Is ELIE a wasteful minimum income scheme?*

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Abstract

ELIE can be interpreted as a minimum income scheme, financed by lump-sum taxes. It may induce social waste as individuals with a low taste for working may opt for voluntary unemployment. We simulate the magnitude of this social waste with microdata for Belgium and compare ELIE with a first-best scheme and a second-best scheme (based on a linear income tax), implementing the same minimum income. As expected, the social waste induced by ELIE is intermediate between the social waste induced by the first- and second-best schemes. Assumptions about the preferences of the voluntarily unemployed play a crucial role.

1 Introduction

Serge-Christophe Kolm's (2005) book Macrojustice (MJ in the sequel) is concerned with "the most general rules of society and their application to the distribution of the benefits from the main resources" (MJ, p.1). Kolm rejects the traditional welfarist approach to income taxation and substitutes for it an ideal of equal freedom. Given the crucial importance of the freedom to act, taxes and transfers must be based on so-called inelastic items, i.e., items which are not affected by individual actions. In Kolm's view these inelastic items must be the productive capacities of the individuals. He then proposes an operational tax-benefit scheme, called ELIE (equal-labour income equalization). The basic idea of ELIE is simple. Society fixes an amount of "initial equal labour" and distributes all the proceeds from working this amount of labour equally over all individuals. This equally distributed amount can be interpreted as a kind of minimum income. Individuals with a productivity smaller than the average in society receive a transfer, individuals with a larger than average productivity have to pay a tax. Each individual keeps full freedom to choose her actual amount of labour time and may keep for herself the income resulting from working more than the "initial equal labour".

The basic motivation for ELIE is an ethical one, i.e., the importance of respecting the freedom to act. However, in Kolm's view, ELIE also has attractive incentive properties. It is basically a tax on wages, not on incomes, and it is incentive-compatible for all those who are working more than the "initial equal labour": indeed, for them, additional units of labour remain untaxed and earn an additional income equal to the individual's productivity. However, there are two potential problems with this argumentation.

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First, it assumes that wages are perfectly observable for all those who are working. While it is true that there is now reasonably reliable information on wages available, or that wages can be calculated from observations on income and on labour time, one may fear that this information could become much less reliable when ELIE were to be introduced. Second (as acknowledged by Kolm himself), the incentive-compatibility argumentation does not go through for those who work less than the "initial equal labour", including the (in)voluntarily unemployed. These can get a minimum income if they do not work at all, and therefore may have an incentive to hide their true productivity.

In this paper we do not focus on the basic ethical foundations of ELIE, but on these incentive issues. Moreover, we will take it for granted that wages are observable for those who are working more than the initial equal labour and we will only focus on the issue of voluntary unemployment, linked to the minimum income feature of ELIE. In section 2, we propose a simple model of the labour market, which is very similar to Kolm's model. We introduce three tax-benefit schemes: (1) a first best ELIE scheme, in which productive capacities are perfectly known, (2) Kolm's ELIE scheme with waste, in which productive capacities are perfectly known for the working population, but not for the (in)voluntarily unemployed, and (3) a traditional second-best (linear) income tax scheme, in which incomes are observed and taxed but productive capacities are not known. We show how ELIE may induce social waste. This immediately raises the (empirical) question of the amount of waste induced. In section 3, we simulate the results for the three tax schemes with Belgian microdata. It turns out that the social waste in Kolm's ELIE scheme is intermediate between the other ones (as expected) and its relative magnitude is highly sensitive to some of the assumptions, especially to the taste of the voluntarily unemployed. Section 4 concludes.

2 Does ELIE induce waste? Three minimum income schemes

To explain the effects of the ELIE tax-benefit scheme, we propose a stylized model of the labour market —which is similar to Kolm's model (see, e.g., MJ, ch. 9-10, 144-184). We assume that individuals differ both in their productive capacities (= constant marginal productivities) and in their preferences for leisure. Tastes and productivities are assumed to be independently distributed. The continuous density function of the productive capacities $w \geq 0$ is given by f (with $f > 0$ on $\mathbb{R}_+$). Each individual belongs to one of a discrete number of taste types $i \in N = \{1, 2, \ldots, n\}$. We use $p_i > 0$ to denote the proportion of individuals with taste type $i \in N$. To simplify the analysis we assume that preferences are quasi-linear in consumption. Summarizing, we have:

Assumption A1: Gross income y equals $w\ell$, i.e., a multiplication of individual productivity $w \geq 0$ and (adjusted) labour $\ell \geq 0$, which is itself a function of labour duration, intensity, speed, and so on (MJ, ch.9, p.145).[1]

Assumption A2: Individuals have preferences over consumption and labour. They like consumption (net income) $c = y + t$, with t a transfer, they dislike labour ℓ, and preferences are strictly convex (MJ, ch.9, figure 9-1, p.157). More specifically, the preferences of each taste type $i \in N = \{1, 2, \ldots, n\}$ can be represented by a utility function $U_i : (c, \ell) \mapsto c - \frac{1}{\alpha_i} \frac{\varepsilon}{1+\varepsilon} \ell^{\frac{1+\varepsilon}{\varepsilon}}$, with $\varepsilon > 0$ the labour supply elasticity and $\alpha_i > 0$ a taste (or ambition) parameter.

Assumption A3: Tastes and productivities are independently distributed.

[1] Note that —in contrast with Kolm (MJ, ch.9, p.145)— we do not restrict ℓ to be bounded in some interval, say $[0, 1]$.

Note that the preference specification in A2 excludes income effects, i.e., giving an amount of money to an individual does not change her labour supply decision (see, e.g., Atkinson, 1990; Diamond, 1998). A further consequence of assumption A2 is that individuals end up with either $y > 0, \ell > 0$ (and thus $w > 0$ must hold for these individuals) or $y = \ell = 0$ (with $w > 0$ for the voluntarily unemployed and $w = 0$ for the involuntarily unemployed). Other combinations of y and ℓ are not possible. As a matter of definition, individuals with a 'real' productivity $w = 0$ are said to be involuntarily unemployed (irrespective of ℓ); the voluntarily unemployed are defined as individuals with a productivity $w > 0$ who choose $\ell = 0$.

Traditional tax theory assumes that gross income y $(= w\ell)$ is observable, while productive capacity w is not. A linear income transfer system with a uniform lump sum transfer B and a constant marginal tax rate τ can then be defined as follows:

LINEAR INCOME TAX: $T_\tau : w\ell \mapsto B - \tau w\ell$, with $B = \tau \int_0^\infty (w\ell) f(w)\, dw$

On the other hand, ELIE assumes that the productivities w are observable, either directly, e.g. from a paysheet, or indirectly, by observing $y = w\ell$ and ℓ, and dividing both (MJ, ch.10, p.172). We assume that, if the paysheet reveals w, then it also reveals both y and ℓ, with $w = y/\ell$. As a consequence, we can write the transfer as $t = T(y/\ell)$, with T a function of 'real' productivity. If (all the) wages are perfectly observed, we define the first best ELIE transfer scheme for a given parameter $k \geq 0$ as follows:

FIRST BEST ELIE: $T_k^{FB} : y/\ell \mapsto k(\overline{w} - y/\ell)$, with $\overline{w} = \int_0^\infty wf(w)\, dw$,

where a budget constraint has been imposed such that the average ELIE-transfer is equal to zero. Note that the parameter k determines the degree of redistribution and plays therefore an analogous role as τ in the linear income tax, while the minimum income $k\overline{w}$ is analogous to the uniform lump sum transfer B.

If one wants to implement the first-best ELIE scheme, one immediately faces the problem that y/ℓ is not well-defined when $y = \ell = 0$. This raises the issue of what productivity should be ascribed to the (voluntarily and involuntarily) unemployed, and therefore the issue of what transfer they should receive. Kolm proposes that for the application of ELIE, an individual i facing the labour market constraint $\ell_i \leqslant \ell_i^0$ should be interpreted as having a productive capacity $w_i = 0$ for $\ell_i > \ell_i^0$; the involuntarily unemployed (with $\ell_i^0 = 0$) thus have $w_i = 0$. But since we cannot distinguish between voluntarily and involuntarily unemployed, we define the 'revealed' productivity $\widehat{w}$ equal to 0, whenever $y = \ell = 0$ (Kolm, MJ, ch.13, p. 215). Of course, this redefinition implies that the budget requirement also has to be adapted by replacing the mean 'true' productivity $\overline{w}$ by the mean 'revealed' productivity, i.e., $\overline{\widehat{w}} = \sum_{i \in N} p_i \int_{w|\ell_i(w)>0} wf(w)\, dw \leq \overline{w}$, with $\ell_i(w)$ the labour choice of an individual with taste type i and productivity w. The ELIE transfer scheme then becomes

ELIE WITH SOCIAL WASTE :

$$T_k^{SW} : y/\ell \mapsto k\left(\overline{\widehat{w}} - y/\ell\right), \text{ with } y/\ell \overset{def}{=} 0 \text{ if } \ell = 0 \;\&\; \overline{\widehat{w}} = \sum_{i \in N} p_i \int_{w|\ell_i(w)>0} wf(w)\, dw. \qquad (1)$$

Equation (1) immediately shows the reason for the terminology "ELIE with social waste". Indeed, it is obvious that individuals can hide their 'true' productivity w by not working and thus revealing a productivity $\widehat{w} = 0$. In fact, Figure 1 (with labour, not leisure, on the horizontal axis) shows that not working (and therefore hiding her productivity), resulting in the minimum income $k\overline{w}$, may be beneficial for an individual with productivity $w > 0$, i.e. may yield a higher utility level than working and getting the income $y_i = k\overline{w} + w(\ell_i - k)$. Of course, if there are individuals shirking, the budget constraint will then lead to a downwards shift of the whole transfer scheme for everybody.

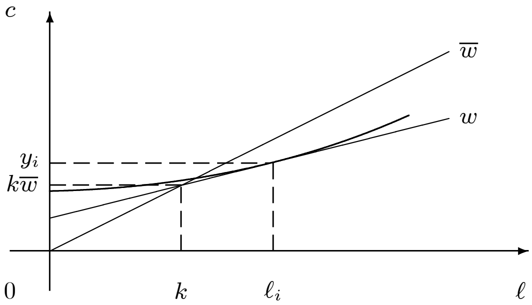

Figure 1: It might be beneficial to hide your true productivity.

Since individuals can only choose to reveal their true productivity (choose $\widehat{w} = w$) or to hide it (choose $\widehat{w} = 0 \leq w$), our model is a peculiar case of Dasgupta and Hammond (1980), in which individuals can choose to work at (and reveal) any productivity level $\widehat{w} \leq w$. Given the specific structure of the ELIE scheme as displayed in Figure 1, it is always the case that, *if* it is beneficial for someone with a productivity $w > 0$ to hide it and to work at a lower rate $\widehat{w}$, with $0 < \widehat{w} < w$, *then* it is optimal for this individual to choose to reveal $\widehat{w} = 0$. Therefore, the current model with two discrete choices $\widehat{w} = w$ and $\widehat{w} = 0$ is sufficient to capture the essential features of Dasgupta and Hammond (1980).

We will now further analyse the labour market equilibrium if Kolm's ELIE is implemented. Individual decisions are linked to each other through the budget requirement. Letting $I(\cdot)$ denote an indicator function which equals 1 in case the statement between brackets is true, and zero otherwise, we define:

Labour supply equilibrium: A labour supply equilibrium for the ELIE scheme in equation (1) is a list $(\ell_1^*, \ell_2^*, \ldots, \ell_n^*)$ of maps $\ell_i^* : \mathbb{R}_+ \to \mathbb{R}_+ : w \mapsto \ell_i^*(w)$, one for each taste type $i \in N$, such that, for each $i \in N$, for each $w \in \mathbb{R}_+$ and for each $\ell \in \mathbb{R}_+$ we must have

$$U_i\left(w\ell_i^*(w) + k\left(\overline{\widehat{w}} - wI(\ell_i^*(w) > 0)\right), \ell_i^*(w)\right) \geq U_i\left(w\ell + k\left(\overline{\widehat{w}} - wI(\ell > 0)\right), \ell\right), \tag{2}$$

with $\overline{\widehat{w}} = \sum_{i\in N} p_i \int_{w|\ell_i^*(w)>0} wf(w)\,dw$.

Note that, since individuals with taste type i and productivity w are assumed to be 'atomic', i.e., their proportion is negligible with respect to the total population, they cannot influence $\overline{\widehat{w}}$ by choosing ℓ different from $\ell_i^*(w)$, and thus $\overline{\widehat{w}}$ also appears at the right-hand side of equation (2).

The next proposition shows the existence of a unique labour supply equilibrium. It is completely defined by cut-off productivity levels w_i° for $i \in N$, such that (1) individuals with taste type i and a productivity $w \leq w_i^\circ$ choose to hide their true productivity and thus to remain voluntarily (if $w > 0$) or involuntarily (if $w = 0$) unemployed, while (2) individuals with taste type i and a productivity $w > w_i^\circ$ choose to reveal their true productivity and thus to work. The proof of the proposition is given in the appendix.

Proposition: If assumptions A1-A3 hold, then there exists a unique labour supply equilibrium $(\ell_1^*, \ldots, \ell_n^*)$ for the ELIE transfer scheme defined in equation (1) such that each individual with taste type $i \in N$ and 'real' productivity w chooses $\ell_i^*(w) = 0$ if $w \leq w_i^\circ = \frac{k^{1/\varepsilon}(1+\varepsilon)^{1/\varepsilon}}{\alpha_i}$ and $\ell_i^*(w) = w^\varepsilon \alpha_i^\varepsilon$, otherwise.

The social waste, induced by ELIE, is caused by the fact that some individuals prefer to shirk, i.e., to get voluntarily unemployed, if they are entitled to a minimum income when they do not work at all. The amount of social waste will then be determined by the (shirking) cut-off levels w_i°. As expected, these increase with k, and hence with the level of the minimum income. They decrease with the taste for working α_i. Indeed, as was already illustrated by Figure 1, the crucial condition for shirking is that the utility of shirking with income $k\overline{\widehat{w}}$, is larger than the utility of working $\ell_i^*(w)\,(>0)$ with income $w\ell_i^*(w)+k(\overline{\widehat{w}}-w)$.

It is therefore clear that in a realistic setting, the minimum income scheme implied by ELIE induces some social waste. The crucial question now becomes how much social waste is induced. The next section provides an estimate, based on a (somewhat rough) calibration and simulation exercise for Belgium.

3 How much waste is induced? An empirical analysis

We base our simulation study on the individual observations available in the last wave of the Panel Study of Belgian Households (1992-2002). We calibrate the parameters of our model so as to replicate as well as possible these individual data (subsection 3.1). We then show in subsection 3.2 the results for the benchmark values of the parameters. The most interesting insights are obtained from the sensitivity analysis in subsection 3.3.

3.1 Data and calibration

We restrict ourselves to the individuals in the potential workforce. The latter is defined as consisting of those individuals who either (1) have work (possibly temporarily suspended), or (2) who do not have work, but are neither retired, nor sick, nor handicapped, and so on. Total sample size of the potential workforce is equal to 3789 individuals. Unemployment among the potential workforce equals 22.8%. Figure 2 presents a kernel density estimate of labour supply (in actual hours worked per week) for the working population only. The 'typical' peaks around half-time and full-time, together with the large group of unemployed (not taken up in figure 2) suggest to use three taste types, α_L (low) α_M (medium) and α_H (high), for those *voluntarily* not working ($\ell = 0$), those working in between 0 and 30 hours a week ($0 < \ell \leq 30$) and those working more than 30 hours a week ($\ell > 30$), respectively; the taste values used in the simulation will be calibrated later on. The data do not allow us to distinguish the involuntarily employed (with $w = 0$) from the voluntarily unemployed (with $0 < w \leqslant w_i^\circ$). We therefore define a parameter β, indicating the fraction of the voluntarily unemployed in the total group of the unemployed (22.8% of the sample). In our benchmark simulation we (arbitrarily) put $\beta = 0.5$. The proportions of individuals in the different groups are then equal to $p_L = 0.114$, $p_M = 0.123$ and $p_H = 0.649$; the proportion of involuntarily unemployed is denoted $p_0 = (1-\beta)\,0.228 = 0.114$.

Figure 2a shows a density estimate of the logarithm of 'revealed' *gross* hourly wages $\widehat{w}$ for the employed. If we assume that no one has an incentive to reveal a productivity $\widehat{w}$ in $(0, w)$, the revealed productivities of the employed must correspond to their true productivities. The distribution is approximately normal with a sample mean and standard deviation equal to 2.65 and 0.36, respectively; this corresponds with a mean gross hourly wage equal to €15. Note that lognormality cannot be statistically rejected (Shapiro-Wilk test). In Figure 2b we look at the logarithmic wage density again, but now separately for the medium and the high taste types.

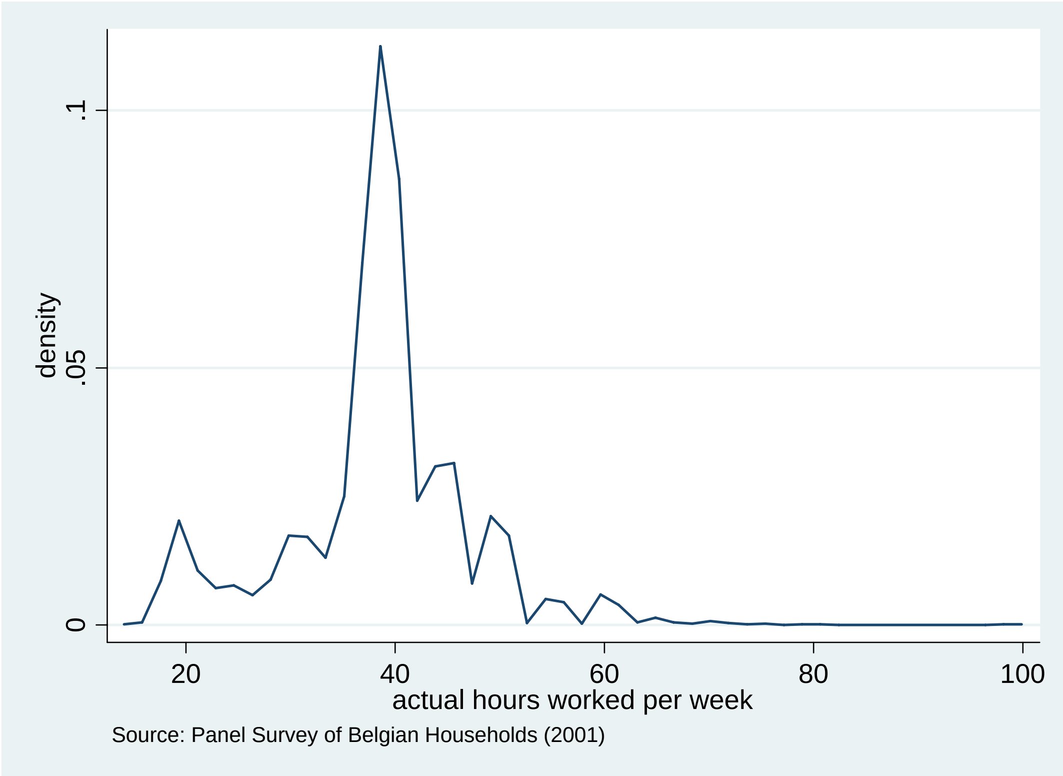

Figure 2: Kernel estimate of the 'actual' labour supply density of the working population.

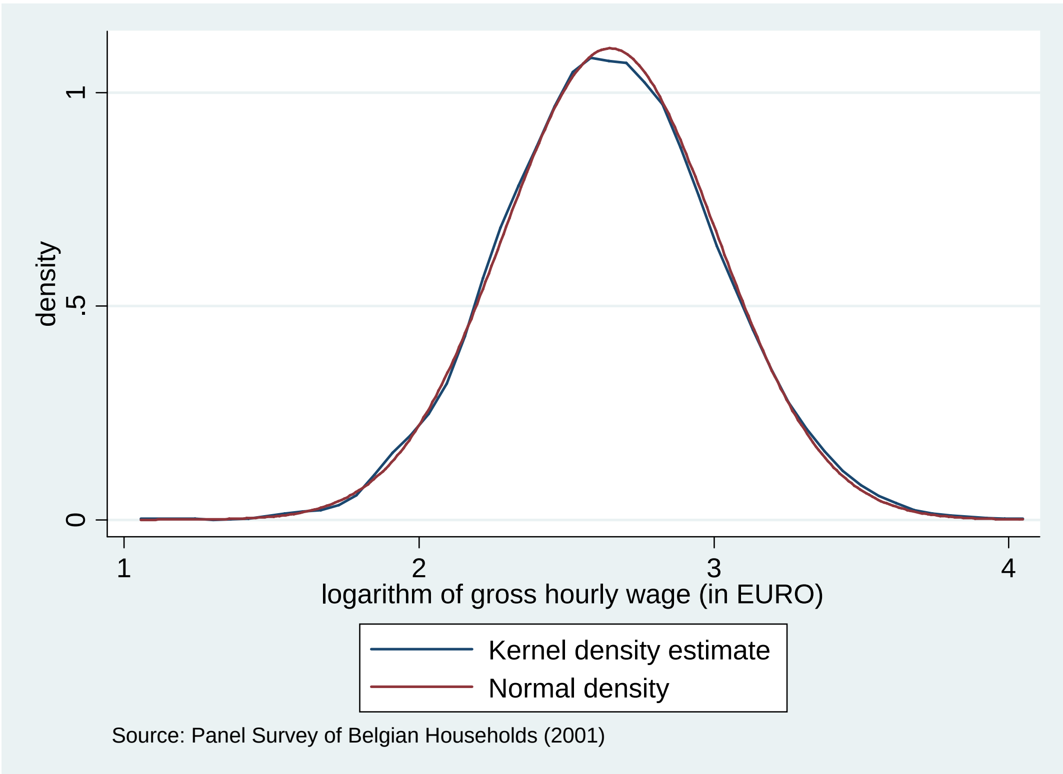

Figure 2a: Kernel estimate of the *gross* hourly log wage density.

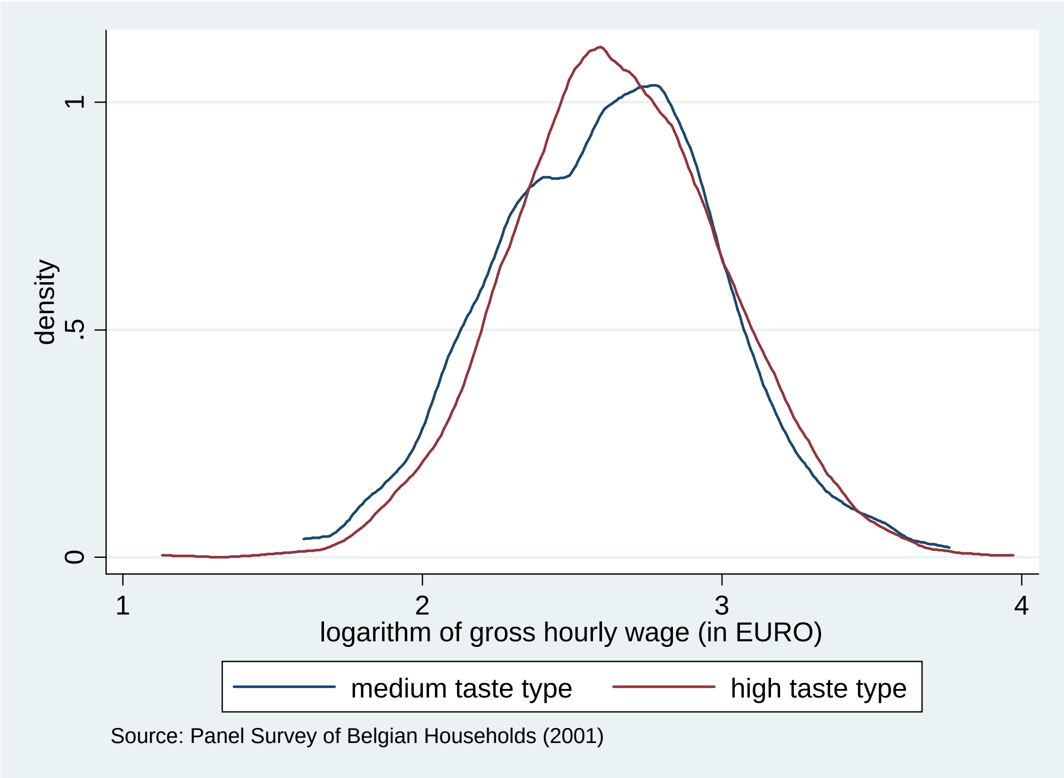

Figure 2b: Kernel estimates of the *gross* hourly log wage density for the medium and high taste types.

Equality of both distributions cannot be statistically rejected (Kolmogorov-Smirnov test), which gives some support for our independence hypothesis between productivity and taste levels (assumption A3). Finally, the current Belgian net income scheme —which maps gross into net incomes (exclusive of social benefits)[2]— can be very well approximated by a loglinear scheme. Figure 3 plots the logarithm of net income versus the logarithm of gross income and shows a tight log-linear fit given by $c \approx 1.42y^{0.76}$ (the explained variance equals 89%).

Let us now combine all the previous information in order to calibrate the three taste values α_i, with $i = L, M, H$. The taste types α_M and α_H are calibrated to ensure that the theoretically predicted mean labour hours per week, given the 'estimated' actual Belgian net income scheme $c \approx 1.42y^{0.76}$, is equal to the observed mean labour hours per week for both types (23.9 and 41.4 hours/week respectively). Recall that all individuals are endowed with a preference technology as in assumption A2. We assume that the elasticity of labour supply ε is the same for everyone and equal to 0.25, which lies within the range of plausible empirical estimates (see Blundell & MaCurdy, 1999). Since the 'true' productivities are independently distributed from the taste types, the productivity distribution is the same for each taste type and given by $F : w \to f(w)$ with $F(0) = p_0 = 0.114$ (the proportion of involuntarily unemployed), and $F(w) = 0.114 + (1 - 0.114)\, G(w)$ for $w > 0$, with G a lognormal distribution function with mean 2.65 and standard deviation equal to 0.36 (to mimick Figure 2a).

[2] Notice that, given quasi-linear preferences in income, there are no income effects and thus, labour supply decisions are not influenced by lump-sum social transfers. (However, some social transfers are not lump-sum —e.g., unemployment insurance benefits— and therefore the calibration exercise will be distorted to some extent.)

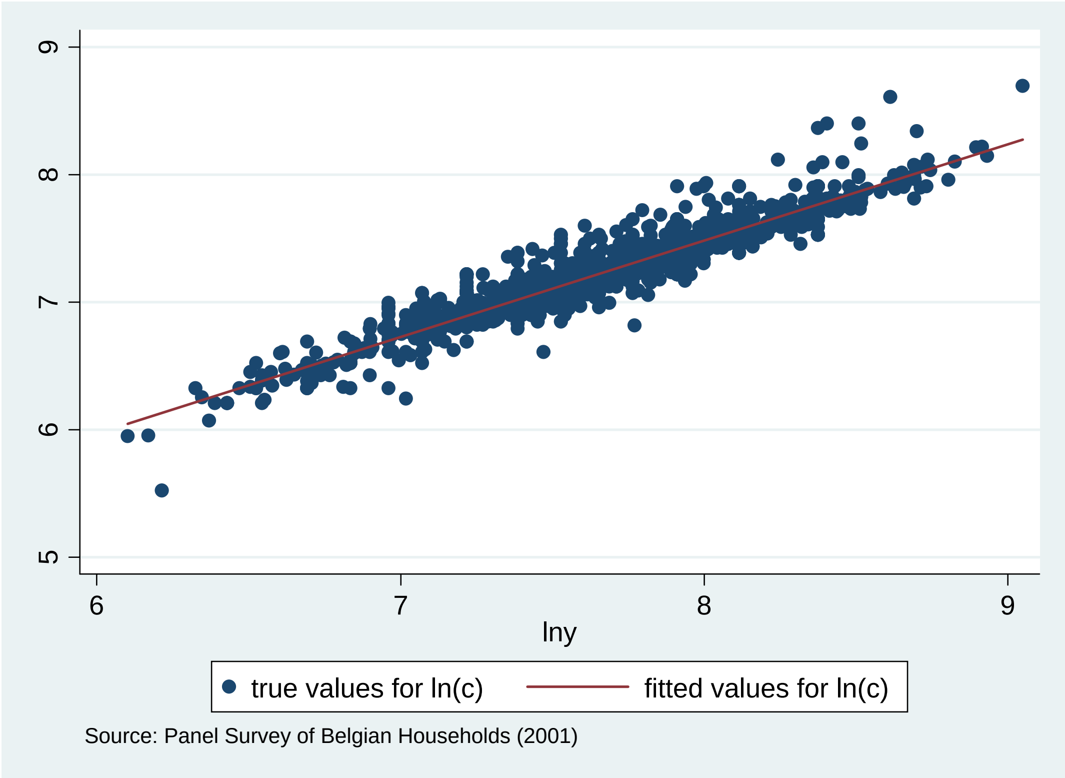

Figure 3: The Belgian tax system is approximately loglinear.

We then still have to fix a value for α_L, i.e. the preference parameter for those who are voluntarily unemployed. By definition these are individuals with $w > 0$. To calibrate α_L, we assume that they would just 'survive' in a laisser-faire economy, where survival means working 10 hours a week (which would provide them on average with a (net and gross) income equal to €603.68 per month). This assumption results in $\alpha_L(10) \approx 178150$.

We will now first show the results for the benchmark case. Remember that we made three crucial assumptions about the benchmark parameters: we have assumed that β (the fraction of the voluntarily unemployed in the total unemployed) $= 0.5$, that these voluntarily unemployed would be able to just survive in a laissez-faire economy ($\alpha_L(10) \approx 178150$), and that the elasticity of labour supply $\varepsilon = 0.25$. We will show in subsection 3.3 the results of a sensitivity analysis with respect to each of these assumptions.

3.2 Results for the benchmark case

Figure 4a shows gross income per capita (in € per month) as a function of the implementable minimum income $k\widehat{\overline{w}}$ (in € per month). Figure 4b shows the welfare losses induced by the different schemes as a percentage of gross income. In 2002-2003 the actual minimum income in Belgium for a single individual was about €600 per month. This corresponds to redistributing the value of one day work per week and will be the focal point of our analysis.

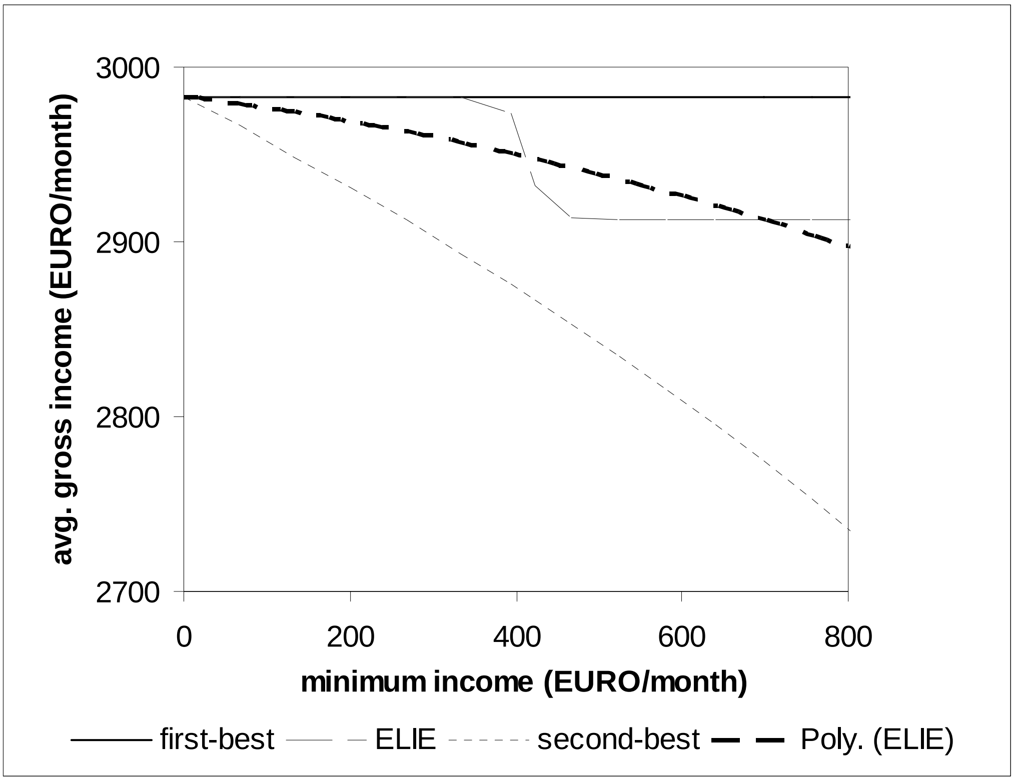

Figure 4a: Average gross income as a function of minimum income, given $\varepsilon = 0.25$ & $\beta = 0.5$ & α_L (10).

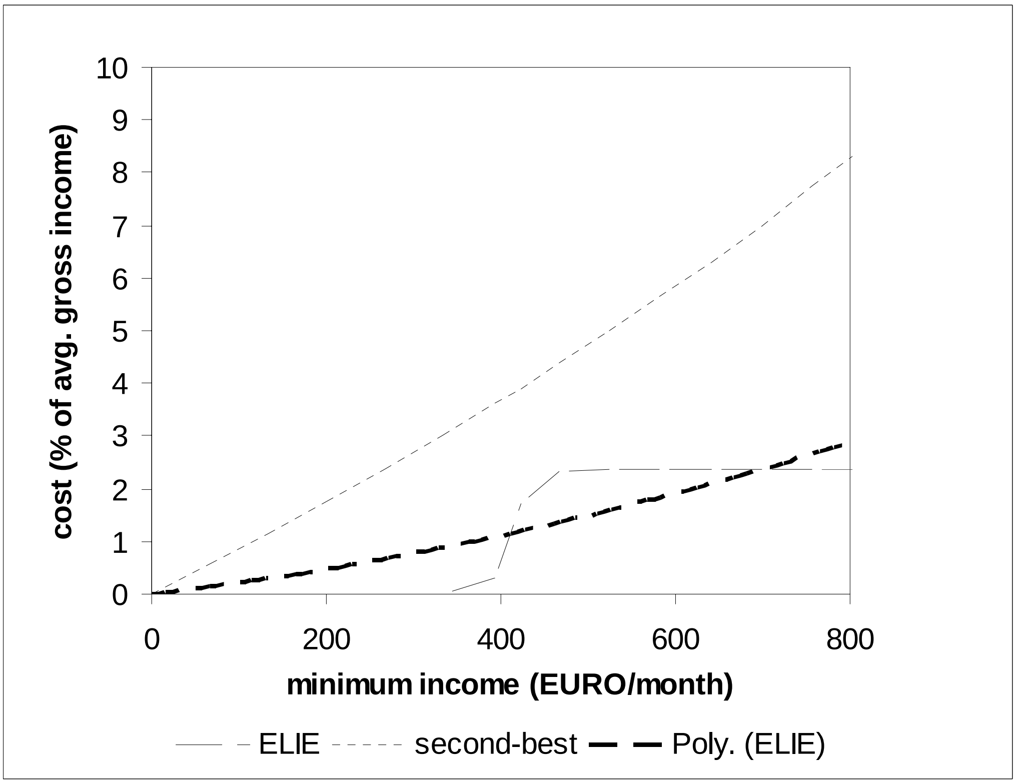

Figure 4b: Efficiency cost as a function of minimum income, given $\varepsilon = 0.25$ & $\beta = 0.5$ & α_L (10).

If ELIE could be implemented in a first-best way, there would be no efficiency cost to society.[3] This first best gross income per capita is given by the horizontal solid line in Figure 4a. The second-best (linear income tax) scheme shows gross income per capita for a linear income tax scheme which implements the same minimum income, i.e., with $B = k\overline{\overline{w}}$. In this case, there is of course an efficiency cost related to the imposition of a marginal tax rate τ. Figure 4b shows that this cost increases almost linearly, and becomes about 6% of gross income for a minimum income of €600/month. We are most interested in the effects of the realistic ELIE scheme (1). For very low values of $k\overline{\overline{w}}$ there is no efficiency cost at all, because all those with $w > 0$ prefer to work. However, once the minimum income approaches €350 per month, the group with the lowest taste type is moving from working to not-working. From about €500 onwards, all individuals with a low taste for work have become voluntarily unemployed, and thus, gross income remains stable again. Admittedly, this is somewhat artificial, as it follows from our assumption of a discrete number of taste types. Yet, assuming more taste types would only smooth Figures 4a and 4b. To give an idea how such a smooth scheme would look like, we added in Figure 4b a polynomial trend line through the ELIE-values. The basic message remains the same: ELIE induces social waste, but for the benchmark values of our parameters it is still a considerable improvement compared to the current practice of second-best. At a minimum income of €600/month, the efficiency cost of ELIE is about 2%, i.e., one third of the efficiency cost of the linear income tax.

3.3 Sensitivity results

We now analyze to what extent the previous results are sensitive to the main choices: the labour supply elasticity ε, the proportion of voluntarily unemployed β, and the low taste type α_L. In each of these cases we only show the welfare cost as a % of gross income, for different levels of the minimum income.

We start with the elasticity of labour supply ε. Figures 5a and 5b present the same simulation as in figure 4b, but with ε equal to 0.125 (half the benchmark) or 0.5 (double the benchmark). Changing ε has the expected influence on the incentive cost of the linear income tax, which varies between 4% (for $\varepsilon = 0.125$) and 7% (for $\varepsilon = 0.5$) for a minimum income of €600/month. The effect on the social waste induced by ELIE goes in the other direction: the larger ε, the (relatively) closer ELIE comes to the first-best. Notice first that the gross income share of the (potentially) voluntarily unemployed is equal to $\frac{p_L(\alpha_L)^\varepsilon}{p_L(\alpha_L)^\varepsilon + p_M(\alpha_M)^\varepsilon + p_H(\alpha_H)^\varepsilon}$ in a laisser-faire economy. The larger ε, the lower their production share. But while in the linear income tax case all taste types continuously reduce their labour supply when the minimum income increases, this is not the case for ELIE, in which the low taste types decide to become unemployed when the minimum income becomes sufficiently high. Therefore, increasing ε brings the waste induced by ELIE (relatively) closer to the incentive cost of the first-best ELIE scheme. In fact, for $\varepsilon = 0.125$, both costs are similar for reasonable values of the minimum income. For large ε, ELIE is much more efficient that the linear income tax.

The next two figures 6a and 6b show the sensitivity with respect to β (the proportion of voluntarily unemployed) by changing it to respectively 0.25 and 0.75. If β were equal to 0, there would be only involuntary unemployment, i.e. all unemployed would have $w = 0$, and ELIE would induce no waste. In fact, the efficiency cost for ELIE remains small for $\beta = 0.25$. For increasing values of β, the waste induced by ELIE increases, while the efficiency cost of the linear income tax slightly decreases. The latter

[3] Of course, this holds as long as participation constraints —the constraint that the utility of working should be higher than the utility of the bundle $(c, \ell) = (0, 0)$— are not binding.

phenomenon is due to the fact that the increase in β is linked to an increase in the number of individuals with $w > 0$. Therefore, the same level of minimum income can be financed with a lower tax rate τ. For $\beta = 0.75$, the welfare cost of ELIE approaches that of the linear income tax at a minimum income of €500/month, but the differences grow larger again for higher values of the minimum income.

Finally, recall that the benchmark value for the low taste type α_L is chosen such that these individuals —who are voluntarily employed in the data— would 'survive' in a laisser-faire economy, where survival means working 10 hours a week. This assumption provides them a (net and gross) income equal to €603.68 per month. We change our assumptions about α_L and assume that in a laissez-faire economy the low taste types would work either 5 hours a week (earning on average €301.84 per month) or 15 hours a week (earning €905.52 per month), respectively. Figures 7a and 7b present the results. The assumption on the taste type of the voluntarily unemployed is crucial. In case of α_L (5), the low taste types choose to be unemployed already from a minimum income of €200 onwards, but the welfare cost of ELIE then stays constant at about 1.2% of gross income. In the case of α_L (15), the choice to shirk is postponed until €550, but then the welfare cost of ELIE is increasing faster, because the voluntarily unemployed work harder in the counterfactual situation without shirking. Still, at a minimum income of €750/month, the welfare cost of ELIE is only half that of the linear income tax.

4 Conclusion

Kolm (2005) largely focuses on the situation of individuals working more than the "initial equal labour time" k, because he considers this to be the true realm of macrojustice. In economies with a large unemployment rate, however, there is a considerable fraction of the population that works less than k. Some of these will be voluntarily unemployed, and, in fact, ELIE may induce some voluntary unemployment because it grants all unemployed individuals at least a minimum income. In this paper we analysed the resulting incentive problems and we used Belgian microdata to get a better idea about the empirical significance of the phenomenon. It turns out that it is not negligible. Yet, for reasonable parameter values, the welfare cost of ELIE is (much) smaller than the welfare loss induced by a linear income tax which would grant the same minimum income. As expected, a crucial role is played by the assumptions made about the preferences of the unemployed.

The relevancy of our work for "Macrojustice" should be put into perspective. First, incentive issues are not the main argument in favour of ELIE. To some extent, they are only a byproduct. Our analysis does not add anything to or detract from Kolm's ethical argumentation in terms of freedom. Second, in Kolm's overall view, ELIE is only part of a set of coherent policy proposals, which also include traditional unemployment insurance and a change in labour market policies. Our analysis captures only one aspect of this broader program, and the results might be different in a broader setting. Third, our finding that preferences are important raises interesting issues related to Kolm's view on (macro)justice as a third best, where the first best would be a society in which individuals are sufficiently able to control the birth of their desires and the second best would be a society in which people sufficiently like each other to remove all conflicts about sharing scarce resources. In such a broader view on society and on human beings, preferences can certainly no longer be seen as exogenous. Our results suggest that more research going beyond a narrow view on individual preferences, could also throw a clearer light on the strengths and limitations of ELIE.

Changing the cost of taxation ε

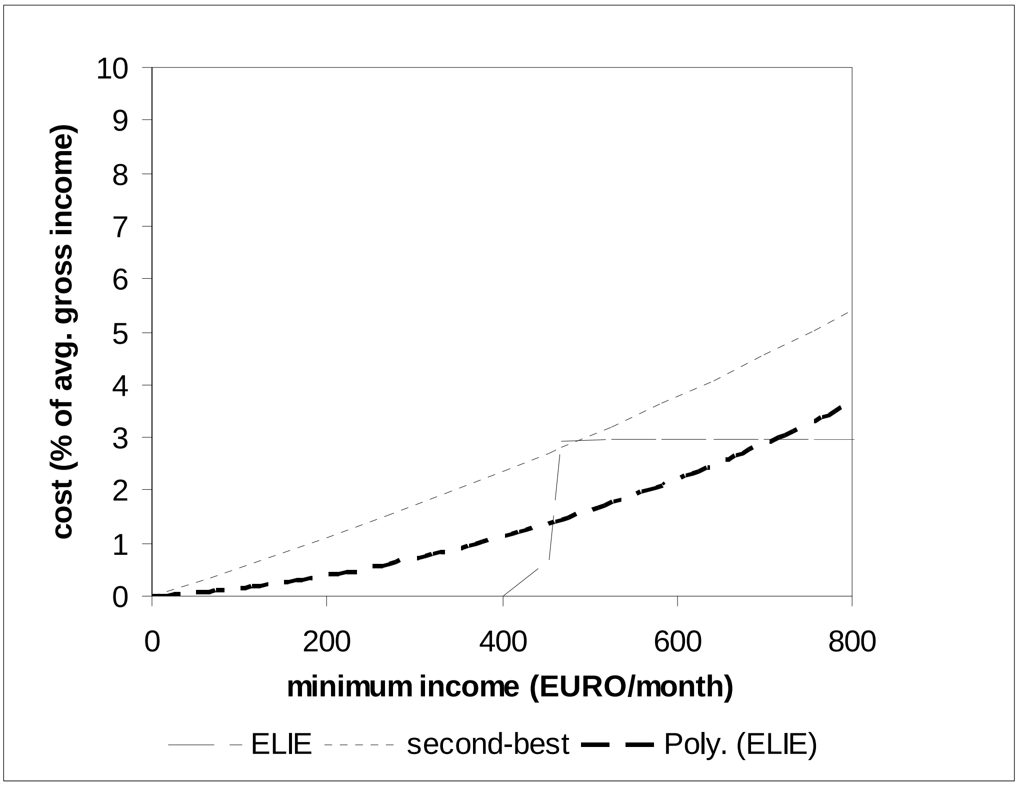

Figure 5a: Efficiency cost as a function of the minimum income, given $\varepsilon = 0.125$ & $\beta = 0.5$ & α_L (10).

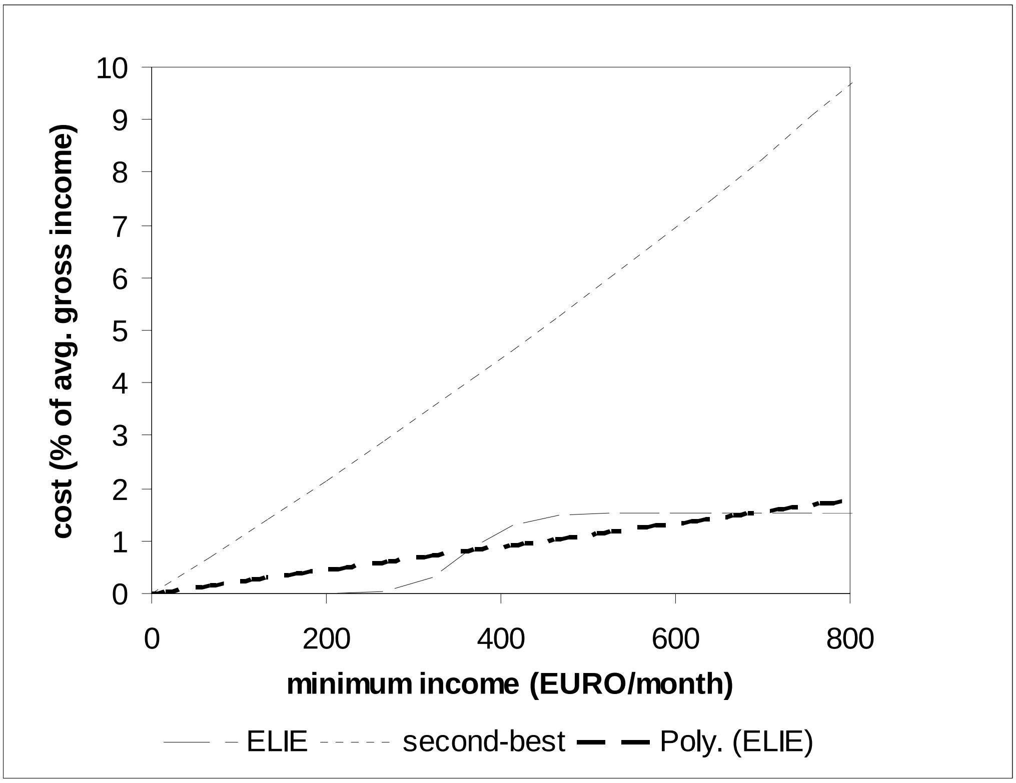

Figure 5b: Efficiency cost as a function of the minimum income, given $\varepsilon = 0.5$ & $\beta = 0.5$ & α_L (10).

Changing the proportion of voluntarily unemployed β

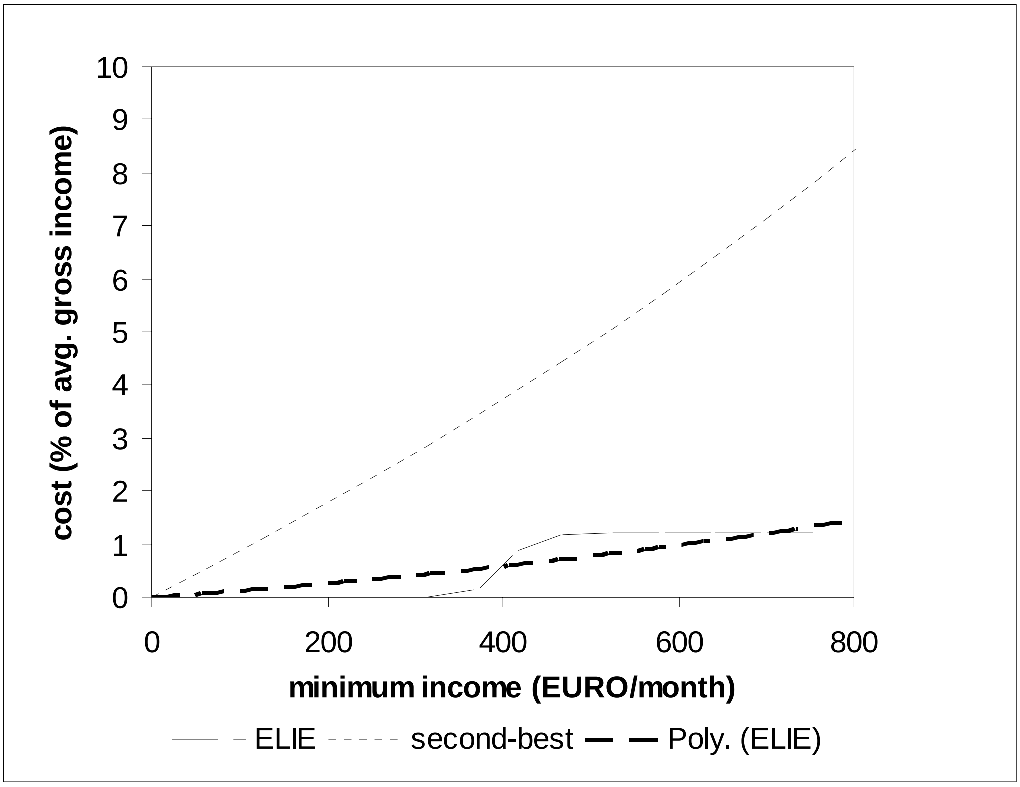

Figure 6a: Efficiency cost as a function of the minimum income, given $\varepsilon = 0.25$ & $\beta = 0.25$ & α_L (10).

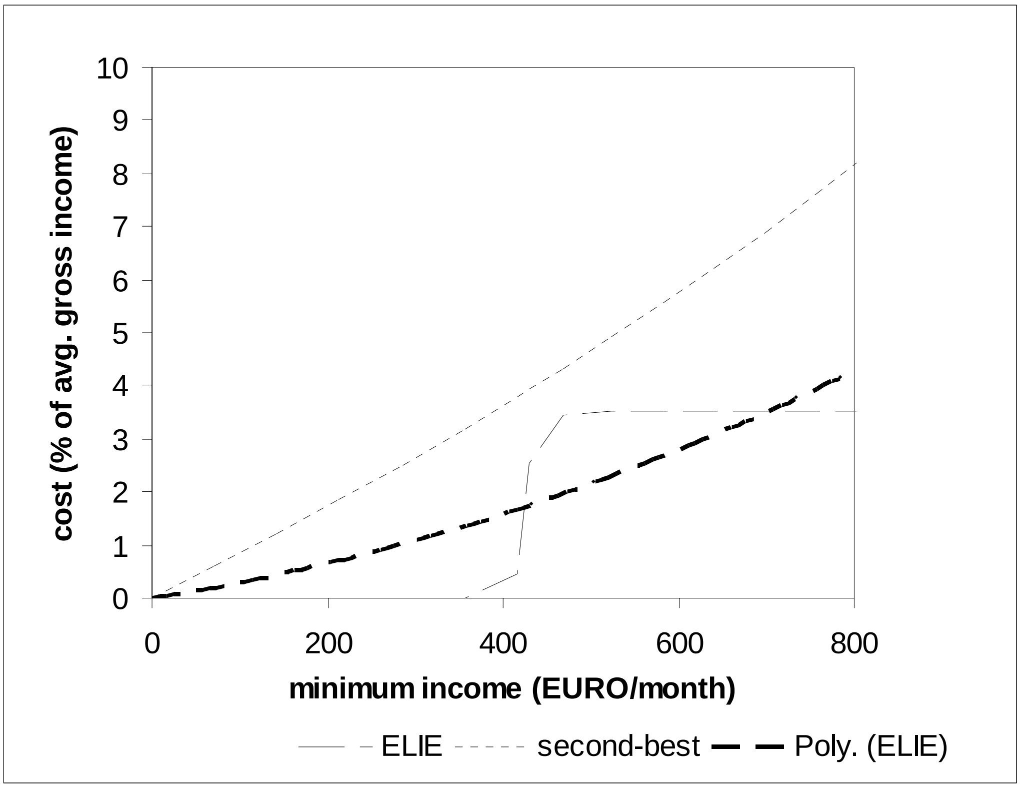

Figure 6b: Efficiency cost as a function of the minimum income, given $\varepsilon = 0.25$ & $\beta = 0.75$ & α_L (10).

Changing the low taste parameter α_L

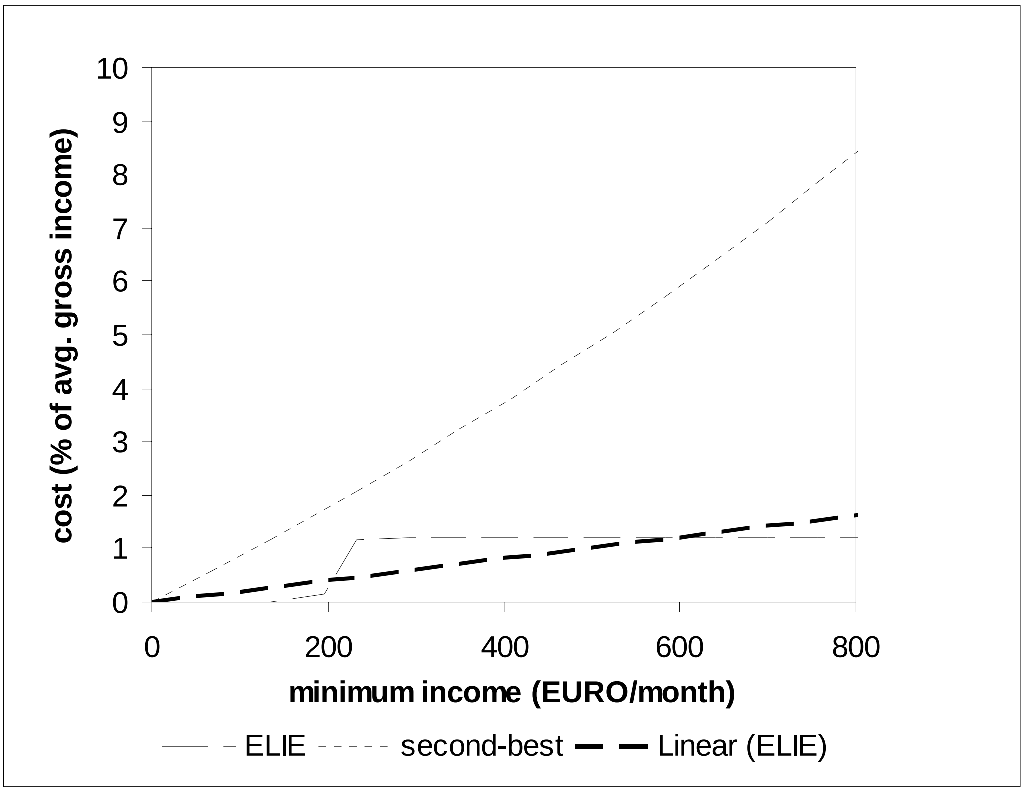

Figure 7a: Efficiency cost as a function of the minimum income, given $\varepsilon = 0.25$ & $\beta = 0.5$ & α_L (5).

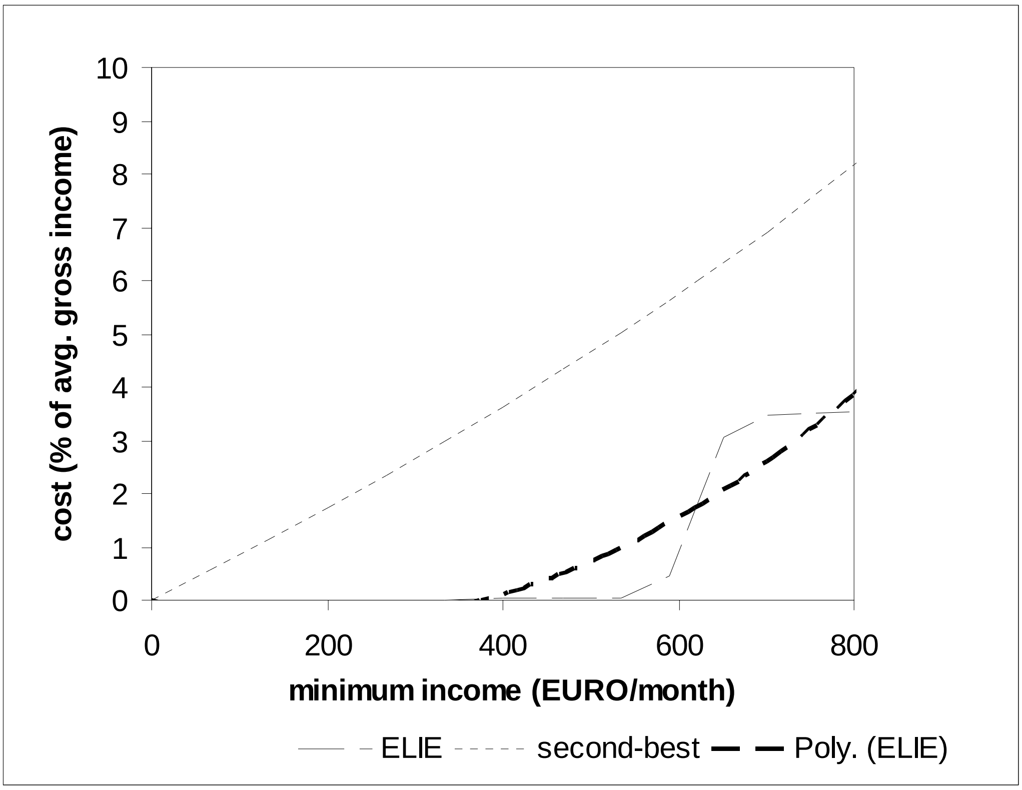

Figure 7b: Efficiency cost as a function of the minimum income, given $\varepsilon = 0.25$ & $\beta = 0.5$ & α_L (15).

Proof of proposition 1

First, we show that, irrespective of the taste type $i \in N$, (1) $\ell_i^*(0) = 0$ and (2) if $\ell_i^*(w) > 0$ for some $w > 0$, then $\ell_i^*(w') > 0$ for all $w' \geq w$. Both (1) and (2) together imply the existence of a unique cut-off level $w_i^\circ = \sup(w \geq 0 \,|\, \ell_i^*(w) = 0)$ for which indeed $\ell_i^*(w) = 0$ for $w \leq w_i^\circ$ and $\ell_i^*(w) > 0$ for $w > w_i^\circ$. Afterwards, we calculate the cut-off levels for each taste type.

First, (1) is trivial from equation (2), since for $w = 0$ and choosing $\ell = 0$ it reduces to

$$U_i\left(k\overline{\widehat{w}}, \ell_i^*(0)\right) \geq U_i\left(k\overline{\widehat{w}}, 0\right),$$

which is, given that utility is strictly decreasing in ℓ, only possible if $\ell_i^*(0) = 0$.

Second, (2) is trivial for $w' = w$ (since ℓ_i^* is, by definition, a map). We show it for $w' > w$ by contradiction. Suppose not, thus, suppose $w < w'$ and $\ell_i^*(w) > 0$, but $\ell_i^*(w') = 0$. Since type w chooses $\ell_i^*(w) > 0$ in equilibrium we must have that

$$U_i\left(w\ell_i^*(w) - k\left(w - \overline{\widehat{w}}\right), \ell_i^*(w)\right) \geq U_i\left(k\overline{\widehat{w}}, 0\right) \tag{3}$$

which is equation (2) for $\ell = 0$. Similarly, since type w' chooses $\ell_i^*(w') = 0$ in equilibrium, we need satisfaction of

$$U_i\left(k\overline{\widehat{w}}, 0\right) \geq U_i\left(w'\ell_i^*(w) - k\left(w' - \overline{\widehat{w}}\right), \ell_i^*(w)\right),$$

which is equation (2) for $\ell = \ell_i^*(w)$. The last two equations lead to

$$U_i\left(w\ell_i^*(w) - k\left(w - \overline{\widehat{w}}\right), \ell_i^*(w)\right) \geq U_i\left(w'\ell_i^*(w) - k\left(w' - \overline{\widehat{w}}\right), \ell_i^*(w)\right),$$

or, (given that there are no income effects),

$$U_i\left(w\left(\ell_i^*(w) - k\right), \ell_i^*(w)\right) \geq U_i\left(w'\left(\ell_i^*(w) - k\right), \ell_i^*(w)\right).$$

Given $w < w'$, and given the preference technology, the last inequality is possible only if $\ell_i^*(w) = k > 0$. Plugging in $\ell_i^*(w) = k > 0$ in (3) yields

$$U_i\left(k\overline{\widehat{w}}, k\right) \geq U_i\left(k\overline{\widehat{w}}, 0\right)$$

which contradicts that utility is strictly decreasing in ℓ, as assumed in A2.

Third, call w_i° the cut-off level for taste type $i \in N$. Individuals with a lower w will not work, thus, $\ell_i^*(w) = 0$ for $w \leq w_i^\circ$. Individuals with a higher w will choose to work, which, given the functional form of preferences in A2 and the labour supply equilibrium for ELIE in (2), implies that $\ell_i^*(w)$ must correspond with labour supply that maximizes individual utility, thus, $\ell_i^*(w) = w^\varepsilon \alpha_i^\varepsilon$ for $w > w_i^\circ$. The cut-off level can now be derived from the fact that it is the productivity type w which is indifferent between the bundles $\left(k\overline{\widehat{w}}, 0\right)$ and $\left(w^{1+\varepsilon}\alpha_i^\varepsilon - k\left(w - \overline{\widehat{w}}\right), w^\varepsilon\alpha_i^\varepsilon\right)$, or, given A2, w_i° solves

$$k\overline{\widehat{w}} = \left(w_i^\circ\right)^{1+\varepsilon}\left(\alpha_i\right)^\varepsilon - k\left(w_i^\circ - \overline{\widehat{w}}\right) - \frac{1}{\alpha_i}\frac{\varepsilon}{1+\varepsilon}\left(\left(w_i^\circ\right)^\varepsilon\left(\alpha_i\right)^\varepsilon\right)^{\frac{1+\varepsilon}{\varepsilon}}$$

which gives us $w_i^\circ = \frac{k^{1/\varepsilon}(1+\varepsilon)^{1/\varepsilon}}{\alpha_i}$ for each $i \in N$.

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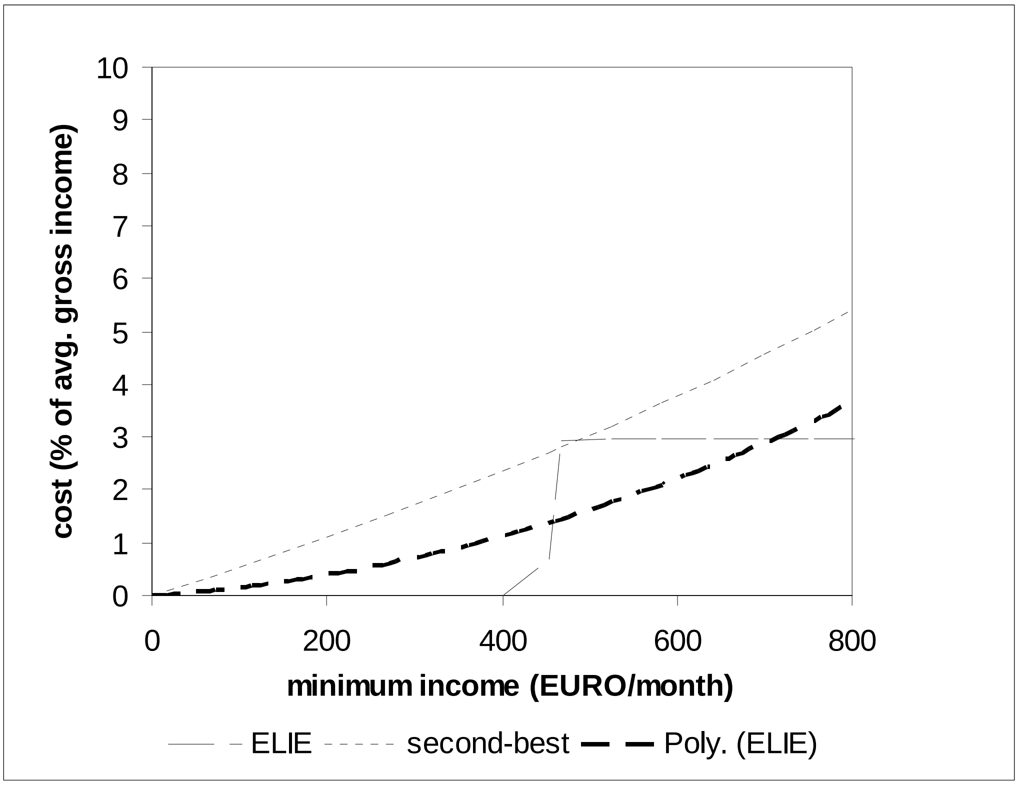
10
9
8
7
6
5
4
3
2
1
0
cost (% of avg. gross income)
0
200
400
600
800
minimum income (EURO/month)
ELIE
second-best
Poly. (ELIE)

Figure 1: