, thereby inducing familial gerontocracies wherein the typical family has a grandfather dictate the sacrifices that his sons make for his grandchildren. An informed grandfather, by implementing a social welfare function, prevents his sons from exploiting, underinvesting in, or mistreating his grandchildren.<sup>17</sup> At the same time the grandparent will achieve a

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<sup>17</sup>In one sense, implementing a gerontocratic solution is not as difficult as it initially appears; in another, it is more difficult. What makes it deceptively easy is that mothers, who have no parental malincentive to speak of, are normally left to make "small" child-rearing decisions. All the gerontocratic solution then requires is that the "big" decisions be made by a grandfather rather than a father. The same kind of shortcut also facilitates the achievement of our legislative solution, with a legally constrained government worker replacing the grandfather.

What makes implementing a gerontocracy difficult, besides the obvious fact that grandfathers must be sufficiently informed to make efficient work and consumption decisions for their grown sons, is that grandfatherly consumption must, be somehow restricted. One method is to limit the gerontocracy to family decisions that do not directly affect the income of the old patriarch, which is assured by law or the simple filial loyalty that such a solution demands in the first place. A second method is to grant the

complete distributional optimum as well as a simple Pareto optimum in allocating resources between parents and children. As grandfathers join together into tribal "councils of elders", they would find little use for social legislation. Rather, a relatively simple set of rules, or "moral laws" designed for the enforcement of private property rights and reduction of internal crime rates -- along with a primary obligation to filial loyalty -- would suffice for social efficiency in mature economies.<sup>18</sup> In fact, early Far-Eastern legislation, as reflected in the rules of Confucius (e.g., Saunders), was exactly of this form. Similarly, in the archaic Near-East, the mature Sumerian councils of the late 3rd millenium BC produced simple, anti-crime-directed, moral laws, complementing them with a severe criminal penalty for "dishonoring" (interpret "disobeying the competent, non-redistributive decisions of") one's parents (e.g., C. Edwards, App. C).

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patriarch ownership rights to the product of the entire family, including his grown sons. This latter method obviously requires a priest class to maintain a mythology sufficiently persuasive to induce the grown sons to acquiesce to the complete control of the old man, to induce sufficient asceticism on the latter's part, and to give itself sufficient prestige to enable it to settle disputes among potential heirs. As a result, the latter system is observed only among largely settled, ex-nomadic, tribes (i.e., ancient Ireland (Maine)).

<sup>18</sup>To achieve adherence to these laws, the new religions formed by the spreading Mongol-Turkish tribes naturally represented the ancestor-spirit of the now-distant central authority as the master of the heavens, thereby placing him in a convenient control position. The Chinese, Sumerian, and Egyptian mythologies developing around this time all correspondingly engendered a new ethic of social sacrifice and extreme reverence for the "highest" authority as well as his own gerontocratic family. These myths both reflected and created the civil reverence ethic required to support the subsequently developed democracies of ancient Sumer and Babylonia, as well as the later Greek and early Roman democracies through the spread of a Sumerian-based mythology by the Dorian colonizers (Webster). The civil reverence ethic that has been supporting our more modern democracies independently grew, as we have already indicated, out of the successive sacrifice-for-the-state ethics expressed first in the mythologies of ancient Germania, then in medieval Western European chivalrous epics, then in mainline Protestantism, and finally in late 18th century, Enlightenment-based, political philosophy.

This ancient Near-Eastern gerontocracy was replaced soon after the centralizing invasions of various semitic groups near the end of the 3rd millenium BC. Here, just as in the classical Greek and modern cases, the newly formed cosmopolitan centers built democracies upon the foundation of a benevolently competitive (i.e., chivalrous) value system, as reflected in the mythology of ancient Sumer (Saggs, pp. 189-90). And, just as in the later cases, these newly formed democracies quickly evolved our four-element policy set, as is readily observable in the Code Hammurabi (e.g., C. Edwards, pp. 28-72. In particular: See paras. 29 and 42 punishing paternal over-consumption and sloth; paras. 137, 162, 166, 168, 172 imposing child support; para. 195 requiring grown children to support non-land-owning parents; paras. 117, 192, 193, 257-8, 261, and 274-75 imposing child labor laws and minimum wages.)

Only the relatively nomadic, uniquely cohesive, Hebrews have continued the ancient, gerontocratic form of mature Sumer, as revealed throughout the Old Testament and expressly stated in the Laws of Moses in Exodus (xx-xiii).

Returning to the Far East, the ancient gerontocracy of the Mongol-Turks was able to retain its early dominance, albeit fitfully, over the occasional dynasties of indigenous ancestor worshippers. The morally constrained gerontocracy of the Far East during the early Chou dynasty was, like the West, infused with substantial doses of benevolence from the 6th-3rd centuries BC as cities grew and private-property became more widespread during the waves of centralization that swept over the civilized world as a result of the advent of large armies of mobile, light-armored soldiers. But, with the benevolence much less extreme than Christianity because of the continued Eastern employment of gerontocracy to solve the parental malincentive problem, Chinese civilization enjoyed much longer periods of stable growth than the West. Nevertheless, its internal-efficiency-enhancing benevolence

-- Confusion or Buddhist -- finally caught up with it through the Mongol invasions of the 10th century. Sometime after the foreign aggression had ended, the Manchu-dominated Orient of the 16th-19th centuries, like the West of the 7th-10th centuries, developed feudal orders, supported not by the chivalry but by obedience ethic implicit in any gerontocratic mythology. It was therefore only with the active encouragement of the West that much of the coastal Northern Orient of the 20th century has appropriately democratized. And only in these areas has social legislation grown up to replace the ancient gerontocracies.

Gerontocracy, rule-by-the-old, is proving to be inappropriate to a world with a sufficiently rapidly changing technology, just as matriarchy proved inappropriate to a sufficiently militaristic world, as pantheonic local ancestor worship proved inappropriate to a sufficiently mobile population, and as church-based or humanistic allocation rules have proved inappropriate to economies sufficiently expanding that efficient incentive systems have not been practically determinable without the informational input of the affected capital owners.

#### F. Primitive Meritocracy: A Non-Solution

In the societies considered above, the military leaders desire a Pareto optimum between the society's other parents and their children. However, in "primitive meritocracies", societies where there is no mythological means of maintaining long-term disparities in the internal distribution of wealth, a current leader places a premium on having one of his own children the leader of the next generation. Therefore, even though the leader is likely to provide lump-sum transfers to his own grown children and therefore efficiently educate them, he does not have an incentive to order other parents to efficiently sacrifice for the education of their children. For the

likelihood that one of the current leader's own children will be a future leader in a meritocratic tribe depends on the amount of education received by the other children. In other regards, the leader, who may be assumed to be naturally somewhat benevolent, will rationally restrict both child abuse and child labor and force support payments for the elderly.

Thus, although both children and the aged in observed primitive societies are typically treated very kindly, education largely proceeds by imitation, an essentially costless, parentally most preferred, form of instruction. And public education, through tribal priests, is largely limited to the creation of the exaggerated views necessary for internal order and defense against external threats. In particular, since the tribe can survive under a thought system generating extreme respect for the chief relative to the rest of the environment, it is sufficient for priests to teach that the chief has a unique source of magical control over the invisible forces of nature, i.e., some form of nature-worship.

A notable absence of value-creating mythologies -- either through convincing hero-tales or after-life stories -- in primitive tribes has struck virtually all serious students of mythology since Tylor and Malinowski (and can be witnessed firsthand by perusing any of the several attempts at constructing substantial, value-creating, mythologies out of ancient tribal legends (e.g., Cendrars)). Such an absence, by precluding the development of the property rights necessary for rational tribal leaders to efficiently order the education of the children of others of his tribe, directly reveals the absence of a set of exaggerations necessary for the tribe to solve its parental malincentive problem.

The obvious way to escape this low-level, human underinvestment trap, short of developing a strong private-property mythology, is group-

selection. Societies with leaders escaping their natural, dynastic preferences will, after several generations, be collectively more productive and flexible than neighboring tribal societies and will therefore out-survive them when all are hit by a series of collective shocks. It is no surprise, then, that primitive tribal societies have survived only in the Arctic regions or the tropics, where, up until the past couple of centuries, there has been a relative absence of large external shocks. Nevertheless, because group-selective pressures have been rapidly growing there in recent centuries, we should correspondingly expect to find numerous indications of evolving solutions to the parental malincentive problem. In fact, recent studies of large central African tribes reveal some sections of the same tribe that are gerontocratic, other groups that are matriarchal, others engaging in sacrificial local ancestor worship, still others that rely on a Christian church for education and welfare, and yet others that rely on voting and legislative controls (e.g., Gibbs).



APPENDIX A: 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 non-negativity constraints:

$$\begin{aligned}
 & U^Y(C_1^Y, C_2^Y, Y_1^L, Y_2^L) + \mu [U^a(C_1^a, C_2^a, A_1^L, A_2^L, U^Y(C_1^Y, C_2^Y, Y_1^L, Y_2^L)) - U^{a*}] \\
 & + \lambda_1 [Q_1^Y(Y_1^W) + Q_1^a(A_1^W) - C_1^Y - C_1^a] + \lambda_2 [Q_2^Y(Y_2^W, Y_1^S, A_1^S) + Q_2^a(A_2^W) - C_2^Y - C_2^a] \\
 & + \gamma_1 [1 - Y_1^L - Y_1^W - Y_1^S] + \gamma_2 [1 - Y_2^L - Y_2^W] + \gamma_3 [1 - A_1^L - A_1^W - A_1^S - A_1^G] + \gamma_4 [1 - A_2^L - A_2^W].
 \end{aligned}$$

We have assumed that the Pareto optimum requires positive consumption by both individuals in both periods and positive amounts of all productive resources to be devoted to all activities except one. The exception involves the employment of  $A_1^G$ . The Kuhn-Tucker conditions applicable to this variable in the above maximization problem are

$$\gamma_3 \geq 0, \quad \text{and} \quad A_1^G \gamma_3 = 0.$$

Since  $\gamma_3$  is the marginal utility of the parent's first-period human capital, the nonsatiation condition on the utility functions implies that  $\gamma_3 > 0$ . Therefore,  $A_1^G = 0$  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 subsequent pure transfer to the aging parent. As such transfers are theoretically costless within our optimality model, being achievable by centrally forced lump-sum transfers from adult children to their aging parents, devoting resources to producing these transfers is Pareto nonoptimal.

Setting the first derivatives of the Lagrangian with respect to each of the variables other than  $A_1^G$  equal to zero yields

$$(A1) \quad \frac{\partial U^y / \partial C_1^y}{\partial U^y / \partial C_2^y} = \frac{\partial U^a / \partial C_1^a}{\partial U^a / \partial C_2^a}$$

$$(A2) \quad \frac{\partial U^y}{\partial Y_1^L} = \frac{\partial U^y}{\partial C_1^y} \frac{dQ_1^y}{dY_1^W}$$

$$(A3) \quad \frac{\partial U^y}{\partial Y_2^L} = \frac{\partial U^y}{\partial C_2^y} \frac{\partial Q_2^y}{\partial Y_2^W}$$

$$(A4) \quad \frac{\partial U^y}{\partial C_2^y} \frac{\partial Q_2^y}{\partial Y_1^W} = \frac{\partial U^y}{\partial Y_1^L}$$

$$(A5) \quad \frac{\partial U^a}{\partial A_1^L} = \frac{\partial U^a}{\partial C_1^a} \frac{dQ_1^a}{dA_1^W}$$

$$(A6) \quad \frac{\partial U^a}{\partial A_2^L} = \frac{\partial U^a}{\partial C_2^a} \frac{dQ_2^a}{dA_2^W}$$

$$(A7) \quad \frac{\partial U^a}{\partial C_2^a} \frac{\partial Q_2^Y}{\partial A_1^S} = \frac{\partial U^a}{\partial A_1^L}$$

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.

APPENDIX B: The Parent's Privately Optimal Choices

To describe the parental optimum, the maximum of (11) with respect to the parental choice variables, 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 the maximizing solution to (9), by the respective arguments of  $x$  and using (10), we obtain

$$\frac{\partial U^Y[\cdot]}{\partial C_1^Y} = \frac{\partial U^Y(\cdot)}{\partial C_1^Y} - \frac{\partial U^Y}{\partial C_2^Y} \cdot \frac{\partial G[\cdot]}{\partial C_1^Y}$$

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

$$\frac{\partial U^Y[\cdot]}{\partial Y_1^S} = \frac{-\partial U^Y(\cdot)}{\partial Y_1^L} + \frac{\partial U^Y}{\partial C_2^Y} \left( \frac{\partial Q_2^Y}{\partial Y_1^S} - \frac{\partial G[\cdot]}{\partial Y_1^S} \right)$$

$$\frac{\partial U^Y[\cdot]}{\partial A_1^W} = \frac{-\partial U^Y}{\partial C_2^Y} \cdot \frac{\partial G[\cdot]}{\partial A_1^W}$$

$$\frac{\partial U^Y[\cdot]}{\partial A_1^S} = \frac{\partial U^Y}{\partial C_2^Y} \left( \frac{\partial Q_2^Y}{\partial A_1^S} - \frac{\partial G[\cdot]}{\partial A_1^S} \right)$$

$$\frac{\partial U^Y[\cdot]}{\partial A_1^G} = \frac{-\partial U^Y}{\partial C_2^Y} \frac{\partial G[\cdot]}{\partial A_1^G}$$

Using these equations, the first-order conditions for the parent's maximization problem, in addition to the  $T^*$  condition described by (12) in the text, are, using (14), easily seen to be

$$(B1) \quad \frac{\partial U^y}{\partial C_1^y} / \frac{\partial U^y}{\partial C_2^y} = (1+E^*) \frac{\partial U^a}{\partial C_1^a} / \frac{\partial U^a}{\partial C_2^a} - E^* \frac{\partial G[x]}{\partial C_1^y}$$

$$(B2) \quad \frac{\partial U^y}{\partial Y_1^L} = (1+E^*) \frac{\partial U^y}{\partial C_1^y} \frac{\partial Q_1^y}{\partial Y_1^W} \left( \frac{\partial U^y}{\partial C_2^y} / \frac{\partial U^y}{\partial C_1^y} \right) \frac{\partial U^a}{\partial C_1^a} / \frac{\partial U^a}{\partial C_2^a} + E^* \frac{\partial U^y}{\partial C_2^y} \frac{\partial G[x]}{\partial Y_1^W}$$

$$(B3) \quad \frac{\partial U^y}{\partial C_2^y} \frac{\partial Q_2^y}{\partial Y_1^S} = \frac{\partial U^y}{\partial Y_1^L} - \frac{\partial U^y}{\partial C_2^y} \frac{\partial G}{\partial Y_1^S} E^*$$

$$(B4) \quad \frac{\partial U^a}{\partial A_1^L} = \frac{\partial U^a}{\partial C_1^a} \frac{\partial Q_1^a}{\partial A_1^W} + \frac{\partial U^a}{\partial C_2^a} \frac{\partial G}{\partial A_1^W} \left( \frac{E^*}{(1+E^*)} \right)$$

$$(B5) \quad \frac{\partial U^a}{\partial C_2^a} \frac{\partial Q_2^y}{\partial A_1^S} = (1+E^*) \frac{\partial U^a}{\partial A_1^L} - \frac{\partial U^a}{\partial C_2^a} \frac{\partial G}{\partial A_1^S} E^*, \quad \text{and}$$

$$(B6) \quad \frac{\partial U^a}{\partial A_2^L} = \frac{\partial U^a}{\partial C_2^a} \frac{\partial Q_2^a}{\partial A_2^W},$$

Note that when both  $E^* = 0$  and  $A_1^G = 0$  so that the derivatives of  $G[x]$  are all zero, (B1-B6) simplifies to a set of equations which, when combined with the grown offspring's marginal condition, (A3), is identical to the set of marginal conditions for Pareto optimality expressed in (A1-A7).

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