The Political Economy of Targeting

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1. Introduction

- Definition of targeting: concentrating welfare benefits on subset of population.
- Need for targeting seems obvious: basic requirement of efficiency.
- Very timely issue: USA, France, etc.
- Raises several problems:
  - Identifying the needy, or deserving. Low take-up of transfers because of administrative complexity or stigma.
  - Incentives: increases marginal rate of taxation.
  - Political problem: “A program for the poor is a poor program”: lack of political support.

- Lecture focuses on last two points.
Outline of the Presentation

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4.1 The model
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2. A simple model focused on redistribution: De Donder & Hindriks (Public Choice, 1998)

2.1. The model

- $n$ agents differ in their productive ability: $0 < a_1 < a_2 < \ldots < a_n$, uniformly distributed over $[0, 1]$.

- Preferences given by

$$U(x, y; a) = x - \frac{(y/a)^2}{2},$$

where $x$ measures consumption and $y$ pre-tax income.

- Quasi-linearity important: no income effect on labor supply when changes welfare participation.
• Government: taxes labor income at rate $t$ and serves a transfer that decreases at rate $\tau$ with (pre-tax) labor income:

$$T(y_i) = b - \tau y_i \text{ for } y_i \leq b/\tau, \text{ so that } i \in R(b, t, \tau)$$

$$= 0 \text{ otherwise, so that } i \in NR(b, t, \tau).$$

• Government budget constraint:

$$\sum_{i \in R(b, t, \tau)} b = \sum_{i \in R(b, t, \tau)} (t + \tau)y_i(b, t, \tau) + \sum_{i \in NR(b, t, \tau)} ty_i(b, t, \tau),$$

where $y_i$ solves

$$\max_y x - \frac{(y/a)^2}{2}$$

subject to

$$x = b + (1 - t - \tau)y \text{ if } y_i \leq b/\tau,$$

$$x = (1 - t)y \text{ otherwise.}$$
• Figure 1: The choice between being recipient or not.
• Figure 2: $b(t, \tau)$ is a complex object.
The rest of the paper looks at values of \((t, \tau)\) which are likely to emerge as political equilibrium in our specific environment, and more importantly, aims at finding some qualitative properties which would extend to more general environments.

We decompose our analysis in two parts. In the first part, we assume that the targeting rate is given from the outside and we let the agents vote on the tax rate only. This allows us to see how a targeting change is likely to influence the level of taxation chosen by the electorate. In the second part, we let the agents vote simultaneously on both dimensions.

*Figure 1.* Optimal labour supply decisions where agent \(i\) is indifferent between welfare participation or not. Lower ability agents strictly prefer participating and higher ability agents strictly prefer opting out.
3. Why targeting may be fatal for redistribution

In this section we are not concerned about how the degree of targeting is determined. Rather, we are interested in investigating how its level influences the choice of \( t \) in a majority voting game. In doing so we aim at illustrating the idea mentioned in the introduction that sharply concentrated benefits may lack political support and eventually end up being poor benefits. In fact, we show that pushing targeting beyond a certain threshold destroys the political support for redistribution. Interestingly enough, this critical degree of targeting leaves a large fraction of the population on welfare; namely, three-quarters of the population.

Formally, our purpose is to derive the majority winning tax rate for various degrees of targeting, \( t^*(\tau) \), and then to show that there exists a critical degree of targeting \( t^* \) such that \( t^*(\tau) = 0 \) for all \( \tau \geq \tau^* \).

In our majority voting game, agents take \( \tau \) as given and vote over tax rates correctly anticipating the resulting effect on the aggregate pre-tax income level and participation rate. This is subsumed in their indirect preferences over tax rates.

Before starting the analysis, it remains to specify our voting equilibrium solution concept. A natural concept of political equilibrium is the Con-
2.2. Voting over $t$ for given $\tau$, or why targeting may be fatal for redistribution

- Changing the funding level may be easier than altering the program’s design.

- Timing: $\tau$ set exogenously, agents vote over $t$ and then choose their pre-tax income $y_i$ (i.e., labor supply).

- Equilibrium concept: Condorcet winner: value of $\tau$ preferred by a majority of voters to any other value.

- Existence: two versions of the “median voter theorem” with single-dimensional policy space and traits space:
  
  - Preferences are not single-peaked: see Figure 3.
  
  - Preferences are single-crossing, so that agent with the median value of productivity is decisive.
the unique majority voting equilibrium (and Condorcet winner) of the game. As illustrated in Figure 4, the median voter’s most preferred tax rate is a U-shaped function of \( \tau \).

This U-shaped function has the following interpretation. If \( \tau \) is sufficiently low, everybody is on welfare which implies as shown in Figure 4 that everybody faces an effective marginal tax rate equal to \( t + \tau \). Being on welfare, the median voter chooses the level of \( t + \tau \) which maximises 

\[
v_{\text{med}}(t, \tau) = b(t, \tau) + (1 - t - \tau)y_{\text{med}}(b, t, \tau)
\]

where the level of \( b \) depends on the aggregate pre-tax income and participation rate. Clearly, any change of \( t \) and \( \tau \) that keeps both the effective marginal tax rate \( t + \tau \) and the participation rate constant does not affect individual welfares since the pre-tax incomes and the level of transfer \( b(t, \tau) \) are unchanged. Hence, tax rate and targeting rates are perfectly substitutable instruments of taxation; and it is no wonder that the median voter responds to any increase in \( \tau \) by a one-to-one reduction in \( t(\tau) \) so as to keep the effective marginal tax rate at his most-preferred level \( t^*(\delta) + \delta = 0.20 \). However as \( \tau \) increases and \( t^*(\tau) \) falls accordingly to a certain point, the high-income agents opt out the welfare program. At this moment, \( t \) and \( \tau \) are no longer perfect substitutes since raising \( t \) increases the contribution of the non-recipient (i.e., those agents rich enough not to be
Most-preferred value of $t$ of the median ability agent as a function of $\tau$: see Figure 4.

Three zones:

- **Zone 1**: low values of $\tau$: everybody receives the welfare benefit, so that $t$ and $\tau$ are perfectly substitutable. Remark: even with uniform distribution of productivities, median income is lower than average income (because $y_i$ proportional to square of $a_i$)

- **Zone 2**: intermediate values of $\tau$: as richer agents opt out, they generate tax proceeds and become “exploited” by majority.

- **Zone 3**: sudden disappearance of political support, when three quarters of agents are on welfare. See Figure 5.
Figure 4. Marginal tax rates selected by majority voting for various degrees of targeting.

eligious) while an increase of $\tau$ does not. This implies that the median voter is less willing to reduce $t$ as $\tau$ increases. In fact, for a uniform distribution of ability, the number of agents opting out is so high that the median voter starts favouring further taxation as a means to extract more income from them. Hence, increasing the degree of targeting rises the majority winning tax rate and so does $b(t^*(\tau), t)$ while $R(t^*(\tau), \tau)$ decreases monotonically.

As $\tau$ increases, the median voter progressively raises $t^*(\tau) + \tau$ up to the point, such as illustrated in Figure 4, where he starts favouring the laissez-faire situation. Pushing targeting beyond that point (labelled $\tau^*$) would destroy the majority support for taxation and drive the majority winning tax rate to zero. This is the theoretical underpinning of the idea that sharply targeted benefits may erode their political support and end up being small benefits. Clearly this result cautions against policies that would push targeting too far.14

Interestingly enough, in our example, more than three-quarters of the population is still on welfare at $\tau^*$ which means that we do not need to reject the richest half of the population from the welfare benefits to erode their political support. Figure 5 below shows heuristically that this result is not specific to the environment adopted.

Clearly, the median voter will always favour zero taxation instead of opting out the welfare system and being a net fiscal contributor. As long as the slope of the indifference curve in the $(t, \tau)$ space is monotonically decreasing with the ability level and the distribution of ability is smooth enough, we have that
at $\tau^a$ some individuals with higher abilities than the median voter necessarily prefer being on welfare than opting out. This implies that strictly more than half the population is on welfare at $\tau^a$.

4. Voting over targeting and taxation

We now allow individuals to vote simultaneously on the tax and targeting rates. Unfortunately, Plott (1967) has shown that multidimensional majority games usually do not have a Condorcet winner. The consequence of this absence is rather severe, since the social preference generated by pairwise majority comparisons may be cyclic over the entire set of feasible options.\textsuperscript{15}
• **Main conclusion**: impossible to support targeting of less than one half of population, and lower bound probably much larger than one half.

• **Intuition**: Median voter prefers laissez-faire even to being in the targeted majority.
2.3. Voting over $t$ and $\tau$

- Well known that no equilibrium if vote simultaneously over $t$ and $\tau$.
- Issue-by-issue voting has 2 drawbacks:
  - May not have Condorcet winner when voting over $\tau$ for given $t$,
  - Such a procedure may choose a Pareto dominated option (see Gevers & Jacquemin (EER, 1987))

- We focus on “bipartisan” competition (à la Hotelling) where both parties maximize their vote shares.
2.3.1. Deletion of weakly dominated strategies

- Corresponds to Uncovered set in social choice theory.
- In general a subset of the Pareto set, but here corresponds to Pareto set: see Figure 6.
- Small and large values of $\tau$ are Pareto dominated:
  - No targeting ($\tau$ close to zero) Pareto dominated because should induce highest ability people to opt out: see Figure 7.
  - Too much targeting Pareto dominated: Laffer-type effect.
which makes individual $n$ (with the largest pre-tax income) weakly better off by voluntarily opting out the welfare program and such that the government budget constraint is relaxed. This in turn enables the government to increase $b$, achieving a Pareto improvement.

In short the richest agent $n$ voluntarily abandons welfare benefits in exchange for a reduction in tax rate which induces him to work more and to pay more taxes. This in turn enables the government to pay higher transfers. Note also

*Figure 6. Uncovered set, Pareto-dominated strategies and the Kramer’s trajectory.*
that this argument does not depend on the particular distribution of abilities chosen.

This Pareto argument in favour of greater targeting holds true as long as the number of non-recipients is small enough (that is, the targeting rate is sufficiently small with respect to the tax rate). Indeed, let us continue the fiscal reform that increases $\tau$ and lowers $t$ such that $t + \tau$ remains unchanged and further individuals opt out. Clearly opting out makes all these individuals better off and increases their net tax payment. All those individuals who were already non-recipients are made better off by the reduction of their tax liability. Hence provided that the size of the latter group is small enough the budget constraint is relaxed and the government can achieve a Pareto improvement by increasing $b$.

It is worth mentioning that the many Pareto dominated options challenges the widespread view that targeting cannot achieve Pareto improvements (see e.g. Besley, 1996). Indeed, it is quite possible that the cost of sharper targeting borne by the rich be offset by the corresponding tax reduction. And, conversely, it is possible that a reduction in targeting makes everybody better off by a Laffer-type effect.

Figure 7. Why having everybody on welfare is Pareto-dominated.
2.3.2. Dynamic competition à la Kramer:

- Repeated game, where the winner (incumbent) sticks with its policy and where the parties are “myopic”.
- Trajectory starts from minmax: poor alternate with rich (to increase $\tau$ and decrease $t$) and with middle-class (to increase $t$ and reduce $\tau$)
- Cycle: small, three quarters of beneficiaries. All trajectories (whatever starting point) end up with same cycle.

2.4. Conclusion

- Too little and too much targeting are Pareto dominated.
- Targeting kills the support for redistribution way before 50% of the voters receive the transfer.
- Complex political economy of simultaneous setting of $t$ and $\tau$. 

3.1. The model

- Income $w_i$ given as
  \[ w_i = y_i z_i, \]
  where $y_i$ is productivity and $z_i$ is random draw (independent from $y_i$) with $E(z_i) = 1$.

- All three distributions ($w$, $y$, $z$) are lognormal, so that median is less than mean.

- Preferences are given by
  \[ U(c_i(n_i), n_i), \]
  where $n_i$ measures labor supply and $c_i$ consumption. Assume $U$ concave, consumption and leisure both normal goods, and Inada conditions.
• Welfare policy similar to previous paper: proportional tax at rate $t$ pays a benefit $b$ to those with zero income, and benefit decreases at rate $1 - \alpha$ times after-tax earnings, so that transfer received is

$$B(w_i, n_i) = \max(b - (1 - \alpha)(1 - t)w_in_i, 0).$$

• Paper concentrates on vote over $t$ for given $\alpha$. 
3.2. Voting over $t$ for given $\alpha$

- Sequence of choices:
  - Agents know $y_i$ and $\alpha$ and the distribution of $z_i$.
  - They vote over $t$.
  - They learn the realization of $z_i$.
  - They choose labor supply $n_i$.

- Preferences satisfy the single-crossing property.

- Observe that they vote over lotteries, and that there is an income effect on labor supply.
**Proposition 1:** Assume universalistic welfare ($\alpha = 1$). Then the median voter prefers a small positive value of $t$ to zero.

- **Intuition:** with median income lower than average income, both redistribution and insurance motives.
- To isolate insurance: assume symmetrical distribution of income, so that median equals average. Median stills prefers $t > 0$ to $t = 0$.

**Proposition 2:** Assume maximum targeting ($\alpha = 0$). The median voter prefers $t = 0$ if the marginal utility of consumption remains finite or does not increase “too fast” as consumption goes to zero.

- **Remark:** local results, for preferences around $t = 0, 1$ and $\alpha = 0, 1$. 

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3.3. Calibrated example

• Log-linear preferences

\[ U(c_i, n_i) = (1 - \lambda) \ln(c_i) + \lambda \ln(1 - n_i), \]

where \( \lambda \) measures

– the relative preference for leisure,
– the share of total income (if \( n_i = 1 \)) that is “spent” on leisure when its price is the wage income foregone,
– “total labor elasticity”.

• To calibrate, we need to specify

– (i) overall distribution of income,
– (ii) distribution of stochastic shock to the median voter’s income,
– (iii) \( \lambda \).
Results: Table 1.

- With $E(w_i) = 1$, benefit level is expressed as percentage of mean wage.
- Deadweight loss: percentage reduction of aggregate income compared to laissez-faire.
- Cost of given $(t, \alpha)$ in reducing labor supply increases with $\lambda$.
- $t = 0$ if $\alpha$ low: minimum fraction receiving benefit is two thirds.
- Bunching at zero labor supply increases with targeting, and also deadweight loss.
- Benefit level may decrease with targeting!
Table 1. The effect of targeting on the political equilibrium

<table>
<thead>
<tr>
<th>Targeting parameter $\alpha$:</th>
<th>0.25</th>
<th>0.50</th>
<th>0.75</th>
<th>1.00</th>
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<tr>
<td>$\lambda = 0.1$</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>Tax rate</td>
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<td>0.40</td>
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<td>Benefit level</td>
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<td>0.45</td>
<td>0.49</td>
<td>0.46</td>
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<tr>
<td>Deadweight loss</td>
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<td>0.18</td>
<td>0.16</td>
<td>0.13</td>
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<tr>
<td>Fraction receiving benefits</td>
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<td>0.89</td>
<td>0.98</td>
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<tr>
<td>Fraction not working</td>
<td>0</td>
<td>0.11</td>
<td>0.04</td>
<td>0.01</td>
</tr>
</tbody>
</table>

$\lambda = 0.3$

| Tax rate                      | 0    | 0.30 | 0.34 | 0.44 |
| Benefit level                 | 0    | 0.28 | 0.27 | 0.25 |
| Deadweight loss               | 0    | 0.25 | 0.21 | 0.19 |
| Fraction receiving benefits   | 0    | 0.76 | 0.93 | 1.00 |
| Fraction not working          | 0    | 0.16 | 0.06 | 0.04 |

$\lambda = 0.5$

| Tax rate                      | 0    | 0.30 | 0.31 | 0.39 |
| Benefit level                 | 0    | 0.17 | 0.16 | 0.15 |
| Deadweight loss               | 0    | 0.31 | 0.28 | 0.24 |
| Fraction receiving benefits   | 0    | 0.73 | 0.91 | 1.00 |
| Fraction not working          | 0    | 0.30 | 0.14 | 0.08 |

Notes: Parameter values are $\sigma^2_y = 0.4$, $\sigma^2_z = 0.2$ and $\sigma^2_w = 0.6$.

the extent of targeting as given by $\alpha$. The variance of the log of hours-adjusted earnings of male workers in the US in 1990 was approximately $= 0.6$ (Blau and Kahn 1996). In addition, the correlation coefficient between earnings in year $t$ and earnings in year $t+5$ is between .6 and .7 for most advanced industrial societies (OECD 1996). Setting $\sigma^2_y = 0.4$ and $\sigma^2_z = 0.2$ generates a wage distribution with a variance of log wages of $\sigma^2_w = 0.6$ and a correlation coefficient between periods of $2/3$.$^{12}$ The large majority of estimates of $\lambda$ for both male and female workers fall in the range of $0 \leq \lambda \leq 0.5$ (Pencavel 1986, Killingsworth and Heckman 1986). In Table 1, we report results for $0.1 \leq \lambda \leq 0.5$.

Table 1 presents the optimal tax and benefit level for the median voter for different values of $\alpha$. Since $E(w) = 1$, the benefit level can be interpreted as a percentage of the mean wage. The cost of a given combination of taxes and benefits in terms of reducing the labor supply rises with $\lambda$. Therefore, the optimal tax and benefit level declines as $\lambda$ increases. The third row is the deadweight loss due to the decline in hours worked. The deadweight cost is measured as the percentage reduction of aggregate income when taxes and benefits are increased from zero to the political equilibrium, or $|\phi(0) - \phi(t)|/\phi(0)$. The fourth row

$^{12}$ The assumption that $\sigma^2_z = \sigma^2_w/3 = 0.2$ might be considered to be an upper bound on $\sigma^2_w$, since some share of the change in earnings that occurs between year $t$ and year $t+5$ is due to the foreseeable consequence of increased experience or increased training. We redid the simulations assuming $\sigma^2_z = \sigma^2_w/6 = 0.1$ and found the results to be very close to those reported in Table 1.
Conclusion: only way to support minority targeting is to add altruism

\[ E(U(c_i, n_i)) + AU(b, 0). \]

See Figure 2 for \( A = 0.05 \) and \( A = 0.1 \)
Table 2. Political equilibrium with partially altruistic voters

<table>
<thead>
<tr>
<th>Targeting parameter $\alpha$</th>
<th>0</th>
<th>0.50</th>
<th>1.00</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
</tr>
<tr>
<td>Tax rate</td>
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<tr>
<td>Benefit level</td>
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<tr>
<td>Deadweight loss</td>
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<td>0.21</td>
</tr>
<tr>
<td>Fraction receiving benefits</td>
<td>0.10</td>
<td>0.79</td>
<td>1.00</td>
</tr>
<tr>
<td>Fraction not working</td>
<td>0.10</td>
<td>0.18</td>
<td>0.06</td>
</tr>
<tr>
<td>$A = 0.1$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tax rate</td>
<td>0.03</td>
<td>0.34</td>
<td>0.50</td>
</tr>
<tr>
<td>Benefit level</td>
<td>0.13</td>
<td>0.29</td>
<td>0.27</td>
</tr>
<tr>
<td>Deadweight loss</td>
<td>0.04</td>
<td>0.27</td>
<td>0.23</td>
</tr>
<tr>
<td>Fraction receiving benefits</td>
<td>0.15</td>
<td>0.79</td>
<td>1.00</td>
</tr>
<tr>
<td>Fraction not working</td>
<td>0.15</td>
<td>0.19</td>
<td>0.07</td>
</tr>
</tbody>
</table>

Notes: Parameter values are $\lambda = 0.3$, $\sigma^2_y = 0.4$, $\sigma^2_z = 0.2$ and $\sigma^2_w = 0.6$

poor, the poor may benefit from policy changes that lower the share of welfare benefits received by the poor once the impact of targeting on the political support for welfare spending is taken into account.

Appendix

To prove part (b) of Proposition 2, we start with case with a constant coefficient of relative risk aversion where $U(c, n)$ is given by (12) in the text. In this case, we have $U(c, n) = b^{-\gamma}$ where $\gamma > 0$. Thus, condition (11) can be written as

$$\lim_{b \to 0} e^{-Q_1 (\ln w_1)^2} b^\gamma \equiv \lim_{b \to 0} \frac{h(w_1)}{b^\gamma} = 0 \quad (14)$$

where $h(w_1) = e^{-Q_1 (\ln w_1)^2}$ and $w_1 = w_1(b)$ defined implicitly by equation (7).

The proof of (14) involves repeated applications of L’Hospital’s rule. Consider the denominator first. If $i$ is the smallest integer such that $i \geq \gamma$, we differentiate $i$ times to obtain

$$\frac{d^i (b^\gamma)}{db^i} = \gamma (\gamma - 1) \cdots (\gamma - i + 1) b^{\gamma - i}$$

which goes to either infinity or one as $b$ goes to zero, depending on whether $i > \gamma$ or $i = \gamma$.

Consider the numerator. We define a new variable $\xi(w_1) = \ln w_1$ and observe that

$$h'(w_1) = -2Q_1 \xi e^{-Q_1 \xi^2} \xi'(w_1) = -2Q_1 \xi e^{-\xi(Q_1 \xi + 1)}$$

since $\xi'(w_1) = 1/w_1 = e^{-\xi}$. Differentiating again, we have

- Impact of income inequality on the support for welfare policies depends on how benefits are targeted.

- Canonical model with universalistic benefits: support increases with inequality measured by gap between median and average income.

- Does not fit well stylized facts (ex: Sweden vs USA).

- In reality, welfare benefits mix redistribution and insurance (not provided by private markets). If insurance is a normal good, than poorer median will want lower benefits.

- Question: which effect is larger, and link with targeting of benefits.
4.1. The model

Two ingredients: uncertainty regarding future and heterogeneity in income and risk.

4.1.1. The agents

- Three groups:
  - fraction $\sigma_0$ is permanently out of labor market (no labor income),
  - fraction $\sigma_L$ is low wage ($w_L$) earners;
  - fraction $\sigma_H$ is high wage ($w_H$) earners (with $w_H > w_L$ and $\sigma_0 + \sigma_L + \sigma_H = 1$).

- All high wage earners are employed.
• Low wage earners face probability $\alpha$ of losing their job if currently employed, and probability $\beta$ of finding a job if currently unemployed. $\Rightarrow \alpha/(\alpha + \beta)$ is
  – fraction of low wage earners employed at any time,
  – long run fraction of time that a low wage earner is employed.

• At any point in time,

\[ e = \sigma_H + \frac{\beta}{\alpha + \beta}\sigma_L \]

is the fraction of the population currently employed.

• Assume that $e > 1/2$ and that $\sigma_H < 1/2$ so that the employed low wage earners are the median income earners.
4.1.2. Fiscal policy

- Proportional tax on labor income at rate $t$.
- Spending per capita $T(t)$ is given by
  \[ T(t) = \tau(t)e\bar{w}, \]
  where $\tau(t)$ is a concave function giving tax revenues as a share of earnings and $\bar{w}$ the average labor income.
- $\gamma$ is the share of spending received by employed agents.
- Consumption of employed is
  \[ c_E(w) = (1 - t)w + \gamma \frac{T(t)}{e}, \]
  while consumption of unemployed is
  \[ c_N = \frac{(1 - \gamma)T(t)}{1 - e}. \]
• $\gamma = 0$: targeting of benefits on unemployed. Pure insurance program.
• $\gamma = 1$: targeting of benefits on employed. Pure redistribution program.
• $\gamma = e$: universalistic benefit, mixing insurance and redistribution.

Summarized on Figure 2
Implicit in equation 3 is an assumption that all persons without earnings receive the same benefit, regardless of their history of employment or earnings.9 If \( \gamma = 0 \), then welfare policy is targeted at those without work. If \( \gamma = 1 \), then the benefits go exclusively to those with earnings. (We assume throughout that \( 0 \leq \gamma \leq 1 \).) A universalistic policy that pays the same benefit to all, regardless of employment status, is implied by \( \gamma = e \).

Our assumptions regarding the distribution of pre- and posttax and transfer income are summarized in Figure 2.

We also assume that all individuals have identical preferences over consumption, described by a standard utility function, \( u(c) \), with the following characteristics: (1) \( u''(c) < 0 \), (2) \( u'(c) \to \infty \) as \( c \to 0 \), and (3) \( \mu = -cu''(c)u'(c) > 1 \). Assumption 1 states that individuals are risk averse. Assumption 2 means that individuals always want some insurance to cover a nonnegligible risk that they may have nothing. Assumption 3 implies that insurance is a normal good or that the demand for insurance increases as income rises. Empirical estimates of \( \mu \), usually called the coefficient of relative risk aversion, consistently conclude that \( \mu \geq 1 \) (Friend and Blume 1975). We assume \( \mu > 1 \) to simplify our discussion. How the description of the results would have to be modified to encompass the borderline case of \( \mu = 1 \) is easily seen from the mathematics.

Assuming that individuals live forever, the expected lifetime utility for a wage earner can be derived from the asset equations:

\[
rv^E = u(c_1(w)) - \alpha(V^E - VN),
\]

\[
rv^N = u(c_N) + \beta(V^E - VN),
\]

where \( V^E \) is the expected lifetime utility of a person currently employed, \( V^N \) is the expected lifetime utility of a person temporarily not employed, \( u(c_i) \) is the instantaneous utility of consumption when employed (\( i = E \)) or when not employed (\( i = N \)), and \( r \) is the discount rate.\(^{10} \) Equations 4 and 5 can be solved for the expected lifetime utilities of starting out in the two different states. We will concentrate on the expected

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9 Such an assumption is stronger than necessary. All the results go through in a more general model in which the benefits targeted to those without earnings partly depend on past wages or contributions as long as there is some minimum benefit that everyone without earnings receives.

10 To understand equation 4, observe that lifetime expected utility (for individuals who live forever) can be written as the sum of current utility during period \( dt \) plus expected lifetime utility one period in the future, discounted by the discount factor \( e^{-rdt} \): 

\[
V^E = u(c_1(w))dt + e^{-rdt}[u(c_N)VN + (1 - adt)V^N].
\]

Future expected lifetime utility equals the expected lifetime utility of someone without employment with probability \( adt \). With probability \( 1 - adt \), lifetime utility remains unchanged. Rearranging terms, letting \( dt \to 0 \), and using the fact that \( (1 - e^{-rt})\to r \) as \( dt \to 0 \) yields equation 4. The derivation of equation 5 is similar. The assumption that individuals live forever can be relaxed by replacing \( r \) with \( r/(1 - e^{-rt}) \) in equations 4 and 5, where \( H \) is the voter’s life expectancy. (We thank an anonymous referee for this observation.)
4.1.3. Preferences

- Given by $u(c)$, that is
  - concave,
  - satisfies Inada conditions,
  - with $\mu = C R R A = -cu''(c)/u'(c) > 1$, so that insurance is a normal good.

- Expected lifetime utility of currently employed agent with low ability is
  \[
  \frac{\beta + r}{\alpha + \beta + r} u(c_E(w_L)) + \frac{\alpha}{\alpha + \beta + r} u(c_N),
  \]
  where $r$ is the discount rate (plus concern for the poor, if any).
4.2. Voting over $t$ for given $\gamma$ (exogenous targeting)

- Objective is to settle the contrasting predictions of the two approaches (insurance and redistribution) concerning the impact of inequality on the support for welfare benefits.

- Preferences are single-peaked, and the median voter is a low wage employed agent.

- His most-preferred value of $t$ equalizes MRS between consumption when employed and when not and MRT (given $\gamma$):

$$
\left(\frac{\beta + r}{\alpha}\right) \frac{u'(c_E)}{u'(c_N)} = \left(\frac{e}{1 - e}\right) \frac{(1 - \gamma)\tau'(t)}{(w_L/\bar{w}) - \gamma\tau'(t)}.
$$
Comparative static analysis:

\[
\frac{dt^*}{dr} > 0, \quad \frac{d\tau'(t)}{dt} > 0, \\
\frac{dt^*}{d\gamma} > 0, \quad \frac{dc_N}{d\gamma} \geq 0,
\]

with \( dc_N/d\gamma > 0 \) if \( \tau(t) \approx t \).

**Proposition 1:** A mean-preserving spread in the income distribution (i) reduces the median voter’s preferred level of benefits when benefits are targeted to those without employment \((\gamma = 0)\) but (ii) increases the median voter’s preferred level of benefits when benefits are targeted to the employed \((\gamma = 1)\).
• **Intuition:** Mean-preserving spread

  - (i) makes decisive voter poorer (lower $w_L$) so that he wants less insurance,
  - (ii) increases the gap between $w_H$ and $w_L$ and thus the amount of redistribution, so that the decisive voter wants more taxation.

• If $\gamma = 0$, insurance dominates and $t^*$ decreases

• If $\gamma = 1$, redistribution dominates and $t^*$ increases.

• The CCRA parameter $\mu$ plays a role:

  - $\mu$ close to 1 means that the redistribution effect dominates,
  - $\mu$ very large means that the insurance effect dominates.
Conclusion:

“In comparing countries with similar average income and similar distribution of the risk of income loss, support for spending on benefits targeted to the unemployed rises as the skewness of the income distribution declines.”
4.3. Choosing both benefit levels and targeting

Two stages in the analysis:

- First, find optimal policy of median income group,
- Second, propose two political models with this policy as an equilibrium.

4.3.1. the optimal policy of the low wage employed agents.

- FOC for $t$:
  \[
  \frac{\beta + ru'(c_E)}{\alpha u'(c_N)} = \frac{e}{1 - e} \frac{(1 - \gamma)\tau'(t)}{w_L/w - \gamma\tau'(t)}.
  \]

- FOC for $\gamma$:
  \[
  \gamma \left[ \frac{\beta + ru'(c_E)}{\alpha u'(c_N)} - \frac{e}{1 - e} \right] = 0. \tag{1}
  \]

- **Remark:** we always have $\gamma < 1$ since $u'(0) = \infty$: need some consumption if unemployed. From (1), two cases: $\gamma > 0$ and $\gamma = 0$. 
A) If $\gamma > 0$.

- Then FOCs for $t$ and $\gamma$ become

$$\tau'(t)\bar{w} - w_L = 0,$$

$$\frac{\beta + r u'(c_E)}{\alpha} \cdot \frac{u'(c_N)}{u'(c_N)} = \frac{e}{1 - e}. \quad (2)$$

- FOC $t$: Equalizes marginal cost and marginal benefit of taxation. We then have

$$\frac{dt^*}{dw_L} = \frac{1}{\tau''(t)\bar{w}} < 0. \quad (3)$$

- FOC $\gamma$: Equalizes MRS between consumption when employed and when not with the cost of transferring income from employed to unemployed, which is equal to the relative size of the two groups.
If $w_L$ decreases, to keep LHS of (2) constant we must decrease the benefit served to non employed:

$$\frac{dc^*_N}{dw_L} > 0.$$ (4)

Putting (3) and (4) together, we obtain

$$\frac{d\gamma^*}{dw_L} < 0.$$ (4)

In words, employed workers who suffer a decline in earnings prefer a partial offset of the wage reduction through an increase in the benefits targeted to themselves.
B) If $\gamma = 0$.

• Then, by Proposition 1, we have that

$$\frac{dt^*}{dw_L} > 0.$$  

Summarized on Figure 3.

**Proposition 2:** A mean-preserving increase in inequality that lowers the income of the median voter (i) reduces wage earners’ preferred level of benefits targeted to those with no income, (ii) reduces wage earners’ preferred level of aggregate spending when initial inequality is sufficiently small, but (iii) increases wage earners’ preferred level of aggregate spending when initial inequality is sufficiently large.
It follows from equations 16 and 17 that

\[
\frac{d\gamma^*}{dw_L} = \frac{1}{\tau(t)w} \left[ (1 - \gamma) \frac{\tau'(t)}{\tau(t)} - \left( \frac{1-e}{e} \right) \frac{dc_N}{d\gamma} \right] < 0.
\]

Employed workers who suffer a decline in earnings prefer a partial offset of the wage reduction through an increase in the benefits targeted to themselves.

The second case to consider is the binding constraint, or when \( \gamma^* = 0 \). In this case, the first-order condition with respect to \( t \) simplifies to

\[
\left( \frac{\beta + r}{\alpha} \right) \left[ \frac{u'(c_E)}{u'(c_N)} \right] - \left( \frac{e}{1 - e} \right) \left[ \frac{\tau'(t)\bar{w}}{w_L} \right] = 0. \tag{18}
\]

Wage earners would like to lower \( t \) and raise money with a lump-sum tax (i.e., set \( \gamma \) below zero), but lump-sum taxes are ruled out by the constraint. Therefore, wage earners prefer to transfer less money from \( c_E \) to \( c_N \) than they would if lump-sum taxes were possible. From proposition 1, we know that \( \frac{dt^*}{dw_L} > 0 \) when \( \gamma = 0 \).

In order to visualize the wage earner's optimal policy, it is helpful to rewrite the policy choice as a choice of aggregate expenditures, \( T(t) \), and a choice of the total transfers that are disbursed to those without earnings, \( (1 - e)c_N \). These choices are graphed in Figure 3. The curve \( T(t^*) \) represents wage earners' unconstrained optimal aggregate welfare expenditures, which decline as \( w_L \) increases. The curve \( (1 - e)c_N \) represents the unconstrained optimum with respect to the benefits targeted to those without earnings. This curve is an increasing function of \( w_L \), equation 17. Since \( T(t^*) = 0 \) when \( w_L = \bar{w} \), whereas \( (1 - e)c_N \) is always positive and increasing in \( w_L \), the two curves must cross at a wage level below \( \bar{w} \), denoted \( w_0 \) in the figure. If \( w_L < w_0 \), wage earners' optimal choice of benefits targeted to themselves is given by the difference between \( T(t^*) \) and \( (1 - e)c_N \). For \( w_L \geq w_0 \), the constraint that \( \gamma \geq 0 \) or that \( T(t) \geq (1 - e)c_N \) binds. The constrained optimum with \( \gamma^* = 0 \) or \( T(t^*) = (1 - e)c_N \) is represented by the curve \( T(t^*) \gamma = 0 \). That \( T(t^*) \gamma = 0 \) is an increasing function of \( w_L \) is a restatement of part (i) of proposition 1.

The comparative static results implicit in Figure 3 are summarized as follows.

**Proposition 2.** A mean-preserving increase in inequality that lowers the income of the median voter (i) reduces wage earners' preferred level of benefits targeted to those with no income, (ii) reduces wage earners' preferred level of aggregate spending when initial inequality is sufficiently small, but (iii) increases wage earners' preferred level of aggregate spending when initial inequality is sufficiently large.

**Proof:** Part (i) states that \( c^*_N \) is an increasing function of \( w_L \) (equation 17 and proposition 1, part (i)). Part (iii) states that \( T(t^*) \) is an increasing function of \( w_L \) for \( w_L < w_0 \) (equation 16), and part (ii) states that \( T(t^*) \gamma = 0 \) is a decreasing function of \( w_L \) for \( w_L > w_0 \) (propostion 1, part (i)).

When workers' income falls, their demand for redistribution decreases, and their demand for insurance against loss of earnings declines. When the wage is sufficiently low, relative to the mean, the preferred level of aggregate spending provides more than enough to finance the preferred level of insurance, which leaves money in the budget to be distributed to employed workers and high-income earners. As the wage rises relative to the mean, however, wage earners' demand for insurance increases, and their demand for redistribution falls. Eventually, the wage rises above the threshold \( w_L = w_0 \), and wage earners prefer the entire welfare budget to be targeted to those without earnings. With \( \gamma = 0 \), wage earners face the conflict between redistributive and insurance motives for supporting welfare spending, described in the previous section. According to proposition 1, the insurance motive dominates when \( \gamma = 0 \), in the sense that the preferred benefit level arises with \( w_L \).

In the previous section, when \( \gamma \) was assumed to be fixed, political choice was one-dimensional, and the political equilibrium could be identified with the optimal policy of the median income group. Proposition 2 implies that the same reasoning can be applied with regard to the simultaneous choice of \( t \) and \( \gamma \) when the median income is sufficiently close to the mean. If \( w_L \geq w_0 \) in Figure 3, a majority of voters prefer to target all benefits to those without earnings. (The \( \gamma \) that is optimal for wage earners who have lost their earnings and for those who never work is always less than or equal to the \( \gamma \) preferred by employed wage earners.) Given majority support for \( \gamma = 0 \), part (i) of proposition 1 applies. The ideal policy combination of

16 Bénabou (2000) derives a similar V-shaped relationship between redistributive spending and inequality from a different set of assumptions regarding preferences, risk, and the fiscal system.
**Intuition:**

- If $w_L$ low, then (i) low tax price of welfare benefits, so that want a lot of taxation ($T(t^*)$ large) and want both redistribution and insurance at optimum.

- As $w_L$ increases: (i) tax price increases so that $T(t^*)$ decreases and (ii) demand for insurance increases (normal goods), but does not crowd out totally tax proceeds so positive remainder for redistribution ($\gamma > 0$).

- For some threshold $w_0 < \bar{w}$, demand for insurance crowds out available tax proceeds ($\gamma^* = 0$).

- From that point on, $t^*$ increases and is driven entirely by demand for insurance.

**Conclusion:** $t^*$ is V shaped with $w_L$. 
4.3.2. Political economy model

- If \( w_L > w_0 \), then a majority always favor \( \gamma = 0 \) (all unemployed plus low wage earners) and the policy favored by low wage earners is a Condorcet winner even when voting simultaneously over \( \gamma \) and \( t \).

- If \( w_L < w_0 \), then \( \gamma^*(w_L) > 0 \) and we need to prevent an alliance of the extremes (unemployed and high wage earners) that could defeat the policy \( (\gamma^*(w_L), t^*(w_L)) \).

- This can be done in two ways:
  - Issue-by-issue voting (Shepsle equilibrium): two choices made by two separate committees, “à la Cournot”. Same agent decisive in two choices.
  - Partisan competition where parties represent exogenous constituencies, à la Roemer (2001).
4.3.3. Empirical tests

- Testable implications: both the share of GDP and of government spending that is allotted in democracies to benefits aimed at those without earnings decrease when the skewness of the (pre-tax) income distribution increases. (True whether $\gamma$ is endogenous or not).

- Borne out by the empirical part of the paper.
5. General conclusion

- First two papers focus on support for targeting and find that it is not possible to sustain a program targeting less than a fraction of the population that is strictly larger than one half (3/4 in DD-H and 2/3 in M-W).
- Way out: altruism. What about uncertainty without insurance?
- Even if support for welfare program remains strong enough when targeting is introduced, the impact on the level of benefits received by the poor is ambiguous.
- Third paper asks different question, and shows that more inequality decreases the fraction of GDP/tax expenditures allotted to unemployed (insurance motive). Borne out empirically.
- Main technical difficulty is multidimensionality of choice space. Much remains to be done.