

The Supply of Social Insurance

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Abstract

We argue that the welfare state is a social commitment device to promote efficiency. The commitment problem involves the inability of those individuals with political power to commit not to expropriate others. The efficiency gains come from insurance against income risks and also avoidance of social conflict. We view social transfers as chosen by a governing group interacting with non-governing groups repeatedly. Social demands from the non-governing groups are credible because these groups have the ability to generate social conflict. Social insurance is supplied as an equilibrium response to income risks within a self-enforcing social contract. Such a view of the social contract suggests four main determinants of the welfare state: the degree of aggregate income risk; the heterogeneity of group-specific income risks; the public administration's ability to implement group-specific transfers; and the ability of the non-governing groups to coordinate their social demands.

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1 Introduction

Social spending rose enormously in all rich democratic societies over the twentieth century. By the 1970s the modern structure of the welfare state was in place, consisting of an array of programs mainly designed to protect families against various income risks.¹ Conventional wisdom attributes the rise of the welfare state to demographic changes, coupled with economic growth, which created increasing social demand for redistribution and the means to meet it. This view presumes that social demands are either fulfilled by a benevolent state or mediated through electoral competition. It also takes for granted that those individuals with political power can commit not to use their power solely in their self-interest, to the exclusion of others in society. Historically, however, significant social spending is allocated in a pro-poor fashion each year, whereas political influence rises with income.² What then determines the supply of social insurance?

In this paper we argue that the welfare state is a social commitment device to promote efficiency. The commitment problem involves specifically the inability of those individuals with political power to commit not to expropriate others. The efficiency gains come from insurance against income risks and also avoidance of social conflict.

In particular, we argue that social insurance is part of a self-enforcing, risk-sharing, mechanism to balance distributional conflict between socio-economic groups. A key distinction is between those individuals who control public policy, the *governing group*, and those who cannot, the *non-governing groups*. The power of the governing group to confiscate income is assumed to be limited by the ability of the non-governing groups to engage in social conflict. Then, in the presence of group-specific income risks, it is in the self-interest of the governing group to make taxes and transfers contingent on income realizations as well as on group identity. In particular, income is transferred towards a given non-governing group when its income is low and the ac-

¹See Lindert (2004).

²See Benabou (2000).

tual income of the governing group is high. From this standpoint, social insurance is supplied by the governing group as part of a program designed to optimally extract social surplus. Repeated strategic interaction between the governing and the non-governing groups enables the latter to obtain a share of the efficiency gains from risk-sharing and cooperation, even though they do not have the power to control social transfers directly.³

When we explore the implications of such a view, we obtain several insights about social insurance programs. First, a higher degree of *aggregate risk* can result in more redistribution toward individuals that do not have direct control over social policy. This is because a riskier economic environment makes it more difficult for the governing group to meet the participation constraints of the non-governing groups. As will be discussed later, this logic helps explain the timing of the introduction of the Social Security Act (1935) in the United States following the Great Depression.

Second, it is in the best interest of the governing group to create distinct transfer programs, each targeting a group of individuals who are subject to common income risks. This observation is interesting because it explains why technical improvements in public administration and record keeping may have been an important force behind the proliferation of transfer programs and the enlargement of insurable events, which characterized the growth of the welfare state in the 1950s and 1960s. It also portrays the expansion of the welfare state as a process of exploiting efficiency gains from social insurance.

A further implication is that, although social transfers are conditional on income, they should not be understood as being purely means-tested, since they depend on the underlying risk and not just on the observed income realization. Thus different groups with similar realized incomes

³Thus, our approach shares the common view that redistributive policy can avert social conflict, and that the threat of conflict endows social groups with *de facto* political power. This view underlies the work of Aumann and Kurtz (1986), Buchanan and Faith (1987), Weingast (1997), Falkinger (1999), Acemoglu and Robinson (2000), Bourguignon and Verdier (2000), Grossman and Kim (2003) and Hillman (2004), among others. In contrast, our focus is on the welfare state, and in particular on the provision of social insurance.

in a given period may receive very different transfers.

Finally, the ability of non-governing groups to coordinate their social demands and their threats of social conflict is an important determinant of the allocation of social surplus across groups. An implication is that more redistributive welfare states result when members of a society can overcome their coordination problems and agree to place larger social demands on the state. The self-enforcing nature of the social contract then compels the governing group to take into account those social demands and choose either to respect them or to embrace social conflict. Historically, external threats, such as the Vietnam War in the case of the U.S., may have served as a coordination device to mobilize distinct social groups (Domhoff, 1990).

Our argument is in contrast with conventional explanations of the welfare state, which view social programs as either altruistic or designed specifically to give social protection to those with direct political influence, e.g., pivotal voters.⁴ Our emphasis on the political power of a governing group is commonplace in sociology and political science, dating back at least to Pareto (1901).⁵ Whether the governing group is the top 1% of the income distribution, as a power elite approach contends, or the middle income voters as an electoral approach might, is not important for our main arguments, although it does have empirical implications. We simply take as given that there is such a governing group and we consider a period of time where the governing group is stable.⁶ In its emphasis on the central role of the provision of insurance in the welfare state, our approach is related to the work of Persson and Tabellini (1996), Benabou (2000), Moene and Wallerstein (2001), Iversen and Soskice (2001) and De Donder and Hindriks (2003). By contrast, we focus on the supply side of the welfare state in the presence of pervasive commitment problems, and bring

⁴See, e.g., Meltzer and Richard (1981). For a critical discussion, see Benabou (1996).

⁵See e.g., Piven and Cloward (1971), Domhoff (1990, 1996), Weingast (1997), and Grossman and Noh (1994) for related approaches stressing distributional conflict. Persson and Tabellini (2002) and Tsebelis (2002) stress the role of legislation, the judiciary and bureaucracies in explaining public expenditure.

⁶See Tullock (1981) for a discussion of stability of voting outcomes in democratic societies.

multidimensional policy conflict to center stage.

Section 2 presents the model. Section 3 discusses the main implications. Section 4 briefly considers the emergence and growth of the welfare state in the U.S.. Section 5 concludes.

2 The Model

Suppose that society consists of two groups. Group A has a continuum of agents with mass 1. Group B has relative size n , and consists of $N \geq 1$ distinct subgroups of identical size. Group A is the *governing group*. By that we mean that it has the power to choose group-specific transfers T_i , for $i = 1, \dots, N$. We use the word *transfer* generically to denote any net income flows. We refer to the subgroups of B as the *non-governing groups*. Group's A power is limited by the fact that the non-governing groups can each choose independently to participate in the social contract, or to opt out. If group i chooses to opt out, each individual in group i earns a conflict payoff that we normalize to zero, which cannot be taxed by the governing group. If all non-governing groups choose to opt out simultaneously, they impose a conflict payoff of zero on each individual in group A . This captures the idea that the participation of at least one of the non-governing groups is essential in the production of output. Conflict payoffs are measured in utility terms.

If group i participates in the social contract, all agents in group i are endowed with identical incomes, $y_i > 0$, but they are subject to the transfer T_i . Similarly, each individual in the governing group is endowed with income $y_A > 0$. The distribution of incomes is a random draw from $F(y_A, y_1, \dots, y_N)$ every period $t \geq 0$, where $y_i > 0$ denotes group i 's per capita income whenever the group chooses to participate in the social contract.

Suppose, furthermore, that transfers every period are conditional on the current income realizations (y_1, \dots, y_N) , as well as the identity of the non-governing groups. We adopt the convention that $T_i(y_A, y_1, \dots, y_N) > 0$ denotes a transfer from group i towards group A ; when

$T_i(y_A, y_1, \dots, y_N) < 0$ the transfer goes towards group i .

Finally, we assume that group A chooses group-specific transfer schedules $\{T_1, \dots, T_N\}$ and each group i simultaneously decides whether or not to opt out, before the realization of the income shocks is observed. We implicitly assume that mechanisms exist to coordinate the decisions of individuals within each group. Individuals in all groups are risk averse, with a constant relative risk aversion utility $u(z) = z^\theta / \theta$ with $\theta \in (0, 1)$, where z is post-transfer income. For simplicity we have set the conflict payoffs of all agents to zero, and in order to ensure that there are any gains from trade we have restricted the coefficient of risk aversion $(1 - \theta)$ to be less than unity. This ensures that there are social gains from including *every* group in the social contract, without changing the essence of our problem.

2.1 The Stage Game

Suppose that the stage game is played just once. Then the governing group extracts all the surplus in all pure strategy Nash equilibria. There is a Nash equilibrium in which all non-governing groups opt out and the governing group sets transfers so each non-governing group would be expropriated if they were to be part of the social contract. There are other equilibria where group i does not opt out and group A 's takes all the surplus anyway. These latter equilibria rely on the fact that the conflict payoff of the non-governing groups has been normalized to zero. If conflict payoffs were positive, then the unique Nash equilibrium would involve every non-governing group opting out. The essential feature of the timing of the stage game every period is that the governing group is unable to commit not to expropriate the non-governing groups. This leads to the paradox of power in a static environment.

Our proposal is that the paradox of power is overcome because of the repeated interaction among social groups, which enables the enforcement of mutually beneficial social contracts that distribute incomes between those with the power to choose taxes and transfers — the governing

group — and those with the power to generate social conflict — the non-governing groups. The view that will emerge is that the welfare state's role is to exploit the *efficiency gains* from social insurance, while mediated by distributional conflict between social groups. Furthermore, the extent of redistribution and thus, the post-transfer distribution of income, depends on society's specification of expected behavior, together with rules to punish deviations from such an expected behavior. This argument, while being a straightforward application of the theory of repeated games, is in contrast with other explanations of the welfare state, which view social programs as either altruistic or designed specifically to give social protection to those with direct political influence.

2.2 The Repeated Game

In the interest of clarity, we restrict attention to equilibria in pure strategies, which map possible period- t histories to non-mixed actions. The play of the game describes the profile of actions $\{T_1^t, \dots, T_N^t, x_1^t, \dots, x_N^t\}$ that is played every period $t = 0, 1, 2, \dots$, where $\{T_1^t, \dots, T_N^t\}$ indicates the schedules of transfers chosen by group A in period t and, for each $i = 1, \dots, N$, $x_i^t = 0, 1$ indicates the action of group i in period t , where $x_i^t = 0$ indicates that group i opts out of the social contract in period t . A strategy for group A is a sequence of transfer schedules. A strategy for group i is a sequence of participation decisions.

All agents discount the future using the common discount factor $\delta < 1$. Group A seeks to maximize the normalized expected payoff

$$v_A = (1 - \delta) \sum_{t=0}^{\infty} \delta^t X^t E \left[u \left(y_A + \sum_{i=1}^N x_i^t T_i^t(y_A, y_1, \dots, y_N) \right) \right], \quad (2.1)$$

where $X^t = 0$ if $\sum_{i=1}^N x_i^t = 0$ and $X^t = 1$ otherwise. Each agent in non-governing group j maximizes

$$v_j = (1 - \delta) \sum_{t=0}^{\infty} \delta^t x_j^t E \left[u \left(y_j - \frac{T_j^t(y_A, y_1, \dots, y_N)}{n/N} \right) \right], \quad (2.2)$$

for all $j \in \{1, \dots, N\}$, respectively.

3 The Welfare State as a Self-enforcing Social Contract

Each non-governing group derives some power from its ability to opt out of the contract, because group A loses access to the group's income. Furthermore, the non-governing groups have the power to opt out simultaneously, in principle, in which case group A 's payoff is zero. More generally, the model captures the idea that social groups can hurt group A relatively more when they are able to coordinate their opting out decisions. In the interest of clarity, we have not emphasized the possibility that the opting out of some groups may hurt the before-transfer incomes of the groups remaining in the social contract. Allowing for the possibility that the income endowments of each group depend on the opting out of other groups does not change the substance of our analysis.

For simplicity we will focus on stationary plays and thus omit all time superscripts from here on. Each play defines an expected payoff for each agent in each group, $\{v_A, v_1, \dots, v_N\}$. The set of feasible payoffs is determined by the aggregate expected incomes associated with each possible play. Note that group A chooses a schedule of transfers, which specifies the post-transfer income distribution for all income realizations. Thus, a deviation by group A in the present context is a deviation from the contract that applies to all income realizations. We assume that all deviations from the equilibrium play are observable.

Analysis of this repeated game is straightforward. Note that there is a Nash equilibrium of the stage game that holds all agents to their minmax payoffs, that is, the lowest payoffs that all other groups can jointly impose on each single group given that the latter responds optimally. In this equilibrium, all non-governing groups opt out. A folk theorem applies in the present context.⁷ That is, any feasible payoffs $v_A > 0$ and $v_i > 0$, for all $i \in \{1, \dots, N\}$, can be enforced by a subgame perfect equilibrium if the discount factor δ is sufficiently high.

The relevance of the folk theorem in the present context lies in that it indicates that the non-governing groups can get some of the surplus from the social contract, even though the contract is

⁷See Fudenberg and Maskin (1986).

controlled by the governing group. The general insight is that informal enforcement mechanisms can play an important role in the redistribution of income through social policy.

3.1 Efficient Social Contracts

We begin by characterizing the set of efficient social contracts, which are contracts such that all groups choose to participate, and risk sharing is efficient.

Consider an efficient equilibrium with positive payoffs $\{v_A^*, v_1^*, \dots, v_N^*\}$. Each period, every group i participates and group A 's choice of transfers $\{T_1(y_A, y_1, \dots, y_N), \dots, T_N(y_A, y_1, \dots, y_N)\}$ solves the problem

$$\max_{\{T_1, \dots, T_N\}} E \left[u \left(y_A + \sum_{i=1}^N T_i(y_A, y_1, \dots, y_N) \right) \right] \quad (3.1)$$

subject to

$$E \left[u \left(y_i - \frac{T_i(y_A, y_1, \dots, y_N)}{n/N} \right) \right] = v_i^*, \quad i = 1, \dots, N.$$

An interior solution to problem (3.1) must be such that group A transfers utility from group i towards themselves at a constant rate. That is,

$$\frac{u' \left(y_A + \sum_{i=1}^N T_i(y_A, y_1, \dots, y_N) \right)}{u' \left(y_i - \frac{T_i(y_A, y_1, \dots, y_N)}{n/N} \right)} = \frac{\lambda_i}{n/N'} \quad (3.2)$$

for all income realizations and for all non-governing groups, where λ_i is the Lagrange multiplier for group i 's participation constraint. Thus, the governing group trades-off, state by state, the marginal benefit from taking additional income from group i and the marginal cost of doing so, which in turn depends on the value that group i places on additional income in a given state.

It is convenient to think of post-transfer income shares, rather than actual transfers.

Definition 1. *A social contract in which $N + 1$ groups participate is a distribution of post-transfer national income shares $\{\alpha_A, \alpha_1, \dots, \alpha_N\}$, where $\alpha_i \equiv \frac{y_i - T_i(y_A, y_1, \dots, y_N)}{y_A + (n/N) \sum_{i=1}^N x_i^i y_i}$, for $i = 1, \dots, N$, with $\alpha_A + \sum_{i=1}^N \alpha_i = 1$.*

With constant relative risk aversion⁸, (3.2) can be expressed as a function of post-transfer income shares:

$$\frac{\alpha_i}{\alpha_A} = \frac{\lambda_i}{n/N},$$

for all $i = 1, \dots, N$. Since the shadow price $\lambda_i > 0$ is independent of the income realizations, post-transfer income shares are also independent of the income realizations. Intuitively, efficient social contracts involve each group getting a constant share of aggregate income, independently of the income realizations. Equilibrium social contracts $\{\alpha_A^*, \alpha_1^*, \dots, \alpha_N^*\}$ and payoffs $\{v_A^*, v_1^*, \dots, v_N^*\}$ are related through the participation constraints of the non-governing groups.

Summing up, we have the following

Proposition 1. *Consider an efficient equilibrium, with payoffs $v_A^* > 0$ and $v_i^* > 0$, for all $i \in \{1, \dots, N\}$.*

The equilibrium social contract is characterized by $\{\alpha_A^, \alpha_1^*, \dots, \alpha_N^*\}$, where α_i^* is the unique solution to*

$$E \left[u \left(\frac{\alpha_i^* (y_A + (n/N) \sum_{i=1}^N y_i)}{n/N} \right) \right] = v_i^*.$$

Given our analysis so far, it will be useful to think about group A as choosing a social contract $\{\alpha_A, \alpha_1, \dots, \alpha_N\}$ in the stage game. Consider the set of all social contracts that can be enforced by a subgame perfect equilibrium, for a given discount factor. To that end, consider the following strategy profile. Group A chooses the social contract $\{\alpha_A, \alpha_1, \dots, \alpha_N\}$ if no one has deviated in the past, and otherwise, chooses $\alpha_A = 1$ and $\alpha_i = 0$ for all $i \in \{1, \dots, N\}$. Group i opts out if and only if someone has deviated in the past, for all $i \in \{1, \dots, N\}$. These strategies require the sanction for any deviation to be a switch to the Nash equilibrium in which all agents are minmaxed forever after. Since this is the worst subgame perfect equilibrium for all agents, any payoffs that can be enforced by some subgame perfect equilibrium can be enforced by the minmax strategies.

For any fixed discount factor $\delta < 1$, the set of all post-transfer income shares of group A that are part of an efficient social contract and can be enforced by a subgame perfect equilibrium is

⁸More generally, each share α_i may depend on the income realizations only through aggregate income.

given by $[\underline{\alpha}_A(\delta), 1]$, where $\underline{\alpha}_A(\delta)$ solves

$$E \left[u \left(\underline{\alpha}_A(\delta) \left(y_A + (n/N) \sum_{i=1}^N y_i \right) \right) \right] = (1 - \delta) E \left[u \left(y_A + (n/N) \sum_{i=1}^N y_i \right) \right], \quad (3.3)$$

and $\underline{\alpha}_A(\delta)$ decreases with δ , approaching 0 as $\delta \rightarrow 1$ and approaching 1 as $\delta \rightarrow 0$. The left side of the equality is the value to agents of group A of remaining in the social contract. The right side is the value of deviating from the contract for one period and obtaining their conflict payoff (zero) forever after. Note that given the strategies of all groups, group A 's optimal deviation is to appropriate all income. The minimum payoff that agents in group A are willing to tolerate before they wish to deviate from the contract is that which makes these values exactly equal. The governing group is strictly better off in the social contract, since there are strictly positive gains from cooperation. Consequently, any (efficient) post-transfer income distribution with $\sum_{i=1}^N \alpha_i \in [0, 1 - \underline{\alpha}_A(\delta)]$ can be enforced by a subgame perfect equilibrium. $1 - \underline{\alpha}_A(\delta)$ measures the limit to the joint surplus that the non-governing groups can obtain in any subgame perfect equilibrium.

It is well understood that subgame perfection does not pin down the play of the game in repeated games with patient agents. Nonetheless, our model provides a framework in which one can anchor a useful discussion of some key features of the welfare state. We have illustrated the scope for redistribution from the governing group towards the non-governing groups, which arises from cooperation. We return to this issue below. Before then, however, we discuss the link between aggregate risk and the post-transfer distribution of incomes.

3.2 Aggregate Risk and Redistribution

We organize our discussion around the following

Proposition 2. *For fixed payoffs $\{v_A^*, v_1^*, \dots, v_N^*\}$, the share of each non-governing group i in aggregate income (α_i^*) increases, for all $i = 1, \dots, N$, with aggregate risk — measured as a mean-preserving spread in the distribution of aggregate income.*

The formal argument is straightforward. Note that the random variable $y = y_A + \sum_{i=1}^N y_i$ is completely characterized by the joint distribution of (y_A, y_1, \dots, y_N) . Let $F_Y(y)$ and $F'_Y(y)$ denote two alternative cumulative distributions of aggregate income. Let $\alpha_i^*(F_Y)$ and $\alpha_i^*(F'_Y)$ denote the corresponding equilibrium group i 's share of aggregate income under $F_Y(y)$ and $F'_Y(y)$, respectively. Suppose that F_Y is a mean-preserving spread of F'_Y . Then, for fixed payoffs, we have that $\alpha_i^*(F_Y) > \alpha_i^*(F'_Y)$, since the agents' utility function is concave, and the group's participation constraint is binding.

The intuition for this property rests on the fact that the governing group optimally extracts social surplus. Thus, starting from a situation where group i enjoys a given payoff v_i , an increase in aggregate risk makes group i 's participation constraint more difficult to meet, and it must be fully absorbed by the governing group, therefore resulting in redistribution towards the non-governing group.

As an example, consider only one non-governing group, that is, $N = 1$, and suppose that each group's per capita income, y_A and y_1 , respectively, are independently normally distributed with means μ_A and μ_1 and variances Σ_A and Σ_1 , respectively. Then, aggregate income, $y_A + ny_1$, is a normal random variable with mean $\mu_A + n\mu_1$ and variance $\Sigma_A + n^2\Sigma_1$. Disregard the fact that incomes can be sometimes negative in this example. Proposition 2 then indicates that the non-governing group's share of national income, $1 - \alpha_A^*$, is higher when Σ_A or Σ_1 are higher. Note, in particular, that an increase in Σ_A induces redistribution towards group 1, away from group A . This example captures sharply the distinct logic of our theory, by showing how redistribution can be in the self-interest of the governing group, despite superficial evidence to the contrary.

Proposition 2 is a comparative statics result that takes the *equilibrium* payoffs as given. In the present context those payoffs arise from social demands that are a fundamental component of the social contract. As discussed next, such a background is one in which the degree of social coordination among the non-governing groups and the ability of the governing group to prevent

such coordination play a critical role.

3.3 Social Consensus

The most desirable contracts for the non-governing groups, that is, those where $\sum_{i=1}^N \alpha_i = 1 - \underline{\alpha}_A(\delta)$, can only be enforced by a strategy profile where *all* groups opt out and thus, punish group *A* whenever *any* non-governing group opts out and, furthermore, to continue to opt out forever after. These actions by the non-governing groups correspond closely to the possibility that non-governing groups are able to *coordinate* their social demands (that is, their v_i 's) by threatening group *A* with their joint opting out unless they *all* extract payoffs $\{v_1, \dots, v_N\}$ from the social contract. This requires not only that the non-governing groups threaten collective actions, but also that there is social consensus on that which is expected of the governing group. This social consensus is not automatic. It requires substantial coordination among the non-governing groups. Since electoral promises as well as laws can be broken and institutions governing public policy making can be changed, something else is needed in order to limit the power of the governing group. Social consensus on the limits on the governing group is then critical not only for social peace, but also for the redistributive effect of the welfare state. Thus, our model suggests that more redistributive welfare states result when the members of the non-governing groups can overcome their coordination problems and agree to place larger demands on the state. The self-enforcing nature of the social contract then compels the governing group to take into account those social demands and choose either to respect them or to embrace social conflict.

There is a range of payoffs which can be enforced by using the Nash-threat that minmaxes all agents, but cannot be enforced by the threat of some, but not all groups opting out. In particular, an alternative reputation mechanism is one where all agents respond to any deviation by switching to the play under any of the subgame perfect equilibria involving the exclusion of some, but not all, of the non-governing groups. Such sanctions constitute a subgame perfect equilibrium. The

following strategy profile can enforce the set of all equilibrium social contracts where m groups opt out, with $1 \leq m \leq N - 1$, for any given discount factor. Let $J \subset \{1, \dots, N\}$ be the subset of all groups that opt out in the proposed equilibrium. Group A chooses the contract $\{\alpha_A, \alpha_1, \dots, \alpha_N\}$, with $\alpha_j = 0$ for all $j \in J$, if no one has deviated in the past and otherwise, chooses $\alpha_A = 1$ and $\alpha_i = 0$ for all $i \in \{1, \dots, N\}$. Group j opts out every period, for all $j \in J$. Group i opts out if and only if someone has deviated in the past, for all $i \notin J$.

Recently, there is much concern with the phenomenon of *social exclusion*, although its precise meaning and scope are unclear. Atkinson (1998) has emphasized the importance of including social groups in the welfare state. Our analysis formalizes some of what may be involved here. The key feature of exclusion in the present context is that opting out of the social contract becomes an equilibrium outcome. The decision by Group A to minmax one of the non-governing groups and the decision of such a group to opt out of the social contract become self-enforcing, leaving efficiency gains unexploited.⁹

The enforcement mechanisms that we have discussed rely on the threat of at least one group opting out of the social contract. This is an inefficient punishment. In the present context, the demand by non-governing groups for a larger share of national income is not credible on its own, unless it is backed by the threat of conflict. Note that it is well understood in the theory of repeated games that Pareto inefficient punishments would be subject to renegotiation if they were to take place.¹⁰ As an example, consider the possibility that mutually profitable *bilateral* agreements between group A and individual social groups can be reached even during the punishment phase. Clearly, group A has an incentive to buy off each non-governing group and similarly, each non-

⁹We have noted that social conflict can occur along the main equilibrium path. Alternatively, it could emerge as a result of small mistakes which cause a punishment phase in the repeated game. Furthermore, note that we have focused on pure strategies, but short periods of conflict may also arise as the result of the non-governing groups using mixed strategies.

¹⁰See e.g. Farrell and Maskin (1989) and Bernheim and Ray (1989).

governing group is willing to stay in the contract in exchange for some surplus. Hence, whenever such bilateral agreements are feasible, group A will exploit all the gains from trade. This is in contrast with the coordinated threat discussed above, where all non-governing groups coordinate to reach a *multilateral* agreement and exploit all the gains from trade among themselves.

The point we wish to make is not that the social contract in which the governing group minimizes the non-governing groups is the only reasonable contract. Quite the opposite, our emphasis is precisely that the inefficiency of social unrest makes it a powerful threat. Indeed, the history of the welfare state suggests that the inefficient threat of conflict is empirically plausible.¹¹

3.4 Social Transfers

So far we have analyzed the social contract in terms of the post-transfer distribution of income. Our maintained assumption that the governing group has the ability to make transfers conditional on all income realizations as well as on group identity has allowed us to understand important features of the social contract without keeping track of the underlying, complex flows of transfers. Now we illustrate how the model can give further insight into the structure of social transfers. We organize our discussion around the next proposition, which follows immediately from our previous results on the post-transfer income distribution, together with the definition of transfers.

Proposition 3. *Consider an equilibrium social contract in which N non-governing groups participate and their social demands are given by $\{v_1^*, \dots, v_N^*\}$. Then, social transfers are given by*

$$\frac{T_i}{n/N} = y_i - \frac{\alpha_i y}{n/N} = y_i - y \left[\frac{v_i^*}{E[u(y)]} \right]^{\frac{1}{\theta}},$$

where $y = y_A + (n/N) \sum_{i=1}^N y_i$, for all $\{y_A, y_1, \dots, y_N\}$, and for all $i = 1, \dots, N$.

Thus, for given demands v_i^* , members of group i will face smaller transfers — that is, make less payments ($T_i > 0$) or receive more benefits ($T_i < 0$) — when their incomes are relatively lower than

¹¹Schram and Turbett (1983) document the positive relationship between the number of families receiving social welfare from 1969 to 1972 in each U.S. state and an index of riots in each state in the preceding three years 1965–1968.

average incomes. This provision of social insurance as state-dependent redistribution suggest two straightforward, but relevant, implications. First, from the viewpoint of a single non-governing group over time, equilibrium transfers can be viewed as partly self-financed, as each individual will face larger payments when his income is higher and larger benefits when his income is relatively lower. Second, from the viewpoint of the cross-section of individuals in the non-governing group at a point in time, state-dependent redistribution takes the form of redistribution from the wealthy to the poor. Indeed, the main rationale of the welfare state, according to our theory, is to exploit the gains from social insurance through risk sharing across social groups.

Consider the implications of Proposition 3 for the mean and the variance of the distribution of social transfers. First, average group i 's transfers are given by

$$E\left(\frac{T_i}{n/N}\right) = E(y_i) - E(y) \left[\frac{v_i^*}{E[u(y)]} \right]^{\frac{1}{\theta}}. \quad (3.4)$$

On average, relatively poorer groups of individuals (those with lower $E(y_i)$) tend to be net recipients of social transfers, whereas relatively wealthier groups tend to be net payers, provided that they have similar demands (i.e., for similar values of their v_i 's). This is explained neither by the benevolence of the government nor by the direct political influence of a relatively poor electorate on social policy. Rather, this is because the optimal exploitation of the gains from social insurance, by the governing group, calls for redistribution from high income states to low income states. On the other hand, the redistributive impact of social programs cannot be assessed without respect to the "bargaining power" of each group of individuals. In this sense, whether social policy is more or less redistributive depends fundamentally on each group's demands.

Second, while group i 's post-transfer income is a function of aggregate risk alone, Proposition 3 indicates that the underlying transfers are a function of group i 's idiosyncratic risk, aggregate risk and the relationship between the two. Thus,

$$Var\left(\frac{T_i}{n/N}\right) = Var(y_i) + \left[\frac{\alpha_i^*}{n/N}\right]^2 Var(y) - 2 \left[\frac{\alpha_i^*}{n/N}\right] Cov(y_i, y), \quad (3.5)$$

and therefore, the variance of group i 's transfers increases with the variance of group i 's income and with the variance of aggregate income, and decreases as the covariance between group i 's income and aggregate income rises. As a special case, suppose that there is no aggregate uncertainty, that is, $y_A + (n/N) \sum_{i=1}^N y_i = \bar{y}$ for all $\{y_A, y_1, \dots, y_N\}$. Then, for each $i = 1, \dots, N$,

$$\frac{T_i}{n/N} = y_i - [\theta v_i^*]^{\frac{1}{\theta}}, \quad (3.6)$$

in which case group i 's transfers are designed solely to cope with group i 's specific risk, taking into account group i 's social demands, as given by v_i .

Our model, on the one hand, does not pin down the size of the welfare state, as it focuses on net transfers, without making the difference between taxes and spending explicit. On the other hand, it suggests a view of the size of the welfare state in terms of the number and complexity of social transfer programs. This view is implied by the following corollary of Proposition 3.

Corollary 1. *Whenever feasible, it is in the best interest of the governing group to design distinct group-specific transfer schedules, each restricting eligibility to individuals who face common income risks.*

To appreciate the broader implications of this corollary for the welfare state, note that our analysis rests on the assumption that the governing group is able to condition transfers on income realizations as well as group identity. More generally, the governing group may not have enough instruments to achieve this outcome, which is a source of inefficiency. First, the governing group may not be able to condition transfers on income realizations, but only on observable group characteristics, such as race, gender, union membership or old age, which can serve as proxies for socio-economic groups of individuals with similar risk characteristics and social demands. This situation may be viewed as constraining transfers to certain groups of individuals to lump-sum amounts conditional on group identity alone. This type of transfer, however, prevents the governing group from exploiting the gains from social insurance and it is, therefore, suboptimal.

Second, the governing group may not be able to condition transfers on group identity, thus

losing its ability to target group-specific risk. Formally this can be viewed as a situation where the governing group solves the problem analyzed above, subject to a set of additional constraints. For instance, consider the case where there are two non-governing groups of individuals facing distinct risks. Now suppose that the governing group can still condition transfers on all income realizations, but it faces the technical constraint that it must offer the same transfer schedule to both groups. The corresponding equilibrium transfer schedule solves the above problem subject to the additional constraint that $T_1(y_A, y, y') = T_2(y_A, y', y)$, for all (y_A, y_1, y_2) . Although solving this problem is more complicated than solving the unconstrained problem, it is easy to verify that the additional constraints limit the ability of the governing group to exploit the gains from social insurance, which in general precludes the possibility of full risk sharing. The main implication is that the governing group must be, in general, better off when these constraints are lifted.

The previous, intuitive, argument is interesting because it leads to a specific view of the growth of the welfare state. For instance, the U.S. welfare state began with simple transfer programs consisting of lump-sum transfers to the old, food relief, etc. The growth of the welfare state since then has consisted of an enlargement of insurable events characterized by the increasing number and complexity of transfer programs as well as the narrowing targeting of each program. With respect to this, our model suggests a view of the growth of the welfare state as being driven by the lifting of technical constraints faced by the public administration, as discussed in the next section.

Finally, we note that transfers in the present context should be interpreted broadly. In practice, reductions in redistribution may show up as a reduction in some social transfers, rather than money flows. For some states of the world, actual transfers from the non-governing to the governing groups can take the form of business subsidies, agricultural subsidies, reductions in taxes etc.. In addition, income redistribution may take the form of changes in the provision of public goods (e.g., Boadway and Marchant, 1995).¹²

¹²An extension of the present model to allow for public good provision is available from the authors upon request.

4 Some Historical Evidence

The emergence and growth of the welfare state in the U.S. supports our view of the welfare state as a social commitment device to promote efficiency.¹³

A key element of our model is the existence of a stable governing group and the non-governing groups. As an empirical matter, the identity of the governing group is likely to vary across specific historical contexts. Domhoff (1990, 1996), Quadagno (1984), and Alston and Ferrie (1993) have all stressed the role of political elites in the formation of the welfare state in the United States. In her discussion of the Social Security Act of 1935, which marks the birth of the U.S. welfare state, Quadagno (1984, p. 644–645) remarks:

Business executives had a direct impact on the Social Security Act by serving on policy-forming committees and by testifying before Congress. They also exerted influence in a less formal manner through a variety of interactions with state managers who held varying degrees of power. Tactics included informal discussions with Roosevelt and committee members, letter writing, proposal development, and attempts to coopt lesser figures.

Alston and Ferrie (1993) observe that Southern large plantation owners formed a major segment of the U.S. governing group for a century preceding 1970, operating through overwhelming Congressional committee control via the Democratic Party. The rural elite's political objectives were to maintain low wages and to secure federal agricultural subsidies for large plantations. The Southern landowners ensured that the unemployment insurance component of the 1935 Social Security Act excluded farm workers and that public assistance programs were administered by the

¹³The history of the welfare state in some European countries suggests that our framework has wide applicability. For instance, Steinmo (1993, p. 88) traces the origin of the welfare state in Sweden to a historic agreement between the Swedish Employers Federation (SAF) and the major trades union congress (LO) in May of 1936, and argues that the postwar social policies of Sweden reflected this historic compromise between the agenda setting power of "big business" interests and the power of labor unions to disrupt production.

states rather than the federal government.

Alston and Ferrie note further that farm mechanization in the 1950's significantly reduced the need for plantation workers and that it was increasingly in the interest of Southern landowners to promote the out-migration of blacks to Northern states. Thus, commenting on the Economic Opportunity Act, which was the centerpiece of the Johnson Administration's War on Poverty, Alston and Ferrie (1993: 868-9) write:

Given the essentially static power position of Southerners in the House and their increased power in the Senate in the 1960's it is extremely unlikely that the welfare state programs of the 1960's could have emerged from Congress without the countenance of Southern congressmen. Not only did Southerners have the agenda control which committee power and their importance within the Democratic Party produced, but . . . both Kennedy and Johnson needed the Southern vote in order to pass welfare legislation.

Tracing the emergence of the U.S. welfare state to the preferences of a rich and powerful elite begs the question: why did this elite implemented the Social Security Act of 1935? In particular, *"[i]t is also important to explain why a piece of legislation with such a high level of "class content", i.e., a social-welfare measure, was implemented with almost no working-class input"* (Quadagno, 1984, pp. 644-645). The logic of our theory can shed light on the role of the Great Depression in the timing of the Act, by explaining why those with political power benefited from it. According to our argument, the social programs introduced by the Act were the governing group's optimal response to the fact that increased aggregate risk made the participation constraint of some of the non-governing groups harder to meet. Weaver's (1983) observation that social movements such as the Townsend movement were ineffective in bringing about social insurance prior to the Great Depression can be explained by the fact that the increase in aggregate risk had not yet been clearly perceived. Furthermore, this view is consistent with the decline in the income shares at the top of

the distribution in the decade following the Act (Kuznets, 1953).

Broadly speaking the development of the welfare state since the Great Depression has been one of enlargement of insurable events and gradual extensions of eligibility to include previously excluded groups of individuals.¹⁴ By showing that it is in the best interest of the governing group, whenever possible, to create distinct transfer programs, targeted to group-specific risks, our approach provides a reason why the rise in social transfers after World War II may owe much to technical improvements in public administration. Thus advances in record-keeping, especially automated data processing which originated during World War II, permitted extensions of social insurance to cover many more occupations and additional types of risks. An examination of the record-keeping history of the Social Security Administration in the U.S. corroborates our view. In 1956 the Social Security Administration installed the first large-scale computer to maintain records and in 1958 the Index was microfilmed.¹⁵ Before then:

[T]he names were typed on flexible strips inserted in metal panels and hung on racks like pages in a book.

With 119 names to a panel and 1,600 panels to a rack, the mammoth file took up a city block of floor space. It was growing at the rate of about 3 million names a year and required 6,000 additional square feet of space every 12 months.¹⁶

An integrated data processing system was put into effect in 1965. This record of adoption of new methods is strongly suggestive that the welfare state could not have expanded in the same way prior to World War II, nor after the 1970s, since by then the basic, necessary record-keeping technology was already in place. To our knowledge, this technical change explanation for the increase in transfers during the 20th century has not been adequately emphasized.

In addition to technical change, social coordination appears to have played a role in explaining

¹⁴See e.g. Moffitt (2002) and Currie (2004) for a discussion of some of the main social programs.

¹⁵Microfiche is a German invention of the 1940s.

¹⁶*SSA History: Social Security U.S.A.– The Program & Its Administration*, <http://www.socialsecurity.gov>.

the growth of the welfare state after World War II. Domhoff (1990) has argued, for example, that the Vietnam War served as a coordination device to mobilize distinct social groups. By showing how the ability of non-governing groups to coordinate their social demands determines the extent of redistribution, our argument sheds light on the role of the increasing demands of disparate social groups that culminated in the mass protests and riots of the 1960s. The more recent fragmentation of these groups may similarly explain the ongoing erosion of protection against risks (Hacker, 2004).

5 Conclusion

Previous studies of the welfare state have taken for granted that those individuals with political power can commit not to use their power solely in their self-interest, to the exclusion of others in society. In this paper we have argued that the welfare state is a social commitment device to promote efficiency. The commitment problem involves precisely the inability of those individuals with political power to commit not to expropriate others. The efficiency gains come from insurance against income risks and also avoidance of social conflict. Our theory is in sharp contrast with conventional explanations of the welfare state, which view social programs as either altruistic or designed specifically to give social protection to those with direct political influence.

We have formulated the view of the welfare state as a self-enforcing risk-sharing agreement supplied by the governing group and designed to maximize their share of the social surplus. We have shown that the extent of inclusion in the resulting social contract and the extent of redistribution are determined by social consensus on the limits placed on the political power of the governing group. Such a social consensus is plagued with coordination problems. Consequently, more redistributive welfare states result when members of a society can overcome their coordination problems and agree to place larger social demands on the state. The self-enforcing nature of

the social contract then compels the governing group to take into account those social demands and choose either to respect them or to embrace social conflict.

We have also provided an intuitive reason why a higher degree of aggregate risk can induce the governing group to supply social programs that are more redistributive. This is because it makes the participation constraint of the non-governing groups harder to meet. However, in order to exploit the potential gains from social insurance, the governing group needs to be able to use transfer programs that target group-specific risks separately. This suggests that the ability of the public administration to implement these group-specific transfer programs is key to the exploitation of the gains from social insurance. By addressing the roles of income risk and social consensus, and why the members of a governing group may find it in their self-interest to supply social programs, our theory can explain diverse features of the origin and the growth of the welfare state, such as the role of the Great Depression in the birth of the modern welfare state, and the role of social protest and technical improvements in record keeping and public administration in the rapid growth of the welfare state in the 1960s.

Our argument abstracts from the role commonly assigned to economic development and negative incentive effects in explaining the sources and the limits of the welfare state. In particular, we have abstracted from the fact that creating and administering taxes and transfer programs is costly. While acknowledging that the implementation of the welfare state requires sufficient economic development to finance social programs, we have shut down this effect in order to illustrate the role of record-keeping in explaining why the golden age of the welfare state took place in the 1950s and 1960s. Further, this source of the growth of the welfare state also suggests its own limit, as the basic record-keeping technology was in place by the 1970s. This reflects a further contrast between our argument and the conventional view, which equates a larger welfare state with larger efficiency losses. Instead, we view the growth in the number and complexity of transfer programs as reflecting the exploitation of further efficiency gains.

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