NBER WORKING PAPER SERIES

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Working Paper 7698
http://www.nber.org/papers/w7698

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
May 2000

We appreciate the comments of Gary Becker, Ralph Chami, Don Coursey, Tom DeLeire, Will Dow, Matt Kahn, Bob Michael, Derek Neal, Charmaine Picard, Eric Posner, Sherwin Rosen, Xavier Sala-i-Martin, seminar participants at Clemson University, Northwestern University, Rice University, The University of Chicago, The University of Quebec at Hull, and the Health-, Aging-, and Productivity Groups of The NBER. Research assistance of Peter Ho, Lars Lefgren, Rob McMillan, and Allison Schrager is also greatly appreciated. Mulligan's work is generously supported by a grant from the Smith-Richardson Foundation to the Stigler Center for the Study of the Economy and the State. The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research.

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NBER Working Paper No. 7698
May 2000
JEL No. H11, H22, H23, L51

ABSTRACT

A common view in public finance is that there is an efficiency-redistribution tradeoff in which distortions are tolerated in order to redistribute income. However, the fact that so much public- and private redistributive activity involves in-kind transfers rather than cash may be indicative of merit motives on the part of the payers rather than a preference for the well-being of the recipients. Efficiency-enhancing public policy in a merit good economy has the primary purpose of creating distortions and may only redistribute income from rich to poor in order to create those distortions – the reverse of the conventional efficiency-redistribution tradeoff. We discuss why the largest programs on the federal and local level in the US – including Social Security, Medicare and Medicaid, and Public Schooling – seem consistent with the reverse tradeoff rather than the classic one. Transfers are not lump sum in a merit good economy, and explicitly accounting for this when calculating tax incidence reduces the estimated progressivity of government policy. As one example, we calibrate the conventional life-cycle model to show how the amount of over-saving induced on the poor by Social Security hurts them at least as much as the "progressive" benefits help them. When the distortions outweigh fiscal transfers in this manner, the classic efficiency-redistribution tradeoff cannot justify the program and the program is far less progressive than conventional analysis suggests.

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1 Introduction

Scholars and citizens alike often believe that governments ought to, and do, help the poor and less fortunate through redistributive tax and spending programs. Many view this as the main purpose of government activity and therefore argue that economic efficiency can be sacrificed for redistributive purposes. This classic efficiency-redistribution tradeoff in public finance has guided much of incidence analysis to establish the degree to which separate policies do indeed help the poor at the expense of the rich, even though it is understood that such policies may distort behavior. For example, although universal public health insurance is fully understood to be distorting by economists, it is suggested that this "inefficiency" should be traded off with the gain in equity its redistribution may create. As the argument goes, inefficiency is the price paid for redistributive concerns of a society.[1]

However, in undertaking redistribution governments rarely go as far as make unconditional transfers to be spent by the beneficiaries on whatever they choose. Rather, the desire to take care of the poor is translated into providing "necessities" such as health care, savings, food, and housing or other goods or services. The rich seem to feel that they are willing to give up part of their income to help out the poor, but only for specific purposes. Indeed, such merit good motives for transferring income seem evidenced by the large amount of voluntary in-kind redistribution taking place in the private non-profit sector, e.g. through churches or other organizations, which many times complement or substitute for the mandatory provisions made through the public sector. What are the distinct implications of merit good motives versus pure redistributive motives for the form and quantity of government policy, for the extent by which policy helps the poor at the expense of the rich; and are these differences quantitatively important?

We argue that merit motives may induce the reverse tradeoff between redistribution and efficiency than dictated by classic public finance. As opposed to the classic trade-off, the majority of US government activity is many times more easily interpreted the exact opposite way under merit motives; redistribution is the price paid for achieving distortions. By explicitly modeling merit goods, we show how policy is likely to appear progressive in a study that treats most or all taxes and transfers as lump sum – as do many of the empirical studies of tax incidence – even while taxes and transfers are (optimally) not lump sum and policy does not enhance the welfare of the poor.

To illustrate how these new implications of merit motives differ from classic public finance,

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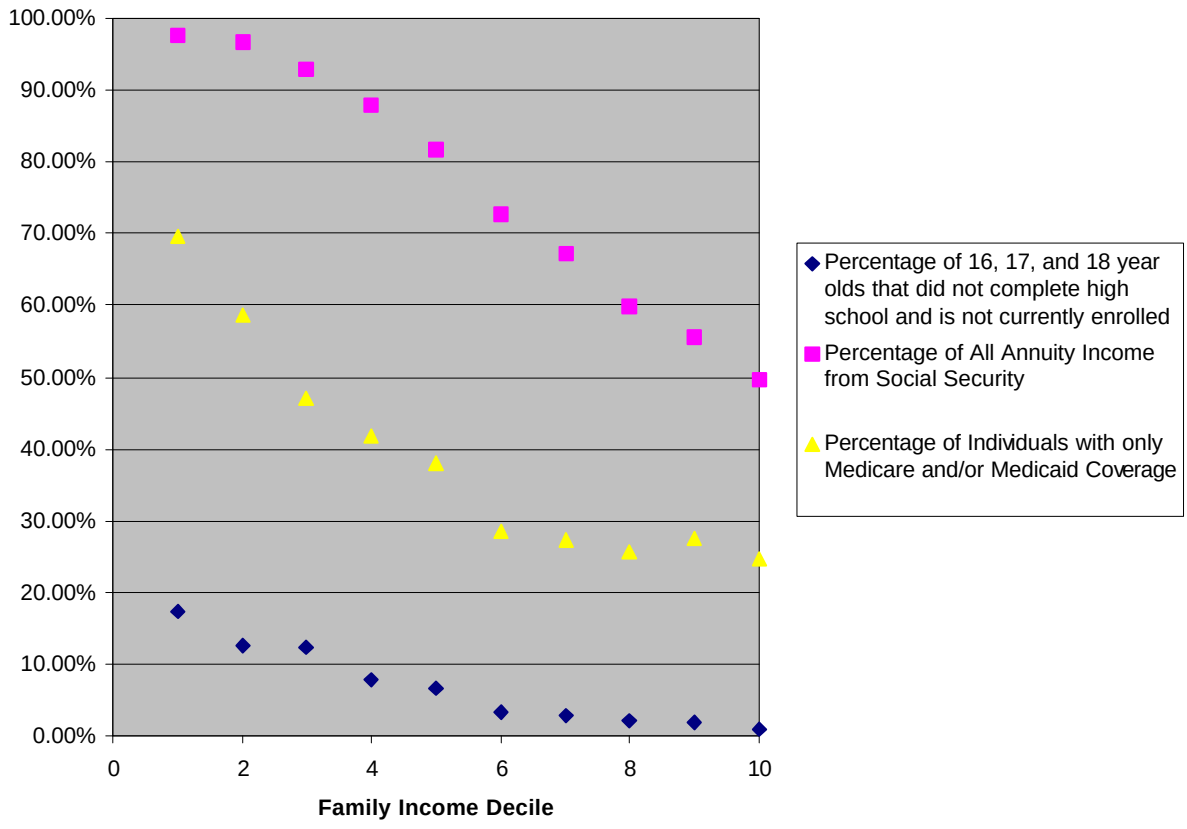
[1] See e.g. Musgrave (1955), Mirrlees (1971), Rosen (1992), Atkesson and Stiglitz (1988).

consider current government activity in the US: the two largest spending items on the federal level are health care and retirement income, and the largest spending item on the local level is education. First of all, all citizens are (sometime during their lives) eligible for these three programs regardless of their economic status, and opting out of the program is either impossible or quite disadvantageous. Second, rich individuals typically consume in excess of the publicly provided level, and hence do not have their consumption distorted as much as do the poor for whom the mandatory nature of the programs makes them consume more than they would in absence of the program. This is an important implication of merit good motives, and its accordance with fact can be seen in Figure 1 below.

Figure 1: In-Kind Program Distortions by Family Income Decile



Source: March, 1998 Current Population Survey (CPS). For Schooling, the dropout series includes all individuals between the ages of 16 and 18 and income refers to parental income. For Social Security, we included all individuals 65 years of age and older who knew the source of their income

and who reported no Railroad Retirement Income. For Medicare, we included all individuals 65 years of age and older. The series are weighted to reflect the population distribution of income and characteristics.

Figure 1 suggests that these large programs cannot be binding for the rich, as they supplement their consumption by private spending, but may be binding for the poor, as they do not consume more than required. The rich, as opposed to the poor, attend school more years than required, hold private pensions in addition to Social Security, and add private Medigap coverage to Medicare. The upward distortion on the poor is an obvious implication of the in-kind subsidies induced by merit motives but is also suggested by the considerably lower consumption of these types of goods for individuals that are equally poor but live in poorer countries where consumption is not affected by the public sector. Merit motives imply that these distortions imposed on poor are enjoyed by the rich who consequently would be willing to compensate the poor through fiscal transfers. Hence, we make the novel claim that the incidence of fiscal policy, in particular its progressivity, is linked to the regressivity of regulatory policy – the poor need more progressive budgetary policy in order to willingly accept the more regressive and distorting consumption of merit goods.

These merit good distortions have important and novel implications for positive and normative incidence analysis. On positive grounds, they imply that so called "cross-hauling," in this case the simultaneous taxing of and spending on the poor, can be explained as being efficiency enhancing under merit motives. In particular, efficiency in a merit good economy is enhanced when income is taken from the poor and returned to them as an in-kind subsidy or as a distortionary transfer. Compare this with the classic public finance analysis where cross-hauling should not occur. When redistribution is motivated to enhance the welfare of the poor, there is little reason to levy a distortive tax on the poor for the sole purpose of raising revenue for a program intended to alleviate poverty.

On normative grounds, the distortions imposed on the poor greatly alter the interpretation of empirical analysis of policy incidence determining the degree to which fiscal policy favors the poor at the expense of the rich. In particular, the value to the rich of the distortions on the poor leads us to conclude that U.S. policy is less progressive than it appears from what we refer to as the *accounting method* for calculating policy incidence which only accounts for fiscal resource flows

between the private and public sector and not the resulting distortions involved in generating those flows. The accounting method has dominated empirical incidence analysis. For example, Pechman (1985) and Musgrave et al (1974) find that poorer individuals receive larger transfers-net-of-taxes than richer individuals in the US and UK. This accounting result does not derive from the tax side – where the share of income paid in taxes is largely unrelated to income - but on the spending side where transfer payments fall with income. Consequently, US fiscal policy has been labeled progressive in an overall sense. The misleading nature of the accounting measures is most easily understood by considering an extreme savings case when the poor are not allowed to consume at all until retired at which point they received the fair accumulation of their lifetime savings. Such a program would be neutral in an accounting sense but presumably be highly regressive in a utility sense. This is the extreme version of a program whose more moderate cousin induces the behavior exemplified by Figure 1; it hurts the poor who may over consume the merit good but the rich are unaffected since they consume more than the mandatory amount.

We quantitatively assess the degree to which the distortions on the poor are important for U.S. government retirement programs such as Social Security. We show how valuing the distortions affects incidence estimates and explain how those estimates are often inconsistent with the classic efficiency-redistribution tradeoff being the source of distortions. This is because we show that conventional life-cycle models imply that the over-saving imposed on the poor costs them at least as much as they gain from the above-market-returns generated by fiscally progressive benefits. These large distortions of mandatory savings programs partly result from the substantial amount of evidence on the unwillingness of individuals to change their savings which makes the classic tradeoff between redistribution and efficiency unable to justify such programs.

Our paper relates to an old and well-established literature analyzing merit good motives and the form of government intervention it induces.[2] However, the analysis has been largely qualitative

[2]For example, Musgrave(1957), Olsen (1980), and others in the literature show, how corrective government policy and even in-kind transfers might enhance efficiency under merit motives. Harberger (1984) integrates merit motives into cost-benefit analysis. There are important normative, and sometimes philosophical, studies of merit goods by Sandmo (1983), Besley (1988), Brennan and Lomansky (1983), Brennan and Walsh (1977), Head (1966), Musgrave (1957, ch 1; 1998). These models, and ours, should not be confused of intra-family merit good models, such as Chami (1998), where government policy can enhance efficiency within the family.

and separated from classic public finance in which enhancing beneficiary utility is the main motivation for the tradeoff between redistribution and efficiency. We extend this older analysis in five ways. First, we suggest that optimal and actual policies mainly distort the behavior of the poor but not the rich. Second, we show how the two approaches delivers different implications for the efficiency-redistribution tradeoff – redistribution motivates policy in the classic model while distortions motivates policy in ours. Third, we argue that the merit good approach better predicts the observed simultaneous taxation of and spending on the poor than does the classic public finance approach. Fourth, we show how quantitatively important the differences between the reverse implications of merit motives and the standard ones of public finance are for evaluating major public programs observed. For example, we argue Social Security changes the behavior of the poor at least as much as it subsidizes them. Lastly, the merit model offers very different explanations for differences over time and across countries of social spending.

The paper is briefly outlined as follows. Section 2 builds a model of redistributive- and merit-motivated public policy, and show how Pareto optimal regulations and fiscal transfers tend to be offsetting. Section 3 shows how the main public programs have the features predicted by the merit good model. Section 4 demonstrates the quantitative importance of the arguments made, in particular the relative size of distortions to progressive redistribution towards poor, for the largest federal program in the US, Social Security. Section 5 concludes.

2 Public Policy in Merit Good and Redistributive Economies

This section states the merit good problem, characterizes the public policies that enhance efficiency, and compares them with policies designed primarily to raise the utility of beneficiaries. While merit motives turn out to be consistent with income redistribution, the optimal amount of redistribution in a merit good economy is small relative to the amount by which the behavior of the poor are distorted. Policy which redistributes little as compared to the amount it distorts the poor, or policies which lower the utility of the poor, cannot be primarily motivated by altruism. Marginal benefit tax rates increase with the size of the program when merit motives operate at the margin, and decrease with program size when redistributive motives operate at the margin.

2.1 Efficient and Laissez-Faire Allocations with Merit and Redistributive Motives

Consider two equally sized groups labeled r for "rich" and p for "poor." The rich care about their own consumption (according to the function u^r) as well as the utility of the poor (u^p) and consumption of merit goods by the poor (according to the function v). The utility of the rich is

$$V^r = u^r(c^r, m^r) + a^r u^p(c^p, m^p) + b^r v(m^p) \tag{1}$$

where u_c^r, u_m^r, $v_m^r > 0$. Here c and m denote the consumption of the non-merit and merit good respectively, labeled by superscripts of the groups consuming them. A *merit good motive* by the rich, as represented by the constant $b^r > 0$, is defined by the merit good of the poor entering into the utility function of the rich and differs from *altruism,* as represented by the constant $a^r > 0$, which concerns the level of utility of the poor. Examples of merit goods are high quality medical care, retirement savings, safe housing, a clean environment, high quality schooling, museums, and safe automobiles. The utility of the poor is

$$V^p = u^p(c^p, m^p) \tag{2}$$

where $u_c^p > 0$. We do not assume that the utility of the poor necessarily increases with consumption of the merit good.

A Pareto optimal allocation maximizes a weighted average of V^p and V^r, which in turn is a weighted average of the three functions u^r, u^p, and v, subject to aggregate resource and nonnegativity constraints:

$$\begin{aligned} \max_{c^r, m^r, c^p, m^p} \quad & u^r(c^r, m^r) + a u^p(c^p, m^p) + b v(m^p) \\ & c^p + c^r + q(m^p + m^r) \le y^p + y^r \\ & c^r, m^r, c^p, m^p \ge 0 \end{aligned} \tag{3}$$

where y^p and y^r, the resources available to poor and rich, respectively, q is the marginal rate of

transformation between merit and other goods, and the constants a and b are derived from the constants a^r and b^r and the relative weight placed on V^r in the social welfare function (3).[3] The set of all Pareto optimal allocations are the set of solutions to (3) for all $a \in [a^r, \infty]$.

Notice how our formulation of the merit good economy also includes what we call an "altruistic" or *redistributive motive*, namely the desire to transfer incomes in order to raise the utility of one group. The redistributive motive might be understood as deriving from two sources, the pure altruism of the rich (parameterized by the constant a^r) and the relative weight given to the poor's utility V^p in public decisions, which are parameterized together in the social welfare function (3) by the constant a. Our formulation nests purely redistributive motives as a special case – the case of $b = 0$. In general, our formulation includes a variety of possibilities for the relative importance of merit and redistributive motives, and the ratio b/a indexes the relative importance of the former.

A necessary condition of an efficient solution is then

$$\frac{u_m^r}{u_c^r} = \frac{u_m^p}{u_c^p} + \frac{b}{a}\frac{v_m^r}{u_c^p} = q \qquad (4)$$

In other words, rich's marginal rate of substitution of merit for non-merit goods exceeds that for the poor because the poor merit consumption has a positive external effect. This contrasts to the competitive equilibrium solution when the marginal rates of substitution equates to the marginal rate of transformation which is the same across groups

$$\frac{u_m^r}{u_c^r} = \frac{u_m^p}{u_c^p} = q \qquad (5)$$

[3] $b \equiv b^r$, $a = a^r + (1-\alpha)/\alpha$, where α and $(1-\alpha)$ are the relative social welfare weights on V^r and V^p, respectively.

The rich are therefore not distorted in their tradeoff; both the efficient and market solution equates it to the marginal rate of transformation. However, the poor are distorted in their tradeoff under the efficient solution. The basic implication of merit motives is that the rich wants the poor to *substitute across goods*, as opposed to uniformly increase their levels of consumption. For example, when merit consumption confers positive external effects, $b>0$, under-consumption of the merit good follows from that the poor do not take into account the benefit the rich receive from their consumption when the rich care about the consumption of the poor. More generally, the first-order conditions imply that the poor are distorted away from their optimal marginal rate of transformation proportionally to our index of merit motives, b/a. The relative size of redistributive and merit motives is what governs the amount of the distortion.

Let a^* be the laissez-faire ratio of rich to poor marginal utility.[4] A few implications of these optimality conditions are worth noting. First, since laissez-faire achieves the social optimum when $b = 0$ and $a = a^*$, policy has a redistributive motive if and only if $a > a^*$ and a merit motive if and only if $b > 0$. Second, even without a purely redistributive motive ($a \leq a^*$), the social optimum may have the poor consuming more than their own income ($c^p + q\, m^p > y^p$), the rich consuming less than their own income, and the poor better off than under laissez-faire. Any income redistribution, or utility improvement for the poor, is in this case a consequence of the rich's motives to change the poor's behavior. Stronger merit motives then increases the optimal amount of redistribution in this sense. In other words, policy motivated by merit motives redistributes only in order to change behavior, which reverses the classical characterization of public policy in which distortions are tolerated in order to create redistribution.

Second, even though pure altruism ($b = 0$) and pure merit motives ($a=a^*$) are both extreme cases, only the latter shares the important characteristics with the intermediate cases. In particular, pure merit motives can motivate policy that distorts the poor, redistributes, and raises the utility of the poor. Pure altruism cannot, in our model, motivate policy that distorts the poor and is unlikely to motivate policy making the poor worse off. The pure altruism model can be embellished to allow for some distortion of the poor, and we do so in Mulligan (1999) and Mulligan and Philipson (2000), but a basic implication of our analysis is that the relative importance of merit motives b/a can be

[4] In other words, a^* is the ratio of marginal utilities when each type $i = r, p$ allocates its own consumption subject the constraint $c^i + q\, m^i > y^i$.

measured according to the relative importance of distortions and redistribution. Another basic implication is that policies improving the utility of the poor are consistent with merit motives, but policies reducing their utility are inconsistent with redistributive motives. The poor may thus favor merit-based policies that distort their behavior.

Third,'cross-hauling', defined as the simultanious taxation and subsidization of a sub-population (here the poor) is done by governments around the world. Cross-hauling is consistent with merit motives but, when taxes are distorting, not with redistributive motives. In the two good economy discussed above, such cross-hauling would take place when the poor non-merit good *c* was taxed for the purpose of stimulating poor merit good consumption *m*. Cross-hauling is consistent with purely redistributive motives when taxes and transfers are lump-sum, because all that matters is the net tax. But, when transfers are distortive on either the spending or tax side, the poorest part of the population should be tax-exempt under purely redistributive motives because larger gross transfers, holding the net constant, are costly. In essence, the poor should not be taxed to pay for antipoverty programs. However, as the figures above reveal, instead of the poor being tax-exempt, they pay equal or larger shares of their income in taxes compared to the rich.

2.2 The Design and Incidence of Corrective Regulatory and Fiscal Policies

Because distortions on the poor are valued by the rich, the empirically uncommon, but by economist idealized, policy of lump sum transfers from rich to poor, cannot implement an efficient allocation. That progressive lump sum transfers may be Pareto improving is a consequence of altruism – not of merit good motives.[5] Merit motives imply that lump sum transfers alone cannot achieve efficiency because the poor still equates their marginal rate of substitution to the marginal rate of transformation, which is less than the social marginal rate of substitution. The classical analysis deems in-kind provision inefficient, and thereby cannot explain their prevalence without resorting to imperfections in the transfer process, e.g. asymmetric information about eligibility, that makes in-kind transfers desirable. Without such transfer imperfections, as is well-known, the goods are worth less to recipients than the cost of providing them; an extra dollar spent on a

[5]See also Hochman and Rodgers (1969), Rodgers (1973), and Harberger (1984).

program costs at least a dollar to collect in taxes but is valued less than a dollar by the beneficiaries of the program. However, merit motives imply exactly this wedge between marginal benefits of program participants and marginal costs and in addition predicts that public provision of such a wedge may be efficiency enhancing compared to private provision. In-kind transfers will be under-valued on the margin by recipients because the social value of the program, taking into account the benefits of richer non-recipients, is equated to its social cost. Indeed, merit motives are consistent with the extreme version of this wedge when in-kind programs provides less than zero value to the beneficiary so that there is not universal take-up by program beneficiaries, e.g. through high-school drop-outs.

How do we expect public policy to be designed in a merit good economy, and how does the design vary with the relative strength of merit and redistributive motives? The answer depends in part on one's theory of public decisions. We have characterized efficient allocations, and we suppose that public policy tends to move the allocation in the direction of efficiency.[6] Even so, there are two relevant concepts of efficiency. The first is that post-fisc allocations must make all parties better off as compared to pre-fisc allocations. The second, Kaldor-Hicks efficiency, is weaker, requiring that all parties *could* be made better off with the appropriate set of lump sum transfers.

Under both definitions of efficiency, the corrective policy involves distorting the poor's consumption in order to satisfy (4). Pigouvian pricing targeted at the poor is one example. Public provision of the merit good for the poor, financed in appropriate amounts by both rich and poor,[7] can also enhance efficiency according to both definitions. However, policies that require the poor to pay for too much of publically provided merit good, or unfunded mandates requiring the poor to consume a minimum quantity of the merit good, are efficiency enhancing only according to the second definition. We do not take a stand on which concept of efficiency characterizes public policies, but emphasize three points. First, public policies satisfying either concept can be derived

[6]A few of the many positive theories of public decisions consistent with our supposition include Coughlin's (1992) model of voting, Wittman's (1995) theory of democracy, and Becker's (1983) model of interest group competition.

[7]And with the necessary safeguards to ensure that the publically provided merit good does not result in perfect substitution away from privately purchased merit goods.

from models of public decisions[8]. Second, when policies are Kaldor-Hicks efficient allocations, there are even sharper differences between a merit good economy and an economy with only redistributive motives. Third, while policies are efficient according to the first definition, the amount of compensation for the poor is increasing the strength of the merit motive and decreasing in the poor's willingness to substitute the merit for the nonmerit good. In other words, a policy substantially redistributing income may not reveal that policy motives are strongly redistributive (*a* large), but only that regulations imposed on the poor are costly to them.

The efficiency of various policy options can be studied by drawing a utility possibility frontier (UPF) in the $[V^p, V^r]$ plane for the economy characterized by (3). For simplicity, our Figure 2 draws the frontier for the case $a^r=0$ (ie, no pure altruism on the part of the rich),[9] $b > 0$ (ie, some merit motive), and traces out the frontier by varying the parameter *a* from 0 to infinity. A competitive equilibrium is represented by the allocation A. It is in the interior of the set of feasible utilities because the poor's merit consumption confers positive external effects on the rich so that the competitive equilibrium involves under-consumption by the poor.

[8]Unanimous voting is likely to produce policies that are efficient according to the first definition. Becker's (1983) model of interest group competition, as applied to our economy with $a^r=0$, predicts that public policy produces allocations that are Kaldor-Hicks efficient *but make the poor worse off* (ie, do not satisify the first definition of efficiency) because the rich are more willing to pressure for unfunded mandates than the poor are to resist them.

[9]The case $a^r=0$ minimizes some of the (possibily interesting) complexities of tracing out a UPF such as the possibility that lump sum tax and transfers are preferred by both rich and poor. See Hochman and Rodgers (1969) for some analysis of these complexities.

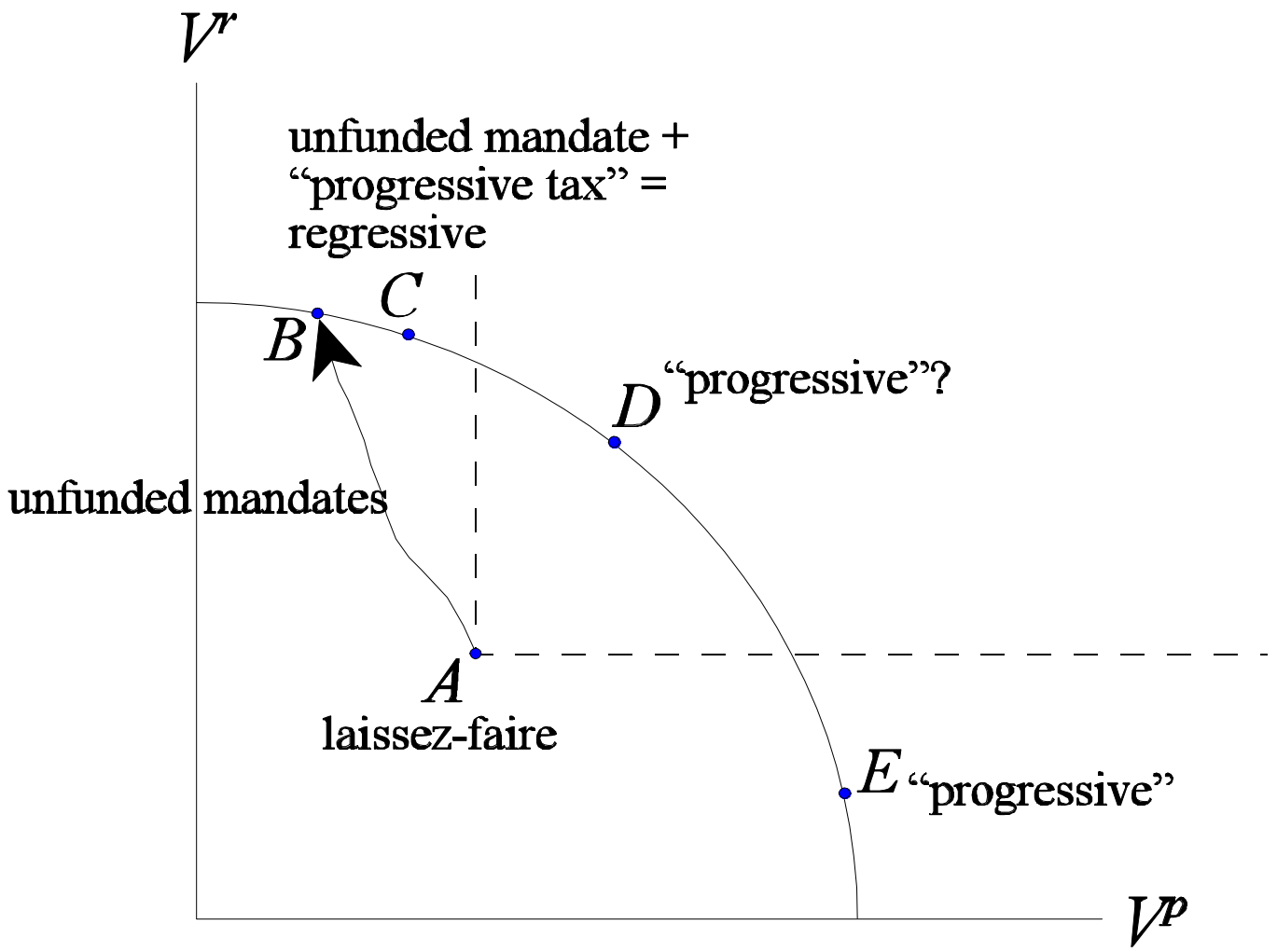


Figure 2 Utility Possibility Frontier in a Merit Good Economy

If one considers the 4 quadrants induced in utility space by the competitive equilibrium allocation A, moving into the northwest one involves compensating the poor less than the distortions imposed on them by the increase in their merit good consumption. Allocations B is an example where distortions are imposed without any transfers from the rich and would be the case for an unfunded mandate such as mandatory individual savings accounts. Allocation C is the less extreme case where such mandatory behavior is accompanied by fiscal progressive transfers towards the poor. Because B is Kaldor-Hicks efficient but is achieved with no income redistribution, the distance along the frontier between B and C can, roughly speaking, be interpreted as a measure of the amount of income redistribution occurring at allocation C. In the quantitative analysis we argue that an example of an intervention such as C would be Social Security when mandated savings are accompanied by progressive benefits that are less than offsetting.

Allocations B and C make the poor worse off, and are efficient only in the Kaldor-Hicks sense. If we were to observe allocations like B or C, we conclude that redistributive motives cannot be an important determinant of policy – even though there may be income redistribution as at C – because the poor are worse off. If instead we were to observe an allocation like D, or somewhere between B and D, it does not follow that merit motives are relatively unimportant because it may be that public decisions produce allocations make all parties better off.[10] In other words, whether the poor are worse off is a very powerful test of the importance of merit motives. It may fail even if, and pass only if, merit motives are important.

Figure 2 also shows how income redistribution may be a consequence of distortions, the reverse of the classic public finance view. To see this, suppose that public policy must make no party worse off relative to laissez-faire. If we increase the cost of distortions to the poor (eg., by decreasing their willingness to substitute c for m), then allocation B and the locus of unfunded mandates move to the left relative to allocation A in the Figure, which increases the distance from B to the northeast quadrant, which means that more income redistribution is required to achieve an

[10] As drawn, Figure 2 assumes that the constraint $c^p \geq 0$ does not bind, so an unfunded mandates can produce an allocation on the frontier without requiring the poor to spend more than their income on the merit good. If it did bind, then there would not exist a frontier to the northwest of A, and all Kaldor-Hicks efficient allocations would make the poor better off.

efficient allocation making all parties better off.

Merit motives, when they operate at the margin, offer a very different explanation for the variation over time and across regions in the amount of social spending. We see from the formula (4) that a greater taste for merit goods (ie, large *b*) increases the "implicit marginal tax rate" – the gap between the social and private marginal rate of substitution for the poor. It also increases the amount of redistribution. Implicit marginal tax rates are positively correlated with the amount of social spending when the merit motive operates at the margin, because the extra redistribution is the price paid for the additional distortion.

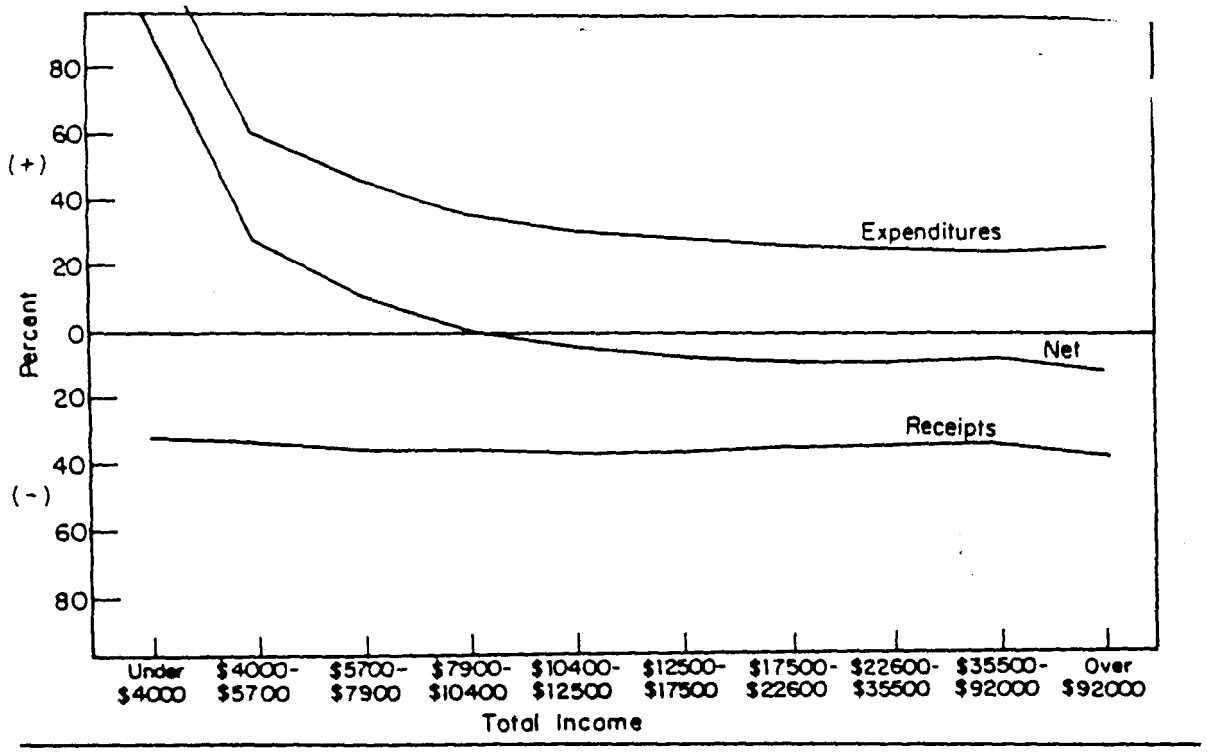
Compare this with a classical explanation, where large amounts of social spending are explained as a consequence of an intense taste for redistribution (ie, large *a*). We see in Figure 2 how, holding constant *b*, large *a* is associated with more redistribution. But we see from the formula (4) that a greater taste for redistribution decreases the "implicit marginal tax rate." In other words, policies motivated by a relatively strong taste for redistribution do less to distort the poor. Hence, implicit marginal tax rates are negatively correlated with the amount of social spending when the redistributive motive operates at the margin. The relationship between implicit marginal tax rates and the amount of social spending summarizes the essence of the merit and classical approaches to the efficiency-redistribution tradeoff.

3 Important Government Programs Interpreted as Merit Good Provision

There are perhaps two approaches to investigating the potentially offsetting trades taking place between regulatory and fiscal policy as implied by merit motives. As discussed, whether such trades occur depends on the model of government intervention, on which we do not take a stand in this paper, and the relative importance of merit and redistributive motives. If the model predicts that winners compensate losers then one would like to measure the overall incidence and distortions for all programs and regulations, which due to data constraints is difficult. The more modest approach is therefore to do it on a program-by-program basis, so that the transfers generated by a given program would be compared to the distortions resulting from the regulations of that program. This is what we do in the bulk of the paper, but at the point briefly discuss government policy incidence

in the aggregate.

To consider policy incidence in the aggregate, we make use of several studies on the relationship between taxes and government spending by income classes, and emphasize the importance of cross-hauling in the fiscal process. For example, an influential study by Pechman (1985) showed that US taxes, including all levels of governments, were fairly flat as a share of income. The poor paid a slightly larger share if corporate income taxes and property taxes were assumed to be pushed on to consumers by competition, but the rich paid slightly larger shares if those taxes were borne by capital. Government spending was found not to have this pattern across income classes; he found that poorer individuals received larger shares of their income from all levels of governments. Consequently, *net fiscal transfers* was found progressive in that after the common share of income paid to the government was deducted from the receipts, the poor faired better than the rich. Figure 3 below (Musgrave et al (1974) , Figure 6, p 289) summarizes this progressive feature of US fiscal policy induced by close to neutral taxes and progressive spending. Figure 4 (Pechman (1985) , Figure 4-2) summarizes this same progressive feature of US fiscal policy in a later study.



TOTAL RECEIPTS AND EXPENDITURES AS A PERCENTAGE OF TOTAL INCOME (Taxes, Benchmark Assumptions; expenditures allocated by total income)

Figure 3 Overall US Taxes and Transfers, 1968. [Source: Musgrave et al, (1974) Fig 6, p. 289]

Federal, State, and Local Transfers and Taxes as a Percent of Market Income, by Population Percentile, 1980[a]

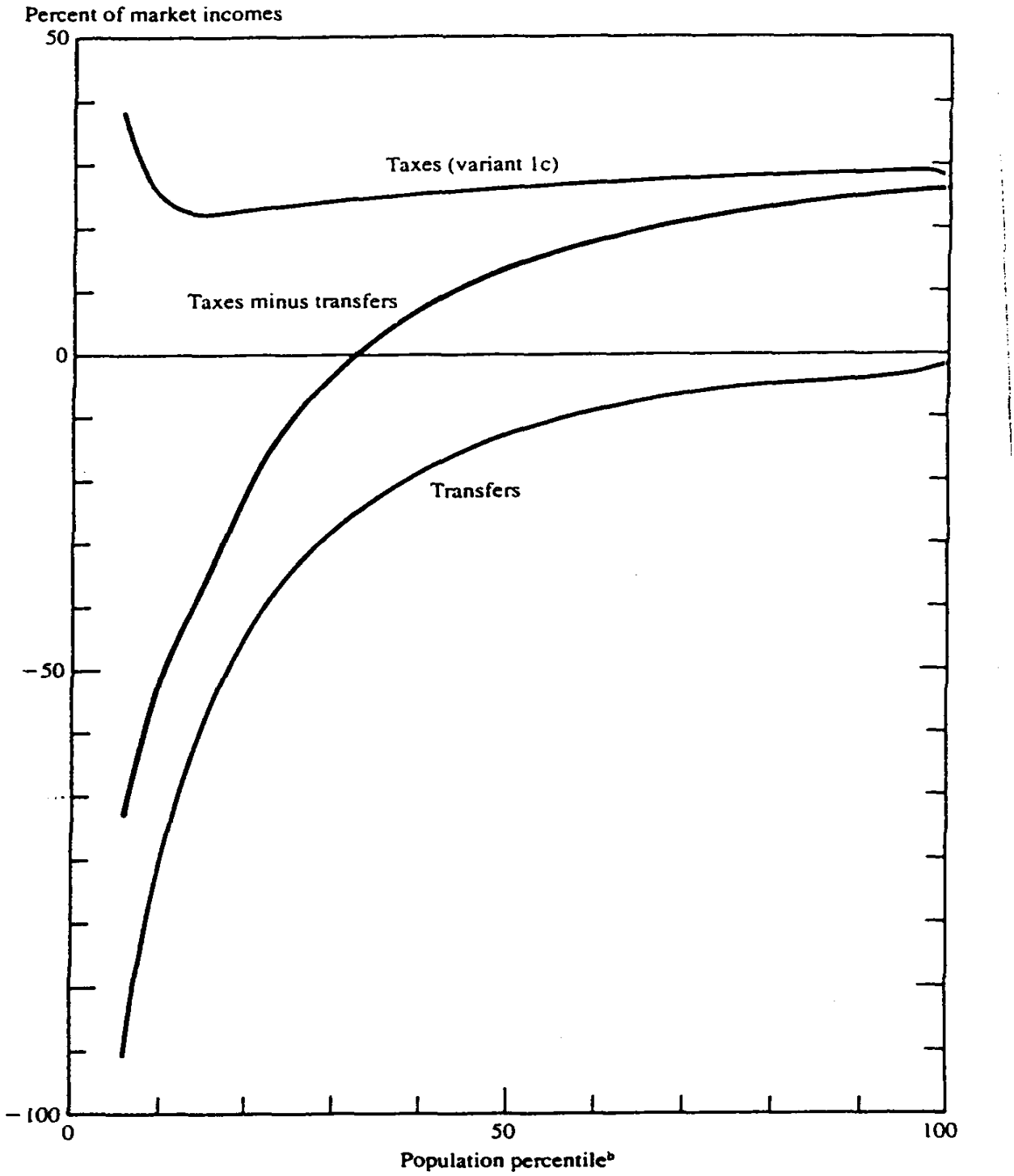


Figure 4 Overall US Taxes and Transfers, 1980. [Source: Pechman (1985), Fig 4-2, p 54.]

Fullerton and Rogers (1993) supports this basic finding using a life-time approach to the measurement of incidence, as opposed to a static approach used by Pechman (1985). Their findings thus again include supporting a close to flat-tax nature of income taxes, a progressive nature of spending, making the overall fiscal effect fairly progressive.

At this first level of aggregate measurement, it appears that the progressive nature of fiscal policy and the regressive nature of in-kind programs are consistent with an overall merit good contract. More precisely, one may compare the amount of total redistribution with the total value of distortions imposed on the poor by all programs. Efficient allocations under merit-motives we saw implied transfers from the rich to the poor in terms of stimulating the merit-good consumption. In the Figure above, the binary representation of rich and poor is therefore revealed by the two income classes defining those who obtain negative versus positive net-transfers. More precisely if the net-transfers $n(y)$ is a decreasing function of income that average to zero, then there will be a group of lower incomes $\{y: n(y) > 0\}$ which are revealed to be the 'poor' with the remainder $\{y: n(y) < 0\}$ revealed to be the 'rich'. For example, in the first figure, the 'poor' are revealed to be the lowest four deciles of the income distribution. Total redistribution is simply the triangular area in the north-west part of the figure, measuring the total net-transfers for the poor. The distortion on the poor would be both those induced by the in-kind nature of public spending as well as the excess burden of the taxes collected from them. From the figures, we see that taxes as a share of income are rather flat at about 30 % of income in 1968 and actually quite regressive conditional on the poor in 1980 where the poorest part of the population have taxes in the range of 40 % of income. Applying conventional estimates on the excess burden of taxation in the range of 50-100 % of revenue[11] it follows that the distortions on the poor is bounded below by about 15-30 % of their income in 1968 and 20-40% of their income in 1980. Therefore, the triangle representing total benefits to the poor must be less than those income shares of the poor to be explained by altruistic redistribution.

[11]Ballard et al (1985) estimate the "marginal excess burden" of the U.S. tax system to be between 0.17 and 0.56, and they find the marginal excess burden of the U.S. individual income tax (IIT) to be fairly representative of all U.S. taxes. Feldstein (1995) shows that these calculations and others in the literature ignore important forms of tax avoidance. He reestimates a marginal excess burden near unity for the IIT.

Part of the problem of explaining these figures as purely redistribution is that the poor have the same (in 1968) or higher (in 1980) tax-rates than richer sub-populations. This 'cross-hauling' should not occur under purely redistributive motives at least not with a perfect transfer process; the poor should be tax-exempt because what is desired are net-transfers to the poor and that is most cheaply produced by not imposing distortions on them. However, both the excess burden of taxation and the in-kind nature of the benefits induces distortions on the poor which are easily explained as efficiency enhancing public policy under merit-motives.

Hence, even the limited information we have about policy incidence in the aggregate can be used to make some evaluation of the importance of merit relative to redistributive motives, because cross-hauling is so clearly important. Ideally, we would also like to know the aggregate cost to the poor of changes in their behavior and compare that the amount of income redistribution shown in the Figures. It seems that this exercise must be done on a program-by-program basis (and also account for cross-program interactions?), and hence computation of the aggregate is a colossal research project. However, if one began the analysis with some of the more important programs (in terms of changing poor behavior), and show that the cost of poor distortions from these programs alone was of similar magnitude as the aggregate redistribution shown in the Figures, it would seem that a complete analysis of all programs must conclude that merit motives are important, and that policy is hardly progressive in the aggregate. Beginning a sequence of such program-by-program calculations is what we do below.

3.1 Program 1: Compulsory Retirement Accounts

Retirement accounts, sometimes referred to as Provident Funds, are typically financed with proportional payroll taxes and pay benefits according to lifetime contributions plus accrued interest. A few countries around the world have such retirement accounts, and many have proposed that the U.S. adopt one. In our context, the two groups are rich and poor. The merit and nonmerit goods are consumption when old and young, respectively. According to our model, the rich would like to see the poor save more for retirement than the poor would in the absence of government intervention. By construction, a Retirement Account is neither progressive nor regressive in the accounting sense. However, as long as the program causes the poor to change their behavior, our model suggests that the program makes the poor worse off in the Hicksian sense. A number of commentators worry

that the poor save too little for retirement (Hamermesh 1984, Robb and Burbidge 1989), so that changing their savings behavior is indeed a primary policy motive as it is in our model.

Our model also shows that such a proportional program can achieve efficiency if consumption of the merit good is a larger fraction of income for the rich – in other words, the rich have higher retirement savings than do the poor – and the merit good cannot be resold.[12] One instance of resale in this application is borrowing during youth against one's retirement benefits, and is generally believed to be difficult or impossible. The fact that governments make it more difficult, through e.g. banning lenders from seizing the old-age benefits in case of borrower default, is indicative of the desire for larger savings rates.

Such a proportional program can also achieve efficiency even when rich and poor consume equal fractions of the merit good if the rich have better opportunities for reselling the government provided merit goods over time. This is likely to be the case with retirement savings because the rich may have assets they can draw down (e.g., monies intended for bequests) in response to the requirements of a Retirement Account while the poor do not.

Hence, our analysis predicts that compulsory Retirement Accounts change behavior mainly of the poor, are regressive in the Hicksian sense, and tend to be more progressive in the accounting sense the higher is the fraction of income which must be contributed to the program. This final prediction is consistent with the apparent finding in the literature that less developed countries simultaneously have smaller Social Security programs and are more regressive in the accounting sense as compared to the programs in developed countries.[13]

3.2 Program 2: Induced Retirement and Social Security

Here the groups are young and old and the merit good is leisure when old[14]. Efficiency might

[12]The studies of Dynan, Skinner, and Zeldes (1996), and others suggest that savings rates are higher for the rich, even accounting for Social Security wealth.

[13] See Mulligan and Sala-i-Martin (1999) on the size of programs and e.g. Midgley (1984) for analysis of the progressivity of Third World programs and Burkhauser and Warlick (1981) or Garrett (1995) for analysis of the progressivity of American programs.

[14]As an example, this is consistent with Sala-i-Martin (1996) who has argued that the elderly impose negative external effects on the young in the labor market.

be achieved in this case with a regulation requiring the old to retire from their jobs. Mandatory retirement hurts the old and, if workers of different ages are substitutes, helps the young. Fiscal transfers from young to old may also be part of the policy package so that both groups might gain from the policy. This prediction is consistent with the vast majority of Social Security Programs around world which *combine* fiscal transfers from young to old with strong inducements to retire (Sala-i-Martin 1996, Mulligan and Sala-i-Martin 1999a,b). From an accounting perspective – a so called "generational accounting" perspective in this case – it would appear that the old gain at the expense of the young. Indeed, generational accounts have been used for a number of countries to show how "policy helps the current elderly and harms current younger and future generations" (Auerbach, Kotlikoff, and Leibfritz 1999, p. 3). However, as generational accounting only focuses on the resource flows to and from the public sector, including the distortions into the analysis changes incidence evaluations.[15]

3.3 Program 3: Medicare and Medicaid

Here the groups are rich and poor and the merit good is healthcare, especially during old age. Efficiency, in the sense of encouraging the poor to consume more healthcare than they would on their own, can be achieved by public provision or financing. Since services are difficult to resell, separate prices for rich and poor are feasible. For Medicare in the US, taxes are roughly proportional to lifetime income and, due to the greater longevity and greater utilization by higher income beneficiaries, benefits are roughly proportional to taxes paid (McClellan and Skinner 1997). Hence, Medicare appears to be neither progressive nor regressive in the accounting sense. Nevertheless, in the case that the competitive equilibrium demand for healthcare is a greater proportion of income for the rich, Medicare is regressive in the Hicksian sense. Medicare looks like the movement from allocation A to allocation B in Figure 2.

Medicaid also provides public healthcare, but beneficiaries are relatively poor while taxes are levied on all income groups. Hence Medicaid is progressive in the accounting sense and may be

[15] Also see Mulligan (1999) who argues that generational accounting ignores the retirement inducing provisions of Social Security programs, overstates the gains by the elderly, and may overstate costs to the young.

progressive in Hicksian sense even if beneficiaries would prefer to spend on other goods the dollar equivalent of their publically provided healthcare. Medicaid looks like the movement from allocation A to allocation C or D in Figure 2. As a package, Medicare and Medicaid are progressive in the accounting sense and may be either regressive or progressive in the Hicksian sense.

The case of Medicaid is particularly interesting when considering long-term care for the elderly. In the US, the share of nursing home days publicly financed is about 60%, and is almost exclusively through the means-tested Medicaid program. It is often argued that there is a lack of demand for long-term care insurance in the US (see e.g. Pauly (1990)). However, since most of long-term care is covered by public financing, completely so for the poor, what is lacking is a *private* demand by the poor. Private long-term care insurance, supplementing the public part, declines with income just as for other the other merit goods we have discussed. This is again naturally interpreted through merit motives; the poor over-consume long-term care insurance through the public distortions, they even demand more of it than the rich (!), and are thus at a corner solution in which their lack of private demand is more pronounced than that of the rich.

Regardless of the type of health care, according to the merit good model, the poor do not have a strong enough preference for health care in a social sense so that offering them a price below cost enhances efficiency. Such pricing induced by insurance is usually interpreted as creating a so called moral hazard problem in the sense that beneficiaries are induced to consume more health care than they would if they made their healthcare consumption decisions based on the resource cost at the time of purchase. But under merit motives such pricing below cost does not create moral hazard and, indeed, enhances efficiency.

3.4 Program 4: Compulsory Schooling, and Labor Market Regulations

Again the groups are rich and poor but now the merit good is schooling. American local governments mandate and provide elementary and high school training. There are two interpretations of this, both consistent with our merit good model. In the first interpretation, taxes roughly proportional to income finance a universally provided education such as a high school degree. Such a program would appear progressive in the accounting sense, but may be regressive in the Hicksian sense because the poor often value schooling less than it costs. An extreme case here is if the poor do not value schooling enough to participate in the program – as is the case for high

school dropouts.

In the second interpretation, schooling is compulsory but not financed by the government. This is basically the American educational program design from the point of view of the federal government and from the point of view of many state governments. Financing by a local government is only nominally different than no government finance at all in this interpretation because families sort geographically according to their income. In this interpretation, compulsory schooling is trivially neither regressive nor progressive in the accounting sense. At the same time, compulsory schooling is regressive in the Hicksian sense as long as the poor demand less schooling than is compelled by the government and less schooling than is demanded by the rich. The results of Landes and Solmon (1972) and others suggest that compulsory schooling laws do not affect the educational attainment of most Americans. Presumably the poor are those who are affected, if any.

One of the most important and prevalent labor regulations is the prohibition of indentured servitude – young people are not allowed to obtain financing for their schooling and other training in exchange for a binding promise to work for the creditor after the schooling is completed. Such regulations, together with government finance of schooling, have a natural interpretation in the merit good model. "Freedom" is a merit good and, as such, is under-demanded by students in the laissez-fair case. To stimulate freedom, students are prohibited by the government from selling their freedom in exchange for publicly subsidized schooling. Our analysis implies that students are not as much better off – and perhaps worse off – from government policy as the accounting for government educational subsidies might suggest, not only because they might prefer cash to the educational subsidy, but also because they are prohibited from borrowing. For example, while Friedman and Friedman (1980) and others have suggested that public university spending is regressive because all income groups pay taxes but mainly the higher income families have children enrolled in universities, our analysis emphasizes that it is for college students that the prohibition of indentured servitude is most binding.

3.5 Program 5: Public Housing

Governments often provide or subsidize housing for the poor, although such programs are typically smaller in magnitude than the old age, medical, and schooling programs mentioned above. Olsen and York (1984) point out that, according to the Hicksian definition of incidence, the poor

value the subsidies less than they cost because "[The accounting approach-our addition] ignores the fact that people are not indifferent between all bundles with the same market value..." (Olsen and York 1984, p. 177). However, they estimate that the average valuation of the housing by program beneficiaries is only 9% less than the market value. They also find program benefits to be correlated with beneficiary attributes in similar ways whether measured by beneficiary valuation or market valuation.

We see Olsen and York's analysis as one application of our model – one in which the government induced change in behavior small relative to those induced by old age, medical, schooling and other programs. Consistent with our prediction that the accounting approach is most accurate for small programs, Olsen and York find relatively small gaps between the accounting and Hicksian incidence for public housing programs.

4 The Quantitative Importance of Merit Good Distortions for Old-Age Programs

The previous sections discuss the *qualitative* implications of merit good motives as they deliver implications different from classic public finance. This section attempts the more challenging exercise of investigating *quantitatively* whether the distortions are large relative to the progressive nature of fiscal policy. Our main finding is that for conventional parameter values in common models of life-cycle consumption, the distortions imposed are of first-order importance and very large relative to the fiscal transfers that offset them. Indeed, we find that for common models and empirically relevant parameter values many times an *infinite* amount of retirement income would be needed to compensate the poor for raising their yearly savings rate by as little as 3%.[16] When the amount of forced savings is low enough for there to be a feasible amount of government provided retirement benefits to offset the distortion, the classic tradeoff between efficiency and redistribution

[16] A sufficient, but not necessary, condition for the inapplicability of the classic justification is that distorted savings of the poor are not compensated for fully in terms of above market returns through the program. To assess this condition, we do not measure the benefits of these distortions for the rich, in terms of their positive external effects, but if the compensation required would be finite such estimates would be necessary in order to infer the social benefit from offsetting regulatory and fiscal policy.

cannot justify the program in itself. In addition, as these distortions are so large as to cover the total amount of redistribution, as discussed in the previous section, the aggregate government budget, and not only the program itself, is difficult to interpret to be generated by the classic redistribution-efficiency tradeoff.

The fact that no amount of progressivity in Social security benefits may make up for the over-savings of the program is quite striking and can be most easily illustrated through Figure 5. As before for Social security, we interpret the merit good *m* as the amount of retirement consumption when old and the non-merit good *c* as the amount of pre-retirement consumption when young.

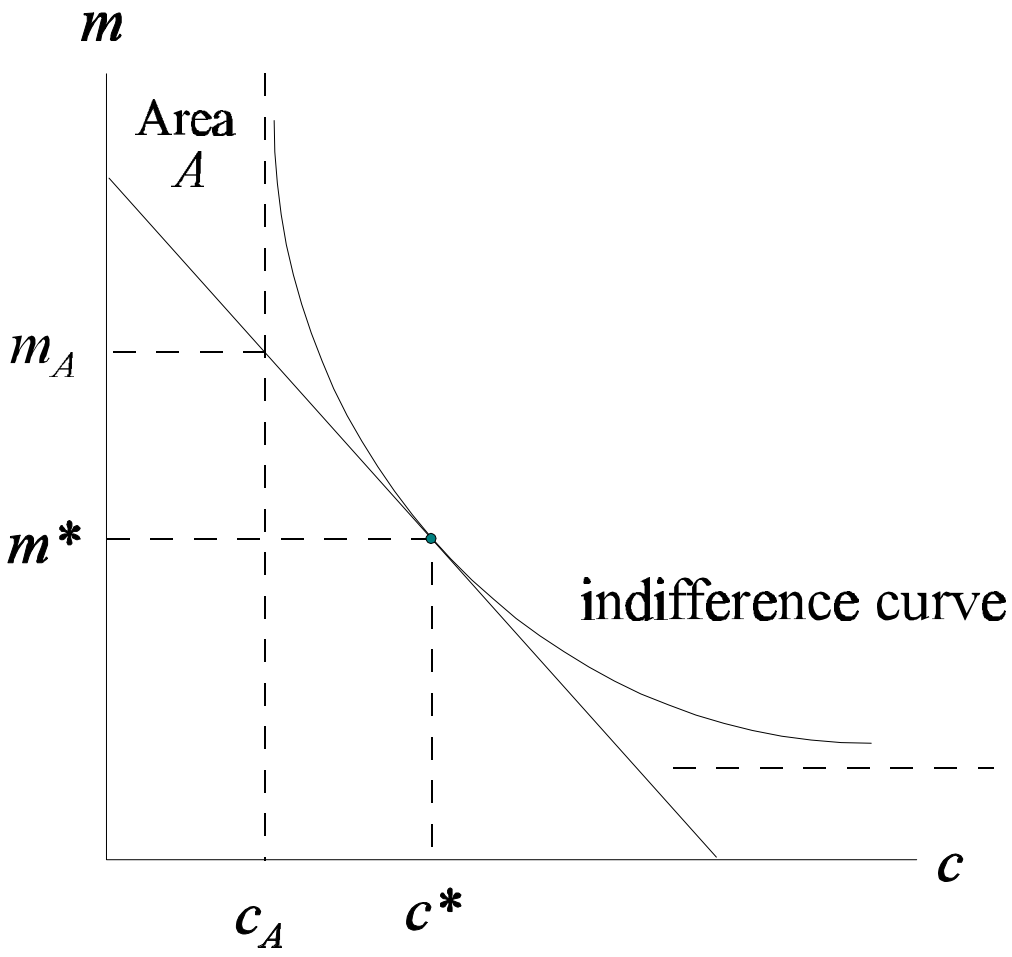


Figure 5: Merit Good Distortions and Mandatory Savings

The accounting approach labels a transfer neutral if it moves the allocation down or up the budget line whether or not trading back to the optimal level of consumption is feasible. However, without resale, the utility of the poor is affected by how much the consumer would have to be compensated to remain indifferent to his optimal level of consumption, and thus traces out the indifference curve instead of the budget set. Consider mandating savings beyond the most preferred level of inter-temporal consumption, indicated by (c^*, m^*). If the individual is paid back the present value of the extra savings mandated, he will simply be moving up the budget line and will in an accounting sense have been subjected to a neutral transfer. This is neutral only if the transfers can be undone in which case the government program has no effect so that accounting measures of incidence are accurate

only when in-kind programs are irrelevant. However, when the transfer cannot be undone, the individual is presumably made worse off. The striking fact that there may be *no* amount of compensation when old that will compensate him for the forced savings when young occurs when, as with the constant elasticity of substitution case shown in the figure, there is enough complementarity so that indifference curves asymptote away from the axis, towards the consumption level c_A for the indifference curve of the optimal consumption pattern. The more complementarity is consumption, the more the two goods want to be consumed together, and the more is the individual is hurt by being forced to favor one good over the other. If the savings mandated lowers current consumption below c_A in the figure then there is no amount of government provided benefits when old that can compensate the individual for the foregone consumption when young. Whatever profile chosen in Area A in the figure, *even if it involves more old consumption than the market allows one to trade over time*, it is dominated by the optimal consumption profile. Put differently, if taxes are high enough to push consumption when young below c_A, then regardless how much the government pays out in retirement benefits, even if it involves massive redistribution from other cohorts, the individual is worse off. Consequently, generous programs in an accounting sense, in which some cohorts are paid by the government much more than the market would yield, may nevertheless hurt those cohorts.

Our quantitative assessment of the magnitude distortions imposed by excessive savings of the poor proceeds in four steps. First, we show how the standard life cycle model can be viewed as a special case of our merit good analysis with simply two goods. Second, we calibrate the model and compute the amount of retirement income an individual would require to raise his savings rate. Third, we explain why government retirement programs can be expected to have a greater effect on the retirement income of the poor than that of the rich. Lastly, we compute how much more regressive is a retirement program when taking into account the excessive savings of the poor rather than simply accounting for research flows to and from the public sector.

4.1 Modigliani's Life Cycle Model as Special Case of the Two Good Merit Model

We consider a continuous-time version of the standard life cycle savings model where the interest rate equals the rate of time preference. Working life begins at time t=0, retirement begins at time

R, and death occurs at time T. Labor income during working life is $y(t)$ and 0 during retirement. Age t consumers enjoy government benefits (negative taxes) in the amount $g(t)$. We assume that the interest rate and the rate of time preference are equal, and denote them δ. In general, it is possible that consumers begin or end life with positive financial assets. However, this situation is more likely for richer persons and we suppose for simplicity that a poor person has no financial assets at the beginning and at the end of his life. In this latter case, the lifetime budget constraint for poor consumers is:

$$\int_0^T e^{-\delta t} c(t)\, dt \;\le\; \int_0^R e^{-\delta t} y(t)\, dt \;+\; \int_0^T e^{-\delta t} g(t)\, dt$$

where $c(t)$ denotes consumption at a given age. The poor also face a borrowing constraint, which we discuss in more detail below.

We assume consumers evaluate a feasible consumption profile $C \equiv \{c(t) : 0 \le t \le T\}$ according to the constant elasticity of intertemporal substitution (CIES) utility function

$$U(C) \;\equiv\; \frac{\sigma}{\sigma - 1} \int_0^R e^{-\delta t} [c(t)]^{(\sigma-1)/\sigma}\, dt \;+\; \frac{\sigma}{\sigma - 1} \gamma^{1/\sigma} \int_R^T e^{-\delta t} [c(t)]^{(\sigma-1)/\sigma}\, dt$$

Here, the parameter σ is the intertemporal elasticity of substitution. In the special case we consider below, the parameter γ is the share of pre-retirement consumption undertaken in retirement in the absence of government policy. Such a taste may arise, for example, from substitutability between leisure and consumption [17] or the lesser needs associated with the maturation of one's children.

Following Modigliani and Brumberg (1954), we assume working income is constant over time, $y(t) = y$. We also assume government benefits are paid only to retirees and in a constant amount

[17] This effect is emphasized by Ghez and Becker (1975), Owen (1969), Robb and Burbudge (1989), and others.

over time, and denote that amount $g(t) = gy$ if $t \geq R$. It is well known that in this case, the most preferred consumption profile involves consuming the same amount, which we denote c, during each period of working life and the same amount, which we denote m, during each period of retirement. Hence the life cycle savings problem in continuous time is a special case of our two good model, where the utility function is:

$$U(C) \equiv u(c,m) \equiv \frac{\sigma/\delta}{\sigma-1}(1-e^{-\delta R})\left[c^{(\sigma-1)/\sigma} + q\gamma^{1/\sigma}m^{(\sigma-1)/\sigma}\right]$$

where the parameter $q = \frac{e^{-\delta R} - e^{-\delta T}}{1 - e^{-\delta R}}$ represents the trade-off between a yearly reduction in consumption when working and yearly retirement benefits when retired. This utility function is a special case of our functions $u^p(c, m)$ and $u^r(c, m)$ – the weighted constant elasticity of substitution case. It naturally depends on the interest rate but also, because the trade-offs are between flows, on the share of life retired. The corresponding budget constraint is given by

$$c + qm \leq y(1+gq)$$

Because the two goods are pre-retirement and post retirement consumption, the relative price of the merit good may be interpreted to be q.

A government old-age retirement program will force consumers to save a constant fraction of labor income during each period of working life. This is a regulation which is unlikely to affect the behavior of the rich because they hold financial assets for other reasons, e.g., they were endowed with them or can afford to make bequests at end of life, and can thus reduce these non-retirement assets stocks in order to abide by the regulation. We consider, on the other hand, when the poor did not have enough non-retirement assets to fully abide by the regulation – and cannot borrow against their government benefits – and thereby must decrease their working life consumption and increase their retirement consumption. In other words, we suppose that a mandatory retirement savings program does change the life cycle consumption profile for the poor, even if it does crowd out some of the savings that would have occurred in the absence of the program.

In order to more readily compare the model with well-known parameters of government retirement programs, it is useful to rewrite lifetime consumption in terms of the yearly savings rate when working, denoted *s*. *s* is inclusive of mandatory savings and, as we explained above, is affected by policy for the poor. The consumption when working is then simply what is left over from income after savings is taken out and the consumption when retired is the accumulated savings together with government retirement benefits

$$c(s,g) = y(1-s)$$

$$m(s,g) = y[\frac{s}{q} + g]$$

Substituting in how savings determines consumption, we denote by $w(s, g) \equiv u(c(s, g), m(s, g))$ the induced utility over savings rates and government retirement benefits and by s^* the most preferred savings rate in the absence of government benefits; $s^* = \arg\max_s w(s, 0)$. This function defines the retirement income $E(s)$ necessary to compensate the individual for undertaking a non-optimal savings rate relative to choosing the privately optimal savings

$$w(s,E(s)) \equiv w(s*,0)$$

The compensating variation represented by the benefit amount $E(s)$ is the primary focus of our analysis of the distortions imposed by excessive savings by the poor. It represents the extra yearly retirement income, expressed as a fraction of working life income, required to compensate a consumer for saving at the rate *s*. Since *s* is a fraction of yearly labor income saved for retirement, it corresponds to the payroll tax "contributions" that are characteristic of so many government retirement programs systems around the world. Similarly, $E(s)$ corresponds to the "benefits" of such programs which involves the full replacement rate $s/q + E(s)$ of which part is paid by the government. In other words, if a worker saves a fraction *s* of his labor income every year, $E(s)$ is the minimal *addition* replacement rate the individual must receive, in addition to the amount he earns on his own retirement savings, in order to be no worse off under the government induced savings program.

4.2 Distortions Induced by Mandatory Savings

We assess the distortions imposed on the poor by excessive savings through the compensating variation calculated for common parameter values that are empirically relevant in matching observed consumption behavior to that of the model. Table 1 reports our numerical results for four parameterizations of the model that fall within the empirically feasible range. The main result displayed is that even very small increases in the savings rate brought about by merit motives lead to very large distortions on the poor.

Table 1: How Much Is Retirement Income Valued?

	Parameter Values			
Parameters	(1)	(2)	(3)	(4)
Years Working, R	42	42	45	45
Years Retired, T-R	15	15	7	7
Elasticity of Substitution, σ	0.5	1	0.5	1
Optimal Savings Rate, s*	0.049	0.049	0.024	0.024
Merit Good Price, q	0.10	0.10	0.05	0.05
Excessive Savings, s - s*	Compensating Variation $E(s)$			
0	0	0	0	0
0.005	0.01	0.00	0.03	0.01
0.010	0.03	0.01	0.16	0.05
0.015	0.07	0.03	0.58	0.13
0.020	0.14	0.05	2.71	0.25
0.025	0.28	0.08	∞	0.42
0.030	0.52	0.12	∞	0.67
	Computations for *2%* Excessive Savings $s = s^* + 0.02$			
m/c with $g = 0$	0.72	0.72	0.94	0.94
m/c with $g = E(s)$	0.87	0.77	3.78	1.20
$\{1+s/[qE(s)]\}^{-1}$	0.18	0.07	0.75	0.22

Notes:

(1) $\delta = 0.04$, $\gamma = 0.5$

(2) m/c is the ratio of retirement consumption to working life consumption

The top part of the table reports the values of the structural parameters and induced values of those parameters, such as the privately desired savings rate s* and the merit good price q. The middle part

of the table reports the cost of the minimum savings requirement, expressed as the extra retirement income per dollar of working life income required for indifference as a function of the amount by which the minimum savings requirement exceeds the optimal savings rate. Reading across the third to last row of the middle panel, for example, shows that consumers require an additional replacement rate ranging from 5 to 271 percent in order to endure the savings rate which is two percentage points higher than their optimum.

The effects of three parameters are important for the calibrated finding that small increases in savings rates hurts the poor a lot in quantitative terms. The first is the length of the retirement period relative to the length of working life. The shorter is working life, the less painful it is to save a given extra percentage of income during working life and a more valuable is a given amount of extra income during retirement. We report computations for two values of the pair of age of retirement and age of death (R, T). The first is a working life of 42 years and a retirement period of fifteen years which, for someone beginning his working life at age 20, corresponds to retirement at age 62 and a life expectancy of 77. We believe this parameterization closely approximates the expected life-cycle of American retirees late in the 20th-century. The second parameterization of $R = 45$ and $T\text{-}R = 7$ corresponds to retirement at age 65 and a life expectancy of 72 years, which we view as an approximation to the expected life-cycle of American retirees in the mid 20th-century.

The second crucial parameter is the intertemporal elasticity of substitution σ. A large value of σ implies that people are not particularly willing to smooth consumption over their life-cycle. σ is thought to be relatively low and a parameterization of $\sigma = 0.5$ is commonly found in numerical public finance analyses of Social Security and other dynamic fiscal policies.[18] The less consumption is substitutable over time, the more the individual is hurt by being forced to favor one time over the other. For the range of parameter values that have been argued empirically relevant, $\sigma < 1$, it should be noted that the CIES utility function implies there are some savings rates for which no amount of extra retirement income can compensate a consumer for the excessive savings induced by merit motives (!). This is seen graphically as indifference curves in Figure 3 whose asymptotes are a

[18]See e.g. Hall (1988) or Auerbach and Kotlikoff (1987, p. 50). Hubbard and Judd (1987) use the CES function form with values of $\sigma = 0.2, 0.25, 0.5$,and 1.1 for very similar purpose – to show that consumers can be worse off under a payroll-taxed financed retirement savings system than under no system at all.

strictly positive distance from the parallel axis[19]. Although the CIES functional form is very common in the public finance literature on life-time consumption, apparently it has dramatic implications for evaluating the welfare implications of large intertemporal government policies.

An important source generating the large distortions on the poor displayed by the table is that savings accumulate and more periods are used to save than consume. This implies that small amounts of excessive savings may hurt the poor a lot, especially if those savings are repaid in-kind in terms of health care. For example, although a two percentage point increase in the retirement savings rate may not seem like a lot, the logic of compound interest implies that two more percentage points as an important effect on the ratio of retirement to working life consumption. This can be seen the table by comparing the optimally desired ratio of retirement to pre-retirement consumption, which in the table corresponds to $\gamma = 0.5$, to the ratio that results from a forced savings rate of $s^* + 0.02$. These calculations are shown in the bottom of the table. The minimum savings requirement increases the ratio of retirement income to pre-retirement income by as much as 50 percent , the forced ratio is 0.72 compared to the optimal ratio of 0.5, when retirement lasts fifteen years. It raises it by close to 100 percent when retirement lasts seven years; compare 0.94 to 0.5. If those subject to the minimum savings regulation are compensated in the form of additional retirement income, then the regulation has an even larger effect on the ratio as shown in the 2nd row of the table's bottom panel for the case when consumers are fully compensated; the ratio more than doubles in the case of a seven-year retirement period.

Another way to evaluate the magnitude of the utility cost of increasing the retirement savings rate by two percentage points is to express the extra retirement benefits as a fraction of total

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[19]To prove this, express the marginal rate of substitution μ as a function of consumption of the merit good c and of the utility level u. Then invert to compute c (remember that $u < 0$ when $\sigma < 1$):

$$c(\mu, u) = \frac{\frac{\sigma-1}{\sigma} u}{1 + q\gamma(\mu q)^{\sigma-1}}$$

For $\sigma < 1$, $\lim_{\mu \to \infty} c(\mu, u) = \frac{\sigma-1}{\sigma} u > 0$.

retirement income, where total retirement income is the sum of a fair annuity paid from accumulated retirement savings (sy/q) plus the government subsidy g:

$$\frac{\text{subsidy}}{\text{subsidy + fair annuity}} = \frac{g(s)y}{g(s)y + sy/q} = \left[1 + \frac{s}{qg(s)}\right]^{-1}$$

For the cases shown in the Table, we see in the last row that the ratio ranges from 0.07 to 0.75 when the government pays the subsidy making the poor indifferent to the program ($g(s) = E(s)$). In other words, consumers as parameterized in the first column need retirement benefits that exceeded those afforded by their own retirement savings to the extent that 18% of their retirement income is a subsidy and 82% of it is a fair return on savings.

4.3 Accounting versus Hicksian Incidence of Old-Age Retirement Programs

We presume that mandatory retirement savings programs have, proportionally, a lesser effect on the retirement consumption of the rich than that of the poor. Reasons for this presumption include: (a) the rich have proportionally more other financial assets which can be used to neutralize much or all of the effect of a retirement savings program on their life cycle consumption profile and (b) the rich may, in the absence of a government program, save a greater fraction of their income for retirement so that a mandatory minimum savings rate is more likely to bind for the poor.

For simplicity, we assume that the savings rate of the rich is not affected at all by government retirement savings programs. Hence the only effects on the rich are through net taxes they pay (if any) to finance retirement income for the poor and their enjoyment of additional retirement income for the poor. Two calculations are in order. The first applies to *future* generations of retirees for whom the calibrations in columns (1) and (2) are most applicable. The second is for *previous* generations of retirees for whom the calibrations in columns (3) and (4) are most applicable.

If the government programs serve to increase the savings rate of the poor by two percentage points, then we see from, say, the first column of Table 1 that (*future* generations of) the poor must receive 18% of their retirement income (= 1.4% of the present value of their lifetime earnings)

through transfers from the rich.[20] This is substantially larger than the degree of *regressivity* of Social Security estimated for future generations of retirees (under current law) by Coronado et al (1999) using the accounting approach. They estimate that the bottom quintile will have paid 3.3% of their lifetime income *more* in Social Security taxes than they receive in benefits which, when annuitized (ie, divide by q), means that the replacement rate of their retirement benefits is 32% lower than it would be if their Social Security "contributions" had been invested at a 4% rate of return. If their retirement savings were 6.9% of earnings during working life (as it is in the Modigliani model as calibrated in columns (1) and (2)), the fair 4% rate of return would have earned them an annuity with a 67% replacement rate ($0.67 = s/q$). Hence, they would be in the same situation if their contributions had been invested at the 4% return and they paid a tax which amounts to 91% of their actual retirement benefits ($0.91 = 0.32/(0.67-0.32)$). Since it is a percentage of actual retirement benefits, this 86% is comparable with the numbers reported for $\{1+s/[qE(s)]\}^{-1}$ in the bottom row of Table 1. However, Coronado et al suggest that the rich are also expected to pay more in Social Security taxes than they pay in benefits, an amount equal to 2.6% of their lifetime income. This is as if they were to pay a annual tax during retirement equal to 60% of their retirement benefits. Although all members of future cohorts are expected to get a "bad deal" (ie, pay more in taxes than receiving in benefits) from Social Security, Coronado et al suggest that the poor members get a worse deal than the rich members – it might be said that the program is expected to be regressive for future retirees in the accounting sense. Our model suggests that the program is even more regressive than that, because the program changes the behavior of the poor most. At the bottom of Table 1's column (2), we have computed that, through their changed behavior, the poor effectively pay another tax amounting to 7% of their retirement income. When the 7% is added to the 86% derived for the poor in Coronado et al's study and compared with the 60% for the rich, we only reinforce the regressive conclusion from the accounting studies.

If the government programs served to increase the savings rate of the *previous* generations of poor by two percentage points, then we see from, say, the third and fourth columns of Table 1

[20]Both rich and poor have historically received more in benefits than they paid in taxes during their lifetime thanks to transfers from younger generations. Under currently law, both rich and poor will presumably receive less in benefits than they paid in taxes. Our concern here is with whether the poor get a good deal as compared with the rich member of their cohort.

that (previous generations of) the poor must receive at least 22% of their retirement income (= 1.3% of the present value of their lifetime earnings) through transfers from the rich. 22% extra retirement income for the poor is similar to Burkauser and Warlick's (1981) estimate for cohorts aged 65 as of 1972. They find that *all* income classes enjoy extra OASI benefits (i.e., beyond an actuarially fair return on their "contributions") that are at least 64% of their total OASI benefit (this 64% is comparable to the numbers reported in the last row of Table 1). This percentage ranges from 65% or so for high income classes to 90% or so for low income classes – a difference of about 25 percentage points. Hence, while the poor have enjoyed a "good deal" from Social Security, only part of that – 25 percentage points – is at the expense of the richer members of their cohort. Since our Table 1 suggests that the poor need an additional 22 percentage points to compensate them for their changed behavior under the program, the 25 extra percentage points is barely compensation enough. In other words, when Burkauser and Warlick's (1981) accounting estimate is added with our estimate of the implicit cost of behavior change, Social Security appears to have been a lot less progressive program for previous generations, if progressive at all. Also notice from the bottom row of Table 1 that our conclusions for previous and future generations of retirees are even stronger when a smaller elasticity of substitution is used to make the calculations.

In summary, a comparison of our Table 1 with accounting studies of the income incidence of US Social Security shows how the regressivity of the "regulatory" portion of the program is a first order consideration. Our estimates of the regressivity of the regulatory portion are as large (in absolute value) as the most progressive estimates of the fiscal portion and even of the same order of magnitude as the cross-cohort redistribution.

5 Concluding Remarks

A common view in public finance is that there is an efficiency-redistribution tradeoff in which distortions are tolerated in order to redistribute income. This tradeoff has guided much of incidence analysis to establish how separate policies help the poor at the expense of the rich, even though it understood that many policies may distort behavior. Merit motives imply that efficiency-enhancing public policy has the primary purpose of creating distortions and may use progressive fiscal policy in order to create those distortions – the reverse of the conventional efficiency-redistribution tradeoff. We discuss why the largest programs on the federal and local level in the

US – including Social Security, Medicare and Medicaid, and Public Schooling – seem consistent with the reverse tradeoff between redistribution and efficiency. Cross-hauling can be explained by merit motives, and the progressivity of fiscal incidence is overstated when interpreted in the classical way.

Our analysis was incomplete and limited in several respects, and therefore left many questions for future research. We conclude by discussing a few of these in detail here.

5.1 Should Preferences be Respected ?

We follow the typical economic approach, and in particular the approach taken throughout public finance, and measure a person's welfare according to the preferences dictating his behavior. Two questions arise. First, should the preferences of the poor be respected ? Second, regardless of the poor preferences, should welfare economics respect any consumption externality? These questions may be interesting but may not affect our main implications. As long as the poor use the preference (2) and the rich use the preference (1) when they participate in public decision-making, the poor will receive greater fiscal transfers the more their behavior is distorted to please the rich[21]. Nor do these questions need answers if we are to show how regulation, taxes, and transfers are related according to the usual theory of policy incidence.

More generally, our analysis may cover other motives behind the preference of the rich to see the poor consume more than they want. In particular, there seems to be a variety of other altruistically induced commodity-specific externalities generating the same predictions for policy design and incidence to which our analysis is equivalent. First, it may be argued to be the case that the rich are purely altruistic but wish to change the poor's behavior because the rich believe the poor are making mistakes with respect to some other more informed preferences. We refer to this as *Information Induced Paternalism* and in the Appendix we show that, with respect to the main results for optimal policy design and incidence, it is observationally equivalent to our merit good economy. Second, the rich utility function could depend negatively on the poor's consumption of the demerit good, rather than positively on the poor consumption of the merit good. Third, the "consumption

[21]Some sophisticated theories of poor judgement suggest that the poor might exercise poor judgement in private affairs, but are willing in public affairs to pay others to help them exercise better judgement. Brennan and Lomansky (1983) propose one such theory for democracies.

externality" can be modeled as an externality in the budget constraint of the rich as, for example, when redistribution prevents crime. Fourth, the motives may capture the inter-temporal strategic issues present in the Samaritan's dilemma, where the rich want to change the behavior of the poor in order to prevent the poor from exploiting rich's altruism. In the Appendix, we again show that a *Samaritan* economy is equivalent, with respect to the main results for optimal policy design and incidence, to our merit good economy. Fifth, the non-excludible public goods may generate similar motives when valued more by the rich than by the poor.

The important point is that all these other ways of generating similar types of motives as those discussed here share a gap between poor's private marginal rate of substitution between merit and non-merit goods and the social marginal rate of substitution. We have used the phrase "merit motive" throughout the paper to characterize motives for changing the behavior of the poor, and perhaps the phrase is poorly chosen if it gives the reader the impression that it rules out some of the cases discussed above. Regardless of what generates the gap, we have stressed the novel differences vis-a-vis standard public finance.

In defining the merit motive, two questions arise which we are unable to answer using our approach. The first is "Which group is altruistic and which is the recipient of altruism?" Our model does not provide much guidance in this regard, and we rely instead on "common sense'" and on indicators of private sector behavior. Second, "What is the merit good?" Again, common sense is our main guide. Perhaps future research will show how economic and other theories might be used to predict which groups are altruistic and which goods are the merit goods.[22]

5.2 Merit Motives versus Other Market Failures

There are of course other motivations and explanations for government involvement in the largest form of in-kind programs such as healthcare, savings, and education. In particular, information asymmetries or spillovers in the private market for health care, annuities, life insurance, and education are often stated as a role for under-provision of these goods. One way to interpret our argument is that merit motives are not different in general from these arguments, as commonly believed, but rather is only a different source of market failure due to the positive external effects

[22]See Mulligan (1997) who discusses endogenous altruism.

of poor consumption. However, we are not aware of any explicit analysis showing information failures in insurance or spillovers in education to be more pronounced for the poor than for the rich. This would have to be the case in order for the central implication discussed here to hold; that the poor are more distorted and subsidized than the rich.

Indeed, we may make an even stronger claim that some of the evidence argued to support information failures we believe better support our implications than such information failures. For example, one set of evidence brought forward to justify Social Security programs is that information problems are important in annuity markets because those insured by private annuities live longer than those who do not (see e.g. Friedman and Warshawsky (1988)). There are several difficulties with using this as support for information problems in mortality based insurance markets. One major issue, mentioned in Cawley and Philipson (1999), is that the same pattern holds in the life insurance market, those holding life-insurance live longer than those who do not. Interestingly, the fact that both those who hold private annuities and life insurance live longer than those who do not is consistent with our claim that the publicly induced distortion is larger for the poor than for the rich. As the poor hold less private life-products when distorted to over-consume them through Social Security and its survivor benefits, longevity in the private market is larger than overall longevity as the private market is dominated by the rich. The superior longevity of both annuity and life-insurance holders may have little to do with information asymmetries but the greater longevity and greater likelihood of the rich to participate in a financial market.

We also believe that differential effect of public health programs on rich and poor are inconsistent with the government-correcting-insurance-market-failure justification for these programs. Is the "moral hazard", "adverse selection", and reasons for insurance market failure more prevalent among the poor who, one would suspect, know less about their risks than the rich?[23,24]

[23]Unless the insurance market fails *because* of interdependent preferences. See Coate's (1995) and our Appendix's analysis of Good Samaritan economies.

[24]It is sometimes argued that, because of administrative costs and other factors, "one size fits all" policies (ie, public benefits that do not vary with the characteristics of the beneficiary) are efficient solutions to market failure (Diamond 1993 makes such an argument for Social Security). If so, might this explain why the government response to market failure involves proportionally larger benefits for the poor such as those shown in our Figure 1? More research on this question is needed, but we conjecture the opposite, that, except when the market failure

Note that the superior knowledge of the poor about their risks is in direct contrast to the lack of knowledge often argued to motivate information induced paternalism.

5.3 Distortions as an Unintended Byproduct of Redistribution

Some well known studies have emphasized imperfections in the transfer process and that, as a result, in-kind programs may be the most efficient means for enhancing the utility of the poor. For example, if there is asymmetric information between government and the private sector, in-kind transfers can enhance the utility of the poor more than means-tested cash transfers, even when the poor value the in-kind transfers at less than their cost, because cash transfers are necessarily low in order to prevent excessive participation in the program by the rich (Nichols and Zeckhauser 1982, Besley and Coate 1991). Distortionary taxation methods have also been justified as an optimal response to asymmetric information in the transfer process.

It may thus appear that some of the differences stressed here would not be robust to such well-known departures from lump sum transfers under only altruistic motives. However, in a related analysis, see Mulligan and Philipson (2000), we suggest that introducing imperfections in the transfer process does not modify three important conclusions. First, the poor value the in-kind transfers at less than their cost, and a complete analysis of the income incidence of policy would not value the transfers to the poor at their cost. Second, implicit marginal tax rates (ie, the amount of distortion) will not increase, or at least not too rapidly, with the amount of social spending when policy is motivated by redistribution because, holding constant the amount of redistribution, the utility of the poor falls with the implicit marginal tax rate. Third, income effects must be more important than substitution effects under redistributive motives, and less important than under merit motives.

Moreover, there are important, and testable, differences between the merit good and asymmetric information explanations of in-kind transfers. First, most quantitatively large in-kind programs have close universal participation so screening out non-participants does not seem to be their primary purpose. Medicare and Social Security are universal and Public Schooling is attended

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is between rich and poor as it is in our merit good economy, governments facing large administrative costs should solve market failures *only* for the rich.

by about 90 % of students.[25] Second, the redistributive interpretation suggests that in-kind transfer programs should also be subject to income and asset tests, otherwise very little redistribution is possible unless the income elasticity of the commodity being subsidized (or taxed) is far different from one (Sah 1983, Nichols and Zeckhauser 1982, p. 375). Third, because beneficiaries value in-kind transfers at less than their cost, only a merit interpretation can explain why beneficiaries might be forced to pay at least the full cost of their transfer, as they are in the Medicare, Social Security, and public schooling programs. Indeed, it is hard to justify on redistributive grounds why the poor might pay any taxes toward an in-kind program whose purpose is to help the poor, let alone pay more than they receive. Fourth, an in-kind transfer program goes too far according to the redistributive interpretation if the commodity is provided up to the point where the beneficiary's marginal valuation is close to zero. And, assuming that marginal valuations decline with the amount of the commodity provided, an in-kind transfer program goes too far according to the redistributive interpretation if, on average, beneficiaries value the commodity at a lot less than its cost. In contrast, the optimal in-kind transfer program in a merit good economy may well provide a commodity to the poor to the point where their average and marginal valuations are zero or even negative. While redistributive motives under asymmetric information might explain food stamps, public housing projects, and a few other in-kind programs, these first four differences make it clear why a very large share of government activity – such as public schooling, Medicare, Social Security, and unfunded mandates – makes too little use of means tested cash transfers to be understood as redistribution from rich to poor under asymmetric information. Fifth, the screening interpretation does not subsidize a commodity differentially preferred by the rich (Nichols and Zeckhauser 1982, p. 376).

5.4 Merit Motives versus Producer Interests

Might powerful producers interests explain in-kind subsidies of their output ? A model of producer interests is complementary to the merit good model, because the merit model does not say

[25]Schooling is perhaps closer to an unfunded mandate when substantial sorting across school-districts take place due to the bundling of housing and education through property tax financing of public education. In particular, the 10% of students who attend private school may sort into low taxed districts.

much about which goods are merit goods and which goods are not. Perhaps a good theory of which producers are powerful would help explain which goods are merit goods. However, the causation may also be in reverse – merit goods may help producers obtain redistribution.

There are at least four differences between a merit-good and producer interest model of in-kind subsidies. First, as is well known an interest group model with producer motives does not easily explain in-kind subsidies (although see Stigler 1975, pp. 115f), because the producers could gain more by getting paid in cash rather than in demand for their output. Second, the producer model relates the importance of subsidies to determinants of political power, such as numbers, the natural of the political process, etc. while the merit good model relates subsidies to basic values of citizens. A careful empirical analysis is beyond the scope of this paper, but we suggest that the reason why schooling, medical care, and other goods are subsidized by so many different governments is that basic values are common in many countries while political representation of teachers, doctors, and other producers differ.[26] For example, we would explain the prevalence of sin taxes not with the political weakness of tobacco farmers, vineyard owners, and brewers, but on the preferences of citizens. Indeed, the merit good approach suggests that subsidies to tobacco farmers and other sin-good producers might, as compensation, go along with policies that discourage the consumption of the demerit goods they produce. Third, producers presumably care about stimulating *aggregate* demand for their product but presumably do not care whose behavior is distorted to raise demand. This is another departure from the merit good model – optimal policy in a merit good economy mainly distorts the behavior of the poor who may have little effect on the aggregate demand for the merit good. Lastly, the two might be separated according the effect of policy on profits and industry output. Producer interests may be best promoted by policies that raise profits by reducing output, where merit good motives are satisfying by expanding consumption and, presumably, output.

[26]Becker (1983) and others have suggested that the importance of food subsidies varies across countries in relation to determinants of the political influence of farmers. However, Becker stresses deadweights costs of redistribution as a determinant of political influence and these are also a determinant of socially optimal policy in a merit good economy. What is tougher for the merit good approach to explain is why food is taxed (relative to other goods) in some countries while subsidized in others.

Appendix: The Samaritan's Dilemma and Information-induced Paternalism as Special Cases of a Merit Good Economy

In this Appendix, we argue that the model of a merit good economy considered in the main text is equivalent, in terms of policy design and incidence, to an economies in which there is a Samaritan's Dilemma between the rich and poor or in which the rich and poor are have different beliefs about the efficacy of merit good consumption.

A.1: Samaritan's Dillemma

There are two types of agents in the Samaritan economy: the rich r (aka, "Samaritans") and the poor p. There is a "demerit good" c_1 and another good c_2, which yield utility for the poor according to:

$$V^p = U^p(c_1^p, c_2^p)$$

The rich care about the resources they keep for themselves, c_1^r and c_2^r, and the utility of the poor:

$$V^r = U^r(c_1^r, c_2^r) + a^r U^p(c_1^p, c_2^p)$$

where a^r is a constant, and each of the U functions are strictly increasing and concave. Notice how the rich care only about the poor's *consumption* as it affects poor utility V^p, and in this sense have no merit motive. Nevertheless, this appendix shows how, depending on the sequencing of decisions, the rich care about the poor's *behavior* independent of how it affects poor utility, and in this sense have a merit motive.

The aggregate resource constraint is:

$$c_1^r + c_2^r + c_1^p + c_2^p = y_1^p + y_1^r \qquad \text{(A-1)}$$

so efficient allocations maximize (A-2) subject to (A-1) for $a \in [a^r,\infty)$.

$$U^r(c_1^r,c_2^r) + a\,U^p(c_1^p,c_2^p) \qquad \textbf{(A-2)}$$

where, as in the main text, a is a constant reflecting the altruism of the rich and the "planner's" relative weight on rich utility. The first order conditions describing an efficient allocation are:

$$a\,U_1^p(c_1^p,c_2^p) = a\,U_2^p(c_1^p,c_2^p) = U_1^r(c_1^r,c_2^r) = U_2^r(c_1^r,c_2^r) \qquad \textbf{(A-3)}$$

where U subscripts denote first derivatives with respect to first and second arguments.

The laissez-faire allocation, and the so-called Good Samaritan problem, result from the sequencing of decisions. In the first stage, the poor decide how much, c_1^p, to consume of the demerit good and how much, m^p, of the remainder of their income y^p to set aside for consumption of good 2. In the second stage, a "planner" makes a transfer from rich to poor, and an allocation of rich consumption, to maximize (A-2) taking $c_1^p = y^p - m^p$ as given. Formally, behavior in the second stage solves:

<u>Stage 2</u>

$$\max_{c_1^r,\,c_2^r,\,c_2^p} \; U^r(c_1^r,c_2^r) + a\,U^p(c_1^p,c_2^p)$$

$$\text{s.t.} \quad c_1^r + c_2^r + c_2^p = m^p + y_1^r$$

The first order conditions for this problem are as in the efficient solution, with the critical exception of the first equality in (A-3).

One feature of the Stage 2 solution is particularly relevant for Stage 1 – the optimal c_2^p as a

function of the resources m^p set aside by the poor in Stage 1. It is assumed that all goods are normal to the planner, from which we can derive the familiar and important result that the derivative of $c_2^p(m^p)$ is less than one:

$$\frac{dc_2^p}{dm^p} = \left[1 + aU_{22}^p\left(\frac{U_{11}^r - 2U_{12}^r + U_{22}^r}{U_{11}^r U_{22}^r - (U_{12}^r)^2}\right)\right]^{-1} < 1$$

An increase in m^p does not increase c_2^p as much because it crowds out some of the transfer from rich to poor. Equivalently, more m^p benefits the rich not only because it raises c_2^p, but also because it raises the resources keep by the rich, c_1^r and c_2^r.

The Stage 2 "planner" could well be the rich, in which case the transfers from rich to poor are voluntary. Otherwise, Stage 2 involves transfers which may be interpreted as "involuntary," so perhaps "laissez-faire" is not the best term to describe such allocations. Nevertheless, the terminology here is not relevant for understand the design and incidence of regulations that could enhance efficiency in this economy, as we show below.

In the first stage, the poor allocate their income between c_1^p and m^p in order to maximize their utility, taking into account the effect of m^p on c_2^p in the second stage:

Stage 1

$$\max_{c_1^p,\, m^p} u^p(c_1^p, m^p) \quad \text{s.t.} \quad c_1^p + m^p = y^p$$

$$\text{with } u^p(c_1^p, m^p) \equiv U^p(c_1^p, c_2^p(m^p))$$

where u^p is the function maximized by the poor in their rational decision-making. Embodied in this function is the poor's accurately anticipated reaction of transfers to their setting aside resources.

The first order condition (A-4) for the first stage is easily derived

$$U_1^p = \frac{dc_2^p}{dm^p} U_2^p < U_2^p \qquad \textbf{(A-4)}$$

and, by comparison with (A-3), proves that the laissez-faire allocation of consumption is inefficient because the poor do not set aside enough resources. The inefficiency of laissez-faire is the first important analogue between the merit good economy described in the text and the Good Samaritan economy.

It is feasible in Stage 1 for the poor to choose any m^p in the interval $[0,y^p]$, including the m^p that would lead to the highest value of the planner's objective in Stage 2. The poor do not do so because, unlike the planner, they are not concerned with the effect of their m^p on consumption by the rich. If, without compensation in the Stage 2, the poor were forced to set aside the m^p preferred by the planner, or even forced to set aside just a little bit more m^p than maximizing u^p, they would be worse off than under laissez-faire even though efficiency would be enhanced. This is the second important analogue between the merit good economy and the Good Samaritan economy.

For the case $a = a^r$, efficient allocations, laissez-faire allocations, and other allocations can be displayed in the utility possibility frontier exactly as they are in Figure 2 for the merit good economy. The laissez-faire or "unregulated" allocation is shown as allocation *A* in the Figure. Policy that only requires the poor to set more aside (ie, increase m^p) than they would in the unregulated economy makes the rich better off and the poor worse off, and is a movement along the locus of "unfunded mandates" shown in the Figure. If such mandate were combined with a larger Stage 2 transfer than would occur with the mandate alone, then we may have an allocation like *C* or *D*. If the extra transfer is not too large, then the poor may still be worse off under the policy than in the unregulated economy, as in allocation *C*. An allocation like *D* could also be attained by a policy subsidizing m^p.

To demonstrate the mathematical connection between the merit good and Good Samaritan economies, we first introduce two definitions:

Definition 1 A parameterization $\Theta = \{a, y^p, y^r, U^p, U^r\}$ of the Samaritan economy is three constants and two functions describing rich, poor, and planner tastes and endowments.

Definition 2 A parameterization $\Theta' = \{a,b,q,y^p,y^r,U^p,U^r,v\}$ of the Merit Good economy is five constants and three functions describing rich, poor, and planner tastes and endowments.

Notice that a parameterization of either economy does not imply an allocation unless we also specify a mechanism (eg., laissez-faire, efficiency).

Proposition Take a parameterization $\Theta = \{a,y^p,y^r,U^p,U^r\}$ of the Samaritan economy. If U^p is additively separable, there exists a parameterization Θ' of the merit good economy such that:

(i) The c_1^p and m^p from the laissez-faire allocation of the Samaritan economy Θ is the same as c^p and m^p from the laissez-faire allocation of the merit good economy Θ'.

(ii) The c_1^p and m^p from the efficient allocation of the Samaritan economy Θ is the same as c^p and m^p from the efficient allocation of the merit good economy Θ'.

Proof To form the parameterization Θ', set $q = 1$, $u^r = U^r$, b equal to any positive number, and v as:

$$v(m^p) = \frac{a}{b}\left[U^p(c_1^p, T + m^p) - u^p(c_1^p, m^p) \right]$$

with the constant T is the difference between consumption and income of the poor in the efficient Samaritan economy. It follows that u^p is additively separable because U^p is, so v does not depend on c_1^p. To complete the parameterization Θ', take a, u^p, y^p, and y^r directly from Θ.

Using this function v in the merit good economy in the text, we find the first order conditions for the laissez-faire merit good allocations (see equation (5)) to be the same as for the laissez-faire Good Samaritan economy. The first order conditions for the efficient merit good allocations (see equation (4)) are the same first order conditions (A-3) for efficient Good Samaritan allocations.

Notice that the Proposition's relationship between merit good and Samaritan economies is for fixed a, so that the comparative statics with respect to a derived in the text for the merit good economy are not identical to those statics for the Samaritan economy, although we believe the

results are qualitatively similar.

Another difference between Samaritan and merit good economies is that using force against the *rich* can enhance efficiency in the former economy, but not in the latter. In particular, efficiency would be enhanced if the rich were forced to make a transfer to the poor that was independent of poor's behavior. If the mandated transfer were of the same magnitude as occurs in the laissez-faire economy, then the poor would be better off while the rich would be no better off. In other words, the Good Samaritan approach to policy leaves unexplained why the poor are forced to change their behavior but, other than paying taxes, the rich are not.

A.2: Information Induced Paternalism

We consider the equivalence for information induced paternalism when the rich are differentially informed relative to the poor about the benefits and costs of poor consumption of the good *m*. In particular we assume that the rich have some beliefs d_s over a set of states of nature s=1,2,..,S for which the poor have beliefs b_s. The states of nature are assumed to determines the utility of consumption of the poor for the good *m*. In state *s* it is assumed that the poor get the separable utility

$$u_s(c^p, m^p) = u_c(c^p) + u_{sm}(m^p) \qquad s = 1,..,S$$

Consequently, the expected utility of the poor is

$$V^p = U^p(c^p, m^p) = u_c(c^p) + \sum b_s u_{sm}(m^p)$$

The rich care about their own consumption and the utility of the poor in an altruistic manner *given their own beliefs* d_s over the states s=1,2,..,S. If we, without loss of generality assume the true state of nature is s=1 the rich utility function is

$$V^r = U^r(c^r, m^r) + a^r[u_c(c^p) + \sum d_s u_{sm}(m^p)]$$

where a^r is a constant, and each of the utility functions are strictly increasing and concave. The aggregate resource constraint is as in the main text. Note that whenever the rich and the poor have the same beliefs about the benefits and costs of the behavior of the poor, $d=b$, the Paternalistic economy simply reduces to a Merit Good economy with altruistic motives only. More generally, for a given Paternalistic economy the social welfare function might be written as (here we have the planner respecting the beliefs of both rich and poor, but that is not of particular importance):

$$\alpha U^r(c^r, m^r) + \alpha a^r[u_c + \sum d_s u_{sm}] + (1-\alpha)[u_c + \sum b_s u_{sm}]$$

where α is the planner's relative weight on rich utility (excluding the indirect weight via rich altruism). Equivalently, the planner maximizes

$$U^r(c^r, m^r) + a U^p + b v(m^p)$$

$$b v(m^p) \equiv a^r \sum (d_s - b_s) u_{sm}(m^p) \quad , \quad a \equiv a^r + \frac{1-\alpha}{\alpha}$$

Hence, we have a merit good economy where the strength of the merit motives depends on the gap in beliefs and the strength of the rich's altruism.

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