Price-Distorting Compensation Serving the Consumer and Taxpayer Interest

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CONTENTS

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1. Introduction

In this paper we address a bothersome question for public choice analysis: Why do consumers and taxpayers acquiesce to seemingly inefficient wealth transfers to a relatively small number of producers? The most common and briefest answer given by political economists is that any individual consumer/taxpayer suffers too little in the rent-seeking game to bear the cost of opposing the aggressive political influence of producers who enjoy the concentrated benefits. In this paper we examine an alternative answer lying in the potential benefits that accrue to consumers and taxpayers from price distorting wealth transfers to heterogeneous producers.

At the most basic analytical level, consumers/taxpayers may benefit from some form of wealth transfer because of two stylized facts regarding the political process: (i) public interest policies, however precisely defined, frequently harm at least some special interest groups; and (ii) moves from the political status quo are often subject to the veto of threatened interest groups. As a result of (i) and (ii), compensation is often useful to make politically feasible the pursuit of public goods and other policies that further consumer/taxpayer interests.

In this context, economic policies may be divided usefully into two types. The first type are those typically deemed to be in the public interest: those meant to correct market failure, or provide public goods, and are ostensibly neutral with respect to their distributional effects. We will follow a standard usage and define public-interest policies as those which expand total social surplus as measured by the sum of consumer and producer surpluses. The second type are those typically deemed to be redistributive or compensatory: those meant to redistribute wealth from one social group to another and are ostensibly unconcerned with efficiency. The distinction between public-interest-serving policies and wealth-transfer policies is summarized by the popu-

lar metaphor of the economy as a pie: the former expand the size of the pie, and the latter allocate the portions served.[1] Expanding the pie does not guarantee that all portions served will also grow. If social groups must cooperate, and/or some groups have sufficient political influence, then the public interest and wealth transfers as compensation are politically inseparable.

The combination of the two types of policies arise in many circumstances. Two recent examples in the popular press are privatization with safeguards for some social groups in formerly command economies (e.g., Tirole); and urban planning and the granting of zoning variances in exchange for the supply of local public goods (for anecdotal evidence, see Lueck). One example more thoroughly examined in the labor literature is special worker adjustment compensation for industries facing increased international competition (e.g., Kruse; Richardson; and Corson and Nicholson) Indeed, the political motivation for Trade Adjustment Assistance "has been viewed as a device to foster adoption of trade liberalizing bills by Congress -- or to fend off protectionist legislation." (Mitchell, p. 495.) In the case of developing economies, there are proposed and working policies to mitigate economic structural adjustment by "safety-net" policies in developing countries (e.g., World Bank). Finally, the example we use here for illustration is the existence of farm income supports combined with publically-supported, price-decreasing agricultural research and development (e.g., Rausser and Foster).

Of course, to an economist examining wealth redistribution as a separate activity, compensation may appear as an inefficient, rent-seeking-based policy given that a public good is in place. The existence of an isolated form of compensation is observationally equivalent to distorting wealth transfers resulting from the competition between pressure groups. In the important models of Beenstock (1989), Becker (1983), Downs (1957), Krueger (1974), Olson (1965), Peltzman (1976), Stigler (1971), and Tullock (1976) groups wrestle over the potential wealth offered by an economic system, enjoy-

ing subsidies or suffering taxes in proportion to their relative political strengths or aggressiveness. The political powers of these rent-seeking groups depend on their attributes, such as membership size, abilities to manipulate the news media, and their efficiency at overcoming the free rider problem. An important element of these frameworks is that potential wealth is defined by freely operating markets. Politically-coerced transfers between groups necessarily waste some of this wealth. In short, transfers flow to the politically strong at the expense of the society as a whole.

This paper is based on an alternative model where a policy that enhances the public interest may have to be accompanied by a compensation scheme in order to be implemented. We are defining, in a prescriptive sense, a politically effective mix of policies as one which manages special interests whose influence might otherwise obstruct the public interest. In this model, a potentially winning group taxes itself in order to mitigate the losses suffered by another group whose political strength lies in its ability to veto a move from the status quo. If threatened with sufficient harm, the latter group's membership would form a blocking coalition that obstructs the implementation of new policies. Our main result is that price-distorting compensation schemes, in contrast to lump-sum transfers, may actually serve the purpose of overcoming this veto more efficiently. This potential efficiency gain results from targeting payments to some members of the losing group who suffer less because they can take advantage of the proposed public-interest policy to a greater extent than other losers. The analysis offers an alternative hypothesis to the traditional view of rent seeking: instead of being failures of public choice, price-distorting compensation schemes may be nothing more than the cheapest means of securing public interest policies.

The first section presents the model's basic assumption of coalition breaking in order to gain acceptance of a public interest policy, or a public good. We present the model as a conflict between two groups, producers and consumers/taxpayers, over the release of a price-decreasing technical change. The second section presents the choice

by consumers/taxpayers of the means of wealth transfer. We consider the continuum of transfer mechanisms which are combinations of two polar cases that do not differentiate between firms with respect to ability to take advantage of the public good. The two polar schemes are: (i) a per-unit-output subsidy, which distorts producer and consumer prices, and (ii) a production-neutral payment, which the producer cannot affect by choice of output level. The section demonstrates the conditions under which consumers/taxpayers would prefer price distortion. The third section addresses the likely case of an imperfect coincidence of consumer and taxpayer interests, and considers the frequent the use of output restrictions with wealth transfers. The fourth section discusses the use of other possible means of targeting compensation.

2. Interest Group Structure

In order to illuminate the basic principles underlying consumer/taxpayer preference for price distorting wealth transfers, we propose a simple model of public choice. We assume that there are two interest groups in society, consumers/taxpayers and producers, and that each group has veto power over a change from the status quo. Individual members of these groups behave competitively in the marketplace, but may cooperate with other group members in political activities. Each group is composed of many members, and there is some rule for weighting the votes of individual members to decide each group's position on a policy, as well as whether or not the group will expend effort opposing a particular policy. For illustrative purposes, we take the particular public-interest policy to be the release of a technical innovation that will increase production, but by doing so will also harm enough producers by decreasing output price that the release without compensation will be vetoed.[2]

Producers are endowed with different levels of ability to utilize the new technology, due to firms differing by location, vintage of capital, and endowments of human capital and entrepreneurial talent. And therefore some producers will suffer more than others with the innovation release. To formalize the concept of ability to take

advantage of the innovation, let a be some index of producer attributes. Define $\pi_0(a)$ as the rent accruing to a-type firms prior to the release of the innovation, and $\pi_1(P,a)$ as the rent accruing to those firms under output price p and with the release. We assume the profit functions are well-behaved in p and a. Without placing any sign on the derivatives of π_0 and π_1 with respect to a, we define ability to take advantage of the release as

$$\frac{\partial \pi_1(P,a)}{\partial a} > \frac{\partial \pi_0(a)}{\partial a} \quad \text{for all } p \ . \tag{1}$$

Intuitively, condition (1) implies that firms of higher level ability gain relatively more, or lose relatively less, from the innovation release. If producers are homogeneous prior to the innovation release, then $\partial \pi_0/\partial a = 0$. Note that with homogeneous firms prior to release, condition (1) implies that $\pi_1(P,a)$ would be a strictly increasing function of ability. Define, for the a-type firm, $y_0(a)$ as the initial output level, and $y(P,a)$ as the post-release optimally-chosen output level. From Hotelling's lemma: $\partial \pi_0/\partial p = y_0(a)$ and $\partial \pi_1/\partial p = y(P,a)$. The gain in output level, y, for a producer due to the innovation release is assumed a positive function of a:

$$\frac{\partial y(P,a)}{\partial a} > \frac{\partial y_0(a)}{\partial a} \quad \text{for all } p \ . \tag{2}$$

In other words, a producer's ability to profit, or suffer less, from the innovation release is positively correlated with the change in output level.

Let $f(a)$ be the proportion of firms of a-level ability over N number of producers. Define V as the minimum number of producer votes needed to have the producer group support the innovation release; or alternatively, define $N - V + 1$ as the minimum number of votes needed to have the group veto the release. Under a weighted-vote rule, $w(a)$, define the index c, such that

$$V = \int_{c}^{\bar{a}} w(a) f(a) da \ . \tag{3}$$

Vote weighting could be a simple one-firm-one-vote rule or a rule based on the initial level of output ($w(a) = y_0(a)$), as is the case in many agricultural marketing orders in

the United States. If the c-type producer is just indifferent to voting against the release (i.e., if $\pi_1(P, c) = \pi_0(c) - k$, where k is a possible cost of lobbying to prevent release), then all firms with ability greater than c will benefit from the innovation's release. Therefore, any generic compensation scheme that affects the producter price or offers a per-producer, price-neutral payment need only make indifferent the c-type producer in order to prevent the producer group's veto of the policy.

3. Targeting Payments When Firms Are Heterogeneous

Given that some form of wealth transfer is necessary to gain acquiescence of a supply-enhancing public-interest policy, the question becomes that of determining the least costly means of breaking the potential coalition of producers. We narrow our attention to *a priori* rules that effect the size of the political coalition. We may think of such rules as being announced at the same time as the promised consequences of the technical advance, but prior to the actual dissemination of the advance. For example, this is approximately the situation in the case of agriculture in the United States, where rules of wealth transfer are in place, and where aggregate growth of production is anticipated to be supported by a structured and on-going system of R&D and dissemination. Aggregate production is expected to grow due to future innovations and discoveries, the particulars of which are unknown to all but perhaps a few.

Of *a priori* rules, we consider two schemes: (i) a nondistorting payment promised to all producers and perhaps based on initial output levels, and (ii) a distorting per-unit-output payment. The key feature of these *a priori* rules is that they are anonymous or generic in the sense that they do not distinguish directly between producers. Consumers/taxpayers do not target payments to specific producers, either because there exist high transaction costs to the identification of those with superior abilities, or because there exist constitutional or institutional constraints to transfers based on overtly personal criteria. Nevertheless, while per-unit-output payments do not directly target a group, they do in effect tend to concentrate transfers on those who

make the greatest relative use of the supply-expanding public-interest policy. The cost to consumers/taxpayers of concentrating transfers on those with the greatest ability is the inefficient level of production brought about by a producer price higher than the market-clearing price.

Specifically, consider the following price-distorting and production-neutral payment schemes. Consumers/taxpayers seek to choose the levels of two generic payments: (i) a production-neutral payment of b dollars per-unit-output on the initial (pre-release) level of a producer's output, and (ii) a non-neutral subsidy $(P_T - P_1)$ on the producer's change in output due to the release. The term P_T is the targeted producer price, and P_1 is the equilibrium, market-clearing price paid by consumers. Defining consumer demand as $D(P_1)$ and supply under the innovation release as $S(P_T)$, market equilibrium price P_1 is such that

$$D(P_1) = S(P_T) \quad . \tag{4}$$

In order to assure breaking of the producer coalition, P_T and b are chosen such that the c-level firms are indifferent to the innovation release. In what follows we represent the supply elasticity as $\varepsilon = (\partial S/\partial P_T)(P_T/S)$, and the demand elasticity as $\eta = (\partial D/\partial P_1)(P_1/D)$.

Represent the a-type producer cost of output level y by $e(y,a)$. The instruments P_T and b are chosen such that

$$(P_T - P_1)\cdot[y(P_T,c) - y_0(c)] + P_1 y(P_T,c) + by_0(c) - e[y(P_t, c), c] = \pi_0(c) - k \quad . \tag{5}$$

Note that the firm makes production decisions based on the target price P_T. Therefore, the point of indifference of the c-level firm with both the innovation release and the transfer payments may be written

$$\pi(P_T,c) + (b + P_1 - P_T)y_0(c) = \pi_0(c) - k \quad , \tag{6}$$

where $\pi(P_T,c) = P_T y(P_T,c) - e(y,c)$ -- the familiar profit function satisfying Hotelling's lemma: $\partial\pi_c/\partial P_T = y(P_T, c)$.

Consumer/taxpayer welfare gains under the innovation release and the compensa-

tion schemes may be measured by the sum of the consumers' Marshallian surplus and the total taxpayer outlays, i.e.,

$$CS = \int_{P_1}^{P_0} D(P)dP - [(P_T - P_1)\cdot(S(P_T) - S_0) + bS_0] \quad , \tag{7}$$

where the post-release and pre-release aggregate supplies are given by $S(P_T) = \int_a y(P_T, a)f(a)da$ and $S_0 = \int_a y_0(a)da$. Payments either may be non-distorting, in the sense that the consumer and producer prices are equal (i.e., $P_T = P_1$); or payments may be distorting (i.e., $P_T > P_1$). The extent to which payments are distorting, or coupled to production decisions, depends on the degree to which consumers/taxpayers rely on the price subsidy to make indifferent the c-type producers to the innovation release (i.e., to satisfy condition (6)). If $P_T = P_1 + b$ then the payments are entirely of the distorting kind; and if $P_T = P_1$ then payments are entirely of the non-distorting kind.

The first result relates to the sub-optimality of a completely non-distorting payment scheme.

Proposition 1: If the marginal coalition-breaking firm's (the c-type producer's) output relative to its initial level $[y(P, c)/y_0(c)]$ is greater than the industry's average relative output increase $[\bar{y}(P)/\bar{y}_0]$, then a distorting payment scheme is preferred by consumers/taxpayers.

To prove this result consider the non-distorting case where $P_T = P_1$ and all transfers are accomplished by the non-distorting per-unit-output payment b on the initial output. A marginal increase in P_T, and a decrease in b satisfying (4) and (6), will increase net consumer/taxpayer gains due to the release-with-compensation policy, if $\partial CS/\partial P_T > 0$. From (7),

$$\frac{\partial CS}{\partial P_T} = -D(P_1)\cdot\frac{\partial P_1}{\partial P_T} - [\,(P_T - P_1)\frac{\partial S(P_T)}{\partial P_T} + (1 - \frac{\partial P_1}{\partial P_T})(S(P_T) - S_0) + \frac{\partial b}{\partial P_T}S_0\,] \quad . \tag{8}$$

From (6),

$$b = \frac{\pi_0(c) - k - \pi(P_T, c)}{y_0(c)} - P_1 + P_T \quad , \tag{9}$$

implying

$$\frac{\partial b}{\partial P_T} = \frac{y(P_T, c)}{Y_0(c)} - \frac{\partial P_1}{\partial P_T} + 1 \ . \tag{10}$$

From the equilibrium condition (4), $\partial P_1/\partial P_T$ is such that

$$\frac{\partial D(P_1)}{\partial P_1}\cdot\frac{\partial P_1}{\partial P_T} = \frac{\partial S(P_T)}{\partial P_T} \quad \text{or,} \tag{11}$$

$$\frac{\partial P_1}{\partial P_T} = \frac{P_1}{P_T}\cdot\frac{\eta}{\varepsilon} \ .$$

Using (10) and (11) in (8),

$$\frac{\partial CS}{\partial P_T} = -D(P_1)\frac{P_1}{P_T}\frac{\eta}{\varepsilon} - \tag{12}$$

$$[\,(1 - \frac{P_1}{P_T})\varepsilon S(P_T) + (1 - \frac{P_1}{P_T}\frac{\eta}{\varepsilon})[S(P_T) - S_0] + \frac{y(P_T, c)}{y_0(c)}\,S_0 - \frac{P_1}{P_T}\frac{\eta}{\varepsilon}S_0 + S_0\,] \ .$$

Using $D(P_1) = S(P_T)$ and $P_1 = P_T$,

$$\frac{\partial CS}{P_T} = -S(P_T) + \frac{y(P_T, c)}{y_0(c)}\,S_0 = S(P_T)[\,\frac{y(P_T, c)}{y_0(c)}\frac{\bar{y}_0}{\bar{y}(P_T)} - 1\,] \tag{13}$$

And thus, from an initial non-distorting policy where $P_1 = P_T$, $\partial CS/\partial P_T > 0$ if and only if

$$\frac{y(P_T, c)}{y_0(c)}\frac{\bar{y}_0}{\bar{y}(P_T)} = \rho > 1 \ ; \tag{14}$$

where $\bar{y}_0 = S_0/N$ and $\bar{y}(P_T) = S(P_T)/N$, and ρ is the measure of relative output increase due to the innovation release. This result demonstrates that there are simple and plausible conditions under which one would expect to observe distorting payment policies, even if consumers/taxpayers had complete control over the selection of those policies.

Proposition 1 relies on the plausible assumption of heterogeneous producers, where the marginal defecter from the blocking coalition increases supply by a greater percentage than the industry average. The relative level of the marginal defecter's output increase to the industry's average is a measure of the degree to which consumers/taxpayers can optimally target payments via non-neutral transfers. More generally, if there is a mix of price distorting and non-distorting payments, then the optimal level of price distortion is a function of these relative rates of output increases due to the innovation release and payment scheme.

Proposition 2: If both price-distorting and non-distorting payment mechanisms are optimal, then the rate of price distortion, measured by $(1 - P_1/P_T)$ is proportional to the rate of increase in the c-type firm's output relative to the industry's average:

$$(1 - P_1/P_T) = \varepsilon^{-1}[\frac{y(P_T, c)}{y_{c0}} \cdot \frac{\bar{y}_0}{\bar{y}(P_T)} - 1] = \varepsilon^{-1}(\rho - 1) \quad , \tag{15}$$

where ε is the aggregate supply elasticity.

This result is simply the first order condition for maximizing the consumer/taxpayer welfare, given by (7), with respect to the choice variable P_T and b, and subject to (6) and the market equilibrium (4). Setting the derivative of CS with respect to P_T, given by (12), equal to zero, and using $D(P_1) = S(P_T)$, the first order condition for consumer/taxpayer welfare maximization is

$$\frac{\partial CS}{\partial P_T} = -S(P_T)\,[\,(1 - \frac{P_1}{P_T})\varepsilon + 1 - \frac{y(P_T, c)}{y_0(c)} \cdot \frac{S_0}{S(P_T)}\,] = 0 \quad , \tag{16}$$

which implies (15).

The optimal degree of price distortion is an increasing function of the rate of output increase of the marginal defecter, and a decreasing function of the aggregate supply elasticity. The measure of relative output increase due to the innovation release, ρ is an indicator of how easily one can target payments to defecting producers via a per-unit-output payment. The supply elasticity, ε, indicates the degree to which resources will be "inefficiently" allocated due to the non-neutral payments. We use the term inefficient in the sense of deviations from maximum social surplus. The optimal level of price distortion, therefore, is a function of both the heterogeneous ability to take advantage of the innovation release, *and* the inefficiency caused by the coupling of payments. This implies that in those industries where producers are fairly homogeneous in their adoption of new technologies, one would be less likely to observe non-neutral, "inefficient" payments.

One particularly noteworthy result is that the optimal degree of price distortion is not directly dependent on the degree of technical change: it is the heterogeneity of the

technology's adoption that is important, not the increase of quantity supplied at any price. The absolute degree of the potential supply shift will determine whether or not consumers/taxpayers seek to break the producer coalition -- a small supply shift may generate insufficient Marshallian surplus to justify the implementation costs of any transfer payment scheme. The absolute degree of the supply shift will also affect the total amount of compensation that must be offered the marginal defecter.

Of course, equation (15) presumes an interior solution, but a corner solution [i.e., $P_T = P_1 + b$] to the consumer/taxpayer problem is possible. The conditions under which the consumers/taxpayers would rely solely on distorting payments would depend on the specific functional forms of the producers' supplies and the demand function. Nevertheless, if producers are sufficiently heterogeneous, in the sense that the c-type firm's output increase is great relative to the industry average, then no non-distorting transfers are made. The broadest condition is, that if

$$(1 - P_1/P_T) < \varepsilon^{-1}(\rho - 1) \quad \text{for all } P_T \text{ and b satisfying (6)}, \tag{17}$$

then a corner solution is optimal, P_T is chosen such that $\pi(P_T,c) = \pi_0(c) - k$, and no non-distorting payments are made. A sufficient condition is given by the following proposition.

Proposition 3: If the percentage difference between the marginal defecter's output increase and the industry's average is greater than the supply elasticity at all levels of P_T that satisfy (6), then consumers/taxpayers prefer the exclusive use of distorting payments to assure coalition breaking.

The foregoing result is simply a stronger version of condition (17), where the left hand side of the inequality has been replaced by unity.

4. Noncoincidental Consumer and Taxpayer Interests, and Output Constraints

A number of additional aspects to the above analysis naturally emerge. First, consumer and taxpayer interests may not perfectly coincide, and second, output res-

tricting policies are often implemented in tandem with transfer or compensation policies in U. S. agriculture. Consumer and taxpayer interests may be imperfectly aligned because of the existence of progressive income tax rates while the share of expenditure devoted to the good in question may be decreasing in income. In addition there may exist inefficiencies associated with taxation itself, making a dollar transferred to producers more costly from taxation relative to increasing the price of the good by restricting production. Placing differential weights on consumers' Marshallian surplus and taxpayers' outlays will alter the optimal combination of price-distorting and non-price-distorting payments. Furthermore, with a greater weight on taxpayers expenditures, output restrictions may serve the purpose of transferring surplus gains from consumers to producers.

Formally, suppose consumer and taxpayer welfare measures receive weights λ and $(1-\lambda)$ in the selection of the optimal transfer mechanism that breaks the producer coalition. There exists an additional instrument at consumers/taxpayers disposal: an output restriction that reduces both firm output and rent by some proportion, $(1-r)$. That is, for some producer price P_T, consumer price P_1, per-unit-initial output payment b, and ability a, a firm produces $r \cdot y(P_T,a)$ and earns rent of $r[\pi(P_T,a) + (b + P_1 - P_T)y_0(a)]$. For example, suppose, in the case of agriculture, each firm is endowed with one unit of land of homogeneous quality, and the per-acre cost function is independent of quality. In this setting, the government requires $(1-r)$ units of land to be "diverted."

The consumers/taxpayers wish to maximize the weighted sum of the Marshallian surplus gain and tax outlays:

$$CS = \lambda \int_{P_1}^{P_0} D(P)dP - (1-\lambda)[(P_T - P_1)r(S(P_T) - S_0) + rbS_0] \tag{18}$$

subject to the market equilibrium condition

$$rS(P_T) = \int_a r \cdot y(P_T,a) f(a)da = D(P_1) \quad , \tag{19}$$

and to a coalition-breaking condition. To break the coalition, the c-type firm must be indifferent to the innovation release and the compensation scheme, i.e.,

$$r[\pi(P_T,c) + (b + P_1 - P_T)y_0(c)] = \pi_0(c) - k \quad . \tag{20}$$

Maximizing (18) subject to (19) and (20) yields the first-order condition for an interior solution:

$$\frac{\partial CS}{\partial P_T} = -\lambda D\frac{\partial P}{\partial P_T} - (1-\lambda)r[(P_T - P_1)\frac{\partial S}{\partial P_T} + S(P_T)\cdot(1 - \frac{\partial P_1}{\partial P_T}) - S_0\frac{y(P_T, c)}{y_0(c)}] = 0 \quad . \tag{21}$$

Noting that $rS = D$ and $\partial P/\partial P_T = (\varepsilon/\eta)(P_1/P_T)$, and $\rho = [y(P_T, c)/y_0(c)]\cdot[S_0/S(P_T)]$ this condition may be written

$$\frac{\partial CS}{P_T} = S(P_T)[-\lambda\frac{\eta}{\varepsilon}\frac{P_1}{P_T} - (1-\lambda)(1 - \frac{P_1}{P_T})\varepsilon + (1 - \frac{\varepsilon}{\eta}\frac{P_1}{P_T})\rho] = 0 \quad . \tag{22}$$

In terms of the optimal rate of price distortion:

$$1 - P_1/P_T = \frac{\omega + (\rho - 1)\eta/\varepsilon}{\eta + \omega} \quad ; \tag{23}$$

where ω is a strictly decreasing function of λ: $\omega(\lambda) = (1 - 2\lambda)/(1 - \lambda)$, and $\omega(0) = 1$, $\omega(1/2) = 0$. One can easily verify that, as the weighting of consumer and taxpayer interest converges to equality at $\lambda = 1/2$, the optimal price distortion becomes that given by (15).

If supply and demand are represented by constant elasticity curves, and that the relative output increase measure ρ is constant over the relevant range of P_T, some direct comparisons between rates of distortion may be made as the weight on taxpayers increases relative to that on consumers. Specifically, as the relative weight on taxpayers increases, $\omega(\lambda)$ decreases and the optimal rate of distortion falls.

Even if taxpayers were given all the weight in the choice of compensation scheme (i.e., if $\lambda = 0$ or equivalently $\omega = 1$), some level of price-distorting payments may still be optimal. Consider an initial case where no distorting payments are made ($P_T = P_1$). Setting $P_T = P_1$ in the left hand side of (22), and replacing the equality sign with a greater-than sign, yields

$$r\,S[-\lambda\frac{\varepsilon}{\eta}-(1-\lambda)(1-\frac{\varepsilon}{\eta})+(1-\lambda)\rho\,]>0\ . \tag{24}$$

A move to distorting payments will increase consumer/taxpayer gains if

$$\rho-1>\omega\frac{\varepsilon}{-\eta}\ . \tag{25}$$

Accordingly,

Proposition 4: As the weight on taxpayers increases from 0.5 to 1, the minimum relative output gain differential between the c-type firm and the industry average that rationalizes a distorting scheme also increases, but is bounded from above by the ratio of the supply elasticity and demand elasticity.

The intuition underlying Proposition 4 is that some tax outlays are being recouped by consumers in the form of increased production. As the consumer benefits of these tax outlays are discounted (i.e., as ω increases), the relative cost of distorting policy increases. Nevertheless, even with complete weight on taxpayer interests, a sufficiently low supply elasticity relative to the demand elasticity would preserve the optimality of targeting compensation via some degree of price distortion.

Given an optimal selection of the rate of price distortion, $(1-P_1/P_T)$, which depends only on λ, η, ε, and ρ, the conditions under which a positive output restriction ($r<1$) enhances consumer/taxpayer interests may be determined. From a point of no output restriction, $r=1$, consumers/taxpayers will gain from a decrease in r, if $\partial CS/\partial r<0$.

Proposition 5: For a constant rate of price distortion, $(1-P_1/P_T)$, output restrictions improve consumer/taxpayer interests if

$$\rho>(1-\varepsilon\pi(P_T,c)/R_c)^{-1}\ , \tag{26}$$

where $R_c=P_T y(P_T,c)$. That is, placing some restriction on output improves consumer/taxpayer welfare for large increases in the c-type firm's output relative to the industry's average, for small elasticities of supply, and for small ratios of rent to revenues for the c-type firm. For a constant rate of price distortion, an output restriction

increases consumer price, P_1, and thus producer price, P_T, will rise. The cost of the output restriction would be less for smaller supply responses, that is, smaller ε_S. The ratio of rent to revenues measures the marginal effect on the c–type firm due to the output restriction. As this ratio becomes smaller, a given restriction would reduce relative rents less, and therefore there would be less need to increase lump-sum payments, b, in order to compensate the firm and maintain condition (20). Note that whether or not moving from no output restriction to some restriction improves net consumer/taxpayer surplus does not depend on the weight λ.

5. Other Transfer Schemes

In addition to simple per-capita non-distorting payments, and per-unit-output subsidies, there exist alternative means of transferring wealth from consumers/taxpayers to producers for the purpose of making indifferent a sufficiently large subset of producers. The best means of transfer is to identify the payments to each producer that would make the producer indifferent to the change, and then make producer-specific payments to the coalition-breaking number of firms that require the least individual transfers. The savings over the generic non-distorting payment depends on the variation of economic rents across producers of c-level ability or greater.

Another means of breaking any obstructing coalition is to provide some non-distorting transfer to an arbitrary subset of producers. If consumers/taxpayers know that it takes, say, 1/2 of all producers to be at least indifferent, then why not randomly select 1 of every two producers for a payment? One practical objection to such a policy is its arbitrary nature, much like a lottery. Aside from this question of arbitrariness, such a policy is equivalent to a simple per-firm payment scheme, and therefore may or may not be dominated by a distorting per-unit-output scheme.

To demonstrate the above observations, suppose again consumers/taxpayers must make at least the c-type producer indifferent to the introduction of the supply-expanding innovation. The payment to randomly-selected producers must be such that

the c-type producer expects an economic rent with the innovation and transfer scheme that is the same as the certain income with a blocking coalition and no innovation dissemination. Without loss of generality, suppose the producers earn identical rents prior to the innovation. The transfer is made in the following way. The consumers/taxpayers announce a level of per-firm payments and an arbitrary number of firms, randomly selected, to receive the transfer. The c-type producer's expected profit under the innovation dissemination is therefore $\pi_0 = \pi_1(P_1) + f \cdot t$, where f is the proportion of producers receiving the non-distorting payment t. If all producers are selected to receive the transfer, then $f = 1$ and we have the case dealt with previously. Note that f and t must vary inversely: $t = (\pi_0 - \pi_1)/f$. This inverse relation maintains the indifference of the c-type producer to the change in available technology. The total level of transfers is the same also; therefore, there is no gain to arbitrarily choosing a subset of producers.

A variation on this last scheme is to take a sufficiently large subset of producers and uncover (perhaps with some cost) the required payments to make each firm indifferent to the innovation dissemination. For convenience let the producers have equal weight on their votes, so that at least C number of producers must be made indifferent with the payment scheme, where $C = \int_c^{\infty} f(a)da$. Suppose the consumers/taxpayers took a random selection of C number of producers, and uncovered and paid the required amounts to each in the selection. This would serve to break the coalition by making all producers in the randomly-selected subset just indifferent to the innovation. Under this plan, the expected average payment is the population's average loss due to the innovation: $N^{-1}\int_0^{\infty}\pi_1(P_1,a) - \pi_0)f(a)da$. Hence the expected total payments will be $C \cdot (\bar{\pi}_1 - \pi_0)$, where $\bar{\pi}_1$ is the average rent under the innovation. Expected payments under the generic transfer scheme are $N \cdot (\pi_1(P,c) - \pi_0)$, implying the generic non-distorting scheme will dominate the subset-selection scheme

if and only if

$$\frac{C}{N} > \frac{\bar{\pi}_1 - \pi_0}{\pi_1(P_1,c) - \pi_0} \quad . \tag{27}$$

That is, if the proportion of producers necessary to break the coalition is large and rents are highly heterogeneous after the dissemination, then consumers/taxpayers would tend to choose generic transfers over a non-generic scheme involving a random sampling of producers. Of course, here we have restricted the size of the subset to be equal to the minimal coalition-breaking number. A larger sample could be drawn and the C number of producers within the sample made indifferent, the remainder receiving nothing. As the sample size increases, this procedure would more closely approximate the "best" solution, although we are ignoring the costs of such information collection.

Conclusion

This paper has demonstrated that the particular means of compensation may serve a purpose beyond that of simply transferring wealth. Analyzing wealth transfers in isolation does not reveal the motivating and underlying political-economic relations that exist between social groups. Taxes and subsidies are a part of a larger portfolio of policies, all of which have some effect on the distribution of welfare. In the complete set of policies wealth transfers may serve a remunerative function. In fact, recipients as a group may actually be losers when one accounts for implementation of the larger portfolio.

Non-neutral, price-distorting payments may provide a less expensive means of preempting coalitions that would otherwise obstruct the entire portfolio. In the model presented here, a output subsidy distorting consumer and producer prices is useful to consumers/taxpayers because it effectively differentiates between decentralized producers; thus, it counters the political opposition to, say, a supply-enhancing policy by dividing and conquering. This is in contrast to other models of political competition between groups that suggest that the transfer mechanism would tend to be the most

efficient, in the sense of minimizing deadweight loss, because all groups could share in an efficiency gain (e.g., Becker(1983), Bruce L Gardner (1989)). Our analysis allows a governing group, consumers/taxpayers, to overcome the problem of imperfect information (about the degree of ability to take advantage of the innovation) through its choice of the compensation scheme.

The framework is particularly relevant to the on-going debate over reform of agricultural policies. Many economists approach this topic assuming that wealth transfers are the inefficient outcomes of chaotic rent seeking. Their recommendations to achieve reform are based on the belief that wasteful subsidies are the rewards of raw political power, or the consequence of consumer ignorance; and that a knowledgeable public would be concerned with gaining efficiency, if not with eliminating transfers altogether. Our framework, on the other hand, explains how a seemingly inefficient policy that appears to harm consumers could be, in fact, a rational component of a larger portfolio of policies ultimately benefiting consumers at the expense of producers.

Footnotes

1/ Following a model addressed elsewhere by Gordon C. Rausser, the former policies are referred to as political economic resource transactions (PERTs) and the latter as political economic-seeking transfers (PESTs).

2/ It should be emphasized that other public-interest policies, such as removing trade barriers, and investment in transportation systems or public utilities, could replace "technical innovation." Moreover, the roles of consumers and producers could be reversed.

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