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**How people perceive the welfare state  
A real effort experiment**

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# **How People perceive the Welfare State.**

## **A real effort experiment**

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**Abstract.** The main activity of a welfare state is to impose taxes in order to collect money to provide services. In this paper we want to test subjects' perception of these two steps in the lab. In particular, using a real effort experiment as a tool, we aim at measuring both the labour supply and the consensus as the level of taxation and the efficiency of the welfare state vary.

## **1. Introduction**

The main activity of a welfare state is to impose taxes in order to collect money to provide services. With reference to taxation, the economic mainstream assumes that the labour supply function is increasing in the wage. This feature implies that taxes are distortionary. Then, at a macroeconomic level, this suggests that a higher tax rate may lead to a lower tax revenue. The Laffer curve is a graphical representation of this effect. At the moment, this hypothesis has been confirmed in two different experimental scenarios. A scenario where the tax revenue is thrown away (Sutter and Weck – Hannemann, 2003, and Levy Garboua, Masclet and Montmarquette, 2005) and a scenario where the revenue is equally distributed among participants (Swennson, 1988, and Sillamaa, 1999).

However, the transformation of the tax revenue into public services raises some issues. For instance, the return in utility due to public goods could be higher than the share of tax revenue used to provide it. Moreover, in providing public services we have to consider administrative costs. Finally, rents for politicians must be considered. We have to consider all these issues if we want to assess the efficiency of the welfare state.

The economic mainstream assumes that the efficiency of the state should not have significant effects on the labour supply. In fact, the incentive due to a higher level of efficiency is redistributed among the population and a marginal increase of the labour supply of a single subject has very little impact on her/his utility.

The aim of this paper is to assess jointly the effects of changes in taxation and in the efficiency of the welfare state to, to gain hints on the resulting effects on tax revenue and on the consensus towards taxation. The experiment is divided into two parts. In the first part we consider the tax rate as our variable because we need to obtain the level of taxation that maximises the tax revenue and the consensus. In the second part we select the best tax rate and we vary the level of efficiency in order to maximise the rent of politicians without

loosing political consensus. In section 2 we describe the experimental model. Section 3 contains the experimental design and in section 4 some results are provided. The fifth section concludes.

## 2. The experimental model

We follow the same protocol used in Ortona et al. (2007) and in Ottone and Ponzano (2007). We compare a no-state scenario and a welfare state scenario by the strategy method. The first scenario is always the same in each treatment while the second changes. In particular, in the no-state scenario we pay one euro for each task performed. At the end of the work, participants cast two dice. If the result is two (1 out of 36 probability) the participant loses her whole income. If the result is seven (1 out of 6 probability) the participant loses the half. The welfare state scenario is as before but the participant pay a tax on their work wage. The tax rates are 30%, 50% and 70%. Then, in the scenario with a tax rate of 50%, we multiply the collected tax revenue by 0.9 and by 1.1. After the multiplication, we use a part of the revenue to restore to 80% (90%) the after tax income of people who lost all (the half). The remainder is equally redistributed – this is the public good.

The labour in the no-state scenario has the following expected marginal return:

$$1 - 0.5 \frac{1}{6} - \frac{1}{36} = \frac{8}{9} \tag{1}$$

While in the welfare state the expected marginal returns is:

$$(1-t) \left( 1 - 0.5 \frac{1}{6} - \frac{1}{36} \right) + t \left( 1 - 0.5 \frac{1}{6} - \frac{1}{36} \right) c \tag{2}$$

where  $t$  represents the tax rate and  $c$  is the parameter associated to the transformation of the tax revenue (0.9, 1 and 1.1).

The theoretical prediction about the effect of changing the tax rate is straightforward if we follow the hypothesis of distortionary taxation.

The theoretical prediction about labour supply and efficiency needs a further inquiry. In particular, in the scenario where  $t = 50\%$  we have to divide the expected marginal returns in three parts: the expected marginal own returns is

$$0.5\left(1 - 0.5\frac{1}{6} - \frac{1}{36}\right) = \frac{4}{9}, \quad (3)$$

the marginal expected insurance returns is

$$0.5\left(0.4\frac{1}{6} + 0.8\frac{1}{36}\right) = \frac{2}{45} \quad (4)$$

and the marginal expected public good returns, obtained by subtracting (3) and (4) from (2), is:

$$\frac{20c - 2}{45} \quad (5)$$

As we said before, the provision of the public good is our main function. In fact, the expected returns of insurance is equal to  $2/45$ , while the expected returns of the public good

is, at least,  $16/45$ . Moreover, we assumed that the rent of our public good is negatively related to the number of participants. Then equation (5) becomes:

$$\frac{20c - 2}{45n} \tag{6}$$

where  $n$  is the number of subjects that play the welfare state contract.

For the subject herself, the expected marginal return is equal to the sum of (3), (4) and (6).

As the level of  $c$  increases from 0.9 to 1 (with  $n = 15$ ), the differences between the two treatments are very low:  $2/675$  (less than 0,3 eurocent).

Considering that subjects perform approximately ten tasks per hour (on average), the expected net revenue per hour in the MPT is 5.15 euro. The increase due to a higher level of efficiency is 0,5% (when  $c$  varies from 0.9 to 1 and from 1 to 1.1). Then, we do not expect significantly changes in the labour supply in the three treatments. In facts, many empirical works (see, for example, Blundell et al., 1998), shows that the elasticity of the labour supply with respect to the wage is, on average, lower than 1 (in some cases lower than 0, see Scacciati, 2004).

### **3. The experimental design**

The experimental design consists of five treatments with different values of the tax rate (30%, 50% and 70%) and of the parameter associated to the tax revenue (0.9, 1 and 1.1). All the sessions were run at the Laboratorio di Economia Sperimentale e Simulativa (AL.EX) of the University of Eastern Piedmont, in Alessandria, Italy<sup>1</sup>.

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<sup>1</sup> The program was written by the programmer of the Laboratory, dr. Marie-Edith Bissey.

In all treatments participants were requested to carry out a secretarial task. In particular, they were asked to copy information about fictitious students (enrolment number, name, surname and mark) into a file, in blocs of 9. Each task (i.e., to copy data for 9 names) was paid 1 euro (before taxes, if the case). After an unpaid training of 1 task, participants were requested to choose the number of blocs they were willing to copy. Participants were informed that the computer would signal mistakes and wait for corrections, and therefore the data had to be copied exactly. A 50% fine was established for those who completed a smaller number of tasks than freely chosen. After the training task, but before the choice of the number of blocs to be copied, the participants were informed of the characteristics of their *working contracts*. Two contracts were submitted, one corresponding to the No – State (NS) and the other to the Welfare State (WS). Participants were requested to state the number of tasks they wanted to carry out under each contract (strategy method), and informed that the assignment to one of the two contracts was to be decided, randomly, only after their decision. At the time of the choice it was common knowledge that two-thirds of the participants would work under WS contract and one third under NS contract. After choosing the number of tasks, but before the assignment to one of the contracts, participants were requested to state their preference for one of the contracts, on a 5-point scale (from strong preference for NS to strong preference for WS). Each participant could leave the lab as soon as s/he finished. There was no time constraint and the end of each session corresponded to the end of the experiment for the last participant. There was no show-up fee.

*The Contracts.* Under the first contract (SN), each participant, after having carried out his job, was asked to toss two dice: if the sum was 2 (1 out of 36) all the earned income was

lost; if the sum was 7 (1 out of 6) half of it was lost<sup>2</sup>. The risk was known to participants at the moment of the choice of the number of tasks to carry out. The second contract was the peculiar feature of each treatment. In fact, in the second contract (WS), the wage and the risk were the same as in the SN, but the wage was burdened by a tax and the tax revenue was multiplied by a coefficient of efficiency of the Welfare State. In particular, in the Baseline Treatment (BT) the wage was burdened by a tax rate of 50% and the coefficient of efficiency was 1. In the High Taxation Rate Treatment/Low Taxation Rate Treatment (HTRT/LTRT) the wage was burdened by a tax rate of 30%/70% and the coefficient of efficiency was again 1. In the High Performance Treatment/Low Performance Treatment (HPT/LPT) the wage was burdened by a tax rate of 50% and the coefficient of efficiency was 1.1/0.9. Under this contract – whatever the treatment – the participants were informed that the manipulated tax revenue would have partially refunded the unlucky ones, bringing the income of those who tossed a 2 (7) to 80% (90%) of their after-tax income. After that, what was left of the manipulated tax revenue was going to be divided equally among all the members of the group, irrespective of individual contribution.

We performed one session for each treatment, with 97 participants in all (undergraduate students of the faculties of Political Sciences and Law). No student took part in more than one session.

#### **4. Results**

*Result 1. Subjects' labor supply significantly decreases only when tax rate grows from 50% to 70%, while per capita tax revenue significantly increases only when tax rate shifts from 30% to 50%.*

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<sup>2</sup> This “experimental risk” is a metaphor for the risks necessarily connected to any economic activity, be it bankruptcy, theft, illness, disappointment or whatever.

From Table 1, it turns out that subjects strongly reduce their labor supply<sup>3</sup> – and, consequently, the level of their output – in the Welfare State scenario when tax rate grows from 50% to 70%. A Kruskal – Wallis test rejects the null hypothesis that the observations come from the same population ( $p = 0.077$ ). Mann – Whitney tests run on pairs of treatments confirm that there is no difference between the labor supply when the tax rate is 30% and when it is 50% ( $p = 0.69$ ), while subjects work significantly less when the tax rate shifts from 50% to 70% ( $p = 0.02$ ). To check whether this difference is due to the tax rate and not to subjects’ different characteristics, we run a Kruskal – Wallis test on the median labor supply provided in each treatment under the State of Nature. This choice is due to the fact that the State of Nature has the same features in all the treatments. If the null hypothesis is not rejected when we consider the State of Nature, but it is when we consider the Welfare State, we may deduce that the differences are due to the contract features and not to the characteristics of the population. The test does not reject the null hypothesis that the observations come from the same population ( $p = 0.42$ ).

**Table 1**

	Per capita labor supply in contract...	
	...SN	...WS
<b>LTRT (N = 21)</b>	15.24	17.24
<b>BT (N = 22)</b>	17.23	18.77
<b>HTRT (N = 18)</b>	13.28	12

At the same time, if we analyze the per capita tax revenue<sup>4</sup> (Table 2), it turns out that it increases as the tax rate changes from 30% to 50%, but that it decreases as the tax rate shifts from 50% to 70%. A Kruskal – Wallis test on the median per capita tax revenue rejects the null hypothesis that there is no difference among the treatments ( $p = 0.014$ ). In particular,

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<sup>3</sup> As we mentioned in the previous paragraph, we used the strategy method and we asked each participant to choose the number of tasks they were willing to perform under each contract. Per capita effort under each contract is computed on the basis of the aggregate output declared by all the subjects, and not only by those afterwards assigned to that contract.

<sup>4</sup> We refer to the potential per capita tax revenue, before dice are thrown.

per capita tax revenues are significantly different between the 30% and the 50% treatment ( $p = 0.005$ ), but not between the 50% and the 70% treatment ( $p = 0.307$ ).

If we run an OLS regression (Table 4) where we check the effect of the tax rate – through treatment dummies ( $T50$  and  $T70$ ) - on the individual tax revenue, we find a positive and significant coefficient in both cases. At the same time the 50% and the 70% tax rates have no different effect on the tax revenue ( $\chi^2$  test,  $p > 0.503$ ). This means that when the tax rate shifts from 30% to 50% the tax revenue significantly increases, while this is not the case when the tax rate increases up to 70%.

**Table 2**

	<b>Per capita tax revenue</b>
<b>LTRT (N = 21)</b>	5.17
<b>BT (N = 22)</b>	9.39
<b>HTRT (N = 18)</b>	8.4

*Result 2. As the tax rate grows from 50% to 70%, the Welfare State becomes unpopular.*

**Table 3**

	<b>Preferred contract</b>		
	<b>SN</b>	<b>WS</b>	<b>Indifference</b>
<b>LTRT (N = 21)</b>	33.4%	47.6%	19%
<b>BT (N = 22)</b>	36.4%	50%	13.6%
<b>HTRT (N = 18)</b>	77.8%	0	22.2%

From Table 3, it turns out that a tax rate of 70% shifts subjects' preferences towards contract SN, while in the first two treatments (tax rate equal to 30% and 50%), most subjects prefer the WS contract. This is supported by a Fisher exact test ( $p = 0.001$ ).

From results 1 and 2, we note that a tax rate of 50% maximises the tax revenue and the consensus. Then, we go on in our analysis about efficiency by using this tax rate.

*Result 3. Subjects' labor supply is not influenced by the efficiency of the Welfare State*

**Table 4**

	Per capita labor supply in contract...	
	...SN	...WS
<b>LPT (N = 22)</b>	17.3	17.8
<b>BT (N = 22)</b>	17.2	18.8
<b>HPT (N = 14)</b>	14.7	15

There is no significant difference between the labor supply provided under the two contracts in the three treatments (Table 4). Using two Kruskal-Wallis tests we see that there is no difference in contract SN ( $p = 0.927$ ) and in contract WS ( $p = 0.585$ ). This implies that labor supply in contract WS is not affected by the performance of the government.

*Result 4. A more efficient Welfare State does not capture people's preferences.*

**Table 5**

	Preference for the WS	
	YES	NO
<b>LPT (N = 22)</b>	27.3%	72.7%
<b>BT (N = 22)</b>	50%	50%
<b>HPT (N = 14)</b>	14.3%	85.7%

As for subjects' preferences, we would expect that the higher the efficiency level of the WS the higher the percentage of players who prefer it. However, this is not confirmed by the experimental evidence (Table 5). A  $\chi^2$  test suggests that there is a significant relation between the treatment and the preference for the WS ( $p = 0.066$ ). Since there is no unidirectional trend of preferences, we further analyse subjects' preferences when the coefficient of efficiency shifts from 0.9 (LPT) to 1 (BT) and when it shifts from 1 to 1.1 (HPT). In the first case there is no significant difference between preference for the WS ( $p = 0.21$ ). The scenario changes when passing from the BT to the HPT. In the latter, players significantly dislike the WS ( $p = 0.039$ ).

## **5. Conclusions**

The main activity of a welfare state is to impose taxes in order to collect money to provide services. In this paper we wanted to test subjects' perception of these two steps in the lab. The result is impressive. Subjects significantly react to a change in the tax rate, but they don't seem to be interested in the efficiency of the Welfare State. In a pure public choice perspective – where a democratic government needs to maximize its rent subject to the constraint of preserving a level of consensus that is sufficient to maintain that power – this may imply that a rational government may choose the tax rate that maximizes the tax revenue and provides an inefficient level of services in order to maximize its rents.

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