

An application of “post-welfarist” theories of justice: comparing theoretical rights to compensation and actual policy measures against poverty

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ABSTRACT. – The aim of this paper is to explore the empirical applicability of “post-welfarist” economic theories of justice and redistribution. We consider whether either of the two simple competing axioms of BOSSERT and FLEURBAEY hold in the current French redistribution system. We first present the theoretical and methodological problems raised by the move from a purely individualistic theoretical approach to empirical measures integrating redistribution within households. We then propose a definition of justice and compensation which, as in ROEMER [1996], uses effort variables defined in relative terms. The French benefit system can be considered as compatible with at least one of the axioms, but only under a very limited definition of individual responsibility: people are neither held responsible for their children, nor for their labour force or marital status.

Une application empirique des théories « post-welfaristes » de la justice sociale

RÉSUMÉ. – L’objectif de ce papier est d’explorer les possibilités d’application empirique des théories économiques « post welfaristes » de la justice sociale. Nous partons des deux axiomes concurrents proposés dans BOSSERT et FLEURBAEY [1996], et analysons si les conditions en sont vérifiées dans le système français de redistribution. Pour cela, nous recensons tout d’abord les problèmes théoriques et méthodologiques posés, entre autres, par le passage d’une approche théorique purement individuelle à des mesures empiriques qui comportent une redistribution à l’intérieur des ménages. Nous proposons, à partir de là, une définition de la justice et des compensations, similaire à celle de ROEMER [1996], en ce qu’elle définit des variables d’effort en termes relatifs. Nous montrons que le système français de redistribution peut être considéré comme compatible avec l’un des axiomes, mais seulement sous l’hypothèse d’une définition très limitée de la responsabilité individuelle : le fait d’avoir des enfants, un travail, ou un(e) conjoint(e) ne paraît pas relever de la responsabilité individuelle.

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Introduction

The aim of this paper is to explore the empirical applicability of “post-welfarist” economic theories of justice and redistribution. A broad concern of our research is poverty and associated social policies.³ Specifically we hope to shed some light on the principles which implicitly govern redistribution by the Welfare State.

Recent economic theories of justice have provided the framework for new approaches to individual responsibility. The paper aims to provide a bridge between these theoretical models and actual Social Welfare systems. Our point of departure is what are sometimes called the “post-welfarist” theories of justice, and particularly responsibility-sensitive theories of justice, such as ROEMER’s theory of equality of opportunities [1996], or BOSSERT and FLEURBAEY’s fair compensation theory [1996] (see also ARNESON [1998]; DWORKIN [1988]). The general feature of these models is to distinguish between circumstances and personal responsibility in individual characteristics. A fair distribution compensates individuals for their different circumstances, but not for characteristics which are their own personal responsibility. These models have immediate applications in terms of State intervention and redistribution. Although ROEMER provides some examples, the empirical content of these theories of justice has only rarely been evaluated (exceptions are CLÉMENT, SERRA and SOL [1997]; ROBEYNS [1998]; SCHOKKAERT and DEVOOGHT [1998]; most of which rely on experimental methods). This paper proposes a first attempt at studying the characteristics of a real State benefit system in the light of responsibility-sensitive theories of justice. We use theoretical principles of justice as guidelines to ask whether the (French) Welfare system takes account of individual responsibility, and infer which situations are implicitly considered as “chosen” by individuals, and which are outside of their responsibility. Although each transfer is purely deterministic, with the guiding principles being explicitly written down in the statute books, the general system’s features are much less clear, at least in France (and probably elsewhere too), due to the presence of so many different benefits, both exclusive and cumulative. The results may thus shed some light on the general properties of social redistribution systems, and reveal the incentive implications from the social compensation associated with different characteristics.

We consider whether the two simple competing axioms in FLEURBAEY [1998] hold in the current French redistribution system. We first present the theoretical and methodological problems arising from the application of a purely individualistic theoretical approach to empirical measures integrating redistribution within households. We then propose a definition of justice and compensation which, similar to ROEMER’s, uses effort variables defined in relative terms. The French benefit system is shown to be compatible with at least one of the axioms, but only under a very limited definition of individual responsibility: people are neither responsible for their children, nor for their labour force or marital status.

3. See, for example, CLÉMENT and SOFER [2000].

Our data comes from the INSEE⁴ Survey “Étude sur les conditions de vie des ménages 1994” (Survey on the Living Conditions of Households 1994). We separate individual variables implying responsibility from those which can be considered as “environmental” or linked to “circumstances”. We first construct a number of different effort variables depending on the individual’s situation. The corresponding “circumstances” variable depends on, amongst others, disabilities, parents’ social background, and health. We then examine the correlation between benefiting from existing measures and the values of these effort and circumstances variables, and explicitly test the empirical content of the axioms mentioned above. Our aim is thus to uncover the main principles implicitly governing the French system of redistribution. Moreover, our results will enable us to estimate the relative proportions in which particular handicaps are compensated by transfers, as well as which (negative) characteristics are compensated by the State.

The first section considers the move from an individualistic theoretical approach to an empirical analysis of redistribution within households. The second section is devoted to the empirical results.

1 Theoretical and methodological issues

1.1 The theoretical model and its implications

Consider a general model as in FLEURBAEY [1998]. The population is represented by a set of N individuals. Any individual i in N is said to have a vector of “advantages” f_i , which describes all his doings, beings or belongings. The vector f_i is determined by both the external resources allocated to i , z_i , and by the individual’s personal characteristics, a_i , through a given function, h , which is the same for all individuals:

$$f_i = h(z_i, a_i)$$

The profile of characteristics in the economy is the mapping defined on N , $a: i \rightarrow a_i$. An allocation of resources is denoted z and is a mapping defined on the same set, $z: i \rightarrow z_i$. The set of feasible allocations in the economy is denoted Z . The social problem is to choose an allocation rule, *i.e.* a correspondence S which selects a subset of Z for each value of the (multiple) vector (N, a, h, W) , where W represents the global resources (unproduced and/or productive) of the economy.

The vector a_i is split into two subvectors $a_i = (a_i^e, a_i^r)$, where a_i^r denotes the components of a_i which are considered individual i ’s responsibility (R -variables), whereas a_i^e represents the characteristics for which the agent bears no responsibility⁵ or which are relative to his/her environment (E -variables).

4. Institut National de la Statistique et des Études Économiques (French National Institute of Statistics et Economic Studies).

5. Responsibility can alternatively be defined using the vector f_i (see FLEURBAEY [1998]).

From what he calls the principle of natural reward, FLEURBAEY derives the first axiom: Independence of responsibility characteristics (IRC):

$$\forall a^r, a^{r'}, S(N, a^e, a^{r'}, h, W) = S(N, a^e, a^r, h, W)$$

Movements in what are considered to be the individual's domains of responsibility have no effect on the allocation that he/she receives from or owes to society: the individual alone is responsible for the consequences of a^r .

Another expression of the same principle is the following: Equal transfer for equal E -variables (ETEE):

$$\forall i, j, a_i^e = a_j^e \implies z_i = z_j$$

The allocation is the same for individuals who differ only in their responsibility characteristics.

Another fundamental principle in FLEURBAEY [1998] is the principle of compensation. Its most egalitarian version requires that two individuals who have equal responsibility characteristics get the same final outcome (EIER: Equal income for equal R -variables):

$$\forall i, j, \text{ if } a_i^r = a_j^r, \text{ then } h(z_i, a_i) = h(z_j, a_j)$$

BOSSERT and FLEURBAEY [1996] show that, except under very restrictive conditions (h separable and additive in the responsibility and non responsibility variables for $N \geq 4$), the two axioms above cannot simultaneously hold. It is thus of interest to ask which of these axioms (if any) is reflected in the actual French system of redistribution.

This test has two key components:

- To provide an empirical counterpart to the axiomatic approach developed above, which raises several methodological problems; and
- To test if the actual social system, and particularly social benefits, are allocated along the lines of the above principles.

1.2 Methodological issues

A number of methodological problems arise when we pass from theoretical models of justice to empirical applications. To note but a few, there is the choice of the “advantages”, the individual characteristics to be taken into account, and the measure of “talents”. We make the following simplifying assumptions to render the model tractable:

- We consider only one outcome in the “advantages” f_i , namely individual net income, R_i .
- Similarly, z_i represents the monetary transfer from society to individual i , which can be positive (social benefits exceeds taxes) or negative. Here we consider only direct taxes.
- The individual characteristics taken into account, a_i^r and a_i^e , will be driven by data availability. We still have the task of distinguishing responsibility and environmental characteristics. Although the dividing line between the

two is far from clear, being the subject of wide philosophical debate, characteristics such as gender, social and family background, and innate talents or capacities are considered as circumstances, while the level of effort expended on accomplishing different tasks (investment in initial or professional training, for example) depends only on personal responsibility.⁶

This reduced model can be written as:

$$R_i = h(z_i, a_i) = z_i(a_i) + k(a_i)$$

We write $Y_i = k(a_i)$, where Y represents gross income and the function k shows how society rewards characteristics a . Axiom ETEE was presented on page 6, while axiom EIER is restated as:

$$\forall i, j, \text{ if } a_i^r = a_j^r, \text{ then } R_i = R_j$$

That is two individuals with the same responsibility characteristics receive the same net (after tax and transfer) income.

However, some important methodological problems remain. We shall focus on two of them. The first relates to the passage from the individualistic theoretical framework to a real world where income measurement is mostly carried out at the household level. If true resources and final outcomes matter when comparing individuals, we have to take into account intra-household re-allocation.

The second problem focuses upon responsibility. Are individuals directly comparable in terms of observed responsibility characteristics, or is there a bias linked to social and cultural backgrounds that generates different preferences, opportunities and motivations? For example, does one more year of post-compulsory schooling represent the same effort (a responsibility characteristic) by a student whose parents are highly educated compared to another student coming from a poor and under-educated family? The question is extensively discussed in ROEMER [1996] and answered negatively. Most sociologists, especially those interested in “social norms” would give the same answer. Similarly, economists who work in the field of relative utility would insist on the role of the reference group upon satisfaction and motivation. We shall adopt the same line and propose an approach which is slightly different from ROEMER’s [1996].

With respect to the first point, the data provides information about the individual labour income of household members. However, adopting an individualistic approach is unsatisfying for several reasons:

- As mentioned above, individual incomes are generally re-allocated within the family, in a way which, despite a few theoretical and empirical insights is still largely unexplored⁷.

6. Distinguishing between responsibility and environmental characteristics is necessarily partly arbitrary. ARNESON ([1998] p. 189-190), for example, argues that “Finally, besides varying in cognitive abilities, individuals vary in their possession of native ‘willpower’ talent that enables one to carry on with what one has decided is best to do. The lack of this talent is sometimes denoted ‘weakness of will’. A theory of justice must treat with respect and fairness all individuals, not merely those who are most competent at decision-making and decision-implementation”.

7. See BOURGUIGNON and CHIAPPORI [1992], for example. To use a “collective model”, we would need more information upon the characteristics of each adult member of the household than is available in the data.

- In France, most subsidies (among which minimum income,⁸ family benefits, and housing benefits), as well as income taxes are based on household, not individual, income.
- The individual is considered in theories of justice as a (potentially) free adult. But how do we deal with children, who generally receive a share of their parents' income?

We choose to infer individual incomes by applying OECD equivalence scales to household income. This implicitly assumes that total household income is shared equally between its members, or at least between its adult members, upon whom we focus here. This, nevertheless, does not solve the question of the status of children. There are two alternative ways of dealing with them:

- Children are included in the non-responsibility characteristics (“circumstances” in ROEMER’S 1996 terminology), *i.e.* they are a component of a^e . In this case, their parents or guardians bear the charge for them, and should be compensated. In this perspective, family benefits enter transfers, *i.e.* are included in z_i . The corresponding variable is TRANSFER 1.
- Children are a variable over which individuals choose, and are thus included in the responsibility characteristics, a^r . This choice is effected in a context of information on children’s costs and benefits. The latter include both non-monetary and monetary components, among which family benefits are included. In this perspective, family benefits can be viewed as a transfer by the State *to the children themselves*, not to their parents (although the latter manage the money). For the parents, family benefits appear as extra income generated by their children; the latter are thus included in family income, R_i , but not in z_i . The corresponding variable is TRANSFER 2.

For the second point, the role of the individual’s reference group in the definition of responsibility characteristics, in model (3), we divide the population up into T types. The responsibility characteristics will then be defined in relative terms using the respondent’s father’s level of education.

1.3 Why an empirical test of the theoretical principles?

We now specify the function $k(a_i^e, a_i^r)$, to test for the axioms ETEE and EIER in the actual Welfare System, and to estimate the parameters of function k . We should be clear about what we do and what we don’t do.

In a social benefits system, transfers are purely deterministic: an individual possessing certain characteristics (income in relation to a given threshold, a number of children of a given age, health or disability problems, etc.) is eligible for certain social benefits. Our aim is *not* to show which variables are the best predictors of transfer receipt: the analysis of eligibility conditions would be more informative in that respect. What we wish to do is totally different: we infer empirically the general principles upon which the French Welfare system is grounded. More precisely, we use theoretical principles of justice as guidelines to study some of the system’s characteristics, such as

8. RMI (Revenu minimum d’insertion).

which situations are implicitly considered as “chosen” by individuals, and which are considered to be outside of their sphere of responsibility. The results may help to shed light on the organising principles of social systems, allowing international comparisons to be carried out, and revealing the system’s incentive properties. Another advantage of the approach below is that individuals are not necessarily assumed to take up all their benefit entitlement: the data describe respondents’ income as it is (including benefits actually taken up), not their virtual income (including all benefits to which they are entitled). Analysis of the statute books does not allow this distinction to be made.⁹

2 The empirical model

Functions k , which here represents gross income Y , and z are defined simply as below¹⁰:

$$(1) \quad Y = k(a^e, a^r) = a^e \alpha + a^r \beta$$

$$(2) \quad z = a^e \gamma + a^r \mu$$

The equation $z = a^e \gamma + a^r \mu + u$ is then estimated, where γ and μ are respectively the coefficients of the non-responsibility and responsibility characteristics vectors, and u is an error term.¹¹

Axiom ETEE says that two individuals with equal non-responsibility characteristics receive the same resources, corresponding here to the same net transfer, z_i :

$$\forall i, j, a_i^e = a_j^e \implies z_i = z_j, \text{ or, as } z_i = a_i^e \gamma + a_i^r \mu$$

$$\forall i, a_i^r \mu = 0, \text{ i.e. } \mu = 0$$

Transfers are only a function of non-responsibility characteristics; there should be no correlation with responsibility characteristics.

Axiom EIER implies that two individuals with equal responsibility characteristics obtain the same net income, R :

$$\forall i, j, a_i^r = a_j^r, \implies R_i = R_j$$

9. We take here the view that it is the actual income distribution which reveals society’s preferences, not the one which would prevail in the theoretical world where all individuals would take up their benefit entitlement.

10. Note that here transfers are *not* expressed as a function of income. Though transfers are mean-tested in France, eligibility to them should appear as an (implicit) function of characteristics, not as an explicit function of income.

11. Note that the assumptions made here imply that the functions k and h are separable and additive, so that both axioms could, in principle, hold simultaneously.

From (1) and (2), we have:

$$(3) \quad R = z + Y = a^e(\alpha + \gamma) + a^r(\beta + \mu) = a^e\lambda + a^r\nu$$

And EIER implies:

$$\forall i, a_i^e\lambda = 0, \text{ i.e. } \lambda = 0$$

We then estimate: $R = a^e\lambda + a^r\nu + \varepsilon$

Our empirical approach is as follows. We first estimate models (1) and (2) to evaluate the empirical content of axioms ETEE and EIER on the whole sample of people who do not pay income tax (see below).

We use a HECKMAN correction for the selection bias resulting from our choice of sample, and correct for endogeneity bias in effort in model (2). We differentiate by gender. Model (3) splits the population up into four types depending on father's education. We then construct an effort variable relative to each type of population.

2.1 The data

The data used come from a survey from the INSEE "Conditions de vie des ménages" run in 1994 in France.¹² This survey is particularly aimed at poorer families, which are over-represented in the survey compared to the whole French population. In addition to questions on respondents' individual characteristics, family size, ages of children, and labour force status, there is information on all types of household income, and especially the different types of public or private benefits households may receive. Unfortunately, there is no information on income taxes paid.

The variable Z_i , in our model, measures direct net public transfers, *i.e.* the difference between social benefits received and the income tax paid by each individual. However, as we have no information on taxes paid, we only consider households which should not be liable for income tax, given the income they report.

To estimate income tax, we create taxable income, estimate the "quotient familial",¹³ and simulate income tax. As there is potentially a significant difference between this calculated amount and true tax liability, due to various tax deductions and tax evasion, we retain only those households with a predicted income tax bill of zero. This process of sample selection may induce biases which we correct using a HECKMAN procedure.

The survey also provides information about education, hours of work, and job search intensity by the unemployed, which we use to measure individual effort. Five effort variables are used. The first two are Employed and Unemployed, the

12. Survey on the Living Conditions of Households. We thank the LASMAS for providing access to the data.

13. The income basis for calculating the marginal tax rate is a function of I/N , where I is household net income and N increases with the number of children.

reference status being out of the labour force. The three other effort variables have alternative definitions, corresponding to the distinction between models (1) and (2), and model (3). In models (1) and (2), the whole population is considered as belonging to the same type,¹⁴ while in model (3), the sample is split into four types according to father's education. We use a similar, though simpler, method to ROEMER [1996]: the equality of opportunities cancelling out any effects of individuals' socio-economic and cultural background. We use father's education to define a type of population, and then compare individual achievement to the median of the distribution for each type. The types¹⁵ have been defined taking into account the relatively narrow distribution of fathers' educational level, which, in our sample, is strongly biased to the left (corresponding to a lower level) compared to the whole population.

Effort is therefore measured relative to that of others in the sample (or sub-sample). Responsibility makes sense only in comparison to other people's behaviour: if transfers are to be linked with effort, one has to be able to differentiate, at least theoretically, between those who made little effort (in comparison to others), and those who made a great deal. Even though the government might not be able to observe directly these relative magnitudes and bases eligibility on absolute values,¹⁶ here the whole distribution matters in the general theoretical framework used (total net transfers must sum to zero). Education and job search by the unemployed, are defined as binary variables: low effort (respectively high effort) in education takes a value of one if school level is under (respectively over) 50% of its cumulative distribution (cd) in the individual's type. The same holds for the definition of search effort for unemployed people.

The last effort variable, "Effjob", is continuous and corresponds to the difference between the individual's hours of work and the average hours of work of his/her type.¹⁷ The descriptive statistics of the variables used in the estimations appear in Table 1 below. Income and transfer variables are measured in monthly French Francs. With respect to the effort variables, considering the whole sample as one type (models (1) and (2)):

- Just under half of men have low education.
- 9.42% of men expend low effort in unemployment, while 9.63% have high effort.

2.2 The estimations

The sub sample of interest in our data is households which are not liable to income tax. As this sample is not randomly selected in the whole population,

14. In model (1) and (2), "relative" effort within a single type is in fact a ratio of absolute effort, and thus a measure of absolute effort would give the same results.

15. The cut points have been chosen because of constraints on the total number of people in different types. For effort in education, more than 50 per cent of the sample have the lowest educational level and we could not take the same three natural cut points as for the effort of the unemployed below.

16. One active search instance for unemployment benefits, for example.

17. For those who have a part-time job and want to work more (constrained part-time), we have given this variable the average value of hours of work: there is a question in our survey about the desired hours of work. Those responding that they wish to work full time are classified as constrained part-time. As part time work, in this case, does not correspond to a choice of low work effort, it has been assigned the average effort value.

TABLE 1

Descriptive statistics for the variables used in the estimations in models (1) and (2)

Variable	Definition	Men (per cent) 955 observations	Women (per cent) 1362 observations
Transfer 1	Monthly transfers by household consumption unit in FF including family benefits	1130.62	1309.09
Transfer 2	Monthly transfers by household consumption unit in FF excluding family benefits	724.59	841.71
Income	Monthly family income by household consumption unit in FF	3307.87	3425.84
Effort in job	Effort at work	0.2	0.07
Low effort in education	Low effort in education	45.55	45.3
High effort in education	High effort in education	54.45	54.7
Low effort in unemployment	Low effort in unemployment	9.42	5.8
High effort in unemployment	High effort in unemployment	9.63	10.05
Father without schooling	Father without schooling	21.10	12.48
Mother without schooling	Mother without schooling	20.84	17.18
Father with primary level	Father with primary level of schooling	62.62	65.56
Mother with primary level	Mother with primary level of schooling	62.72	64.75
Father with secondary level	Father with secondary schooling	5.55	5.8
Mother with secondary level	Mother with secondary schooling	6.39	6.9
Father with technical level	Father with a vocational school diploma	4.39	5.21
Mother with technical level	Mother with a vocational school diploma	1.88	2.79
Father with higher level	Father with a college diploma or higher	2.1	2.42
Mother with higher level	Mother with a college diploma or higher	0.84	1.17
Disability	Disability	14.55	13.51
Nbchild0	No children	34.34	30.61
Nbchild1	One child	12.88	19.25
Nbchild2	Two children	16.33	18.97
Nbchildm	Three children or more	36.44	31.17
Age 1625k	Age between 16 and 25	6.38	8.37
Age 2650k	Age between 26 and 50	35.6	62.41
Age 51plk	Age over 51	58.01	29.22
Farmer	Work in agriculture	3.56	1.91
Artisan comm	Independent worker	3.35	1.54
Manager	High skilled worker	4.61	2.57
White collar	White collar worker	6.28	18.57
Blue collar	Blue collar worker	33.3	4.26
Inactive	Out of the labour force	29.21	54.11
Unemployed	Unemployed	19.68	17.03
Employed	Employed	51.09	28.85
Retired	Retired	23.35	15.27
Inact choice	Inactive	5.86	38.83
Mcond	Working Conditions (index of)	18.32	14.83
Couple	Spouse present	79.58	57.63
Foreign	Born as a foreigner	27.96	22.69

we test for possible selectivity bias using the two-step HECKMAN method. The variables in the selection equation explain why the individual belongs to the poorest part of the population. The selection equation is identified using household socio-professional category, which is thus excluded from the

explanatory variables in the income and transfer equations.¹⁸ The variables used and the results of the probit estimation are found in Table 3.

We calculate the amount of transfers and the amount of income received by the one respondent per household who provides full socio-demographic information in our survey. The transfer is “individualised” by taking the difference between the individual equivalent of the total household income (using OECD equivalence scales) minus the individual equivalent income before transfers. Two values of the variable TRANSFER are calculated corresponding to different ways of taking children into account. The income regressions use individual equivalent income of total household income (variable INCOME) as the dependent variable. All regressions are run separately for males and for females.

Two types of explanatory variables are used. The first covers “circumstances”, for which individuals are not considered responsible. We keep only those which are significant in at least one regression. The list of these appears at the bottom of Tables 1, 2 and 3. The second category covers “effort”, *i.e.* variables implying individual choice and responsibility. These are listed in the second part of Tables 1, 2 and 3. Being employed or unemployed (rather than out of the labour force) is included as an effort variable, as is the choice of marriage or cohabitation.¹⁹ Three models are estimated:

Model (1) is a simple OLS estimation, with correction for sample selection bias. The effort variables are calculated in the same way for the whole sample used, so that the whole population is assumed to be of the same type. As the effort variables are relative (to the mean or the distribution over the whole population), the method provides correction for possible endogeneity bias.

In model (2), we correct for the endogeneity of the employment variables: being employed or unemployed (the reference situation being out of the labour force) can be considered, at least partially, endogenous relative to the level of transfers received or to the amount of income earned.²⁰ We first run a probit equation for the whole population (separately by sex) with employment then unemployment as the explanatory variable (see Table 6 in Appendix 2), and use the estimated values rather than the original values in the regressions. As in model (1), we assume that the whole population belongs to the same type.

Finally, in model (3), the population is split into four types, according to father’s education (without schooling, primary education, over primary level, unknown school level). The probit equations instrumenting employment and unemployment, and the calculation of the relative effort variables, are carried out separately for each type.²¹ This method tries to correct effort for the fact

18. Though there might be a correlation between the household head’s CSP and household income, the relation is somehow loose: in most cases, household income not only depends on male income, but also on the income of other members of the family, especially the wife’s.

19. See note 17 about the “choice” employment/unemployment. In the same way, it could be argued that to be widowed, or even divorced in some cases does *not* imply one’s responsibility, but we assume that these cases are a small minority.

20. Correcting for possible endogeneity is not assuming that being either employed, unemployed or out of the labour force is entirely a matter of individual choice (which certainly might be highly debatable in the mid-1990s France).

21. The results are available from the authors on demand. The variables used are the same as in the probit equation estimated for the whole population

TABLE 2

Descriptive statistics for relative effort variables (mean value) used in model (3)

Effort variables	Fathers' level of education							
	Unknown school level		Without Schooling		Primary education		Level of education over the primary level	
	Men (50 Obs)	Women (116 Obs)	Men (192 Obs)	Women (170 Obs)	Men (598 Obs)	Women (893 Obs)	Men (115 Obs)	Women (183 Obs)
Low effort in education	42.00	58.62	71.87	71.76	42.14	42.89	30.43	40.98
High effort in education	58.00	41.37	28.12	28.23	57.86	57.11	69.56	59.02
Low effort in unemployment	14.00	10.34	9.37	6.47	7.52	7.28	6.95	11.47
High effort in unemployment	14.00	9.48	17.19	8.82	7.86	6.27	14.78	10.38

that different educational backgrounds (as measured by the father's level of education) affect the individual's ease of access to education, job information when unemployed, and labour force status. As in model (2), the method corrects for the possible endogeneity of effort variables.

The descriptive statistics of effort by type appear in Table 2.

2.3 The results

Table 3 shows the results of the probit estimations of the selection equation. Tables 4 and 5 then present by gender the estimation results of the three models for transfers and income respectively. Due to limited space, we shall comment only the results which are directly linked to our objective of testing the axioms described above.

The dependent variable in Table 3 is the household's eligibility for income tax. Unsurprisingly, the number of children is positively correlated with non-eligibility, which reflects the French tax system, where tax liability falls with number of children (the "quotient familial")²². The probability of non-eligibility decreases with age, which reflects the life-cycle effect. Being employed reduces the probability of non-eligibility for males, but not for females. Parents' low levels of schooling increase the probability of being selected in the sample, especially for the parent who has the same gender as the individual. Surprisingly, a mother who has a highly skilled education also increases the probability of non-eligibility for females. Disability, being a farmer or a blue collar (only for males) or being born a foreigner strongly increase this probability, while, not surprisingly, having a highly skilled occupation strongly reduces it.

These results are used to calculate the MILLS ratio and to correct for sample selection bias. This ratio (IRM) is significant for both the transfer variables, (TRANSFER2) and for net income (INCOME) for women.

Table 4 shows the results of transfer estimation. Axiom ETEE implies that two individuals with equal non-responsibility characteristics obtain the same resources, corresponding here to the net transfer z_i . We then expect the dependent transfer variables to be positively correlated with non-responsibility negative characteristics and independent of the responsibility characteristics (here the effort variables). With respect to the latter, only those reflecting activity status (EMPLOYED and UNEMPLOYED) are significant for both males and females before the endogeneity correction. Being employed strongly and significantly reduces the amount of transfers (in both definitions), while being unemployed significantly increases them. Splitting the population by types (model 3), only unemployment remains significant, with a positive effect on transfers, as expected. Also, high effort in education (for women: negative), high effort in unemployment (women in the TRANSFER 2 definition: positive), and work effort (men in the TRANSFER1 definition: negative), become significant. Only a small number of the effort variables constructed are significant. However, being in a couple is systematically negatively correlated with transfers.

22. See note 11 above.

More of the circumstances variables are significant under the TRANSFER1 definition, as the number of children is strongly correlated with transfers (the R-squared is higher as well). As expected (and as predicted by the axiom ETEE), the number of children, and being disabled (for women) increases transfers. Conversely, being aged 16-25 or over 50, as well as being retired reduces transfers.

We conclude that axiom ETEE holds only if individuals are not responsible for having children, being employed, or living as a couple. Transfers (other than family benefits) depend on children, although this does not necessarily reflect any failure of the system and supports our first assumption concerning children. Transfers also depend on labour force status, which means, for instance, that unemployment, is mainly considered as involuntary. In a country with 12% unemployment, this is not unrealistic. Finally, people are not held responsible for their family status either: remaining single or getting divorced are not individual choices. A case can also be made for this.

Which non-responsibility characteristics are compensated? Only disability and bad health fall into this category. Parents' education, when significant, tends to go in the wrong direction, *i.e.* it is positively correlated with the benefits received by those who are arguably already more favoured in that respect.

Following on from this last result, the model works rather better when the population is not split into different types. Splitting the population should worsen the results, instead of improving them, as we expect only partial compensation for bad circumstances, not compensation which totally "levels the playing field"²³ *i.e.* fully compensates for unfavourable backgrounds.

Axiom EIER implies that the final outcome, net income in our study, should be the same for people with equal responsibility characteristics (Table 5): INCOME should be positively correlated with the effort variables and independent of the others. The results do not support this interpretation: surprisingly, the two "effort" variables which were significant in the estimation of transfers (EMPLOYED and UNEMPLOYED) are not significant here, except for women in model (3). However, two other effort variables are significant: effort at work in the case of men and effort in unemployment in the case of women, although not necessarily with the expected sign (both attract significant negative estimated coefficients).²⁴ Again, note the significant effect of the couple variable, especially for men.

The circumstances variables, which should be insignificant under EIER, attract in fact significant estimates. Some of these concern parents' characteristics (parents' schooling, again with a marked effect of the parent of the same gender, or parents' occupation). Disability, the number of children, and retirement also have a strong effects on income: positive for disability and a large number of children, negative for retirement for women. Age variables also have a significant effect. From this, one can conclude that axiom EIER is clearly not validated by our results.

23. ROEMER's expression, meaning a true equality of opportunities.

24. These paradoxical results might be an illustration of the "poverty trap" often mentioned in France concerning the population whose income is mainly provided by public subsidies: at the bottom of the wage distribution, strong disincentive effects on labour have been shown to take place because even low wages cannot be cumulated with many subsidies (see, for example BOURGUIGNON and CHIAPPORI [1998], or LAROQUE and SALANIÉ [2002]). Thus, a non negligible number of workers who work longer do actually get a lower income because they lose their eligibility to many benefits (see GURGAND and MARGOLIS [2001]).

Concluding remarks

The results from the empirical analysis of the axioms ETEE and EIER are clearly very different. The French welfare system loosely meets the assumptions of axiom ETEE of equal transfer for equal non-responsibility characteristics, but only under a very limited conception of responsibility: individuals are not responsible for the number of their children, nor for their labour force or marital status. Hence being single, having a large number of children or being disabled are considered as “non-responsibility” characteristics which the State compensates for. However, axiom EIER clearly does not hold. Income does not seem to be the consequence of effort only (in fact, effort does not play much of a role at all, but that could be linked to the choice of our sample, which includes only low income households). The results obtained in model (3) are not significantly different from those of model (2).

As our sub-sample is rather specific, one natural extension of the paper will be to examine whether these results continue to hold for the whole population. ▼

TABLE 3

Probit equation for no income tax liability

Variables	Men (5454 obs)	Women (6715 obs)
Intercept	- 0.51*** (0.11)	N.S.
Employed	- 0.95*** (0.11)	- 0.86*** (0.06)
Unemployed	N.S.	N.S.
Inact choice	Ref	Ref
Couple	N.S.	- 0.57*** (0.04)
No couple	Ref	Ref
Father without schooling	0.32*** (0.1)	N.S.
Mother without schooling	0.22** (0.1)	0.39*** (0.08)
Father with secondary education	N.S.	- 0.17** (0.08)
Mother with secondary education	N.S.	N.S.
Father with technical education	N.S.	N.S.
Mother with technical education	N.S.	N.S.
Father with higher education	N.S.	- 0.54*** (0.11)
Mother with higher education	N.S.	0.29** (0.14)
Hand health	0.24*** (0.07)	N.S.
Retired	- 0.44*** (0.11)	- 0.41*** (0.06)
Nb child 0	N.S.	- 0.22*** (0.06)
Nb child 1	Ref	Ref
Nb child 2	0.33*** (0.07)	0.19*** (0.06)
Nb child more	1.52*** (0.08)	1.06*** (0.07)
Age1625k	0.19** (0.08)	0.25*** (0.06)
Age2650k	Ref	Ref
Age51plk	- 0.17** (0.08)	- 0.46*** (0.07)
Farmer	0.66*** (0.15)	0.98*** (0.16)
Artcomk	N.S.	N.S.
Manager	-0.72*** (0.11)	- 0.67*** (0.09)
Blue Collar	0.24*** (0.09)	N.S.
Employed	Ref	Ref
Foreign	0.15** (0.07)	0.11** (0.06)
Log Likelihood	- 2126.19	- 2843.97

*** significant at 1%, ** significant at 5% and * significant at 10%.

TABLE 4

Estimation of transfers (relative effort variables)

Variables	Transfer 1 (Men)			Transfer 2 (Men)			Transfer 1 (Women)			Transfer 2 (Women)		
	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
Intercept	1603.88*** (248.7)	2422.3*** (300)	2064.4*** (290)	1640.3*** (145.2)	2189.2*** (197.7)	1426.2*** (208.9)	1185.7*** (230.5)	1709.1*** (290.4)	1567.6*** (222)	1025*** (89.6)	898.5*** (160.3)	902.7*** (131)
Employed	-760.9*** (157.5)	-1623.6*** (381)	N.S.	-867.7*** (127.4)	-1901.3*** (255.7)	-420.5** (183.5)	-704.8*** (160.6)	N.S.	903.3** (386)	-377.3*** (93)	N.S.	N.S.
Unemployed	351.4*** (151.4)	764.1*** (123.4)	529.7*** (127.3)	321.9*** (138.9)	815*** (104.4)	748.8*** (114.5)	410.3*** (144.3)	634.3*** (154)	448.8*** (155.6)	460.7*** (114.6)	691.4*** (118.4)	489.6*** (121.7)
Inact choice	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Effjob2	N.S.	N.S.	-7.8* (4.2)	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Low effort in education	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
High effort in education	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	-142* (84)	N.S.	N.S.	-128.3* (66.4)
Low effort in unemployment	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
High effort in unemployment	N.S.	N.S.	382.6*** (112.5)	N.S.	N.S.	479.8*** (103.6)	N.S.	N.S.	330.4*** (140.6)	244.6* (132.2)	298.1** (124.5)	556.3*** (111.3)
Couple	-222.1*** (80.5)	N.S.	-214.3*** (83.2)	-365.5*** (70.3)	-183.8** (79.7)	-445.5*** (74.8)	-788.2*** (116.4)	-410.1*** (106.7)	-296.7*** (91.6)	-590.7*** (62.1)	-428*** (82.4)	-433.2*** (64.5)
No Couple	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Father without schooling	N.S.	N.S.	-220.8* (125.7)	N.S.	N.S.	-258.4** (116.1)	N.S.	N.S.	-308.8** (154)	N.S.	N.S.	-216.6* (122.7)
Mother without schooling	N.S.	-180* (103.1)	N.S.	N.S.	-236.1** (93.7)	N.S.	228.2* (132)	N.S.	N.S.	N.S.	N.S.	N.S.
Father with primary education or don't know	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Mother with primary education or don't know	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Father with secondary education	N.S.	-286.5** (134.6)	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	-211.9* (125.9)

TABLE 4 (continued)

	Transfer 1 (Men)		Transfer 2 (Men)		Transfer 1 (Women)		Transfer 2 (Women)				
Mother with secondary education	278.8** (127.9)	297.9** (128.3)	324.4** (130.9)	N.S.	N.S.	366.1** (145.3)	417.3*** (146.1)	393.5*** (146.5)	N.S.	N.S.	N.S.
Father with technical education	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	324** (158)	N.S.	N.S.	N.S.	N.S.
Mother with technical education	741.4*** (221.6)	630.1*** (223.1)	676.6*** (227.2)	754*** (202.4)	528.2*** (204.3)	689.3*** (213.1)	N.S.	N.S.	N.S.	N.S.	N.S.
Father with higher education	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	1133.2*** (257.7)	1494.5*** (248.1)	1380.9*** (250.1)	N.S.	N.S.
Mother with higher education	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	-959.5*** (337.5)	-1058.9*** (340.1)	-1105*** (339.9)	N.S.	-478.9* (270.4)
Hand health	N.S.	-197.5** (99.3)	N.S.	N.S.	N.S.	N.S.	209.6** (103.5)	179.9* (108.1)	180.7* (104.4)	207.3*** (81.2)	247.2*** (83.8)
Nb child 0	323.2*** (97.6)	N.S.	369.9*** (100.9)	-	-	-	-544.9*** (120.3)	-372.1*** (114.7)	-325.3*** (116.2)	-	-
Nb child 1	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Nb child 2	341.8*** (113.9)	392.2*** (119.7)	N.S.	-	-	-	N.S.	N.S.	N.S.	-	-
Nb child more	785.1*** (181.8)	528.9*** (167.8)	N.S.	-	-	-	975.8*** (199.5)	428*** (159.5)	332.4** (152.3)	-	-
Retired	-1077.2*** (148.3)	-523.7*** (107.3)	-701.3*** (105.7)	-1017.3*** (131.2)	-450.9*** (94.7)	-545.5*** (97.9)	-695.9*** (151.3)	-347.7*** (129.1)	-315.1** (129)	-604.4*** (107)	-443.6*** (101.3)
Age 1625k	-606.5*** (129.4)	-530.8*** (132.8)	-750.9*** (131.6)	-381.4*** (115.7)	-307.5*** (116.2)	-416.9*** (122)	N.S.	N.S.	N.S.	N.S.	N.S.
Age2650k	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Age51plk	-423.5*** (98.4)	-868.6*** (170.3)	-263.8** (143.2)	-265.1*** (88.8)	-843*** (136.8)	N.S.	-524.2*** (137.6)	N.S.	N.S.	-396.7*** (103.4)	N.S.
IRM	N.S.	-437.8*** (135.1)	-644.9*** (129.7)	122.3* (65.3)	-235.8*** (72.5)	N.S.	668.5*** (245.5)	N.S.	-346.8** (137.5)	324.4*** (90.6)	N.S.
R ² (%)	39.9	39.4	36.8	34.1	33.7	26.8	25.2	24.3	24.1	20.11	19.3
N obs	955	955	955	955	955	955	1362	1362	1362	1362	1362

TABLE 5

Model 2 Estimations of income (relative effort variables)

Variables	Income (Men)			Income (Women)		
	Model (1)	Model (2)	Model (3)	Model (1)	Model (2)	Model (3)
Intercep	2788*** (283.4)	2868.9*** (339.7)	2606.9*** (321.9)	3000.6*** (231.9)	3145.9*** (290.2)	2769.9*** (220.9)
Employed	N.S.	N.S.	N.S.	N.S.	N.S.	748.7* (384)
Unemployed	N.S.	N.S.	N.S.	N.S.	N.S.	395.7** (154.8)
Inact choice	Ref	Ref	Ref	Ref	Ref	Ref
Effjob2	- 10.6** (4.6)	- 10.7** (4.6)	- 11.2** (4.6)	N.S.	N.S.	N.S.
Low effort in education	Ref	Ref	Ref	Ref	Ref	Ref
High effort in education	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Low effort in unemployment	Ref	Ref	Ref	Ref	Ref	Ref
High effort in unemployment	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Couple	379.5*** (91.7)	383.9*** (98.7)	375.6*** (92.3)	N.S.	N.S.	N.S.
No Couple	Ref	Ref	Ref	Ref	Ref	Ref
Father without schooling	N.S.	- 197* (117.4)	N.S.	N.S.	N.S.	- 374** (153.3)
Mother without schooling	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Father with primary education or don't know	Ref	Ref	Ref	Ref	Ref	Ref
Mother with primary education or don't know	Ref	Ref	Ref	Ref	Ref	Ref
Father with secondary education	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Mother with secondary education	N.S.	N.S.	N.S.	429.7*** (146.2)	446.7*** (146)	419.7*** (145.7)
Father with technical education	N.S.	N.S.	N.S.	410.9*** (158.9)	425.7*** (157.9)	344.4** (161)
Mother with technical education	687.8*** (252.5)	683.7*** (252.8)	689.4*** (252.2)	N.S.	N.S.	N.S.
Father with higher education	N.S.	N.S.	N.S.	865.8*** (259.2)	957.6*** (248)	875.8*** (248.8)
Mother with higher education	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Hand health	N.S.	N.S.	183.9* (105.6)	187.6* (104.1)	N.S.	207.5** (103.9)
Nb child 0	N.S.	N.S.	N.S.	- 633.8*** (121)	- 584.5*** (114.6)	- 546.4*** (115.6)
Nb child 1	Ref	Ref	Ref	Ref	Ref	Ref
Nb child 2	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Nb child more	657.6*** (207.1)	640.4*** (190.1)	672.8*** (174.7)	717.4*** (200.7)	594.7*** (159.4)	630.5*** (151.6)
Retired	N.S.	N.S.	N.S.	- 293* (152.2)	N.S.	N.S.
Age 1625k	- 411.7*** (147.4)	- 421.7*** (150.4)	- 413.9*** (146.1)	N.S.	N.S.	N.S.
Age 2650k	Ref	Ref	Ref	Ref	Ref	Ref
Age 51plk	- 562.3*** (112.1)	- 576*** (193)	- 483.6*** (159)	- 381*** (138.4)	N.S.	N.S.
IRM	N.S.	N.S.	N.S.	531.3** (247)	325** (141.1)	291.8** (136.8)
R ² (%)	23.1	23.2	23.2	17.14	17.1	17.7
N obs	955	955	955	1362	1362	1362

*** significant at 1%, ** significant at 5% and * significant at 10%.

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APPENDIX 1

The population is split into T types. Type t_k , $t_1 \leq t_k \leq T$ is determined by the value of one variable in a^e , a^{ej} , the respondent's father's level of education: if $a_i^{ej} = k$, then individual i will belong to type t_k . The responsibility characteristics will then be defined in relative terms using observable variables. For example, the variable "job effort" is constructed as follows using the corresponding value of hours of work:

$$i \in t_k \quad \implies \quad a_i^{rm} = b_i^m - \text{mean}(b_i^m)$$

where b_i^m is the value for individual i of the observable variable b^m , corresponding to the true responsibility characteristic arm. This holds if b^m is continuous. When b^m takes discrete values, it makes sense to create discrete values for the variable a^{rm} also. Here, we use two categories ($n = 2$) for discrete variables, because of their tight distribution of fathers' level of education.

APPENDIX 2

TABLE 6

Probit estimation of employed/unemployed (whole sample).

	Men (955 Observations)		Women (1362 Observations)	
	Employed	Unemployed	Employed	Unemployed
Intercept	N.S.	- 1.76*** (0.43)	N.S.	- 1.42*** (0.21)
Couple	0.26* (0.14)	N.S.	- 0.35*** (0.09)	- 0.34** (0.15)
Nodiplok	- 0.3*** (0.1)	0.45* (0.27)	- 0.41*** (0.08)	N.S.
Bacck	N.S.	N.S.	N.S.	N.S.
Suppk	N.S.	N.S.	0.37** (0.19)	N.S.
Hand Health	0.52*** (0.15)	N.S.	N.S.	- 0.54* (0.3)
Nb child 0	- 0.63*** (0.16)	N.S.	N.S.	N.S.
Nb child 2	N.S.	N.S.	N.S.	N.S.
Nb child more	0.34** (0.15)	N.S.	- 0.23** (0.12)	- 0.4** (0.2)
Age1625k	0.35* (0.19)	N.S.	N.S.	0.6*** (0.19)
Age51plk	- 1.25*** (0.12)	- 0.65* (0.36)	- 1.09*** (0.13)	- 0.88*** (0.28)
Rural	0.5*** (0.14)	N.S.	0.22** (0.11)	N.S.
Urb20	N.S.	N.S.	N.S.	N.S.
Urb100	N.S.	N.S.	N.S.	N.S.
Paris	N.S.	N.S.	N.S.	0.38* (0.22)
Etrk	N.S.	N.S.	N.S.	N.S.
Mcond	-	4.95*** (0.44)	-	3.44*** (0.18)
Log Likelihood	- 449.93	- 62.3	- 702.53	- 185.49