Persistent Distortionary Policies with Asymmetric Information

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Why do distortionary policies persist when Pareto improvements are seemingly available? According to a standard textbook argument, an efficient outcome can be obtained by eliminating the distortions, compensating the losers with a lump sum transfer and redistributing the gains that are left over. This paper shows that this argument hinges on the assumption of complete information about the losses suffered by the losers. We relax this assumption and show that, in fact, the informationally efficient way of compensating losers may involve the use of seemingly inefficient (but informationally efficient) distortionary policies.

We believe that our argument applies directly to policies that generate deadweight losses through higher consumption prices such as trade barriers, immigration restrictions, and minimum wages. Our argument may however be applicable to other distortionary policies.

We add an informational friction to the textbook "winners compensate losers" argument. In our model, seemingly inefficient distortionary policies persist only as the optimal response to the information constraints. The optimal policy has an interesting form: the winner offers the loser the choice between maintaining or dropping the distortionary policy; if the distortionary policy is dropped, the loser receives a lump-sum transfer.

Our explanation relies on the intuition that maintaining a distortionary policy, while creating a deadweight loss, has the benefit that it does not generate a need for compensation. When the policy maker does not know the amount that should be transferred, there is a

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risk of over-compensating. Compensating with a transfer is expensive because it induces the losers to over-report their losses in order to receive a higher transfer. This implies that the winner typically pays in excess of the actual losses suffered by the losers. The optimal policy trades off the cost of increasing the overpayment versus the deadweight loss generated by the distortionary policy.

There have been several attempts to explain the apparent contradiction between the textbook argument supporting lump-sum transfers, and the empirical fact that distortionary policies, in some cases, persist. We argue in Section I that this paper provides a novel explanation to the puzzle.

In Section II we introduce a very stark model. Dropping a distortionary policy creates winners and losers. The winner's benefit is (with certainty) greater than the loser's loss. This is the sense in which the policy is a distortion. We do not model the aggregation of the winners' preferences and assume a representative winner dictates the policy. We also do not model the reasons why the winners must compensate losers, because it is not the focus of this paper; instead, we assume that a policy must be chosen subject to keeping losers at least as well off as in the status quo. Under our assumptions, with complete information the distortionary policy would always be dropped, since the loser could be compensated with a transfer sufficient to make the change a Pareto improvement[1]. The setup is intended to make it as difficult as possible for distortions to persist.

We assume that losses are private information. We believe there are several applications for which this is a natural assumption. When a trade barrier is lifted, for example, displaced home producers might lose jobs and gain leisure. The value of the former might be quantifiable; the net benefit, removing the value of the gained leisure, would be much harder.

Rather than assume a particular institutional structure, we construct a point on the Pareto frontier, and show that it involves maintaining the distortion. The policy maker (the winner) must solve a mechanism design problem, choosing whether to drop the policy, and a the amount to be transferred to the loser. These choices are a function of the loser's reported loss from moving to the non-distortionary policy. We impose the constraint that the loser be kept as well off as he would be under the distortionary policy. In this sense our analysis mirrors the usual argument that efficient policies can be implemented, together with lump-sum transfers, to generate Pareto improvements.

We show that the optimal policy has two regions, one where the distortionary policy is maintained, and another where a constant transfer is made, but the distortionary policy is dropped. The loser chooses the region he prefers. In the context of inefficient trade barriers, for instance, one can think of this as a policy where the government offers either a trade barrier (the distortionary policy) or a "trade assistance program" (a cash transfer) for displaced producers, and the producers choose one or the other. There will be a threshold compensation level: if the losses are low enough, the distortion is dropped, and a transfer is made. Higher losses result in maintaining the distortionary policy.

I. Alternative explanations and related literature

The literature has proposed several explanations for the existence and persistence of seemingly inefficient policies. We view our explanation as complementary to those.

The traditional public finance literature has been familiar with the notion that imperfect information on the part of the government may lead to the use (seemingly) inefficient policies[2]. In-kind transfers to the poor, for example, are useful to target transfers when the identity of the intended recipients is unknown. If the poor have a particular taste for the good that is provided in kind, lump-sum transfers are informationally inefficient because of incentive compatibility. If the identity of the intended recipients were known, the role for distortionary policies would be eliminated[3]. Our explanation differs from these because in our model the identity of the winners and losers is known to all.

When the identity of the intended recipients is *not* known to the planner, transferring resources entails distortions, either to acquire resources through taxation, or to keep transfers to the intended recipients away from others. In the larger context of optimal taxation, these distortions cannot be greater, at the margin, than the distortions from other tax instruments that might be available. For instance, if an outside source of funds were available at some constant marginal cost (as is typical in the treatments like Jean-Jaques Laffont and Jean Tirole (1993)), this would pin down the marginal level of distortion that not knowing the identities of the recipients could generate. Since our model assumes that identities are known, resources could be collected through lump-sum taxation and there is no restriction on how distortive the inefficient policy might be relative to other forms of taxation that are available.

The important tension in our story is that compensation through cash transfer generates an information rent, and that rent distorts the optimal policy away from such transfers. Our notion that payment through transfers generates scope for rents for those that receive transfers seems in accord with intuition; however, we do not deny that there might also be distortions in raising the funds, which our model does not incorporate.

Our paper is also related to a strand of the literature that derives a status-quo bias, and therefore the persistence of potential inefficiencies, from "political failures". Usually, these arguments require a specific institutional arrangement. Alberto Alesina and Allan Drazen (1991) model the war of attrition between pressure groups in the process of agreeing on policy decisions and redistributions. Raquel Fernandez and Rodrick (1991) show how inefficient outcomes may persist under majority voting when some voters have incomplete information about whether they will gain or lose from a policy change. Stephen Coate and Stephen Morris (1999), model the idea that policies create incentives for the beneficiaries to take actions that increase their willingness to pay for these policies in the future, therefore generating policy persistence. This may lead to inefficiencies when the efficient policy is not a constant policy. In Coate and Morris (1995), the politician's concern for reputation might imply the adoption of inefficient policies[4].

In general, these papers consider one particular mechanism or institutional framework that may lead to inefficient outcomes. Our explanation does not rely on a form of political failure[5]. We show that the constrained-optimal allocation given the informational problem leads sometimes to the persistence of seemingly inefficient distortionary policies.

Our characterization of the result parallels the result in Robert Townsend (1979), which considers optimal insurance in an exchange economy with costly state verification and random endowments. In the optimal contract, monitoring is used when there is a low realization of the random variable. In our framework bad news correspond to a high loss, and if this is the case, monitoring takes the form of a distortionary policy. The cost of monitoring is the deadweight loss induced by the policy[6]. The spirit of our paper is similar to a long line of papers, including work such as David Baron and Roger Myerson (1982), showing that asymmetric information can lead to an important tension between efficiency and division of surplus. Here, inefficient policies are adopted to avoid over-transferring resources to the loser. If the loser were simply transferred the highest possible loss, an efficient allocation could always be attained, but at high cost to the winners.

II. The Model

Imagine a world where a distortionary policy exists, but could be eliminated. Dropping the policy creates a cumulative benefit of b for some, who we label the winners, but incurs a loss of l on others, called the losers. We assume $b > l$, and this is the sense in which the policy is distortionary.[7] Note that we are intentionally vague about the exact source of benefits and losses b and l; we want to emphasize that our results do not depend crucially on a particular source of the gains.

We study the classic issue of choosing a policy on the Pareto frontier. As in the textbook example, implementing the efficient policy is an obvious outcome if it Pareto dominates the distortions; the move to eliminate distortions is unanimously supported. We assume that winners choose the policy and are concerned about the potential welfare losses incurred by the losers. We do not model directly this concern, but instead assume that winners choose a policy that makes them as well off as possible, subject to the restriction that they keep losers' welfare at the level enjoyed in the status quo. As such, we imagine this exercise as explaining the *persistence* of inefficient policies, taking their initial existence as given. If we can find a point on the Pareto frontier where distortions are used, then it seems plausible that they might be observed in practice.

Since there is no heterogeneity assumed among winners and losers, we treat them as single agents. Assume, as a benchmark, that the representative winner knows the displacement loss l. In this case the textbook justification for dropping distortionary policies applies: the winner could transfer l dollars to the representative loser and drop the distortionary policy obtaining a Pareto improvement. Crucial to our theory is therefore that l is not observed by the winner.

The value of l is private information of the loser. The winner knows only that l is drawn from the cumulative distribution $F(l)$ with support $L = [\underline{l}, \bar{l}]$. We assume that $F(l)$ is differentiable and has an associated density function $f(l)$. We consider the extreme case where $\bar{l} < b$, in other words, we assume no policy uncertainty: under complete information, the winner would always choose the non-distortionary policy and a transfer of l. The assumption is meant to make distortions as *hard* to achieve as possible at an optimum[8].

We model formally the set of policies as follows. The winner chooses $m \in \{0, 1\}$, that is, dropping ($m = 0$) or maintaining ($m = 1$) the distortionary policy. The winner can make a transfer t to the loser. If there were many winners, the transfer could be interpreted as financed through a lump sum tax on all winners. Assuming that revenue can always be raised at zero social cost, we are making transfers as efficient as possible, giving them the best chance to be used.

We calculate optimal policies by formulating the problem as a mechanism design problem. The loser reports a loss $\widehat{l}$; as a function of the report, the winner chooses a transfer $t(\widehat{l})$ and policy $m(\widehat{l}) \in \{0,1\}$[9]. We use the revelation principle to focus on truth telling mechanisms. In order for the winner to guarantee that the loser is no worse off than under the distortionary policy ($m(l) = 1$), it must be the case that, for any l, $t(l) \geq (1 - m(l))l$, in other words either the distortionary policy is maintained ($m(l) = 1$), in which case the transfer can be set to zero ($t(l) = 0$), or the policy is dropped and a transfer is given covering the loss: ($m(l) = 0$ and $t(l) \geq l$). We consider the case where the winner chooses transfer and policy without randomization[10].

The utility of the winner as a function of the policy is therefore:

$$u(t,m) = (1-m)b - t \tag{1}$$

For a given report of $\widehat{l}$, the loser suffers the loss $\left(1 - m(\widehat{l})\right) l$ but benefits from the transfer $t(\widehat{l})$, so that the net benefit is

$$R_l\left(t(\widehat{l}), m(\widehat{l})\right) = t(\widehat{l}) - \left(1 - m(\widehat{l})\right) l \tag{2}$$

The mechanism design problem is:

$$\max_{t(l),m(l)} \int u\left(t(l), m(l)\right) f(l) dl \tag{3}$$

$$\text{subject to: } l = \arg\max_{\widehat{l}} R_l(t(\widehat{l}), m(\widehat{l})) \tag{4}$$

$$R_l(t(l), m(l)) \geq 0 \ , \ \text{for all } l \tag{5}$$

Constraint (4) is the truth-telling constraint. Constraint (5) guarantees that the loser is always at least as well off as he would be with the distortions in place. The following proposition characterizes the optimal policy.

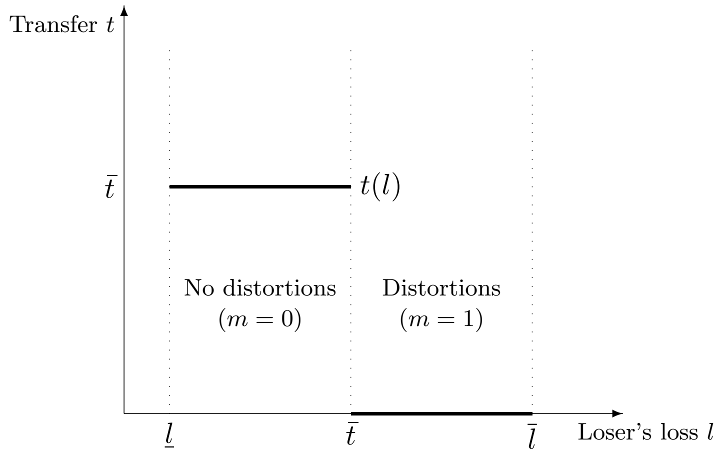

Figure 1: The optimal policy

Proposition 1 *The optimal policy takes the form*

$$\begin{array}{ll} t(l) = \bar{t},\ m(l) = 0, & l \leq \bar{t} \\ t(l) = 0, m(l) = 1, & l > \bar{t} \end{array}, \quad \bar{t} \in L \tag{6}$$

The proof is in Appendix A. Figure 1 illustrates the optimal policy. Losers with losses less than $\bar{t}$ are compensated through a transfer of $\bar{t}$. Note that the transfer is constant in that range: if the winner chooses to compensate any loser with a transfer, she must transfer the same amount to all losers being compensated with a transfer. If the transfer was not constant, the losers receiving a lower transfer would misreport to get the largest possible transfer.[11] Hence, the amount to be transferred must be equal to the largest loss among the losers that are being compensated with a transfer.

This is a fundamental cost of transfers; the more types l for which a transfer is used, the higher is the cost for *all* of the types that receive a transfer. As a result, for high cost reports, it might be better to choose $m(l) = 1$, that is, to keep the distortionary policy. Although this generates a deadweight loss, funding by transfer may be more costly because it implies larger overpayments to low cost losers. For losers with $l \in (\underline{l}, \bar{t})$, the compensation *more* than covers the loss, and they are strictly better off than under the inefficient policy without transfer. One can view this as an information rent.

When l is below $\bar{t}$ (which occurs with probability $F(\bar{t})$), the winner must pay $\bar{t}$ to compensate the loser, but she gains b from moving to the efficient policy. Above $\bar{t}$, the winner chooses to keep the distortions, gaining neither b nor paying t. Therefore, the choice of threshold $\bar{t}$ is simply the maximization of expected net benefits $F(\bar{t})(b-\bar{t})$; the first order condition for $\bar{t}$ is[12]

$$f(\bar{t})(b-\bar{t}) = F(\bar{t}) \tag{7}$$

The left-hand side reflects the marginal benefit from increasing $\bar{t}$: with a marginal probability of $f(\bar{t})$, the winner obtains the benefit b from switching to the efficient policy, less the transfer. On the other hand, this increases the payment that must make to all losers reporting below $\bar{t}$; this payment is made with probability $F(\bar{t})$, the marginal cost of increasing $\bar{t}$, shown in the right-hand side

To see the way in which distortions are used, take F to be the uniform distribution on $[\underline{l}, \bar{l}]$. In this case the solution is $\bar{t} = \max\{(b+\underline{l})/2, \bar{l}\}$. If the loss from the distortions are big enough ($b > 2\bar{l} - \underline{l}$), losers are always compensated with a transfer of $\bar{l}$. When $b \in (\bar{l}, 2\bar{l} - \underline{l})$, the optimal mechanism prescribes that the winner should choose to maintain the distortions for high enough reports of l. Hence, seemingly inefficient policies can be an optimal policy under incomplete information about the costs to the losers. As we noted earlier, under complete information, $m = 0$ and $t = l$; incomplete information is the only factor driving the result that this distortionary policy will survive.

III. Conclusion

This paper provides a novel explanation to the puzzle of why seemingly inefficient distortions persist. Our explanation complements other existing explanations that rely on incomplete information about identities or various form of "political failure."

When losses are unobserved, cash transfers may generate more information rents. As a result, distortionary policies may be part of an optimal solution. In fact, it may be the case that some distortions are used for a wide variety of cases.

Because we study Pareto improvements, our results are not particular to a specific political arrangement for policy-making. Of course, as various authors have shown (see references in Section I), political environments may influence outcomes. Our purpose here is only to show that distortions can arise on the information-constrained Pareto frontier, and hence may not be as puzzling as they first appear.

In the mechanism design problem analyzed in this paper, the consumer has the ability to commit to a policy as a function of the special interest's report of displacement loss. The problem is that once the loss is revealed, the winner prefers to use this information to target the amount of the transfer and avoid the deadweight loss associated with the distortionary policy. In Mitchell and Moro (2004) we generalize the result obtained in this paper by undertaking an equilibrium approach. We characterize the equilibrium outcomes in the asymmetric information case when there is no commitment. While the model displays a large number of equilibria, the characterization of the outcome is the same as in the commitment case. In these equilibria essentially two signals are used, "a high signal", sent by losers with a "high" loss, and a "low signal", sent by losers with lower loss. The policy maker chooses to keep the distortions when the special interest sends a high signal, but compensates using transfers whenever the special interest sends a low signal. Just as with the mechanism of the previous section, such a transfer must be equal to the highest loss of those reporting the low signal. From the winner's point of view it may be better maintain the distortion and pay the deadweight loss rather than choose to send a transfer to every loser sending a low signal.

Appendix A: Proof of Proposition 1

Let $L_0 = \{l : m(l) = 0\}$ and $L_1 = \{l : m(l) = 1\}$

Claim 1 *The transfer is constant whenever the policy choice is constant, that is $t(l) = t_0$ for all $l \in L_0$ and $t(l) = t_1$ for all $l \in L$.*

If not, then there are $l, l' \in L_i$ such that $t(l) < t(l')$. But then the loser with cost l has incentive to report cost l' to get a greater transfer and the same m

Claim 2 *$m(l)$ is increasing in l.*

If either L_0 or L_1 is empty, the result is trivially true. If both are non-empty, then, suppose that the claim is false. Then there exists l_1 and l_0 with $l_0 > l_1$ and $m(l_0) = 0$, $m(l_1) = 1$. Incentive compatibility requires $t_0 \geq l_0$, otherwise type l_0 prefers the trade barrier and therefore reports $\widehat{l} = l_1$. Incentive compatibility also requires

$$\begin{aligned} R_{l_0}(t_0, 0) &\geq R_{l_0}(t_1, 1) \\ R_{l_1}(t_1, 1) &\geq R_{l_1}(t_0, 0) \end{aligned}$$

Rewriting the first term in each inequality using (2):

$$\begin{aligned} R_{l_0}(t_0 - l_0, 1) &\geq R_{l_0}(t_1, 1) \\ R_{l_1}(t_1 + l_1, 0) &\geq R_{l_1}(t_0, 0) \end{aligned}$$

But that implies $t_0 - l_0 \geq t_1$ and $t_1 + l_1 \geq t_0$, which cannot hold for $l_0 > l_1$, a contradiction.

Claim 3 *$t_0 = \bar{t} = \max_{l \in l_0} l$ and $t_1 = 0$*

Constraint (5) implies $t_0 \geq l$ for all $l \in l_0$ and $t_1 \geq 0$. If $t_0 > \bar{t}$ and $t_1 > 0$, the winner can lower both t_0 and t_1 by the same amount, raise her payoff, and maintain incentive compatibility. If $t_0 = \bar{t}$ and $t_1 > 0$, then, for any $l_1 \in l_1$, $R_{l_1}(t_1, 1) > R_{l_1}(0, 1) > R_{l_1}(t_0, 0)$, since $t_0 < l_1$. As a result, the winner can lower t_1 and maintain incentive compatibility. If $t_0 > \bar{t}$ and $t_1 = 0$, then, for any $l_0 \in l_0$, $R_{l_0}(t_0, 0) > R_{l_1}(0, 1)$, and, again, the winner can lower the transfer t_0 and maintain incentive compatibility. Therefore it must be the case that $t_0 = \bar{t}$ and $t_1 = 0$

This completely characterizes mechanism (6) in the statement of the proposition. ■

Appendix B: the case where $b < \bar{l}$

When $\underline{l} < b < \bar{l}$, there are two regions. For $l \in [\underline{l}, b]$, the optimal policy for the winner under complete information would be to drop the distortionary policy ($m = 0$) and transfer l to the loser. For $l \in [b, \bar{l}]$, the status quo is actually the efficient policy; losses outweigh benefits.

A natural question is whether or not distortions might persist in this environment. The answer is yes. A simple implication of (7) is the following.

Proposition 2 $\bar{t} < b$

One incentive compatible policy, that also makes the loser at least as well off as in the status quo, is to set $\bar{t} = b$. However, under this policy, the winner gives away the entire gain b whenever she chooses $m = 1$. The winner can therefore do something better: by marginally lowering $\bar{t}$, the winner enjoys some of the benefits of dropping the distortionary policy for $l < \bar{t}$, and neither gains nor loses otherwise, since he sticks with the distortionary policy. As a result, the optimal policy has $\bar{t} < b$, so that some cases in the range $(\bar{t}, b)$, incomplete information leads us to observe distortions.

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Notes

[1]This is, for example, the standard argument in favor of free trade: trade barriers generate deadweight losses from higher prices of the traded goods. Under complete information, it would be efficient to drop the barriers and compensate the displaced workers with a lump-sum transfer.

[2]See, for example, Albert Nichols and Richard Zeckhauser (1982), and Charles Blackorby and David Donaldson (1988).

[3]Similarly, in the Trade literature, Robert Feenstra and Tracy Lewis (1991) explain that trade barriers may arise when the identity of the winners and losers from free trade is hard to identify. See also Dani Rodrik (1995) for a survey of the literature that investigates "why trade is not free."

[4]See also S. Lael Brainard and Thierry Verdier (1997), Carl Davidson et al. (2004), Gene Grossman and Elhanan Helpman (1994), Wolfgang Mayer (1984), Mayer and Raymond Riezman (1987), Christopher Magee (2003), and Devashish Mitra (2001).

[5]In particular, our explanation does not rely on assuming a special distribution across voters (as in Fernandez and Rodrick (1991)), or on the uncertainty about the quality of the politician (as in Coate and Morris (1995)), or on the adoption of a special institutional framework as in Alesina and Drazen (1991) and Coate and Morris (1999). On the other hand, these explanations do not require that the information about the amount to be transfered is unknown, as our model does.

[6]This form of solution has been shown to be optimal in the context of monitoring criminal activities, for example see Dilip Mookherjee and I.P.L Png (1989) and Jennifer Reinganum and Louis Wilde (1985).

[7]For example, $b - l$ could reflect the net gains from trade when moving from autarchy to free trade.

[8]In Appendix B we consider the case $\underline{l} < b < \bar{l}$, and show that $m = 1$ arises in that case as well.

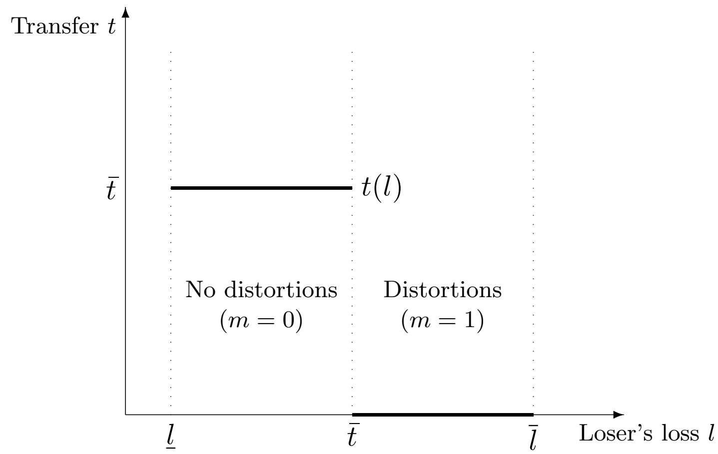
[9]In Matthew Mitchell and Andrea Moro (2004) we consider a richer policy space in which m is allowed to vary continuously between 0 and 1. That assumption is meant to allow for degrees of inefficiency. The results are not qualitatively different from those that are obtained in this paper.

[10]For the linear preferences we consider, there is no loss of generality in this restriction

to pure choices.

[11]If the winner had a noisy signal of l, the rule could include a transfer increasing in l. This however would not affect our main conclusion that sometimes the optimal policy prescribes $m = 1$.

[12]We are for this calculation assuming that $f'(\bar{t})(b - \bar{t}) - 2f(\bar{t}) < 0$, so that the problem is concave.



Transfer t
$\bar{t}$
$t(l)$
No distortions
$(m = 0)$
Distortions
$(m = 1)$
$\underline{l}$
$\bar{t}$
$\bar{l}$
Loser's loss l