Basic income versus fairness: redistribution with inactive agents

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Abstract

Some philosophers diverge on whether redistributive transfers to able-bodied inactives would be fair. This paper evaluates their claims. Labor markets feature multidimensional heterogeneity in leisure preferences, disutilities of participation, wages and home production. The social objective champions the ethics of equality of opportunity while upholding the Pareto principle. In the Mirrleesian second-best, it turns out that welfare analysis is reduced to a sufficient statistic. Its empirical application suggests that an inactivity benefit would not be welfare-improving in most high-income countries. Overall, the equity gains of introducing a basic income with respect to equality of opportunity are tenuous, whatever its efficiency costs.

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1 Introduction

Across developed countries, a flagship feature of safety net programs is that able-bodied inactive agents are not eligible because transfers are conditioned on labor market participation[1]. Typically, cash transfers are granted either to active job-seekers through social assistance and unemployment insurance, or to low-income earners via in-work benefits.

However, in recent years, this standard scheme has been criticized by those advocating for the introduction of a universal basic income, which is a social benefit granted on an individual basis without a means test nor any work requirements (Van Parijs & Vanderborght, 2017). In the labor market, this tax-benefit reform would amount to grant some positive transfers to able-bodied inactives[2].

On the one hand, introducing a basic income may improve equity by reducing the welfare inequality between inactive and active agents. On the other hand, granting some subsidy to inactive individuals comes at the cost of disincentivizing job-seeking efforts of unemployed agents as well as work effort provided by employed individuals. This tension echoes a familiar discussion[3] on the trade-off between the equity gains and the efficiency costs of welfare benefits. While the former have been scarcely explored, the latter are subject to considerable disagreement in the literature: labor supply elasticities and the associated efficiency costs of transfers are large in Conesa et al. (2023), Daruich and Fernández (2024), and Golosov et al. (2024) but small in Cesarini et al. (2017).

In this paper, I measure the equity gains of introducing a basic income *whatever the size of its efficiency costs*. In order to do so, I build a parsimonious model that rationalizes the choice of voluntarily inactive agents. The model displays multidimensional heterogeneity in both preferences and productive skills which allows to capture relevant features of the redistribution problem at hand like disutility of participation and home production.

Yet, as agents are arbitrarily heterogeneous along their ordinal preferences, there are multiple ways to aggregate (cardinally) these heterogeneous preferences in a single social objective. Therefore, the government must gauge the desirability of any tax-benefit system by taking an ethical stance on how individual welfare should be measured, compared interpersonally, and aggregated into a social objective.

In this paper, I will study the case of a government that seeks to equalize opportunities in the economy while respecting the celebrated Pareto principle. In particular,

[1]This is the case for all social assistance programs for the 29 developed economies studied in this paper (MISSOC, 2021).

[2]Because of this, the paper uses the term 'basic income' and 'inactivity benefit' interchangeably.

[3]This tradeoff is the cornerstone of the theory of optimal taxation *à la* Mirrlees (1971).

the social objective will be axiomatically constructed under the premise that inequalities in productive skills should be compensated for, whereas inequalities spawned by different preferences should be respected. This compensation (for one's skills)-responsibility (for one's preferences) approach has been pioneered by Fleurbaey and Maniquet (2006, 2007, 2011, 2018) for the standard income tax problem.

Studying this social objective with respect to basic income is particularly relevant for several reasons[4]. First, recent surveys have suggested that this ethical standpoint has received some public support (Saez & Stantcheva, 2016; Stantcheva, 2021; Weinzierl, 2017). Second, these axioms are rooted in a long tradition in political philosophy (Dworkin, 1981; Fleurbaey, 2008; Rawls, 1971; Van Parijs, 1995, 2021). Third and most importantly, philosophers sharing closely related ethical standpoints disagree on the policy recommendations that it entails[5]. Rawls (1988) argued that his difference principle does not justify that *Malibu surfers should be fed* as they enjoy so much leisure that they are not among the worst-off. Van Parijs (1991) countered that one should not take a stance on what a good life is, and granting a basic income would allow anyone to enjoy as much leisure as one wishes, including the worst-off, thereby providing Rawlsian justification to basic income.

These fairness axioms endogenize the social objective. It is then transposed in a second-best Mirrlees (1971) environment where the government collects distortive (non-linear) taxes on employed agents in order to finance transfers that may be decomposed into social assistance (e.g. TANF), in-work benefits (e.g. EITC), and an inactivity benefit. The exercise yields two analytical results which are the main contributions of this paper.

First, I characterize the optimal inactivity benefit. Despite multidimensional heterogeneity in the model, it follows a surprisingly simple additive formula from which one can derive qualitative properties and perform comparative statics. In particular, whenever the public finance constraint is marginally relaxed, the inactivity benefit covaries positively with the traditional social assistance, suggesting that basic income should supplement rather than crowd out existing transfers programs.

Second, I derive a sufficient statistic for the desirability of any tax-benefit reform, even in a suboptimal world[6]. Because the model does not impose any structural as-

[4] Let me note that I do not aim to endorse a single view of social welfare but rather to link a practical policy recommendation with transparent ethical underpinnings.

[5] Notoriously, neither Rawls nor Dworkin endorsed themselves the view that an inactivity benefit would be justified by their theories of justice. As Dworkin (2000) puts it "*forced transfers from the ant to the grasshopper are inherently unfair*" (p.329).

[6] Second-best optimum might be unreachable for real-world tax-benefit systems because of political economy constraints (Bierbrauer et al., 2021) or more generally because actual governments do not behave like the Mirrleesian planner (Stantcheva, 2016). Hence, policy recommendations of practical use are more likely to emerge from the study of welfare-improving reforms.

sumptions on primitive preferences and abilities, this sufficient statistic holds for any empirical correlations between them. The sufficient statistic guides the government on where it should spend any extra dollar of transfers to achieve a welfare improvement. In particular, it prescribes that this extra dollar should be spent in transfers to inactives (resp. actives) whenever inequality among them is larger than inequality among actives (resp. inactives). The inequality measure pinned down by the axioms is crudely the difference between the worst consumption and the average production for each sector.

Whether introducing a positive inactivity benefit in our economies is welfare-improving and/or optimal is ultimately an empirical question. While values for average production among actives are readily available statistics, estimating the inactives' average home production surplus is a challenging task. I elicit conservative bounds on home production by exploiting recent data from the *Global Survey on Working Arrangements* (G-SWA) on time savings when working from home (Aksoy et al., 2023). I combine these estimates with data on current tax-benefit systems on childless singles and lone parents (OECD, 2020) to compute the sufficient statistics for 29 developed economies.

Even under a series of conservative assumptions, the empirical application finds that the worst inactive is closer to the average home production than than the worst active is to the average wage. As a result, all 29 governments should first increase transfers to actives before any dollar spent on inactivity benefit constitutes a welfare improvement.

Next, I quantify lower bounds on these increases in transfers to inactives to justify any dollar of basic income. I find that their magnitude are almost always unrealistically large: on average, governments should at least triple the safety net before any dollar of basic income is welfare-improving. In sum, the inquiry shows that either the overall amount of social transfers is much too low in all developed economies, or granting an inactivity benefit cannot be welfare-improving.

Overall, this paper suggests that the equity gains of granting some benefits to voluntarily inactive agents are tenuous. This holds against a series of conservative assumptions: the social objective has most extreme inequality-averse assumptions and the government does not have a preference for labor market production over home production.

This demonstrates a normative tension between the allowance of basic income[7] and equality of opportunity. Hence, the present analysis suggests that a government wishing to fight unequal opportunities outside of the labor market should do so by providing better opportunities within the labor market when the latter is much more productive.

[7] I only study the desirability of the conditionality of social benefits to labor market participation, while basic income proposals additionally requires waiving conditionalities to means and to the household composition (Van Parijs, 1995). Arguably, the desirability of an inactivity benefit is a first step for the study of the desirability of a fully fledged basic income.

Literature

The study of conditionality of welfare benefits has a long history in economics[8] and basic income has been recently studied by e.g. Banerjee et al. (2019), Conesa et al. (2023), Daruich and Fernández (2024), Ghatak and Maniquet (2019), Golosov et al. (2024), and Hoynes and Rothstein (2019). However, most papers consider utilitarian welfare or do not exploit heterogeneous tastes. The main contribution of the present paper is to derive a simple and estimable sufficient statistic to guide policy-making even under multidimensional heterogeneity in preferences, home production and wages.

The paper also contributes to optimal taxation theory. In the canonical Mirrlees (1971) model, agents may only react to tax-benefit reforms by decreasing their hours worked i.e. on the intensive margin. This class of models has been amended to allow for participation decisions in Choné and Laroque (2005, 2011), Diamond (1980), Jacquet et al. (2013), and Saez (2001, 2002). However in these *pure* extensive margins models, there is no difference between an unemployed and an inactive. Several papers have then added search frictions to rationalize involuntary unemployment together with endogenous participation decisions (Hungerbühler & Lehmann, 2009; Hungerbühler et al., 2006; Jacquet et al., 2014; Lehmann et al., 2011). Yet, they do not allow the government to distinguish the transfers it gives to the inactive from the one to the unemployed.

Boadway and Cuff (2018) allow the government to differentiate the transfers to nonparticipants from the transfers to the (involuntary) unemployed. Nonetheless, their model assumes homogeneous preferences, no intensive margin and a piece-wise linear income tax schedule while the present paper relaxes all these three assumptions. Kroft et al. (2020) also operates this differentiation and do not have any of the aforementioned shortcomings. Let me pinpoint three main differences with that paper. First, they model wages as endogenously determined in general equilibrium while in the present paper, wages are left exogenous. Second, they have a (Bergson-Samuelson) weighted utilitarian social welfare function whereas I consider an Arrovian social ordering function that reflects the ethics of equality of opportunity. Third, they focus on the derivation of the optimal tax system but I will also look at welfare-improving reforms, even in a suboptimal world. As I model a home sector[9] and a formal sector, the paper is related to the Mirrleesian optimal tax derivation of Rothschild and Scheuer (2013) in the multisector Roy (1951) model. The important difference is that they assumed that the tax schedule is uniform across sectors while I do not. In particular, it will be assumed that outcomes from the home sector are unobservable, and that the government can only

[8] See Besley and Coate (1992b, 1995), Boadway and Cuff (2014), Boadway et al. (2003), and Boone and Bovenberg (2013) among many others.

[9] Gayle and Shephard (2019) introduced home production in an optimal income tax model. However, their focus is different as they estimate a large structural microeconometric model, with a marriage market and they focused on the jointness of spouses taxation.

give a lump-sum amount to all inactives. Beaudry et al. (2009) also assume that home production is unobservable but hours worked are observed and they focus on the difference between social assistance and unemployment insurance.[10] In contrast here, I focus on the difference between social assistance and inactivity and assume that gross income are observed along with the activity binary decision.

I outline two additional differences with standard optimal tax papers. First, the literature since Saez (2001, 2002) typically studies small local tax reforms. By contrast, this paper derives a sufficient statistic that can assess any tax reform, including (potentially suboptimal) large and global ones such as the introduction of a basic income. Second, this paper does not need to impose any structural assumption on preferences nor any correlation between heterogeneity dimensions, while optimal tax papers typically do so to solve the multidimensional screening problem. Both facts are possible thanks to the axiomatic derivation of a social objective as a transitive ordering between any two allocations i.e. any two tax-benefit systems. This endeavor has been inspired by the fair income tax literature (Fleurbaey & Maniquet, 2006, 2007, 2011, 2018). The present paper also contributes to the latter by including inactive agents as well as additional dimensions of heterogeneity and deriving the axiomatic characterization in this new environment.

In section 2, I formalize the environment. In section 3, I construct the social objective in the first-best. In section 4, I introduce the Mirrleesian second-best environment and derive the main theoretical results. In section 5, I present the empirical application. In section 6, I assume a stigma associated to benefits recipients while in section 7 I conclude.

2 Model

There is a finite set $\mathcal{I} = \{1, 2, ..., I\}$ of agents whose generic element is denoted by i. There are only two goods, consumption and labor, forming a bundle denoted by $(c_i, l_i) \in X$. The homogeneous consumption good $c_i \in \mathbb{R}_+$ is produced either in the home sector or in the labor market. The labor supply variable l_i is set to -1 when the agent stays at home, or takes value of hours worked in a normalized interval $[0, 1]$ when the agent is in the labor market. Hence, an inactive agent has $l_i = -1$, an unemployed agent has $l_i = 0$ and an employed agent has $l_i \in (0, 1]$.

Each agent is endowed with a convex preference ordering $\succsim_i$ that can be represented by a continuous ordinal utility function $u_i(c_i, l_i)$ which is strictly increasing in c_i and non-

[10] For a more recent treatment of the redistribution versus insurance problem in cash transfers and unemployment insurance, see Ferey (2022).

increasing in l_i over $[0,1]$. An agent has an idiosyncratic disutility of participation[11] to the labor market whenever $u_i(c_i,-1)-u_i(c_i,0)\geq 0$ which captures the utility loss for an inactive that becomes unemployed while keeping the same level of consumption. Importantly, the disutility of participation must be distinguished from the willingness to work[12]. In this framework, disutility of participation embodies a preference to produce at home rather than in the labor market, while willingness to work reflects the substituability between consumption and hours worked on the labor market.

In addition to their preferences, agents are also heterogeneous along their vector of innate productive abilities $(w_i,h_i)\in[\underline{w},\bar{w}]\times[\underline{h};\bar{h}]\subseteq\mathbb{R}_+^2$, where the first coordinate denotes the marginal productivity used on the labor market and the second coordinate captures the *surplus* of home production that inactivity allows for relative to activity, not its *level*.

In the labor market, I retain the standard assumption of a constant return to scale technology whose sole input is hours worked, and its marginal productivity is given by w_i. In the home sector, h_i captures the surpluses of production that active agents loose by joining the labor market. It is a reduced-form term for outcomes of activities such as gardening, child rearing or housekeeping. Obviously in reality all agents produce at home, be they inactive, unemployed or employed. Hence, it is implicitly assumed here that all actives produce an identical level at home, normalized to 0 (i.e. the first-best Laissez-faire consumption of unemployed agents) and inactives produce h_i more than them[13].

In the first-best, the second fundamental welfare theorem prescribes that efficient redistribution could be achieved through lump-sum transfers. Denoting these transfers by t_i, the first-best budgets, illustrated in Figure 1 are defined by :

$$B(t_i,w_i,h_i)=\left\{\forall(c_i,l_i)\in X: c_i\leq a(l_i)w_il_i+(1-a(l_i))h_i+t_i\right\}$$

where $a(\cdot)$ is an indicator function that takes value 1 if the agent is active (i.e. $l_i\in[0,1]$) or 0 if the agent stays at home (i.e. $l_i=-1$)[14].

Observe that when $a(\cdot)=1$, this model nests the standard linear production model

[11]It is known that the disutility of participation displays substantial heterogeneity in the cross-section of households (Kaplan & Schulhofer-Wohl, 2018). Here, it may capture (but it is not restricted to) the stigma utility cost of welfare conditionality as in Moffitt (1983), see Appendix B.2. .

[12]In this setup, the willingness to work may be approximated by the marginal rate of substitution over non-negative values for l. A low (resp. high) marginal rate of substitution in absolute value reflects a high (resp. low) willingness to work

[13]In the empirical section 5, I argue that, while absolute levels of home production are typically unobservable, reasonable bounds for home surpluses h_i may be found.

[14]Observe that the use of this indicator function renders moot the actual value of l_i when inactive as long as it is not in [0,1]. The choice of -1 is arbitrary and harmless.

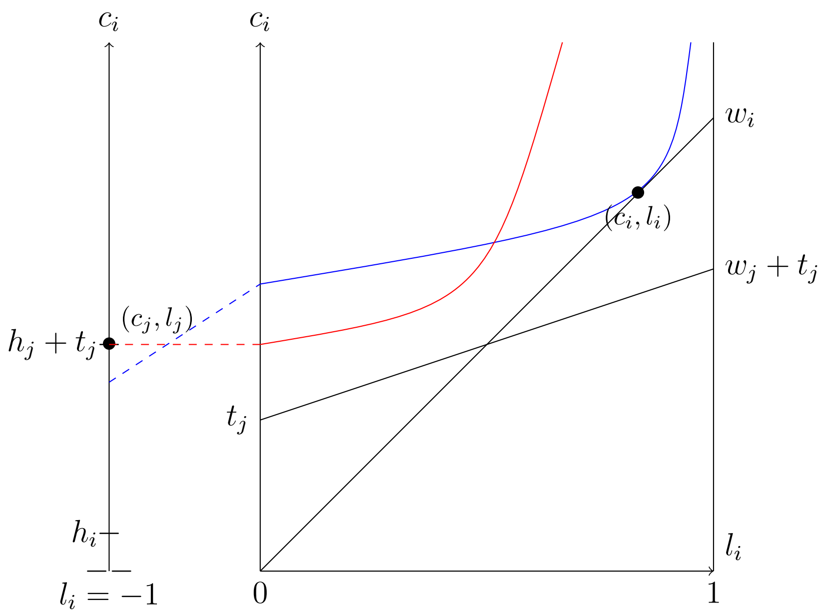

Figure 1: Illustration with two agents i, j such that $w_i > w_j$ but $h_j > h_i$. Blue agent i receives no lump-sum transfer and has a positive disutility of participation, but still chooses optimally to be active. Contrarily, the red agent j receives $t_j > 0$ and does not display disutility of participation but chooses to be inactive.

used e.g. in optimal taxation theory. Hence, agents can react to tax reforms along three margins in this model: (i) intensive (by decreasing hours worked when employed), (ii) standard-extensive (by switching from employed to unemployment), and (iii) participation-extensive (by switching from activity to inactivity). Four important remarks must be raised.

First, this model allows for both involuntary and voluntary unemployment. In the former case, the (primitive) state of the labor market nullifies the productivity of some agents (such that $\underline{w} = 0$) which can remain active with $l_i = 0$. By contrast, voluntary unemployment arises when $l_i = 0$ is the utility-maximizing choice of an agent endowed with some positive wage rate $w > 0$[15].

Second, I assume that there is no intensive margin in the home sector[16]. Of course, in reality agents partition their time between leisure, paid work and home production. However, labor market inactivity is a binary status for any tax-benefit system, such that there is no such thing as a part-time inactive in the eyes of the fiscal authority : agents can either be full time in the home sector or not at all in this sector.

[15]In the first-best, unemployment (both voluntary and involuntary) only happens when $h = 0$. In the second-best, unemployment may happen when transfers to unemployed are larger than transfers to inactives, which is the empirically relevant case.

[16]Moreover, an intensive margin in the home sector would imply that the inactivity benefit distorts effort in the home production which would be unfavorable to the emergence of a basic income. Hence, this modelling assumption is conservative with respect to my result.

Third, inactive and unemployed agents both enjoy the full unit of leisure. However, only the former are able to produce at home. This is equivalent to say that there is a fixed time cost spent looking for a job when unemployed that can be used productively when inactive. Hence, h_i must be understood (and measured) as the product of this time cost with the hourly idiosyncratic[17] value of production in the home sector. For example, in a legal working week of, say, 40 hours, the inactive and the unemployed do not provide any hours worked and thus enjoy 40 hours of leisure. However, an unemployed must spend, say, 10 hours sending job applications during which the inactive takes care of his children. The inactive's h_i is then the product of $\frac{10}{40}$ with the shadow price of an hour of day care services in that economy. This estimation procedure for h_i is discussed at length in section 5.

Fourth, the model assumes away any positive externality of job search. This is again a conservative assumption, in the sense that such externality would lay the grounds for Pigouvian subsidies to the unemployed (or Pigouvian tax on inactivity) in the redistributive problem, which would be unfavorable to the emergence of a basic income. Despite that, I find below that basic income is not desirable such that this result would be even stronger with such an externality.

Note that throughout the paper, no parametric specification of utility functions is imposed. Moreover, I will not impose any correlation between primitives $\succsim_i, w_i$ and h_i, neither at the individual level nor in the cross-section. As a consequence, the results are valid *for any* empirical moments observed in the data.

Finally, let me define an economy e by a list of endowments for each agent in each heterogeneity dimension $e = \{(\succsim_i, w_i, h_i)\}_{\forall i \in \mathcal{I}}\}$. I denote the set of all such economies by E. An allocation is a bundle for each individual and is denoted $(c, l) = \{(c_i, l_i)_{\forall i \in \mathcal{I}}\} \subseteq X^{\mathcal{I}}$.

3 Fair social objective

Each economy can yield many allocations which are associated with observable inequalities in consumption-labor outcomes (c_i, l_i) all originating from unobserved heterogeneity in primitives $(\succsim_i, w_i, h_i)$. The key question for a government is: when should an allocation (c, l) be socially preferred to an allocation (c', l')?

There are infinitely many ways to answer this question. The standard approach used in economics in general and in optimal taxation theory in particular consists in using a weighted sum of utility functions to assess welfare improvements. However, when agents have heterogeneous preferences, such summation is sensitive to the cardinaliza-

[17]In a structural macro exercise with time use data, Boerma and Karabarbounis (2021) show that (1) inequalities in the home sector are quantitatively important and (2) inequalities in home production efficiency are needed to explain the variance of home inputs conditional on wages and preferences.

tion of preferences, i.e. to the choice of the particular $u_i(\cdot)$ function that represents $\succsim_i$.

There is no commonly admitted way to choose such a cardinalization. Yet, it implicitly embodies a way to compare welfare interpersonally, and as such it is ethically-loaded. The literature in normative economics has acknowledged that policy recommendations are contingent on an ethical view and as such it is better to visibilize it rather than leaving it to the researcher's choice. But how can we link ethics with a social welfare function?

A popular method in recent years has been to rely on Saez and Stantcheva (2016)'s generalized weighted sum of utilities where weights can be a function of $(\succsim_i, w_i, h_i)$ to reflect different fairness views. While this approach is flexible and tractable, it has a major drawback: it may fail transitivity in its policy recommendation (Sher, forthcoming).

In the present paper, I build a Social Ordering Function (SOF), i.e. a function that associates to each economy a transitive ordering of allocations.[18] In particular, among the many possible SOF, we will select the one that respects three key fairness principles: (1) **Weak Pareto**, (2) **Responsibility** and (3) **Weak Transfer**.

Weak Pareto ensures that a Pareto-dominated allocation will never be chosen by the planner. Yet, there are typically many points on the Pareto frontier, and the next two axioms single out the one that reflects equality of opportunity. **Responsibility** requires that in the knife-edge case where all agents have the very same productive endowments w and h, then the *Laissez-faire* allocation (i.e. the absence of transfers) is the social optimum, even if unequal $\succsim_i$ still generates inequalities. As a result, **Responsibility** does not fight inequalities spawned by unequal preferences. Conversely, **Weak Transfer** requires that if two agents have identical preferences and identical labor supply decisions, a transfer from the richer to the poorer agents is a social improvement. Hence, **Weak transfer** fights inequalities spawned by unequal skills. As argued above, philosophers sharing these ethical views disagree on the policy recommendation that it entails. I now present the social objective function that pursue the ethics of equality of opportunity.

Definition 1. *The FSOF considers that (c, l) is socially strictly preferred to (c', l') whenever*

$$\min_{i\in\mathcal{I}} M_i(c_i, l_i) > \min_{i\in\mathcal{I}} M_i(c'_i, l'_i)$$

[18] This aggregation from individual preferences to social welfare follows the Arrow (1950) tradition and constructs the SOF axiomatically as in the pioneering work of Fleurbaey and Maniquet (2007).

where $M_i(c_i, l_i)$ *is a money-metric utility function defined as*

$$M_i(c_i, l_i) = \min t \qquad \textit{such that } (c_i, l_i) \sim_i \max_{\succsim_i} B(t, \tilde{w}, \tilde{h})$$
$$\textit{where} \quad \tilde{w} = \frac{1}{I}\sum_i w_i \qquad \tilde{h} = \frac{1}{I}\sum_i h_i \qquad \textit{and } t \in \mathbb{R}$$

In short, $M_i(c_i, l_i)$ is a money-metric utility function that measures the well-being of agent i when she consumes the bundle (c_i, l_i) as the transfer that renders this agent indifferent between (c_i, l_i) and her preferred bundle in the budget determined by the average productive vector. Loosely speaking, the further away the individual sees herself from an average agent, the worst will be her well-being. The graphical construction of $M_i(c_i, l_i)$ is illustrated in Figure 2.

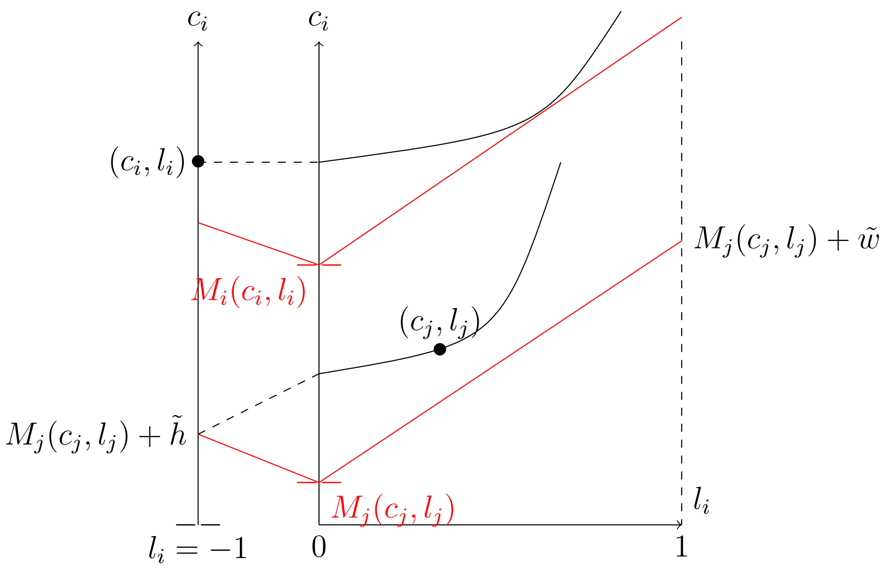

Figure 2: The construction of $M_i(c_i, l_i)$. The slope of the red lines are given by arithmetic average $\tilde{h}$ and $\tilde{w}$ and define references budgets $B(t, \tilde{w}, \tilde{h})$. The well-being at (c_i, l_i) is found by finding the transfer t such that the reference budget is tangent to the indifference curve of i at (c_i, l_i). The transfer t is measured on the vertical axis at $l = 0$.

Definition 1 implies that the social welfare function will focus on the agent having the smallest $M_i(c_i, l_i)$, i.e. the agent with the lowest well-being. In other words, the social objective is of the *maximin* type. At this stage, it must be recalled that an infinite degree of aversion to inequality in a well-being measure does not necessarily lead to an infinite taste for redistribution (i.e. pure egalitarianism). For example, *maximinning* a money-metric utility function with individual-specific reference prices (w_i, h_i) imply that the absence of redistribution is optimal (Fleurbaey & Maniquet, 2018). Hence, the key determinant of the following results lies more on the use of $M_i(c_i, l_i)$ than on its *maximin* nature.

The next theorem shows that the aforementioned three axioms single out the social welfare function in Definition 1 when they are combined with two technical axiom. The fourth axiom, **Mean-Preserving Separability** is reminiscent of the Separability axiom used in virtually all social welfare function since Fleming (1952) : indifferent agents should not matter in the social decision.[19] The last axiom, **Hansson (1973) Independence**, allows the social welfare function to use indifference curves rather than mere utility levels to escape Arrow (1950)'s impossibility. All formal definitions of axioms are relegated to Appendix A.1.

Theorem 1. *If a SOF satisfies* ***Weak Pareto, Responsibility, Weak Transfer, Mean-Preserving Separability*** *and* ***Hansson Independence****, then it is the FSOF in Definition 1.*

Proof. See Appendix A.2. ■

Before providing intuition behind this result, it is useful to study its consequences for optimal policy. What would be an optimal schedule of lump-sum transfers in the first-best with respect to FSOF? Because of the maximin nature of the social objective, optimality in the first-best is achieved whenever all agents in the economy have an identical well-being measure, i.e. $M_i(c_i, l_i) = M_j(c_j, l_j)$ for all $i, j \in \mathcal{I}$. All agents then reach their indifference curve tangent to this reference budget set, thereby all enjoying the same level of well-being in the eyes of the planner. Crucially, observe that, given the heterogeneity in preferences, this does not mean that all agents consume the same bundle.[20] I illustrate an first-best optimal allocation in Figure 3.

3.1 Why the average?

Theorem 1 asserts that the fair social objective should be (1) of the maximin type,(2) over money-metric utilities, and (3) with the particular money-metric utility function $M_i(c_i, l_i)$. If one compares these results to the literature, only the latter contains some novelty. Indeed, it is now standard in the literature on equality of opportunity that the finite inequality aversion embodied in **Weak transfer** axioms turns out to be infinite when combined with the other axioms.[21] Moreover, it comes at no surprise that money-metric utilities are a useful and flexible way to cardinalize utilities when preferences are heterogeneous.[22] What is peculiar and new with Theorem 1 is that the reference budget

[19]The axiom used in this paper is logically weaker than the standard Separability axiom. This weakening is required to avoid an impossibility, as is proven in the Appendix A.

[20]Also, note that such strongly egalitarian allocations may also be reached with a standard utilitarian setup in the first-best, as it is known since Edgeworth (1897).

[21]See e.g. Fleurbaey and Maniquet (2011) and Piacquadio (2017) for a discussion.

[22]In related papers, Bosmans et al. (2018), Fleurbaey and Maniquet (2017), and Piacquadio (2017) provided recent axiomatization of money-metrics as arguments of social welfare functions. Their history dates back at least to Samuelson and Swamy (1974) and recent papers showed their empirical relevance (Baqaee et al., 2024; Jaravel & Lashkari, 2024)

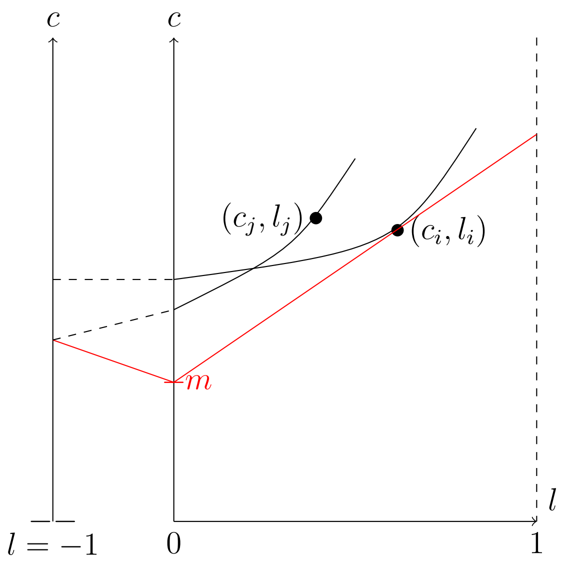

Figure 3: An allocation (c, l) equalizing $M_i(c_i, l_i) = M_j(c_j, l_j) = m$ across agents is optimal with respect to FSOF in the first-best.

is pinned down by arithmetic averages $\tilde{h}$ and $\tilde{w}$. I now sketch an example to provide intuition for this result. It is illustrated in Figure 4.

Consider four agents: two agents with preferences $\succsim_a$ and two with preferences $\succsim_b$. For the purpose of this example, let us assume that these are purely inelastic preferences, i.e. the labor supply choice is independent of their endowments. We know that the social ordering should be *maximinning* a money-metric utility function and wonder which reference endowments are pinned down by the axioms.

When these four agents have identical skills, the economy is $\{(\succsim_a, h, w), (\succsim_a, h, w), (\succsim_b, h, w), (\succsim_b, h, w)\}$. In such case, **Responsibility** implies that the absence of redistribution is optimal and *Laissez-faire* allocation (c^*, l^*) is optimal. Because of the maximin nature of the social objective, we must have that the money-metric welfare of all agents is equal at the optimal allocation. Which reference endowments in the economy $\{(\succsim_a, h, w), (\succsim_a, h, w), (\succsim_b, h, w), (\succsim_b, h, w)\}$ ensures that the money-metric welfare of agents a and b is equal at (c^*, l^*) ? The answer is : all those that are such that

$$R(\{h, w\}, \{h, w\}, \{h, w\}, \{h, w\}) = \{h, w\}$$

where R is the reference operator. This equation tells us that $R(\cdot)$ is a mean. At this stage though, it could be many means: the quadratic mean, the cubic mean and all other Hölder means respect that equation.

Now imagine that there is a shock to the endowments of agents and the economy becomes $\{(\succsim_a, h+\delta, w+\delta), (\succsim_a, h-\delta, w-\delta), (\succsim_b, h+\delta, w+\delta), (\succsim_b, h-\delta, w-\delta)\}$ where $\delta > 0$. In other words, among each pair of agents with preferences $\succsim_a$ and $\succsim_b$, there is

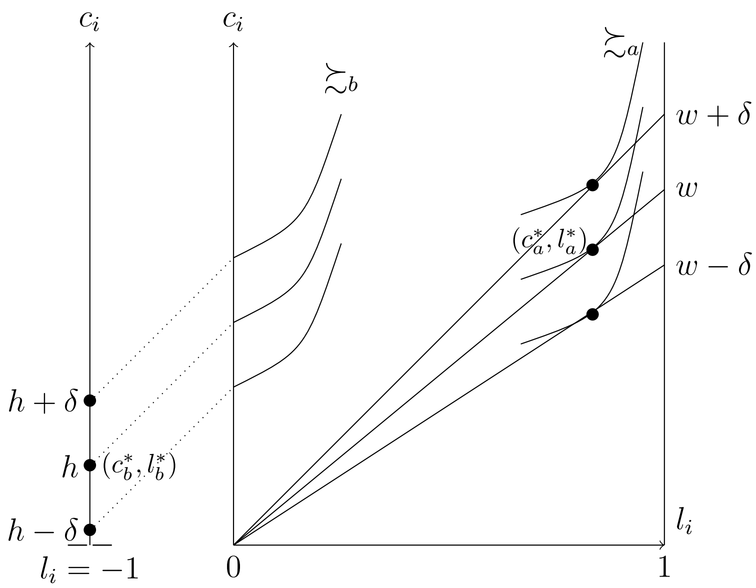

Figure 4: Why the average? By **Responsibility**, (c^*, l^*) is optimal if everyone has the same (w, h) endowment. By **Weak Transfer**, (c^*, l^*) is also optimal for arithmetic mean-preserving spreads from the equal endowment economy.

one winning (δ, δ) in her endowments and one loosing (δ, δ). In that case, **Weak Transfer** imposes that a within-pair transfer from the fortunate to the unfortunate is a social improvement. Iterating **Weak Transfer**, one finds that the social optimum in the new economy is also the allocation (c^*, l^*).

We have shown that the social optimum is identical in two economies, where one economy is constructed as an arithmetic mean-preserving spread from the other. This forces the reference price to be the same in both economies i.e.

$$R(\{h+\delta, w+\delta\}, \{h-\delta, w-\delta\}, \{h+\delta, w+\delta\}, \{h-\delta, w-\delta\}) = R(\{h, w\}, \{h, w\}, \{h, w\}, \{h, w\})$$

There is only one operator $R(\cdot)$ that satisfies the last two equations : the arithmetic average. This shows why arithmetic averages as reference prices are compatible with the axioms of **Weak Transfer** and **Responsibility**. The formal proofs relegated in the Appendix A.1 build on this intuition. In Theorem A.1 I prove that there an impossibility between **Weak Transfer**, **Responsibility** and **Separability**. Indeed, removing indifferent agents from the economy is not innocuous in our setting because they change the size of the pie, which influences the potential redistribution that the axioms of equality of opportunity will be able to achieve. In the proof of Theorem 1, I show that **Mean-Preserving Separability** is enough to escape the impossibility, i.e. restricting the Separability axiom to case that do not affect the per-capita amount of resources in the economy.[23]

4 Redistributive taxes and transfers

In this section I characterize the tax-benefit system pursuing equality of opportunity under incentive-compatibility constraints. As in Mirrlees (1971), these constraints arise because the government is unable to observe the endowment vector $(\succsim_i, w_i, h_i)$ of each individual despite knowing its joint distribution in the population.

Moreover, the government is unable to observe l_i and can only observe $y_i = a(l_i)w_i l_i$, the gross labor income reported in tax returns. I will also assume that, when $y_i = 0$, the government can perfectly distinguish the inactive from the unemployed agent. In other words, $a_i(\cdot)$ is observable even if l_i is not. This is a key assumption : it allows the government to differentiate the transfers it gives to unemployed agents from transfers to inactives. This is consistent with the observation that in most developed economies, there exists a screening mechanism enforcing the conditionality of welfare benefits to a job-seeking behavior.[24]

For active agents with $a(l_i) = 1$, the government designs the tax schedule on the labor market through the nonlinear tax function $\tau(y)$ which is a subsidy whenever $\tau(y) < 0$ on some y. For agents out of the labor market with $a(l_i) = 0$, the government cannot observe home production yet these inactive agents may receive a subsidy $D \in \mathbb{R}$ which is a tax if $D < 0$ such that the second-best budgets are

$$B(\tau, D, w_i, h_i) = \left\{(c_i, l_i) \in X | c_i = a(l_i)[a(l_i)w_i l_i - \tau(a(l_i)w_i l_i)] + (1 - a(l_i))[h_i + D]\right\}$$

I call these variables: D the inactivity benefit, $-\tau(0)$ the social assistance and $\tau(y)$ the tax schedule. Agents choose l_i to maximizes $u_i(c_i, l_i)$ under this second-best budget constraint.

One may wonder about the relationship between the tax-benefit system (τ, D) studied here and the basic income proposals. Indeed, why wouldn't we give a basic income *universally* to both actives and inactives? Observe that the tax-benefit system (τ, D) studied here is completely equivalent to a universal basic income $(\tau' - D, D)$ for a τ' chosen such as $\tau' - D = \tau$, i.e. both systems decentralize the very same allocation. In other

[23] Formally, this does not prove that arithmetic averages are the only reference prices compatible with **Weak Transfer** and **Responsibility**. Such a proof is beyond the scope of the present paper. Yet, it can be proven that popular alternatives to the arithmetic mean will violate some axioms, in particular the geometric and harmonic means, the $\min$ and the $\max$ operator. All results in section 4 are valid for a general reference vector $(\tilde{h}, \tilde{w})$. In the empirical section 5, I benefit from the fact that arithmetic averages for wages are readily available statistics in many countries.

[24] In practice, such screening mechanism may be imperfect and costly. I come back in the conclusion on the sensitivity of the results to this assumption.

words, it is the (consequentialist) difference between active and inactive transfers that has welfare consequences, not the (deontological) means of transfers[25]. For clarity, I retain the formulation with an inactivity benefit.

An incentive-compatible allocation (c, l) is such that :

$$\forall i, j \in \mathcal{I}, (c_i, l_i) \succsim_i (c_j, l_j) \text{ or } (c_j, l_j) \notin B(\tau, D, w_i, h_i)$$

Before turning to the main results, we need one assumption. It ensures that there exists at least one agent in the economy that has the worst endowments and *hardworking poor* preferences, i.e. no preference for leisure and a disutility of participation such that she is indifferent between social assistance and inactivity.

Assumption (Hardworking Poor Existence)**.** *For any incentive-compatible allocation (c, l) decentralized by (τ, D) and any economy $e \in E$, there exists $j \in \mathcal{I}$ such that $(w_j, h_j) = (\underline{w}, \underline{h})$ and $(\underline{h} + D, -1) \sim_j (-\tau(0), l_j)$ for all $l_j \in [0, 1]$.*

This assumption may seem strong for small economies but is arguably more reasonable when designing tax-benefit systems for large economies, as the present paper is concerned about. Moreover, since governments cannot observe indifference curves, it seems prudent to design policies as if the worst-off agents existed, should that indeed be the case in reality.

The next theorem translates the allocation ordering implied by the axioms from a function expressed in abstract well-being measures (in Theorem 1) to a function expressed in terms of policy tools and economy's parameters. It is stated and proven for the case where the smallest wage rate in the population is 0, i.e. $\underline{w} = 0$. It can be interpreted either as agents unable to work or as involuntary unemployed agents.[26] The case $\underline{w} > 0$ can be derived in a similar way and is relegated to Appendix B.1.

Theorem 2. *For $e \in E$ such that $\underline{w} = 0$, and any two incentive-compatible allocations (c, l) and (c', l') decentralized by (τ, D) and (τ', D') respectively, one has that (c, l) is socially preferred to (c', l') with respect to the FSOF whenever*

$$\min\left\{\underline{h} + D - \tilde{h}; -\tau(0) - \tilde{w}\right\} \geq \min\left\{\underline{h} + D' - \tilde{h}; -\tau'(0) - \tilde{w}\right\} \tag{1}$$

[25] In layman terms, whether a job-seeker receives 1000 USD as social assistance or 500 USD as basic income combined with 500 as social assistance yield the same bundle for that jobseeker.

[26] Involuntary unemployment corresponds to the case in which the state of the labor market nullifies an agent's productivity.

Proof. By Theorem 1, it suffices to show that for all $e \in E$ with $\underline{w} = 0$

$$\min_{i \in \mathcal{I}} M_i(c_i, l_i) = \min \left\{ \underline{h} + D - \tilde{h}; -\tau(0) - \tilde{w} \right\}$$

By Hardworking Poor Existence, for any (c, l), $\exists j \in \mathcal{I}$ with $(w_j, h_j) = (\underline{w}, \underline{h})$ with preferences such that she is indifferent between all feasible bundles for her, i.e. $(\underline{h}+D, -1) \sim_j (-\tau(0), l_j)$ for all $l_j \in [0, 1]$. In other words, because $M_j(\cdot)$ represents $\succsim_j$ one has $M_j(c_j, l_j) = M_j(c'_j, l'_j)$ for any $(c_j, l_j), (c'_j, l'_j) \in B(\tau, D, 0, \underline{h})$. Using Definition 1, and the flat indifference curve of j over $l_j \in [0, 1]$ one has

$$M_j(c_j, l_j) = \min_{\hat{l}} t \text{ s.t. } \begin{cases} -\tau(0) = \tilde{w}\hat{l} + t & \text{if } \hat{l} \in [0, 1], \\ \underline{h} + D = \tilde{h} + t & \text{if } \hat{l} = -1 \end{cases}$$

This is equivalent to

$$M_j(c_j, l_j) = \left\{ \underline{h} + D - \tilde{h}; -\tau(0) - \tilde{w} \right\}$$

We are left to prove that j is the agent with the lowest well-being among all agents. By incentive-compatibility, all agents i with $(w_i, h_i) \geq (\underline{w}, \underline{h})$ must have $(c_i, l_i) \succsim_i (c_j, l_j)$. Because the M_i function is a money-metric utility function and represents preferences, it follows that $M_i(c_i, l_i) \geq M_j(c_j, l_j)$ for all $i \in \mathcal{I}$ which completes the proof. ■

Theorem 2 tells us that the worst-off in the society is the agent who is consuming the bundle that is the furthest away from her sectoral average production. The link with Theorem 1 is apparent here : the smallest 'distance to the average' utility function $M_i(c_i, l_i)$ can be written in sufficient statistics in the second-best. In other words, if the distance to the average in the home sector $(\underline{h} + D - \tilde{h})$ is larger than in the labor market $(-\tau(0) - \tilde{w})$, the worst-off in the society are the agents consuming $(\underline{h} + D, -1)$. As a consequence, a welfare-improving reform would consist in raising D in that case. In other words, Theorem 2 implies that reducing within-sector inequality is welfare-improving in the sector that has the largest level of inequality. The sectoral inequality measure is simply the difference between the smallest consumption and the average productivity.

How can one relate this result to the axioms in section 3? Recall that **Weak Transfer** implied that among equal-preferences agents a transfer from the richer to the poorer was a social improvement *provided they have the same labor supply choice*. This is precisely the driver of the government's inequality aversion within a sector. Now, even if perfect equality was achieved in each sector of the economy, there might still be inequalities between sector, say because $\tilde{h} < \tilde{w}$. But in that case, **Responsibility** would prevent the government from further reducing these inequalities, as agents choosing the home sector with a smaller consumption do so because of their tastes. As a result, the axioms treat each sector equally : one dollar produced in the labor market is not better than a dollar produced at home per se. The combination of these two arguments yields a social welfare function that fights within-sector inequality in the sector that has the largest level of inequality.

Theorem 2 is useful because it amounts to identifying a sufficient statistic for the evaluation of the desirability of *any* tax-benefit reform, even in a suboptimal world. It can be used to compare a reform scenario (τ, D) against the status quo tax-benefit system (τ', D'). I come back to the usefulness of this theorem in the empirical section 5.

Let me now turn to the characterization of the optimal tax benefit-system. It is enough to concentrate on D^* for our purposes.

Theorem 3. *For $e \in E$ with $\underline{w} = 0$, if there exists an incentive-compatible allocation decentralized by (τ^*, D^*) that is optimal with respect to the FSOF, then*

$$D^* = \tilde{h} - \underline{h} - \tau^*(0) - \tilde{w}$$

The proof is immediate from Theorem 2. The optimal inactivity benefit follows a similar formula for economies with $\underline{w} > 0$[27] and is relegated to Appendix B.1.

This optimal inactivity benefit formula is interesting for several reasons. First, it gives us an idea of the consumption difference that should hold between actives and inactives. In other words, it pinpoints the premium that active agents *fairly* deserve because of their participation in the labor market, if any, the magnitude of which must be pinned down by empirical moments of the economy.

Second, this premium is increasing in the discrepancy between average productivity in the labor market and at home $(\tilde{w} - \tilde{h})$. This suggests that as the labor market becomes more productive, the inactivity benefit should decrease for a given τ^*. This would come as no surprise if we had introduced a government budget constraint. What is peculiar, surprising and new here is that this holds only because of fairness considerations, whatever the size of efficiency costs.

Third, this theorem also informs us on the complementarity/substituability of the inactivity benefit with the traditional safety net programs. In particular, basic income should supplement, rather than crowd out, the standard safety net as they covary in identical rather than opposite directions: an increase in one dollar of optimal social assistance $-\tau^*(0)$ should be accompanied with an increase of one dollar in optimal inactivity benefit D^*, *ceteris paribus*.

[27]The main difference is that the worst-off in the labor market may be different from the ones earnings $-\tau(0)$. For example, they may work full time at the minimum wage.

Finally, while Theorem 3 characterizes the optimal relationship between the safety net and the inactivity benefit, it is silent about the optimal joint *level* of (τ^*, D^*). To sketch its design[28], consider a given economy e and the *Laissez-faire* policy $(0, 0)$. The government computes the well-being of the worst-off in the labor market and the worst-off in the home sector using Theorem 2. In most cases, the distance to the average is much greater in the former than in the latter sector. Hence, the government will start by directing some transfers to the worst-off in the labor market, up to the point where the distances to the averages are equalized across sectors, as embodied by Theorem 3. In turn, the Rawlsian government will pursue tax collection as much as efficiency permits. In other words, it will direct redistribution such that any dollar spent on D is matched with a dollar spent on the safety net, thereby setting their joint level as high as efficiency permits.

5 Empirical application

Whether introducing an inactivity benefit is a welfare-improving reform or an optimal policy is ultimately an empirical question, as one can notice from Theorem 2 and Theorem 3, respectively. In this section, I leave aside the determination of the optimal policy because observed tax-benefit systems around the world are probably far away from the Mirrleesian optimum such that policy recommendations of practical use are more likely to emerge from the study welfare-improving reforms. I therefore need to estimate parameters $-\tau(0), \underline{h}, \tilde{w}, \tilde{h}$ from equation (1) in Theorem 2.

I set the right handside equation (1) with the status-quo tax-benefit system such that $(-\tau'(0), D') = (-\tau'(0), 0)$ for all countries as to date no OECD government has waived the conditionality of welfare benefits to labor market participation. Then, I calibrate the left handside with the reform that consists in giving one dollar of inactivity benefit, i.e. the reform $(-\tau(0), D) = (-\tau(0), 1)$. In turn, one obtains a sufficient statistic for the desirability of the reform of the inactivity benefit as an answer to the following question : *by how much should one increase the safety net in order for 1 dollar of inactivity benefit to be welfare-improving ?* Hence, this section performs a bounding exercise.

The advantage of the sufficient statistics (1) is that estimates for the current social assistance $-\tau'(0)$ as well as the average gross earnings $\tilde{w}$ are readily available statistics for many countries[29]. However, the difficulty of this exercise is that home production surpluses estimates for $\underline{h}$ and $\tilde{h}$ are not readily available. From section 2, we know that

[28]It is easy to prove that τ^* would have the same qualitative properties as Fleurbaey and Maniquet (2007), i.e. setting $\underline{w} - \tau(\underline{w})$ as high as possible with negative marginal tax rates over $[0, \underline{w}]$.

[29]I recover $-\tau'(0)$ and $\tilde{w}$ from the OECD (2020) tax-benefit simulator for 29 developed economies. The results are differentiated for two different family compositions (i.e. two different status-quo τ') : childless singles and lone parents with two children. The reference year is set to 2020 for the case $\underline{w} = 0$ because there is little doubt that there has been involuntary unemployment.

h_i must be measured as the product of the sunk time cost of participating in the labor market[30] with the productivity in the home sector. Let me denote the former by F and the latter by γ_i:

$$\underbrace{h_i}_{\text{home surplus}} = \overbrace{F}^{\text{Time cost of participation}} \times \underbrace{\gamma_i}_{\text{home hourly productivity}}$$

To estimate these two key unobservables, I will take a Beckerian view on home production and set average productivities to be identical across the two sectors, i.e. $\tilde{\gamma} = \tilde{w}$ (Becker, 1965). Moreover, I impose that $\underline{\gamma} = 0$. Observe that I only impose two moments restrictions, i.e. on the minimum and the average, while staying completely agnostic about the shape of the γ_i distribution. Section 5.1 addresses robustness.

To get an estimate of F, I exploit the recent G-SWA survey on time savings when working from home (Aksoy et al., 2023). On average across countries, workers spent 72 minutes per day commuting which is taken to reflect the sunk cost of labor market participation[31]. In turn, F is expressed as the fraction of this time cost over the statutory length of the working week[32] because l is normalized to 1. For example, the average American spends 55 minutes commuting per day over a 40 hours workweek, yielding a $F_{US} = 11.56\%$.

The results are reported in table 1.

Despite a series of conservative assumptions, I find that for all 29 countries, the safety net should be increased by very large amounts before any dollar spent on inactivity benefit constitutes a welfare improvement. The magnitude of estimates are in general smaller for lone parents than for childless singles, as most countries typically offer more generous coverage to the former than the latter. These results come from the fact that distances to the average are much larger in the labor market than in the home sector, or equivalently, that the well-being measurement pinned down by the axioms always identify the worst-off as being a job-seeker in these economies, but never an inactive. It is worth pointing out that, while results for the case $\underline{w} > 0$ are qualitatively similar, the magnitude is considerably smaller (see Appendix B.2). Yet, the policy conclusion is unchanged.

There are two ways to interpret this result. The first interpretation follows the line

[30] Observe that in the real world, this sunk time cost can only be partly controlled by the government (through job-seeking ordeals). This paper focuses on the redistribution problem considering that these ordeals are set for other reasons (see e.g. Rafkin et al. (2023)). Accordingly, the measurement of F is set to match commuting time, which is independent of these ordeals.

[31] An alternative strategy would have been to use estimates of the time devoted to job search activities. However, Mukoyama et al. (2018) documented that unemployed Americans spend on average 31.1 minutes per day searching for a job, such that my choice is again conservative.

[32] Additional details on the empirical application are relegated to Appendix D.

Table 1: Summary of results. Sufficient increase in $-\tau(0)$ for $D = 1$ to be a welfare-improving reform, in percentage of current $-\tau(0)$.

Country	Lone parents	Singles
Australia	365,99%	410,22%
Belgium	142,67%	248,18%
Bulgaria	352,10%	1109,41%
Canada	353,95%	600,39%
Czech Republic	303,34%	730,34%
Estonia	116,44%	657,54%
France	121,11%	371,55%
Greece	294,24%	589,93%
Germany	218,40%	744,30%
Croatia	325,47%	793,48%
Hungary	1490,03%	1490,03%
Israel	223,35%	549,81%
Ireland	186,29%	288,84%
Japan	68,66%	319,12%
Lithuania	224,54%	788,99%
Latvia	302,19%	1307,68%
Luxembourg	82,64%	189,04%
Malta	205,47%	235,06%
Netherlands	257,60%	257,60%
New Zealand	164,09%	295,15%
Poland	188,73%	994,14%
Portugal	244,71%	589,42%
Romania	1012,90%	2697,91%
Slovenia	35,97%	245,36%
Slovak Republic	511,34%	1365,17%
Spain	220,58%	374,47%
Turkey	3639,13%	∞
United Kingdom	226,69%	638,80%
United States	762,76%	2163,63%

of the inverse-optimum literature[33]. If the current safety nets are assumed to be optimal with respect to FSOF, then the optimal D^* in all countries studied should be negative. This goes against the idea that introducing a basic income without modifying the safety net would be welfare-improving. The second interpretation goes as follows. Before introducing a basic income, a prioritarian government should significantly (most of the time, unrealistically) increase the safety net coverage offered to the actives.

5.1 Discussion

I made several assumptions that, if relaxed, would render the conflict between basic income and equality of opportunity even stronger. I discuss them in turn for the empirical application, the theoretical framework and the government's objective.

From the theorems of section 4, we know that a positive basic income is more likely to emerge if the gap $\tilde{w} - \tilde{h}$ is small. In order for my negative result on its desirability to be robust, I have made measurement assumptions that were favorable to the emergence of a basic income, i.e. conservative assumptions. First, the ratio of the average productivity in the home sector to the labor market $\frac{\tilde{\gamma}}{\tilde{w}}$ has been set to 1 while Bridgman et al. (2018) found it closer to 0.3. Second, the choice of F could have been smaller if it had reflected time devoted to job search rather than commuting (see Mukoyama et al. (2018)). Third, I assumed that the average marginal product of labor $\tilde{w}$ is equal to the average gross earnings. However, as firms have monopsony power, the marginal product of labor is higher than the wage[34]. All in all, these choices suggest that estimates in table 1 are lower bounds.

Moreover, several features of the theoretical framework are also conservative with respect to this conflict. First, I considered that there is no negative externality of home production. However, if it includes black market activities, the government might wish to impose a Pigouvian tax on inactives and/or hold them responsible for their h_i, thereby decreasing even more the desirable level of D^*. Second, the model assumed away the existence of an intensive margin in the inactives' production function. As in Saez (2001, 2002) or Rothschild and Scheuer (2013), such an intensive margin would have driven an additional efficiency cost of raising D by disincentivizing effort in the home sector. Hence, these results would only be reinforced by including an intensive margin.

However, I have assumed that the government can perfectly distinguish a job-seeker from an inactive at a zero cost, which might seem a strong assumption. Yet, as long as the monitoring cost for the government has a lower dollar value than estimates from Table 1, the government should fully invest in it. Given the size of the estimates, the

[33] See Bourguignon and Spadaro (2012) and Stantcheva (2016) for an introduction and a critique of the inverse-optimum approach, respectively.

[34] Mas and Pallais (2019) review the literature and consider that the marginal product of labor may be 25% larger than the average wage.

inclusion of costly monitoring is unlikely to overturn the policy recommendation.

Finally, this result holds despite the fact that the social objective have not favored the production in the formal sector with respect to the one in the home sector[35] even if there may be good reasons to do so. Indeed, there has been recent calls in the public debate for an increase in the employment rate, notably in order to maintain the sustainability of public pension systems in aging economies.

However, this paper did not exclude the possibility that other social objectives may lead to different policy recommendations. In particular, among the family of social objectives pursuing equality of opportunity, the FSOF studied above may be criticized by some because it holds agents responsible for their disutilities of participation. In Appendix C, I study the case where disutilities of participation are driven by a welfare recipient stigma[36] that the government wishes to compensate for. It is shown that the estimates in Table 1 can be then interpreted as lower bounds for the government's willingness to compensate for the stigma cost of conditionality.

6 Conclusion

This article has explored redistribution between active and inactive agents. The inquiry showed that abandoning the conditionality of social benefits to labor market participation is unlikely to be justified by the ethics of equality of opportunity in most developed economies.

A priori, this ethical standpoint could have justified both an anti- and a pro-basic income argument as could be attested by the debate between Rawls (1988) and Van Parijs (1991) on whether Malibu surfers should be fed. What the present paper has done is precisely to reconcile these two diametrically opposed interpretation of a single fairness viewpoint, by proving the conjecture outlined in Van Parijs and Vanderborght (2017, p.112) : "*[Once leisure is included in the index], the optimal option, by the standard of the difference principle, will crucially depend on the relative weights the index places on income and leisure, [...] and on a great many contingent empirical facts*". In this paper, the relative weights on these dimensions are those of the agents themselves because of the non-paternalistic nature of the social objective. Then I quantify where and when these empirical facts are such that basic income may be not be justified: in developed economies.

The main explanation lies in the fact that as the value of home production is small,

[35] This is especially relevant to the debate because proponents of basic income have argued that one should not be paternalistic about what a good life is (see in particular Van Parijs (1995)).

[36] This *welfare stigma hypothesis* has received attention from the theoretical literature (Besley & Coate, 1992a; Hupkau & Maniquet, 2018; Lindbeck et al., 1999; Moffitt, 1983) and was recently backed by experimental evidence (Friedrichsen et al., 2018).

inactivity is driven by preferences for which agents are held responsible. Hence, an inequality-averse government can fight inequalities outside the labor force by providing better opportunities within the labor market, which is desirable under the proviso that the aggregate technology in the formal sector is productive enough.

This paper has left exogenous the definition of the eligibility requirements to be considered as an active job-seeker. However, it is well-known that there exists a heterogeneity in the stringency of these requirements across developed countries, whose positive and normative study is left for future research.

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A Axiomatic proofs

A.1 Axioms

In this section, I define formally each axiom used in the paper. Notation-wise, the social ordering function (SOF) $\succsim$ for an economy $e \in E$ is a transitive ordering such that for any two allocations $(c, l), (c', l') \in X^{\mathcal{I}}$, we write $(c, l) \succsim (c', l')$ whenever (c, l) is socially weakly preferred to (c', l'). The strict social preference and the social indifference are denoted by $\succ$ and $\sim$, respectively.

The first axiom is the celebrated Pareto principle that imposes that the planner agrees with unanimous decisions.

Axiom 1 : Weak Pareto
If $(c_i, l_i) \succ_i (c'_i, l'_i)$ for all $i \in \mathcal{I}$ then $(c, l) \succ (c', l')$.

The second axiom hold agents responsible for inequalities spawned by their preferences. It is illustrated in Figure A.1.

Axiom 2: Responsibility
For all economy $e \in E$ and allocations with $(w_i, h_i) = (w_0, h_0)\ \forall i \in \mathcal{I}$,
If $\exists i, j \in \mathcal{I}$ and $(c, l), (c', l') \in X^{\mathcal{I}}$ with

$$(c_i, l_i) \in \max_{\succsim_i} B(t_i, w_0, h_0) \quad (c'_i, l'_i) \in \max_{\succsim_i} B(t'_i, w_0, h_0)$$
$$(c_j, l_j) \in \max_{\succsim_j} B(t_j, w_0, h_0) \quad (c'_j, l'_j) \in \max_{\succsim_j} B(t'_j, w_0, h_0)$$

and $(c_k, l_k) = (c'_k, l'_k)$ for all $k \in \mathcal{I}\backslash\{i, j\}$ and $\exists \delta > 0$ such that $t'_i - \delta = t_i \geq t_j = t'_j + \delta$, then $(c, l) \ \succ \ (c', l')$.

The third axiom compensates agents for unqual skills (w_i, h_i). It is illustrated in FIgure A.2.

Axiom 3 : Weak Transfer
For all economy $e \in E$, all allocations $(c, l), (c', l') \in X^{\mathcal{I}}$, if $\exists i, j \in \mathcal{I}$ two agents with $\succsim_i = \succsim_j$ such that

$$l_i = l_j = l'_i = l'_j$$

and for some $\delta > 0$

$$c'_i - \delta = c_i \geq c_j = c'_j + \delta$$

while $(c_k, l_k) = (c'_k, l'_k)\ \forall i \in \mathcal{I}\backslash\{i, j\}$;
Then, $(c, l) \ \succsim \ (c', l')$

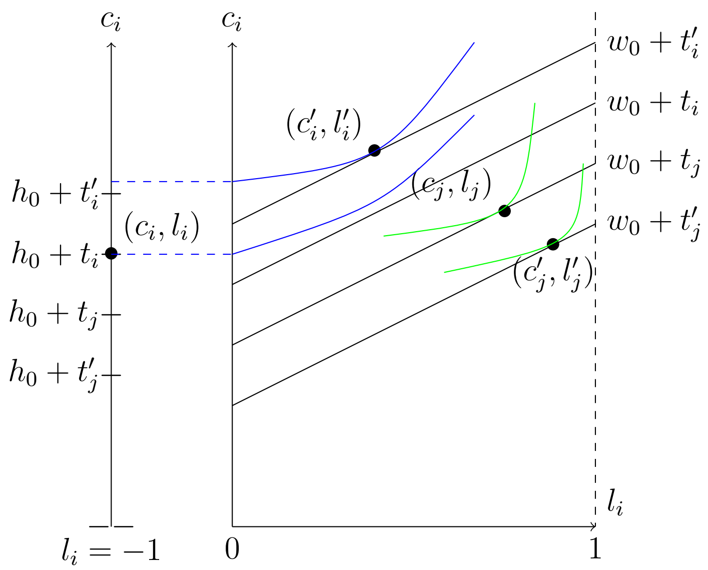

Figure A.1: In this figure, all agents have the same endowments w_i and h_i. Yet, they have received different lump-sum transfers for some reasons. **Responsibility** imposes that $(c, l) \succsim (c', l')$

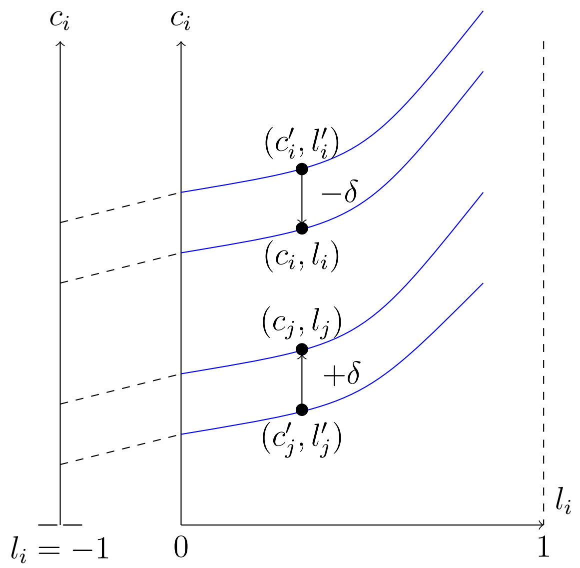

Figure A.2: **Weak Transfer** imposes that $(c, l) \succsim (c', l')$

Now, in order to build a SOF *for all economies* one needs consistency conditions i.e. invariance rules of the social evaluation when the economy changes. A popular choice in the literature is *Separability* which prescribes that adding or removing from the economy indifferent agents should not affect the ranking between two allocations.

Axiom : Separability
If there exists $(c,l),(c',l') \in X^{\mathcal{I}}$ such that $(c_j,l_j)=(c'_j,l'_j)$ then

$$(c,l) \succsim (c',l') \iff (c,l)_{(\mathcal{I}\backslash\{j\})} \succsim_{(\mathcal{I}\backslash\{j\})} (c',l')_{(\mathcal{I}\backslash\{j\})}$$

with $(c,l)_{(\mathcal{I}\backslash\{j\})} = \Big((c_1,l_1),...(c_{j-1},l_{j-1}),(c_{j+1},l_{j+1}),...,(c_I,l_I)\Big)$
and $(c',l')_{(\mathcal{I}\backslash\{j\})} = \Big((c'_1,l'_1),...(c'_{j-1},l'_{j-1}),(c'_{j+1},l'_{j+1}),...,(c'_I,l'_I)\Big)$ and $\succsim_{(\mathcal{I}\backslash\{j\})}$ is the SOF when the set of agents is $\mathcal{I}\backslash\{j\}$

We will also use a logical weakening of the latter, i.e. ***Mean-Preserving Separability*** which prescribes that removing indifferent agents from the economy does not affect the social ranking only if the absence of these agents do not change the per-capita amount of resources.

Axiom 4 : Mean-Preserving Separability
For all $\mathcal{S} \subset \mathcal{I}$ and for all economy $e, e_{(\mathcal{I}\backslash\mathcal{S})} \in E$ with $e_{(\mathcal{I}\backslash\mathcal{S})} = \Big((w_i,h_i,\succsim_i)_{\forall i\in\mathcal{I}\backslash\mathcal{S}}\Big)$, and for all $(c,l),(c',l') \in X^{\mathcal{I}}$ such that

- $(c_i,l_i)=(c'_i,l'_i)$ for all $i \in \mathcal{S}$ and
- $\frac{1}{I}\sum_{i=1}^{I} w_i = \frac{1}{S}\sum_{i=1}^{S} w_i$ and $\frac{1}{I}\sum_{i=1}^{I} h_i = \frac{1}{S}\sum_{i=1}^{S} h_i$

Then $(c,l) \succsim (c',l') \iff (c,l)_{(\mathcal{I}\backslash\mathcal{S})} \succsim_{(\mathcal{I}\backslash\mathcal{S})} (c',l')_{(\mathcal{I}\backslash\mathcal{S})}$
where $(c,l)_{(\mathcal{I}\backslash\mathcal{S})},(c',l')_{(\mathcal{I}\backslash\mathcal{S})} \in X^{\mathcal{I}\backslash\mathcal{S}}$ and $\succsim_{(\mathcal{I}\backslash\mathcal{S})}$ is the social ordering over the subpopulation $\mathcal{I}\backslash\mathcal{S}$.

Finally, the fifth axiom, ***Hansson (1973) Independence***, deals with the informational structure of the SOF. It weakens the Arrovian binary independence in order to escape the impossibility of social choice. It imposes that when the indifference curves over two allocations are unchanged between two economies, then the social ordering over these allocations is unchanged as well.

Axiom 5 : Hansson (1973) independence
For all economy $e = \Big((w_i,h_i,\succsim_i)_{\forall i\in I}\Big)$ $e' = \Big((w_i,h_i,\succsim'_i)_{\forall i\in I}\Big) \in E$ with $(\succsim_i)_{i\in\mathcal{I}}$ and $(\succsim'_i)_{i\in\mathcal{I}}$ two profiles of preferences, let $(c,l),(c',l') \in X^{\mathcal{I}}$ be two allocations,

$$\text{If} \quad \forall q \in X \quad \Big[(c_i,l_i) \sim_i q \iff (c_i,l_i) \sim'_i q \text{ and } (c'_i,l'_i) \sim_i q \iff (c'_i,l'_i) \sim'_i q \ \forall i \in \mathcal{I}\Big]$$

$$\text{Then,} \quad [z \succsim z' \iff z \succsim' z']$$

where $\succsim'$ is the SOF when the economy is e'.

A.2 Theorems and proofs

I now prove that the standard axiom of *Separability* clashes with **Responsibility** and **Weak Transfer**. To the best of my knowledge, this result is new. The key difference with previous papers is that the present paper has three dimensions of heterogeneity $(\succsim_i, w_i, h_i)$ while most previous papers only had two (Fleurbaey & Maniquet, 2018).

Theorem A.1. *There is no SOF that satisfies **Responsibility, Weak Transfer** and Separability for all* $e \in E$

Proof. By contradiction, suppose the statement does not hold. Consider the economies $e_1 = \{(\succsim_i, \bar{h}, \underline{w}), (\succsim_j, \bar{h}, \underline{w})\}$, $e_2 = \{(\succsim_i, \underline{h}, \bar{w}), (\succsim_j, \underline{h}, \bar{w})\}$,
$e_3 = \{(\succsim_i, \bar{h}, \underline{w}), (\succsim_j, \bar{h}, \underline{w})(\succsim_i, \underline{h}, \bar{w}), (\succsim_j, \underline{h}, \bar{w})\}$, with $\bar{h} > \underline{h}$ and $\bar{w} > \underline{w}$, as well as their associated utility-maximizing bundles:

$$(c_1, l_1) \in \max_{\succsim_i} B(0, \bar{h}, \underline{w}) \qquad (c_2, l_2) \in \max_{\succsim_i} B(0, \underline{h}, \bar{w})$$

$$(c_3, l_3) \in \max_{\succsim_j} B(0, \bar{h}, \underline{w}) \qquad (c_4, l_4) \in \max_{\succsim_j} B(0, \underline{h}, \bar{w})$$

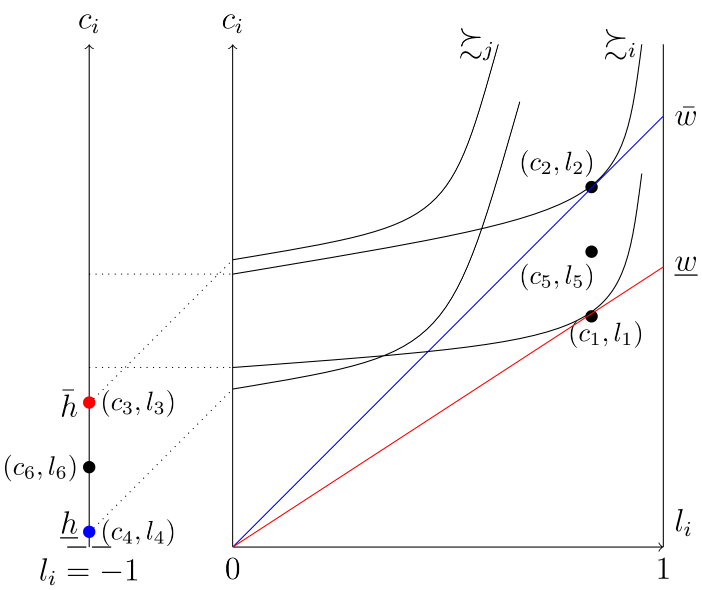

Figure A.3: Illustration of the proof of Theorem A.1.

Let me add the additional restrictions that $c_3 - c_4 = c_1 - c_2$, and $l_1 = l_2$ as well $l_3 = l_4$. I define the average bundles $(c_5, l_5) = \frac{(c_1,l_1)+(c_2,l_2)}{2}$ and $(c_6, l_6) = \frac{(c_3,l_3)+(c_4,l_4)}{2}$ and illustrate the setup in Figure A.3..

By **Responsibility,** $\Big((c_1, l_1), (c_3, l_3)\Big) \succ_{(e_1)} \Big((c_5, l_5), (c_6, l_6)\Big)$,

By **Separability,** $\Big((c_1, l_1), (c_3, l_3), (c_2, l_2), (c_4, l_4)\Big) \succ_{(e_3)} \Big((c_5, l_5), (c_6, l_6), (c_2, l_2), (c_4, l_4)\Big)$,

By **Compensation,** $\Big((c_5, l_5), (c_6, l_6), (c_5, l_5), (c_6, l_6)\Big) \succsim_{(e_3)} \Big((c_1, l_1), (c_3, l_3), (c_2, l_2), (c_4, l_4)\Big)$, By **Transitivity**, $\Big((c_5,l_5),(c_6,l_6),(c_5,l_5),(c_6,l_6)\Big) \succ_{(e_3)} \Big((c_5,l_5),(c_6,l_6),(c_2,l_2),(c_4,l_4)\Big)$,

By **Separability**, $\Big((c_5,l_5),(c_6,l_6)\Big) \succ_{(e_2)} \Big((c_2,l_2),(c_4,l_4)\Big)$,

But this contradicts **Responsibility**, proving the statement. ∎

The main-text Theorem 1 shows that one can escape the impossibility of Theorem A.1 by weakening **Separability** to **Mean-Preserving Separability**. I prove Theorem 1 by using two lemmas. This proof is reminiscent to Fleurbaey and Maniquet (2006, 2011) and Valletta (2014)[37]. Lemma 1 implies the maximin[38] nature of the social ordering while Lemma 2 characterize the well-being measure.

Lemma 1. *If the SOF satisfies **Weak Pareto, Hansson independence and Weak Transfer,** then* $\forall e \in E$, $(c,l),(c',l') \in X^{\mathcal{I}}$ *if there exists* $\{i,j\} \in \mathcal{I}$ *such that* $\succsim_i = \succsim_j \equiv \succsim_0$ *and*

$$(c'_i,l'_i) \;\succ_0\; (c_i,l_i) \;\succ_0\; (c_j,l_j) \;\succ_0\; (c'_j,l'_j)$$

while $(c'_k,l'_j)=(c_k,l_k)$ *for all* $k \in \mathcal{I}\backslash\{i,j\}$, *one has* $(c,l) \;\succ\; (c',l')$.

Proof of Lemma 1. Follows mutatis mutandis the proof of Lemma 1 in Fleurbaey and Maniquet (2006). ∎

Lemma 2. *If the SOF satisfies **Weak Pareto, Responsibility, Weak Transfer, Hansson Independence, and Mean-Preserving Separability,** and* $\forall e \in E$, $\exists (c,l),(c',l') \in X^{\mathcal{I}}$ *such that*

$$M_i(c'_i,l'_i) > M_i(c_i,l_i) > M_j(c_j,l_j) > M_j(c'_j,l'_j)$$

and $(c_k,l_j)=(c'_k,l'_k) \;\; \forall k \in \mathcal{I}\backslash\{i,j\}$

Then,

$$(c,l) \;\succ\; (c',l')$$

Proof of Lemma 2. By contradiction, suppose that $(c',l') \;\succsim\; (c,l)$.

Let me introduce two new agents, a,b such that :

- $(w_a,h_a)=(w_b,h_b)=(\tilde{w},\tilde{h})$
- $\succsim_a = \succsim_i$ and $\succsim_b = \succsim_j$

[37] In comparison with Fleurbaey and Maniquet (2006), I have a stronger Responsibility requirement but a weaker Separability requirement and more dimensions of heterogeneity. With respect to Valletta (2014), I have weaker versions of Pareto and Transfer axiom. That paper dealt with the fair income tax if there are two consumption goods but only one productive skill. In the present paper, I have an homogeneous consumption good but productive skills in two sectors.

[38] There has been recent axiomatizations of money-metric aggregator with finite inequality aversion which consists in weakening either **Weak Transfer** (Bosmans et al., 2018) or **Hansson Independence** (Piacquadio, 2017). However, I kept the present structure as the maximin has been crucial in the basic income debate.

I denote the relevant economies in the following way :

$$e_{(\{a,b\})} = \Big((w_i, h_i, \succsim_i)_{\forall i \in \{a,b\}} \Big) \qquad e_{(\mathcal{I} \cup \{a,b\})} = \Big((w_i, h_i, \succsim_i)_{\forall i \in \mathcal{I} \cup \{a,b\}} \Big)$$

Let $\Big((c_a, l_a), (c_b, l_b) \Big), \Big((c'_a, l'_a), (c'_b, l'_b) \Big)$ be two allocations in $e^{\{a,b\}}$ such that

$$(c_a, l_a) \in \max_{\succsim_a} B(t_a, \tilde{w}, \tilde{h}) \quad (c'_a, l'_a) \in \max_{\succsim_a} B(t'_a, \tilde{w}, \tilde{h})$$
$$(c_b, l_b) \in \max_{\succsim_b} B(t_b, \tilde{w}, \tilde{h}) \quad (c'_b, l'_b) \in \max_{\succsim_b} B(t'_b, \tilde{w}, \tilde{h})$$

with $t_a > t'_a > t'_b > t_b$
and

$$M_i(c'_i, l'_i) > M_i(c_i, l_i) > M_a(c_a, l_a) > M_a(c'_a, l'_a) > M_b(c'_b, l'_b) > M_b(c_b, l_b) > M_j(c_j, l_j) > M_j(c'_j, l'_j)$$

By **Mean-Preserving Separability,**

$$\Big((c', l'), (c'_a, l'_a), (c'_b, l'_b) \Big) \succsim_{(\mathcal{I} \cup \{a,b\})} \Big((c, l), (c'_a, l'_a), (c'_b, l'_b) \Big)$$

Recall that $(c_k, l_k) = (c'_k, l'_k)$ for all $k \in I \backslash \{i, j\}$. Moreover, because $M_i(\cdot)$ and $M_a(\cdot)$ represents the same preferences (resp. $M_j(\cdot)$ and $M_b(\cdot)$), we can apply Lemma 1 between agents i and a (resp. between agents j and b) to get

$$\Big((c, l), (c_a, l_a), (c_b, l_b) \Big) \succ_{(\mathcal{I} \cup \{a,b\})} \Big((c', l'), (c'_a, l'_a), (c'_b, l'_b) \Big)$$

By transitivity of the SOF,

$$\Big((c, l), (c_a, l_a), (c_b, l_b) \Big) \succ_{(\mathcal{I} \cup \{a,b\})} \Big((c, l), (c'_a, l'_a), (c'_b, l'_b) \Big)$$

By **Mean-Preserving Separability** one has,

$$\Big((c'_a, l'_a), (c'_b, l'_b) \Big) \succ_{(\{a,b\})} \Big((c_a, l_a), (c_b, l_b) \Big)$$

and this contradicts **Responsibility**, which completes the proof for lemma 2. ■

Proof of Theorem 1. The proof of theorem 1 is immediate from the combination of Lemma 1 and Lemma 2 with the characterization of the maximin ordering by Hammond (1976).

□

B Results for the case $\underline{w} > 0$

B.1 Theoretical results

All the results in the main body of the paper have been presented with a worst wage rate in the economy equal to zero $\underline{w} = 0$. In this section, I show that the results can be extended to the case where $\underline{w} > 0$. This subsection derives the equivalent results as those presented in section 4 in the main text. It will not be assumed here that *Hardworking Poor Existence* holds. Rather, I will impose *Minimality* which restricts the number of tax-benefit systems (τ, D) that decentralizes a particular incentive-compatible allocation (c, l) by focusing on those where no inconsequential tax cut are left. It formally requires that the second-best budget $B(\tau, D, \underline{w}, \underline{h})$ coincides with the envelope curve of agents' indifference curves at (c, l). It is enough to restrict this assumption only for agents with the worst endowments.

Assumption (Minimality). *A tax-benefit system (τ, D) that decentralizes the incentive-compatible (c, l) for $e \in E$ satisfies Minimality if*

$$B(\tau, D, \underline{w}, \underline{h}) = cl\left\{ \bigcup_{i:(w_i,h_i):(\underline{w},\underline{h})} Q_i(c_i, l_i) \right\}$$

where cl denotes the closure of a set, $Q_i(c_i, l_i)$ is the upper contour set of agent i at bundle (c_i, l_i) i.e. $Q_i(c_i, l_i) = \{(c_i', l_i') | (c_i', l_i') \succsim_i (c_i, l_i)\}$.

When the tax-benefit system is not minimal, one can devise tax cuts that do not affect any individual nor the budget constraint of the government. It is therefore a quite natural assumption. Figure A.4 provides an example of a violation of Minimality. Although (τ, D) decentralizes (c, l) in this two-agent economy, one could find a tax cut such that no one is affected. It would amount to make the blue locus coincide with the envelope of agents' indifference curves, i.e. to annihilate the shaded area in Figure A.4.

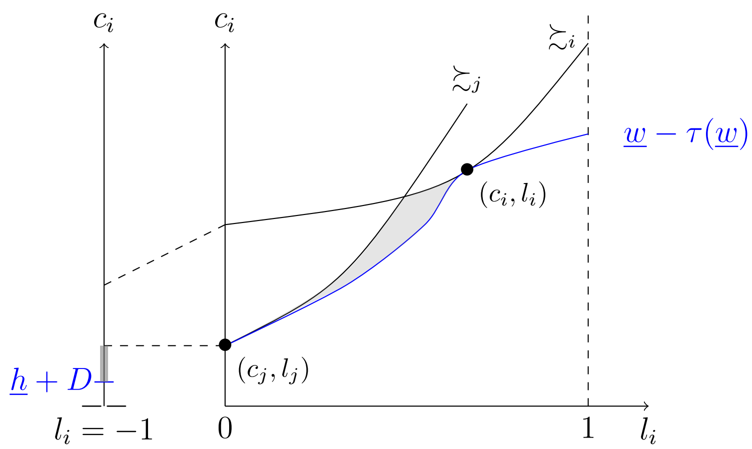

Figure A.4: (τ, D) decentralize (c, l) but violates Minimality.

It is worth noting that when (τ, D) satisfies *Minimality*, $y - \tau(y)$ is non-decreasing in y because preferences are monotonic. As a consequence, *Minimality* forbids $\frac{\partial \tau(y)}{\partial y} > 1$ on some $y \in [0, \underline{w}]$, i.e. a confiscatory tax rate on some interval of low incomes. The next theorem is reminiscent to Theorem 2 in the main text.

Theorem A.2. *For $e \in E$ such that $\underline{w} > 0$, and any two incentive-compatible allocations (c, l) and (c', l') decentralized by (τ, D) and (τ', D') respectively, one has that (c, l) is socially preferred to (c', l') with respect to the FSOF whenever*

$$\min\left\{\underline{h} + D - \tilde{h};\ \min_{0 \leq y \leq \underline{w}} (1 - \frac{\tilde{w}}{\underline{w}})y - \tau(y)\right\} \geq \min\left\{\underline{h} + D' - \tilde{h};\ \min_{0 \leq y \leq \underline{w}} (1 - \frac{\tilde{w}}{\underline{w}})y - \tau'(y)\right\} \tag{2}$$

Proof. By Minimality, we know that there will be at least an agent with endowments $(\succsim_j, \underline{w}, \underline{h})$ such that she is indifferent between a bundle $(c_j, l_j) \in B(\tau, D, \underline{w}, \underline{h})$ and $\max_{\succsim_i} B(t, \tilde{w}, \tilde{h})$ for some t. One computes $M_j(c_j, l_j)$ as

$$M_j(c_j, l_j) = \min_{\hat{l}} t \text{ s.t. } \begin{cases} \underline{w}\hat{l} - \tau(\underline{w}\hat{l}) = \tilde{w}\hat{l} + t & \text{if } \hat{l} \in [0, 1], \\ \underline{h} + D = \tilde{h} + t & \text{if } \hat{l} = -1 \end{cases}$$

This is equivalent to

$$M_j(c_j, l_j) = \min\left\{\underline{h} + D - \tilde{h};\ \min_{0 \leq y \leq \underline{w}} (1 - \frac{\tilde{w}}{\underline{w}})y - \tau(y)\right\}$$

All agents $i \in \mathcal{I}$ with $(w_i, h_i) \geq (\underline{w}, \underline{h})$ must have $(c_i, l_i) \succsim_i (c_j, l_j)$. Because the M_i function is a money-metric utility function and represents preferences, it follows that $M_i(c_i, l_i) \geq M_j(c_j, l_j)$ for all $i \in \mathcal{I}$ which completes the proof. ■

The main difference with the main-text Theorem 2 is that now the worst-off in the labor market may be different from those earning the social assistance. In particular, they could be working with low pay, such as full time minimum wage earners. We conclude this subsection by deriving the optimal inactivity benefit with a formula reminiscent to Theorem 3.

Theorem A.3. *For $e \in E$ with $\underline{w} > 0$, if there exists an incentive-compatible allocation decentralized by (τ^*, D^*) that is optimal with respect to the FSOF, then*

$$D^* = \tilde{h} - \underline{h} + \min_{0 \leq y \leq \underline{w}} (1 - \frac{\tilde{w}}{\underline{w}})y - \tau^*(y)$$

To sketch the optimal tax system, consider again the Laissez-faire policies $(\tau, D) = (0, 0)$. The government computes the smallest well-being in each sector using Theorem A.2. If it sets marginal tax rates such that $\frac{\partial \tau(y)}{\partial y} = 1 - \frac{\tilde{w}}{\underline{w}}$ for all $y \in (0, \underline{w})$, i.e. negative marginal tax rates on low incomes, then all low-incomes have identical well-being. Then, the government collects taxes as much as efficiency permits and sets the joint level of D^* and $-\tau^*(0)$ as in Theorem A.3. Again, this is very close to the optimal tax schedule of Fleurbaey and Maniquet (2007), where the present paper adds the key difference between D^* and $-\tau^*(0)$.

B.2 Empirical results

This subsection extends the results of section 5 in the main text to the case where $\underline{w} > 0$. I have assumed that $\underline{(}w) = \arg\min_{0\leq y\leq \underline{w}}(1-\frac{\tilde{w}}{\underline{w}})y-\tau^*(y)$ for all countries. The simulation is run for 2019 with the exact same parameters as in the main text, except that $\underline{w}-\tau(\underline{w})$ is now interpret as the disposable income of a minimum wage earners working full time.

Table A.1: Summary of results. Sufficient increase in $\underline{w}-\tau(\underline{w})$ for $D=1$ to be a welfare-improving reform, in percentage of current $\underline{w}-\tau(\underline{w})$.

Country	Lone parents	Singles
Australia	102,75%	116,50%
Belgium	50,47%	112,84%
Bulgaria	74,41%	139,96%
Canada	118,73%	165,95%
Czech Republic	96,99%	147,41%
Estonia	53,97%	114,82%
France	46,91%	91,72%
Greece	158,22%	158,22%
Germany	132,58%	214,20%
Croatia	129,42%	129,42%
Hungary	137,39%	233,21%
Israel	52,77%	119,34%
Ireland	46,10%	111,43%
Japan	54,23%	179,36%
Lithuania	88,95%	157,29%
Latvia	43,39%	139,87%
Luxembourg	50,49%	110,96%
Malta	93,07%	138,38%
Netherlands	116,16%	142,99%
New Zealand	44,68%	59,68%
Poland	125,05%	165,15%
Portugal	107,27%	107,27%
Romania	185,09%	192,31%
Slovenia	11,61%	97,30%
Slovak Republic	77,42%	118,30%
Spain	89,53%	102,38%
Turkey	119,83%	126,20%
United Kingdom	83,42%	134,01%
United States	103,51%	289,04%

I conclude that the results are qualitatively similar even if quantitatively different. The policy conclusion is unchanged: governments should first increase support for low-income workers before any dollar of inactivity benefit is welfare-improving.

C Welfare recipient stigma

In this section, I consider the case of a government that does not wish to hold agents fully responsible for their preferences because their disutilities of participation have been partly driven by the *welfare recipient stigma*. It captures the idea that some agents remain inactive and do not take up conditional social benefits because enduring the screening device of the government entails a mental burden, rooted in the stigma that societies attach to benefits recipients.

Consider the following structure for the disutility of participation d_i:

$$d_i(c_i) \equiv u_i(c_i, -1) - u_i(c_i, 0) = s_i + \delta_i(c_i)$$

where $\delta_i \in [-s_i, +\infty)$ is the idiosyncratic taste parameter[39] and $s_i \geq 0$ is the value of stigma. . Observe that s_i has a money-metric interpretation: it is the maximal amount of consumption that an agent is willing to forgo in order to escape enduring the screening device of the government.

For clarity of the exposition, let me assume that there are only two draws of this stigma utility cost : $s_i \in \{S, 0\}$ with $S > 0$. Hence, there are only two different exposures to the stigma cost of conditionality in the population : those that do suffer from it and those that do not[40]. The social planner wishes to compensate for s_i as well as w_i and h_i, while holding responsible for δ_i and their willingness to work.

Rather than deriving rigorously the full axiomatization that this compensation for s_i would entail, I sketch the result by an example. Consider the case of two fraternal twin sisters, agents k and j. They are identical in every respect but they differ in their exposure to the stigma utility cost: agent k suffers from it such that $s_k = S$ while agent j do not and $s_j = 0$.

Consider the bundle (c_j, l_j) and (c'_j, l'_j) that are such that agent j is indifferent between the two, and they are consumed when inactive and unemployed, respectively. I sketch this setup in Figure A.5.

In red are drawn the indifference curves of agent k. Obviously, when she is unemployed and consumes (c'_j, l'_j) she suffers the stigma $s_k = S > 0$ associated to this labor market status. If one computes the $M_i(c_i, l_i)$ utility of these two agents when they consume (c'_j, l'_j), one gets that $M_k(c'_j, l'_j) = M_j(c'_j, l'_j) - S$. In other words, *when unemployed,*

[39]The fact that δ_i can now have negative values reflect the possibility for some agents to derive non-pecuniary benefits from labor market participation (such as friendliness from colleagues for example) which could partly offset the burden S puts on them.

[40]If this partitioning in two sets is degenerate, we are back to the analysis of the previous sections as there is no inequality to compensate for. In other words, if all agents experience the same stigma cost of conditionality, or if none of them does, the main formulas are unaffected.

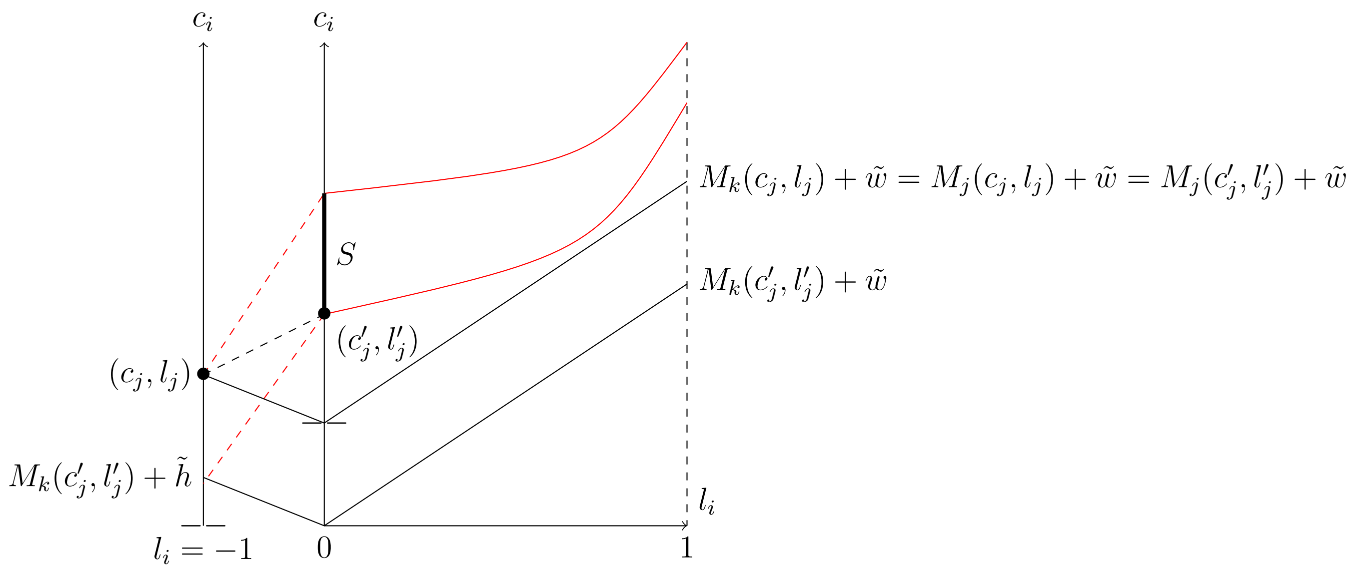

Figure A.5: Agents k and j are identical in every primitive but one: the inactive k suffers a stigma utility cost of S while the unemployed j does not. In red, the indifference curves of k. Agent j is indifferent between (c_j, l_j) and (c'_j, l'_j).

the well-being measure derived in previous sections already accounts for the fact that those suffering from a larger disutility of participation (here, coming from the stigma) have a lower well-being.

Now, the difference is when the agents are inactive and consume (c_j, l_j). In this case, the indifference curve of k lies above the one of j, and they only coincide at (c_j, l_j). If one applies the $M_i(c_i, l_i)$ utility to this situation, one gets that $M_k(c_j, l_j) = M_j(c_j, l_j)$, i.e. both agents have the same level of well-being, even if agent k *would* have suffered from the stigma *had she joined the labor market*.

A government that compensates for S should treat the well-being of k when inactive as if she had actually experienced this stigma cost. In other words, the well-being measure when inactive must be reduced by s_i with respect to the $M_i(c_i, l_i)$ utility. Hence, the new well-being measure compensating for the stigma, is given by

$$W_i(c_j, l_j) = M_i(c_i, l_i) - (1 - a_i)s_i$$

In turn, all the analysis above can be repeated using $W_i(c_j, l_j)$ instead of $M_i(c_i, l_i)$. Obviously, the worst-off in the home sector will now have a well-being measure of $\underline{h} - S + D - \tilde{h}$. Hence, the optimal (τ^{**}, D^{**}) that maximins $W_i(c_j, l_j)$ follows:

$$D^{**} = S + \tilde{h} - \underline{h} + \min_{0 \geq \underline{w}}(1 - \frac{\tilde{w}}{\underline{w}})y - \tau^{**}(y)$$

I conclude that S positively influences the optimal inactivity benefit in an additive fashion and thereby weakens the conflict between fairness and basic income outlined in previous sections. Because of the formalization, S has a money-metric interpretation and should measured as an answer to this question : *how much would one be willing to pay (i.e. forgo consumption) to escape enduring the screening device of the government?*

To the best of my knowledge, such empirical estimates for S are not available in the literature. In order to justify that one dollar of inactivity benefit is welfare-improving, S must be at least larger than the estimates of table 1. In many instances, it seems unrealistically large. Alternatively, S could also be interpreted as an ethical parameter. In that case, estimates from table 1 would provide lower bounds on the government's willingness to pay to escape its own screening device.

D Details on the empirical application

I used the OECD tax-benefit simulator version 2.5.0. with the following parameters:

- Childless single 2020 : aged 40, unemployed for 6 months, with 216 months of social security contributions accumulated over the lifetime, earning social assistance, for the year 2020. Eligible to social assistance, net of income tax and social security contributions.

- Lone parents 2020 : aged 40, unemployed for 6 months, with 216 months of social security contributions accumulated over the lifetime, earning social assistance, for the year 2020. Children aged 4 and 6. Eligible to social assistance, lone parents support, net of income tax and social security contributions.

- Childless single 2019 : aged 40, unemployed for 6 months, with 216 months of social security contributions accumulated over the lifetime, earning statutory minimum wage. Eligible to social assistance, in-work benefits, net of income tax and social security contributions.

- Lone parents 2019 : aged 40, unemployed for 6 months, with 216 months of social security contributions accumulated over the lifetime, earning statutory minimum wage. Children aged 4 and 6. Eligible to social assistance, in-work benefits, lone parents support, net of income tax and social security contributions

The set of countries covered by the G-SWA survey (Aksoy et al., 2023) is a strict subset of the 29 countries I study. Whenever the estimate for F was not available, I kept the maximum of the series, i.e. 100 minutes per day.

The legal length of the working week is taken from the OECD (2021) (Annex Table 5.A.1.). The statutory length may differ from the negotiated length in some countries. When both are present, I took the maximum among the two. If both are absent, I set the length of the working week to 45 hours, corresponding to the maximum of the series. I considered that the working week lasts 5 days.

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