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Abstract

In this paper, we review possible theoretical justifications of a universal basic income (UBI) scheme and also examine the determinants of its feasibility and scope. We begin by contrasting the unconditionality of UBI with the many conditions that typically accompany other welfare policies. Possible justifications for an unconditional UBI range from pure normative reasons to practical reasons due to the problem of screening beneficiaries and imperfections in institutions in charge of implementing tax and welfare policies. We also explore theoretically the conditions that determine the feasibility and size of a UBI. The broad picture that emerges from our review is that both normative and practical considerations make UBI easier to defend as a tool of poverty alleviation in poor economies than a tool to achieve social justice in rich ones.

JEL Classification: D31, D63, H24, H31, I38

Keywords: universal basic income, unconditional cash transfers, welfare policies, Labour Supply

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Universal Basic Income: Some Theoretical Aspects*

Maitreesh Ghatak† François Maniquet‡

April 2019

Abstract

In this paper, we review the desirability and feasibility of a universal basic income (UBI) scheme from the theoretical point of view. We first discuss the possible theoretical justifications of UBI contrasting the unconditionality of UBI with the many conditions that typically accompany other welfare policies. These range from pure normative reasons to practical reasons due to the problem of screening beneficiaries and imperfections in institutions in charge of implementing tax and welfare policies. Next we explore theoretically the conditions that determine the feasibility and size of a UBI. The broad picture that emerges from our review is that both normative and practical considerations make UBI easier to defend as a tool of poverty alleviation in developing countries than a tool to achieve social justice in developed ones.

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1 Introduction

A Universal Basic Income (UBI) is a universal and unconditional stream of cash income paid by the government to every full member of society- it is paid irrespective of whether an individual is working, of his or her existing income, and whoever he or she lives with (Van Parijs, 1995).[1,2] The concept of UBI has a distinguished

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[1] As Van Parijs (1995) observes, full membership of society is not meant to be restricted to citizens only - a sufficient length of legal residence is generally regarded as the key criterion.

[2] From this point on, we refer to an individual as a "she".

intellectual tradition starting from radical thinkers, liberals, and utopian socialists in the eighteenth and nineteenth century, such as Thomas Paine, Thomas Spence, Charles Fourier, Joseph Charlier, and John Stuart Mill.[3] It is an idea that appears under various labels such as "social dividend", "citizen's income", "demogrant", and "basic income". It has drawn support from both the left and the right end of the political spectrum - for example, it has been discussed by left-of-centre economists like James Tobin and James Meade, and it also seems to have inspired the negative income tax proposal of Milton Friedman.

In recent years the idea of UBI has gained traction again in the debate on reforming the welfare state in major market economies on both sides of the Atlantic and has received support from mainstream politicians in the British Labour Party, the US Democratic Party, the French Socialist Party, and the Green Party in several European countries, the UK, Canada, and Australia. It was put up for a referendum (and was defeated) in Switzerland in 2016, has been tried out on an experimental basis with mixed initial reports in various European countries like Finland and the Netherlands, and the Canadian province of Ontario. The idea of UBI also resonates with a recent policy shift in many developing countries as well as international development assistance organizations like the World Bank and the DFID towards direct cash transfers which involves rolling all subsidies into a single lump-sum cash transfer to households.[4]

This paper has two objectives - to discuss the *desirability* and *feasibility* of UBI from the point of view of economic theory.

First, we explore the desirability of UBI by examining normative justifications of it in different economic environments. As we are also interested in understanding the case for UBI as a policy tool in both developed and developing countries, it is useful to clarify how we differentiate between their economic environments. The key differences we focus on are the size of the population living close to the margin of subsistence, the degree of formality of certain markets (such as labor markets) that determines the extent to which income levels and hours worked are observable to the policymaker, and state capacity in terms of implementing tax and welfare policies.

Second, a UBI proposal typically (but often implicitly) assumes a change in the tax system or in overall government spending for it to be a budget-balanced or revenue-neutral proposal. We analyze the feasibility of a UBI scheme assuming it is funded by a linear income tax, taking into account the behavioural response of such a scheme on labor supply.

We restrict our attention to studying UBI purely as a mechanism for redistribution (or transfer), as opposed to a substitute to policies to address specific market failures, such as microfinance in the context of credit markets or unemployment insurance in the context of labor markets, or of policies to fund the provision of public goods and services.[5] The natural comparison is with other

[3] See Van Parijs and Vanderborght (2017) for a discussion of the history of the idea.

[4] See Banerjee, Niehaus, and Suri (2019) and Hoynes and Rothstein (2019) in this symposium for a discussion of UBI in the context of the developing world and advanced countries.

[5] Banerjee et al (2019) deal with some of these issues.

transfer policies that are not in the form of cash or involve targeting to specific groups or conditional on some form of compliance criteria being met.

Among the several conditions that characterize a UBI compared to other redistribution policies, the absence of targeting or means-testing is the one that we concentrate on the most. Any universal scheme is expensive, and a natural question to ask is why should those who do not earn any labor income receive the same net transfer independently of their ability to earn income, of their own non-labor income, and of the income of those who live with them? How should the tax burden of UBI be spread among the net contributors to the redistribution system?[6] To answer these questions, we start with the observation that an individual's total income is the sum of labor and non-labor income, and labor income in turn is equal to an individual's labor time times her wage. Income inequality can then come from differences in labor time or differences in wages or differences in non-labor income.

We distinguish between three types of arguments, which we label as first-best, second-best, and third-best arguments.

In a first-best world, the benevolent policymaker is assumed to have full information about the characteristics of individuals and can taylor tax and transfer schemes according to them. We find that while it is possible to justify UBI on normative grounds even in a first-best world, it is much easier to defend it based on considerations of poverty alleviation than on the notions of fairness that are at the heart of optimal taxation. For example, transferring the same amount to all idle individuals independently of why they do not work - whether it is due to low wages, or low willingness to work - requires the optimal allocation to be one where there is no redistribution from high-wage to low-wage earners, combined with a large redistribution from high to low-willingness-to-work individuals, which is hard to justify on normative grounds.[7]

In a second-best world, the characteristics of agents are no longer assumed to be observable to the policymaker. Taxation is assumed to be based on pre-tax incomes only. In this case it is much easier to justify UBI based on some egalitarian objective than in a first-best world because information asymmetries benefit individuals who have high wages but low willingness to work. However, if there are formal labor markets (as is the case in developed countries) then a screening device exists that can be used by the benevolent policymaker to identify, among these who do not work, these who have the ability to earn income on their own. This consists of monitoring of individuals benefiting from unemployment or social assistance, with firms asked to reveal whether they would be ready to hire them or not. It is interesting to note that all existing unemployment insurance or social assistance programs in developed countries are in fact based on such devices,

[6] This addresses the one of the main concerns about UBI, namely, the poor and rich receive the same transfer which does not appear very equitable. We show that unless the additional direct or indirect tax revenues that are used to fund UBI are regressive, gross transfers to the rich will be offset by taxes and in net terms, only those below a certain income level will receive a net transfer under UBI.

[7] All through the paper wages are assumed to reflect productivity of individuals.

something that has not been sufficiently studied in the theoretical literature. In the presence of such a device, a UBI can still be justified, including on the grounds of poverty alleviation. However, some qualifications to this should be added when the maximum feasible level of UBI from the fiscal point of view is not sufficient to guarantee a basic income equal to the poverty line for all. In this case, the goal of poverty alleviation may imply not treating all those who do not work equally generously but to provide some incentives to work so that their overall after-tax income is above the poverty line. In this case, the arguments in favor of UBI also justify complementing it with means-tested social assistance programs targeted towards low-wage individuals.[8]

In a third-best world, we introduce imperfections in the tax and welfare system into the picture. By imperfections, we mean that labor income may be imperfectly observed, and conditional social assistance may require the involvement of inefficient or corrupt local agencies. In such a world, we argue that UBI may be a way to circumvent these imperfections under the same egalitarian objective as these who do not necessarily lead to UBI absent these imperfections.

In our classification of the first, second, and third-best environments, we do not directly deal with frictions in specific markets, such as labor, credit, and insurance, other than the reference to the formality of labor markets in developed countries mentioned above. In the presence of market failures, cash transfers can have efficiency-enhancing effects by relaxing borrowing constraints or allowing individuals to smooth consumption or income. A satisfactory treatment of this angle is beyond the scope of this paper and besides, Banerjee et al (2019) deal with it fairly comprehensively in the context of developing countries in this symposium.[9]

Next we turn to examining the feasibility of a UBI scheme funded by a linear tax (as in the formulation of Atkinson, 1995) across environments where the fraction of the population that is very poor, average income levels, the degree of inequality as well as the effectiveness of the tax and benefits system varies. Taking into account the labor supply responses to taxation of working individuals to fund a UBI, we show that the case for a UBI even from the point of view of feasibility may be stronger for poorer countries.

The plan of the paper is as follows. In Section 2, we discuss in detail various aspects of UBI proposals and identify the ones we will focus on. In Section 3, we begin our review of the theoretical arguments for and against UBI by comparing cash and in-kind benefit systems. In Sections 4, 5 and 6, we review the possible justifications of non-means tested transfers in first-best (full information), second-best (asymmetric information about beneficiaries), and third-best environments (imperfect enforcement of tax and benefits systems). In Section 7 we carry out a positive analysis of a UBI scheme that is funded by a linear tax in terms of what it implies in terms of its effects on labor supply and the determinants of budgetary

[8] By low-wage individuals we refer to those that would be unable to earn an after-tax income above the poverty line even if they work full time. In our formal analysis we take them to be zero-wage individuals for simplicity.

[9] See also Baird, McKenzie, and Özler (2018) and Ghatak (2015) for discussions of some of these mechanisms related to cash transfers in the context of developing countries.

feasibility. We conclude in Section 8.

2 Characterization of a UBI

UBI is a redistribution scheme that has three components. First, it is a cash transfer as opposed to in-kind transfer like food, housing, or fuel; second, it is universal, i.e., it is not targeted to any specific group based on socioeconomic or demographic criteria and third, it is unconditional and not contingent on the recipient satisfying any compliance criteria.

Unconditionality of UBI may be defined in reference to the various conditions that exist in current social benefit systems:

First, it is not conditioned on *means*. We can distinguish three types of means unconditionality of basic income:

a) it does not depend on the beneficiary's ability to earn labor income, whereas a large spectrum of current social benefits are restricted to involuntary unemployed (those whose effective temporary wage rate is zero),

b) it does not depend on the beneficiary's non-labor income, in particular, capital income,

c) it does not depend on the income of the people living with the beneficiary, whereas current benefits are often conditional on the income of the spouse or the parents;

Second, it is not conditioned on any *demographic* criteria like age, gender, marriage or family status, and family composition;

Third, it is not conditioned on special *needs*, using criteria like health, handicap, etc;

Fourth, it is not conditioned on whether the beneficiary is *deserving or worthy* which goes against conditional transfer schemes that are contingent on parents sending their kids to school, on the beneficiary's criminal records, etc.

It is true that many UBI proposals in practice allow some demographic criteria like age - for example, they are typically aimed at people in the working age group.[10] Also, they are typically not expected to replace benefits based on special needs, such as health or handicap, which makes the overall benefits contingent on some aspect of needs. Given this, the absence of conditionality effectively relates to absence of means-testing, whether the recipient deserves it, and considerations of family composition (e.g., married or single, having children).

From the economic point of view, the absence of means-testing is the most controversial aspect of UBI. Accordingly, we will spend a large part of this review discussing the possible justifications of non-means tested transfers. Before that, we briefly review the debate between transfers in cash versus in-kind in the next section.

[10] Recipients of UBI are supposed to be adults. In most proposals, children either fall under a different scheme or their parents or guardians are entitled on their behalf to reduced amounts.

3 Cash versus in-kind transfers

Suppose individuals care about c (essential consumption) and x (inessential consumption) and their preferences are represented by the utility function $u(c, x)$.[11] Suppose the budget constraint is $c + px \leq y$ where y is income, and p is the price of the inessential consumption good (the price of essential consumption is normalized to 1). Let us denote the individual demand functions for c and x as $c(y, p)$ and $x(y, p)$. In this world, if a cash transfer of amount b is to be given to an individual, then the new budget constraint is $c + px \leq y + b$, where y now stands for pre-transfer income. Assuming both essential and inessential consumption to be normal goods, we would expect $c(y + b, p) > c(y, p)$ and $x(y + b, p) > x(y, p)$. In Fig. (1), we depict the two budget lines with and without the transfer, and the corresponding choices of the consumer by the points E_0 and E_0'. Denoting the indirect utility function by $v(y, p)$, it follows directly that $v(y + b, p)$ exceeds the utility that the individual can obtain from any other form of transfers since a lump-sum transfer of b makes the choice problem unconstrained.

Consider now an alternative transfer of value b that is either in-kind, in the form of a coupon or voucher, or electronic benefit transfer (EBT) cards. For example, in India, fair price shops (FPS), also known as 'ration shops", distribute food and essential items at a subsidized price to the poor. In contrast in the US the Food Stamp programme, or its current version called the Supplemental Nutrition Assistance Program (SNAP), benefits are directly deposited into the household's EBT card account, which can be used to pay for food at various retail outlets.[12] The new budget line can be written as $\max\{c - b, 0\} + px \leq y$. For $c \geq b$, the budget line shifts parallelly as in the case of cash transfers. However, under this scheme if the beneficiary wants $c < b$, then the amount $b - c$ cannot be converted to x, something that is possible under cash transfers, and the upper bound for x is set by the pre-transfer income y.[13] In Fig. (1), the budget line under this scheme is the same as the one for the unconditional cash transfer of b for $c \geq b$

[11] We interpret essential goods as those that are indispensable, like water or food, in the sense that zero consumption of them makes the marginal utility of all other goods zero (see Matsuyama and Ushchev, 2017 for a formal treatment). This is different from the distinction between necessities and luxuries that has to do with the income elasticities being smaller or greater than one. It is related but different from the distinction between merit vs demerit goods that reflects the notion of the policymaker as to what kind of goods are potentially deserving of societal support. These could reflect need as is the case with essential goods, but it can also reflect positive externalities or behavioral biases associated with them that could lead to underconsumption.

[12] In fact, India has experimentally introduced a Direct Benefit Transfer (DBT) scheme in a limited number of areas starting in 2013, that transfers subsidies directly to the bank account of beneficiaries, with the hope that this will reduce leakages and delays associated with the existing public distribution system. Some of the initial evaluations present a mixed picture. For example, Muralidharan et al (2017) conclude that DBT-based reform holds long-term promise, and that over time beneficiaries prefer DBT to in-kind transfer via the ration shops. However, in the short-run there is not enough evidence to support a universal expansion of DBT, and responses from beneficiaries do not unambiguously establish a revealed preferences for cash transfers.

[13] See Hoynes and Schanzenbach (2009) for a detailed discussion.

and for $c < b$ it is a vertical line with the intercept $\frac{y}{p}$ on the horizontal axis.

Let $\hat{c}(y+b,p)$ and $\hat{x}(y+b,p)$ denote the choices of c and x under the in-kind scheme. Given the nature of the change in the budget constraint, as long as $c(y+b,p) \geq b$, $\hat{c}(y+b,p) = c(y+b,p)$ and $\hat{x}(y+b,p) = x(y+b,p)$: the condition on which good to buy has no bite and the choice of the consumer is depicted by the point E_0'. If $\hat{c}(y+b,p) = b$ (we assume free disposal post receiving the transfer) then $\hat{x}(y+b,p) = \frac{y}{p}$.

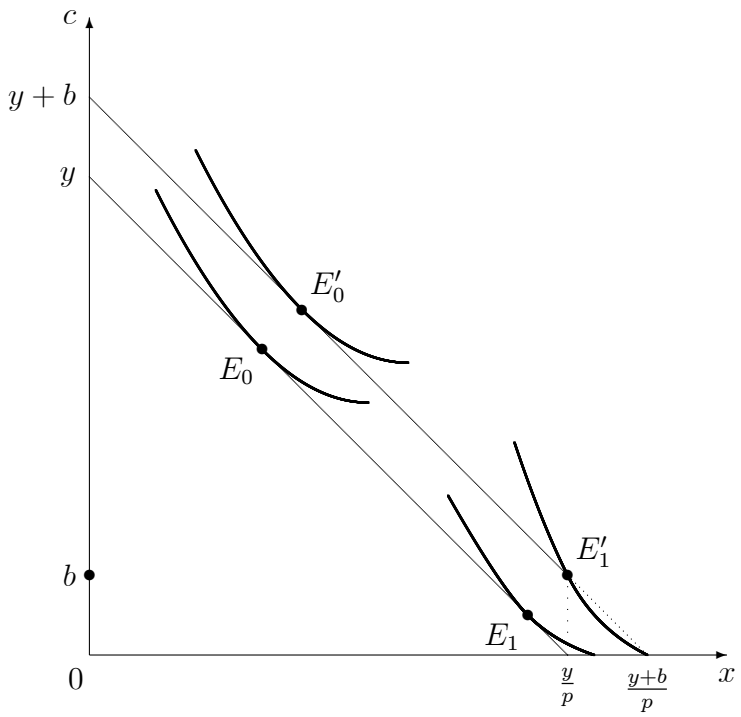

Figure 1: Cash versus in-kind transfers.

In this case, the outcome would be different from the previous case. We have highlighted this with the points E_1 and E_1' - clearly, the consumer would have chosen a different point with an unconditional cash transfer, one where she would consume $c < b$ and $x > \frac{y}{p}$ but is constrained to choose the point E_1' which involves $\hat{c}(y+b,p) = b$ and $\hat{x}(y+b,p) = \frac{y}{p}$. But even in this case the consumption of x is higher than in the pre-transfer situation, as $x(y,p) < \frac{y}{p}$.

What this means is, either way, there is greater consumption of x compared to the pre-transfer period. So contrary to what one might think, even with a restricted form of transfer intended to increase essential consumption, there will be an increase in inessential consumption due to an income effect. The extent of the increase in inessential consumption, of course, would be less than the case of an unconditional cash transfer. This simple analysis therefore suggests that only for beneficiaries who are marginal the impact of cash and in-kind transfers are different - for inframarginal beneficiaries, there is no difference. Evidence in fact seems to suggest most recipients happen to be inframarginal (Hoynes and Schanzenbach, 2009).

From the welfare point of view, clearly the individual is better off with a flat cash transfer of b and any transactions costs involved in making an in-kind transfer of the amount b will make the logic stronger from the social efficiency point of view. Only when the in-kind transfer is completely fungible the two forms of transfers will be equivalent.

Therefore, we conclude from this discussion that the case for in-kind transfers has to rest on departures from this framework.

First, in-kind transfers can be used for self-targeting, if these benefits are targeted to the poor as opposed to being universal, if the goods involved are necessities of very basic quality.[14]

Second, if the benevolent policymaker has paternalistic preferences that are different from that of the beneficiary, then in-kind transfers may be preferred to cash transfers. This would depend on to what extent there are positive externalities or the beneficiaries are subject to behavioral biases that would lead them to underconsume merit goods. It would also depend on to what extent intrahousehold resource allocation considerations are relevant (e.g., gender discrimination, insufficient altruism towards children) so that we cannot automatically assume that the head of the household will necessarily spend the cash income in a way that is most beneficial for the whole family.

Third, if there are transactions costs in accessing markets, in-kind transfers are effectively larger in real terms. Clearly in remote rural areas of developing countries having cash is less useful than in more urban areas.[15]

Fourth, there is also a political economy argument for in-kind transfers: if voters dislike the fact that their taxes are used by the beneficiaries to buy inessential (or more broadly, demerit) goods, then a restriction to essential or merit goods makes sense because that makes voters more willing to pay and it does not effectively decrease the utility of the beneficiaries so long as they are inframarginal.

In the end, it is an empirical matter as to how cash transfers tend to get spent by beneficiaries. Evidence from developing countries actually suggest that, on average, cash transfers to the poor do not cause them to spend their money on inessential consumption (see, Evans and Popova, 2017).

Before we end this section, we would like to mention a possible reinterpretation of the model of this section as a model of labor supply, which is the one we will focus on for the rest of the paper. We can think of y, as an individual's full income, i.e., the money value of her available time evaluated at her wage, together with her non-labor income. Then the allocation of y into c and x can be thought of as the allocation of full income into consumption, c, and leisure, x, the price of which

[14] In section 5, when we discuss workfare, the issue of self-targeting in a second-best environment comes up again.

[15] In a study of a bicycle scheme for school children in Bihar (Ghatak, Kumar, and Mitra, 2016), it was found that those living in remote areas do in fact prefer in-kind to cash transfers, with the opposite holding for those who live in urban areas. Muralidharan et al (2017) in their study of cash transfers replacing food-ration entitlements for the poor, the Direct Benefit Transfer (DBT) programme, found that costs varied across beneficiaries depending on access to banking.

is the wage. Under this reinterpretation, a paternalistic policymaker would be one who thinks that people are likely to consume more leisure than what they should. An in-kind policy would then be to impose a minimal amount of work requirement (or, job-seeking effort) on an individual. We do in fact observe policies that try to incentivize people to work or look for jobs in developed countries, and also workfare programs in developing countries, such as the employment guarantee scheme in India (see Ravallion, 2018).[16]

4 In a first-best world

Under what circumstances would a benevolent policymaker wish to transfer the same amount of money to different types of individuals? We begin exploring this question in a first-best world. By first-best, we mean that the policymaker has full information about all the relevant characteristics of individuals and can tailor taxes and transfers to these, and there are no direct costs or frictions associated with the implementation of these policies.[17] Given that most arguments in favor of UBI refer to informational asymmetries or incentive issues or administrative costs, the common intuition is certainly that UBI is an implausible first-best policy. We demonstrate this point explicitly in this section, which acts as a benchmark and a point of departure for our analysis of the desirability of UBI in more realistic second and third-best worlds.

We assume that the benevolent policymaker is interested in maximizing a social welfare function that is consistent with Pareto efficiency, which is a natural starting point. In a first-best world, all Pareto efficient allocations can be obtained by first designing a lump-sum tax and transfer system, and then letting individuals choose their labor supply given that labor is rewarded at their actual productivity.[18,19] Choosing the optimal allocation then boils down to choosing the optimal list of lump-sum taxes and transfers.

We begin by distinguishing two definitions of basic income that come up in debates on UBI. Sometimes basic income is defined as the transfer that an individual would get on top of all her other incomes, with the amount being independent of these other incomes. It is universal when all individuals in the economy receive

[16] Arguments to justify such policies are sometimes grounded on the assumption of behavioral biases, such as present bias that may induce people to overestimate the cost of looking for jobs. The consequence of this kind of bias is studied, for instance, by Lockwood (2016).

[17] As mentioned in the introduction, we do not deal with market imperfections except in a very limited way that has to do with formality of labor markets. This in turn is largely related to the ability of the policymaker to use certain screening mechanisms in the design of the tax-transfer policies.

[18] Taxes and transfers are lump-sum when they do not depend on the behaviour of individuals.

[19] Technically speaking, we are in a setting in which the second fundamental welfare theorem holds: each Pareto efficient allocation can be decentralized by an appropriate design of lump-sum taxes and transfers. Note that the ability of the policymaker to observe the types of the individuals and make the lump-sum transfers depend on these types implies that observing labor times becomes redundant: optimizing individuals freely choose the labor time that the policymaker would assign to them.

the same amount of it. This is the notion of UBI that lies behind some policy experiments, such as the ones conducted in Namibia and India, funded by the German United Evangelical Mission and the UNICEF respectively.[20] This will be the topic of Section 4.1.

In general, though, basic income typically refers to the income of individuals who do not work, and it is an income guarantee in the sense that individuals would automatically get this income in case they stop working.[21] It is funded by taxes paid by working individuals. It is universal when all individuals who do not work receive the same amount of it, independently of whether they do not work because of their low wage or their low willingness to work. This will be the topic of Section 4.2.

We will study two possible justifications of such a UBI. First, we will explore whether there exist good normative reasons to treat all individuals who do not work identically, whether it is due to low productivity reflected in low wages or low willingness to work (Section 4.2.1). Second, we will explore the conditions under which the more direct objective of poverty alleviation leads to granting the same income to all idle individuals (Section 4.2.2).

We adopt a simple framework where individuals have Cobb-Douglas preferences over net or after-tax income and leisure time. All through we stick to a static framework of income-leisure choice, and so after-tax income equals consumption. The preferences of an individual are represented by a utility function:

$$u(y, \ell) = \alpha \log(y) + (1 - \alpha) \log \ell, \tag{1}$$

where ℓ stands for her leisure time and y for her disposable income. We assume there is an upper bound on ℓ, which we denote by T, the amount of available time, assumed to be equal among individuals. The difference between available time and leisure is the labor supply.

Preferences are heterogeneous among individuals, and this is captured by α, the weight that income receives relative to leisure in the utility function. A higher α means a greater willingness to work. Given this simple preference shifter, we denote utility as $u(y, \ell; \alpha)$. We assume that α takes values in an interval $[\underline{\alpha}, \overline{\alpha}]$.

Each individual has an ability to earn income, or wage, $w > 0$, which may differ across individuals. We assume all through that w is exogenous for simplicity. Finally, we assume that individuals have some exogenous amount of non-labor income, $m \geq 0$. As a result, the set of individuals in the economy is fully described by the distribution of the parameters α, w, and m reflecting the preferences, the ability to earn income, and non-labor income. This distribution is represented by a density function $f(\alpha, w, m)$.

When we consider the difference between developed and developing countries in this section that will be in terms of only one factor - a subsistence consumption

[20] See Van Paris and Vandenborght (2017) for detailed descriptions of such experiments and related references.

[21] This, for example, is the formulation of Tobin et al (1967), Friedman (1968), and Atkinson (1995).

level. For a developing country we will modify the above set up by introducing an additional constraint that $y \geq \underline{y}$ where $\underline{y} > 0$ is the subsistence consumption level. This can be incorporated by a slight modification of the above utility function to:

$$\begin{aligned} u(y,\ell) &= \alpha \log\left(y - \underline{y}\right) + (1-\alpha)\log \ell \text{ for } y > \underline{y} \\ &= -V, \text{ otherwise} \end{aligned}$$

where V is some large positive number. In a first-best world, in which the policy-maker is assumed to observe all parameters of the economy, whether individuals earn income in the formal or the informal market does not matter, a further distinction between developed and developing countries that we will return to in the two subsequent sections.

As mentioned above, all Pareto efficient allocations can be obtained through lump-sum transfers based on characteristics of individuals. Let $t(\alpha, w, m) \in \mathbb{R}$ denote the tax paid by an individual of type (α, w, m), which can be positive or negative. The t's have to satisfy the government budget constraint:

$$\int_0^\infty \int_0^\infty \int_{\underline{\alpha}}^{\overline{\alpha}} t(\alpha, w, m) f(\alpha, w, m) da dw dm \geq B \tag{2}$$

where B stands for the net expenditure of the government. We can restrict our attention to situations in which an individual of type (α, w, m) chooses the bundle of goods (consumption and leisure time) that she prefers among all bundles she can reach given her tax t and the reward to her labor, w, to solve:

$$\max_{y \geq 0, \ell \in [0,T]} u(y, \ell; \alpha) \text{ s. t. } y \leq w(T - \ell) + m - t(\alpha, w, m). \tag{3}$$

This leads to the optimal consumption and leisure time

$$y^*(\alpha, w, m) = \alpha(wT + m - t(\alpha, w, m)) \tag{4}$$

$$\ell^*(\alpha, w, m) = \frac{(1-\alpha)(wT + m - t(\alpha, w, m))}{w} \tag{5}$$

if the natural constraint that $\ell \leq T$ is met, that is if

$$w \geq \frac{1-\alpha}{\alpha} \frac{m - t(\alpha, w, m)}{T}. \tag{6}$$

This yields the following indirect utility function:

$$v(w, t, m; \alpha) = \alpha \log \alpha (wT - t + m) + (1-\alpha) \log \frac{1-\alpha}{w} (wT - t + m). \tag{7}$$

Otherwise we get a corner solution:

$$\begin{aligned} y^*(\alpha, w, m) &= m - t(\alpha, w, m) \\ \ell^*(\alpha, w, m) &= T \end{aligned}$$

with the corresponding indirect utility function

$$v(w,t,m;\alpha) = \alpha \log(-t+m) + (1-\alpha)\log T. \tag{8}$$

This gives us the following expression for labor supply:

$$\begin{aligned} L^*(\alpha,w,m) &= \frac{(1-\alpha)wT + \alpha(t(\alpha,w,m)-m)}{w}, \text{ if } w \geq \frac{1-\alpha}{\alpha}\frac{m-t(\alpha,w,m)}{T} \\ &= 0, \text{ otherwise.} \end{aligned}$$

As this expression makes it clear, the set of individuals who do not work ($L^*(\alpha,w,m) = 0$) is composed of individuals of several types. Some may have a very low wage w, others a very low willingness to work α, and yet others a very high non-labor income m. As we will see below, what is an ethically justified way to treat of these different types of individuals is a central question for UBI.

If we consider a developing economy, an additional case can arise, the case in which the subsistence constraint is binding. In this case, the optimality conditions are

$$y^*(\alpha,w,m) = \underline{y} \tag{9}$$

$$\ell^*(\alpha,w,m) = T - \frac{\underline{y} - m + t(\alpha,w,m)}{w} \tag{10}$$

and the indirect utility function is given by

$$v(w,t,m;\alpha) = \alpha \log \underline{y} + (1-\alpha)\log T - \frac{\underline{y} - m + t(\alpha,w,m)}{w}. \tag{11}$$

In this first-best world, the policymaker has the freedom to treat differently income inequalities that come from differences in labor time from these that arise from differences in wages and these that arise from differences in m. As a result, it is not necessarily optimal for the policymaker to allocate transfers $-t(\alpha,w,m)$ that monotonically decrease with labor income $wL^*(\alpha,w,m)$: the policymaker may well want to distinguish between those who work a lot for a low wage from those who work less with a higher wage, even if they end up with the same labor income.

Inequalities may also come from differences in m. If the benevolent policymaker considers inequalities in m normatively undesirable, then she should tax m at 100% and redistribute the proceeds. If the policymaker does not consider these inequalities normatively problematic, then she can simply disregard them. In both cases, there is no loss of generality in developing our analysis under the assumption that $m = 0$ for all individuals and focus on heterogeneity in terms of α and w. This is what we do for the remaining of this section. We will bring inequalities in m back in the analysis in the next section.

The two definitions of basic income that we introduced at the beginning of Section 4 can be translated into our model as, first, a transfer amount of $-t$, and, second, a guarantee on y. We study them in turn in the following subsections.

4.1 A lump-sum transfer to all

If basic income is interpreted as a lump-sum transfer $-t$ received by individuals, then it is universal if it does not depend on α or w, i.e., if $t(\alpha, w) = t$ for all α and all w.

Clearly, under this formulation the basic income can be positive only if the government has a revenue to match the spending on basic income from other sources than taxes. An example is the well-known case of the Alaska Permanent Fund, in which a share of the profit of the state-owned oil industry is evenly redistributed among the citizens of the state. Such a basic income is non distortionary, i.e., it does not impose any inefficiency on the economy.

If the public sector of the economy does not have any profit to redistribute, or, as it is typically the case, if running the government requires some resources, then a basic income in this sense is simply not feasible given the budget constraint (2). As a result, this way of defining basic income is not very promising from the point of view of justifying UBI, and hence the Namibian and Indian experiments we mentioned earlier are of limited interest.

4.2 A lower bound on consumption

Let us now define basic income as an income guarantee. Here we need to distinguish between developed and developing countries. We begin with the former, where those who have the lowest income (or consumption, as income and consumption are equivalent in our static model) are to be found among those who do not work. Making a basic income universal, that is guaranteeing a minimal y independently of individual type (α, w) raises several normative questions. Observe that individuals who do not work consume the lump-sum transfer that they get, and nothing more. Let $\underline{b}$ denote this universal minimal consumption level, i.e., $\underline{b} = -t(\alpha, w)$ for all the individuals (α, w) who do not work, i.e., choose $\ell = T$. From our earlier analysis, it means that all individuals such that

$$w \leq \frac{1-\alpha}{\alpha}\frac{\underline{b}}{T} \tag{12}$$

do not work at an efficient allocation in which they receive a basic income of $\underline{b}$. Remember that the group of these idle individuals includes low-wage-high-willingness-to-work individuals and high-wage-low-willingness-to-work individuals. The key normative question is, is it possible to define social welfare in a way that suggests treating all individuals who do not work, i.e., whose types satisfy (12), identically?

There are two ways of answering yes to this question, which we review in the next two subsections. The first way is based on normative principles of fairness consistent with interpersonal welfare comparison among individuals with heterogenous preferences. The second way is consistent with the goal of poverty alleviation.

4.2.1 Interpersonal welfare comparison and heterogeneity of preferences

The feature of UBI that is the most difficult to justify is that it treats those who do not work identically, whether they don't work because they are not able to earn income or because they would be able to work but they prefer not to. As Van Parijs and Vanderborght (2017) put it:

> "Of all objections to a basic income, one sticks out above all others– and is more emotional, more principled, and more decisive in the eyes of many. It relates to its being unconditional in the sense of being obligation-free, of not requiring its recipients to work or be willing to work. [...] In [one] version [of the objection], the 'liberal' one, the underlying principle is [...] about fairness. As Jon Elster puts it, an unconditional basic income 'goes against a widely accepted notion of justice: it is unfair for able-bodied people to live off the labor of others.' " (Van Parijs and Vanderborght, 2017, p 99.)

To deal with this question, we need to develop a notion of social welfare in a world characterized by heterogeneity in productivity and willingness to work. For this, we will use the double heterogeneity (in α and in w) introduced in our basic model at the beginning of this section. Defining social welfare in such a context happens to have been at the center of optimal taxation theory in the recent years.[22] The brief discussion that follows builds on these developments.

Assume, to simplify, that we have two types of preferences, parameterized by $\underline{\alpha}$ and $\overline{\alpha}$, with $\underline{\alpha} < \overline{\alpha}$, and several types of wages: $w \in \{0, \ldots, \overline{w}\}$. The tax function can be decomposed as follows:

$$t(\alpha, w) = t^e(w, \alpha) + t(w) + t(\alpha),$$

such that:

- $t^e(w, \alpha)$ is the amount of redistribution within sets of individuals having the same preferences; in the optimal taxation literature following Mirrlees's (1971) seminal contribution, individuals are assumed to have the same preferences; income redistribution then only aims at decreasing income inequality arising from differences in wages; the social welfare function used by Mirrlees was defined in terms of individual utility and not incomes, so that we can treat the choice of $t^e(w, \alpha)$ to pursue the objective of equalizing utilities among individuals with the same preferences;[23]

[22] Starting with the important contribution of Boadway et al (2002), a general answer to this question has been recently provided by Fleurbaey and Maniquet (2011) in the framework of the theory of fair allocation. See also Fleurbaey and Maniquet (2018) for a survey of the contribution of the fairness approach to optimal taxation.

[23] Mirrlees did actually define social welfare as the sum of utilities, leaving the equalization objective to be contained in the concavity of the utility function. We do not discuss the consequence of this definition here and consider the simpler social objective of decreasing utility inequality instead.

- $t(\alpha)$ is the correction factor to the above component that takes heterogeneity in preferences into account, i.e., $t(\alpha)$ is the amount paid by all individuals of preferences α, and it determines the amount of redistribution from high to low willingness-to-work individuals;

- $t(w)$ is the correction factor based on wages, that is $t(w)$ is the amount paid by all individuals of wage w, and it determines the amount of redistribution from high to low wage individuals, after utility equalization within classes of individuals with the same preferences.

We start with the following properties of $t^e(w, \alpha)$. Given that we are in a first-best world, we can assume that full equality is achieved among individuals having the same preferences.[24] To simplify the exposition, let us assume that, for each preference parameter α, we have only two individuals, one with a low and one with a high wage. Let us further assume that, within each preference groups, the low wage is so low that the individual remains idle, by efficiency, which means that (12) holds: the marginal rate of substitution of leisure to income exceeds wage at zero labor supply.

Let us look at both α's in turn and let us concentrate on redistribution among the corresponding two individuals. Let t be the tax paid by the working individual, and let b be the transfer received by the idle individual. To begin with, we ignore budget balance issues, and assume that b is calibrated in such a way that both individuals reach the same utility level. This means that b depends on t according to the following equation, in which the left-hand side gives us the (indirect) utility of the working individual, maximizing her preferences given her wage w and tax t, and the right-hand side gives us the utility of the idle individual, consuming bundle (b, T):

$$\alpha \log \alpha(wT - t) + (1 - \alpha) \log \frac{1 - \alpha}{w}(wT - t) = \alpha \log b + (1 - \alpha) \log T.$$

This can be rewritten as:

$$\log b = \log \alpha(wT - t) + \frac{1 - \alpha}{\alpha} \log(1 - \alpha)\frac{wT - t}{wT}. \tag{13}$$

It is clear that b is a strictly decreasing function of t: if the working individual is asked to pay a larger tax, then a lower transfer is needed to keep the idle individual at the same level of utility.

Let us now bring budget balance back in the picture. If $t = 0$, then a positive b is needed, but that leads to a deficit. If $t = wT$, then $b = 0$ is sufficient to equalize utilities, but the budget runs a surplus. That means that a unique fixed point exists to (13) that balances the budget. At this point, $b = t$.[25] The key point in

[24] In a first-best world even social welfare functions that exhibit a positive but limited degree of inequality aversion will achieve full equality.

[25] We assume here that there are two individuals, but a unique fixed point would also exist if we generalize to the case of an arbitrary number of individuals.

this reasoning is that b is increasing in α, i.e., the transfer obtained by the idle individual at the utility equalizing allocation is increasing in the willingness to work of the corresponding group of individuals. This is easily seen by computing

$$\frac{d\log b}{d\alpha} = -\frac{1}{\alpha^2}\left[\log(1-\alpha) + \log\left(\frac{wT-t}{wT}\right)\right]. \tag{14}$$

This expression is positive as both $1-\alpha < 1$ and $\frac{wT-t}{wT} < 1$, so that the logarithms of the terms in the right hand side are negative.

This result is intuitive. Let us assume that preferences are such that even very productive individuals do not work much. Then not much can be redistributed and utility is equalized among these individuals when idle individuals only receive a small transfer. If, on the other extreme, we look at a group of individuals with a high willingness to work, so that only very unproductive individuals remain idle, then a lot is available for redistribution and utility equalization results in idle individuals receiving large transfers.

Let us now merge the two sets of individuals, and let us consider two idle individuals (both of whom by the efficiency conditions relating to labor supply do not work) $(\underline{\alpha}, w)$ and $(\overline{\alpha}, w')$ such that $w > w'$. The level of consumption of these two individuals is equal to the transfer they get, $-t(\underline{\alpha}, w)$ and $-t(\overline{\alpha}, w')$. A UBI is the outcome only if $-t(\underline{\alpha}, w) = -t(\overline{\alpha}, w')$. By the property of $t^e(w, \alpha)$ highlighted above, we know that $-t^e(\underline{\alpha}, w) < -t^e(\overline{\alpha}, w')$, i.e., individual $(\underline{\alpha}, w)$ receives less from individuals with the same preferences as hers than does individual $(\overline{\alpha}, w')$. Therefore, UBI requires that at least one of the following two conditions holds. Either

$$-t(w) \geq -t(w'),$$

which means that high-wage individuals should pay no more taxes than low-wage individuals. Or

$$t(\overline{\alpha}) - t(\underline{\alpha}) > t^e(\underline{\alpha}, w) - t^e(\overline{\alpha}, w').$$

We know from (14) that individual $(\overline{\alpha}, w')$ receives more from individuals with the same preferences as hers than does individual $(\underline{\alpha}, w)$. Therefore, the right-hand side of the inequality is positive. Consequently, the left-hand side of the inequality has to be positive and larger which means that redistribution should take place from high to low willingness-to-work individuals, and the difference between the tax paid by the former and that paid by the latter needs to more than offset the difference in the transfers that take place within groups of individuals with the same preferences.

To sum up, UBI requires the combination of very low or even no redistribution from high to low-wage individuals and a large redistribution from high to low willingness-to-work individuals, two rather counter-intuitive norms of justice.[26] It

[26] In Fleurbaey and Maniquet (2011, 2018) precise definitions of fairness principles are proposed to take account of the double heterogeneity in wages and preferences and social welfare functions satisfying these properties are deduced. Based on these results, it is possible to develop a complete and rigorous proof that UBI requires the absence of redistribution from high to low-wage individuals and a maximal redistribution from high to low willingness-to-work individuals. This proof is available upon request to the authors.

is hard to imagine policymakers redistributing from low to high wage individuals or from high to low willingness-to-work individuals and so UBI cannot be viewed as a first-best policy.

It is useful to make one observation here. What the argument above has shown is that the normative intuitions that justify redistributing income all point toward transferring a larger amount to the low-wage-high-willingness-to-work individual than to the high-wage-low-willingness-to-work ones. This shapes the question we need to address in Sections 5 and 6 as follows: in spite of the normative desire to transfer larger amounts to low-wage-high-willingness-to-work than to high-wage-low-willingness-to-work individuals, can issues such as incentives, or administrative imperfections force us to treat them equally?

To conclude this subsection, let us turn to the case of developing countries. Remember that under the first-best, the only difference between developed and developing countries is that in the latter the behavior of some individuals is determined by subsistence considerations: the constraint that consumption should be above a subsistence level is binding. This difference turns out to have two drastic consequences for the discussion we just carried out, which can immediately be derived from Eqs. (9) and (10).

First, in an economy in which subsistence constraints are binding, individuals with the lowest consumption are not those who do not work and wait until they are employed at a positive wage in a formal sector. It is indeed what studies from developing countries suggest - namely, that very poor people in developing countries are not idle but actually work long hours often in several different forms of work to make ends meet (see, for example, Banerjee and Duflo, 2011).

Second, the labor time of these individuals is independent of their preferences but only depends on their wage, their non-labor income and the tax and transfer system.

As a consequence, the question that we raised in this section, based on what Van Parijs and Vanderborght (2017) posed as a key objection to UBI, namely, that it may subsidize those who could work but simply do not because of their preferences for leisure, does not appear very relevant when we consider developing countries.

4.2.2 Poverty reduction

There is a second way to justify imposing a universal lower bound on consumption. It is related to poverty reduction. Poverty, in this case, is defined as living with means that are considered, for whatever reasons, insufficient. If poverty is defined in an unconditional way, i.e., if being poor is defined only as a function of the means of existence that one individual has independently of why this individual lies below the means threshold, then the objective of defining a minimal consumption level can be immediately justified.

In a first-best world, this objective translates into a UBI proposal. Nobody can gain by trying to incentivize individuals whose types satisfy (12). It is efficient to let them not work and allocate them the minimal consumption level $\underline{b}$.

If the objective is to prevent all individuals from consuming less than $\underline{b}$, then some individuals will receive a positive (lump-sum) transfer even if they work. From (4), the consumption level at an efficient allocation is equal to $\alpha(wT + m - t(\alpha, w, m))$. It is important now to bring m back in the picture, as the policymaker does not have any reason to tax it all away. Rather, it should be taken into account as it influences the minimal consumption. All individuals of type (α, w, m) should then receive a lump sum transfer satisfying

$$-t(\alpha, w, m) \geq \frac{\underline{b}}{\alpha} - (wT + m)$$

so that their consumption is bounded below from $\underline{b}$.

This argument holds for both developed and developing countries. The main difference between them, of course, has to do with the targeted level of $\underline{b}$. The most natural candidate is the income poverty line. In developing countries, this line is typically absolute and is similar to what we called the subsistence level above. In developed countries, this line is typically relative and it is fixed in most OECD countries at 60% of median income (considerably above the subsistence level).

To sum up, poverty reduction may justify UBI in a first-best world, provided poverty is defined as a minimal consumption level that does not depend on individual characteristics. This, however, calls for an important qualification regarding conditionality. We had characterized means unconditionality earlier as having three components, namely, no conditions on the ability to earn income, non-labor income, and incomes of other household members. While poverty reduction justifies the absence of condition on one's ability to earn income, it does not justify making the transfer independent of non-labor income or of incomes of other household members, two variables that can be captured by m.

To conclude, the main lesson from this section on the first-best is that UBI can be normatively justified even in a first-best world, but it is much easier to defend based on poverty alleviation than on the values that are at the heart of optimal taxation. If the benevolent policymaker is able to distinguish income differences that arise from differences in ability as captured by wages from those that arise from differences in willingness to work, only extreme and somewhat implausible normative stances can justify treating individuals who do not earn income independently of whether it is because their wages or because their willingness to work is too low.

5 In a second-best world

In the previous section we discussed conditions that a social welfare function has to satisfy to justify UBI in a first-best world, i.e., when the benevolent policymaker is perfectly informed of the characteristics of the individuals. In most debates, however, UBI is presented as a second-best policy. It aims at reforming an existing tax and welfare system in which the policymaker does not observe types and, in

particular, where "means" cannot be costlessly tested. In this section, we drop the assumption that the characteristics of individuals, (α, w, m), are perfectly observable, and assume that only pre-tax incomes are. Of course, the assumption of observable incomes is mostly valid in economies where the labor market is formal and the fiscal administration works well, i.e., developed countries. In the next section, we consider additional departures from the first-best assumption, and look at problems due to the informality of the labor market and frictions on the administrative side.

In the optimal labor income tax literature, it is customary to summarize such a tax-transfer system by the equation

$$y^n = y^g - \tau(y^g), \tag{15}$$

where y^g denotes gross labor income, y^n denotes net (that is after-tax) labor income and τ aggregates all the policies that transform pre-tax into post-tax incomes (labor income tax, social security contribution, in-work benefits, family benefits, housing benefits, social assistance, unemployment insurance and unemployment assistance). Notice that it is possible for $\tau(y^g)$ to be negative, in which case it represents a net transfer, and also, that y^n is an increasing function of y^g.[27]

Is it easier to justify UBI in such a setting? This is the question we address in this section.

Before we discuss this question, we need to justify our focus on (15). There are two reasons for this.

First, the celebrated Atkinson-Stiglitz theorem (see Atkinson and Stiglitz, 1976) states that provided preferences are separable in labor time and consumption and identical across individuals, any utility profile that is implementable by using indirect taxation is also implementable if we restrict ourselves to direct (that is labor income) taxation. It implies that indirect taxation can be dispensed with if the goal is to maximize any social welfare function. Of course, in reality preferences are often not separable between labor time and consumption. Think, for example, of day care, the demand for which increases with labor supply. These goods are easily identified, though, and optimally taxing or subsidizing them is not too difficult. What is key for our purpose is the assumption that funding a generous UBI through indirect taxation is not justified. The effect of the UBI reform on social welfare is much more transparent if we restrict ourselves to studying who should bear the financial cost of the reform. Of course, if pre-tax incomes are not well observed, with the consequence that it is fairer to tax consumption, then social welfare maximization may require to use indirect taxation. We do not address this question here.

Second, by restricting our attention to (15), we disregard capital-income taxation, which can be a part or all of non-labor income, m. Contrary to the point we made about indirect taxation, this simplification does not imply that it is not

[27] This last property is actually assumed without loss of generality. If it did not hold, that is if it were possible to get a larger net income by working less, individuals would indeed work less. An important consequence of this property for our purpose is that y^n is minimal at $y^g = 0$.

justified to fund a generous UBI with capital income taxation. We do not address this question in this section and come back to the issue of taxing m in Section 7 below. In this section, we focus on how the tax and transfer system should treat individuals with the lowest incomes. As it is reasonable to assume that these individuals do not have much capital income, we disregard capital income taxation.

The literature on tagging (e.g., Akerlof, 1978, Cremer et al, 2010, and Weinzierl, 2011) is relevant in our second-best world, where the characteristics of an individual, namely productivity or wages, preference for leisure, and non-labor income are not known to the tax or welfare authorities. The key lesson from this literature is, if there are characteristics of the individual that are not directly relevant from the economic point of view (e.g., gender, race, age) but are correlated with an individual's earning potential, then making the tax-cum-transfer scheme partly dependent on them may help in the screening problem. Therefore tagging may be efficient both directly by economizing on scarce tax revenue available for redistribution but also, indirectly by not having to use screening mechanisms like workfare. The problem with tagging, of course, is that it violates horizontal equity.

The universal aspect of UBI may look the very opposite of tagging, but it is not. First, defenders of UBI sometimes think of it as depending on observable and non-manipulable variables that are correlated with need, such as age. Tagging on age, in this case, would certainly be acceptable. Second and more fundamentally, in the way we defined it, UBI requires that the transfer to zero-income earners be unconditional, and this does not preclude the use of tagging, provided it only affects taxes and transfers beyond UBI. Of course, if horizontal equity is part of the set of values that UBI is supposed to be based on, then clearly tagging is not consistent with it.

5.1 Does no means-test mean that there is no phasing-out?

A popular interpretation of UBI is that it will change (15) into

$$y^n = b + y^g - \tau^*(y^g), \tag{16}$$

where b is the UBI, that is everybody, including Serena Williams and Floyd Mayweather, would receive an additional income, b, and taxation needs to be adjusted from τ to τ^* so as to collect the necessary funds. To put it differently, universality is understood as meaning that there is no phasing out of UBI, everybody benefits from it.

We begin this section by underlining that Eqs. (15) and (16) are perfectly equivalent, as can be seen by fixing

$$b = -\tau(0) \tag{17}$$

$$\tau^*(y) = \tau(y) - \tau(0). \tag{18}$$

When $\tau(0) < 0$, any labor income tax scheme that can be described as (15) is a UBI system.

What this implies is that the UBI proposal is not about everybody receiving an additional income, it is about making $-\tau(0)$ unconditional. Remember that unconditionality of UBI requires that it is not means tested, and, in particular, that it does not depend on the ability to earn income. That requires the following two characteristics of the new tax system, which, as we will see in the next section, are absent of all existing redistribution systems.

1. If employed individuals earning $y^g > 0$ and consuming $y^n = y^g - \tau(y^g)$ decide to stop working, they are entitled to receive $-\tau(0)$ independently on their type (α, w).

2. Unemployed individuals, benefitting from unemployment insurance, unemployment assistance or social assistance, are entitled to $-\tau(0)$ independently of whether they are ready to take a job, should one become available.

How this unconditionality can be practically implemented is an important but different issue. Will b be transferred on a monthly basis from the social security budget to all individuals before they earn any income, with employers paying b back to the social security and not to the worker at the end of the month? Will it rather be paid *ex post* yearly by the fiscal authorities after they observe all the y^g's? Or, will individuals earning less than b have to apply to receive it monthly? These are some difficult and important practical policy questions to think about. We do not deal with these questions here. Rather, we focus on the consequences of UBI on the *ex post* relationship between earning and disposable income.

5.2 Different consequences of removing conditionality

Most existing transfers to low-income individuals are means tested. Following our discussion of UBI in Section 2, we can distinguish between three levels at which transfers are conditional on means: they can be conditional on a low ability to earn income, on the lack of personal non-labor incomes, and/or on the lack of income of other households members. The first level of conditionality is typical of both unemployment benefits and social assistance. The second and third levels are more typical in the case of social assistance, which is consistent with the fact that unemployment insurance is an individual insurance against the risk of losing one's job and one's labor income, independently of other means of subsistence. Let us illustrate these conditionality schemes.

First, transfers to low-income individuals can be conditional on a low (or even zero) ability to earn income. Implementing this level of conditionality requires to screen, among individuals with very low incomes, those who have a low ability to earn income from those who have a low willingness to work. This screening is typically done by delegating to firms the evaluation of the employability of the candidates. Candidates are requested to look for jobs and they are considered as able to earn income as soon as one or several firms are ready to hire them. Countries differ in their ways of implementing this level of conditionality, but the general spirit is clear: if it appears that an individual could earn income by

working but refuses to take available jobs, he or she is typically excluded from unemployment insurance or social assistance.

The wider heterogeneity has to do with the eligibility for this benefit of those who have voluntarily quit their jobs. A large number of countries do not pay unemployment benefits in case of voluntary unemployment, with the number of legitimate reasons that justify a voluntary quit varying (see Langenbucher, 2015). Then there are countries on the other end of the spectrum, like Slovakia, who do not even examine the reason why the previous employment ended (see `http://ec.europa.eu/social/BlobServlet?docId=13773&langId=en`).

There is less heterogeneity in the condition that beneficiaries be looking for jobs and ready to take one when it is available. In fact, with the exception of Switzerland and Spain, all countries in Europe require a "willingness to work" for unemployment assistance schemes. Exceptions, such as those depending on the family situation, and what constitutes a "willingness to work," vary across countries (see MISSOC Analysis, 2011).

Second, transfers to low-income individuals can be conditional on lack of personal non-labor incomes.

Third, transfers to low-income individuals can be conditional on the lack of incomes of other household members. In the Netherlands, for instance, The Supplementary Benefits Act (TW) which is part of their unemployment insurance scheme) provides assistance to people who get a benefit from one of the employee insurance schemes if their income *plus that of their partner* falls below the minimum guaranteed income. In Belgium, the level of benefit of unemployment insurance from year two on is adjusted according to how many earners there are in the household (see `http://www.oecd.org/els/soc/benefits-and-wages-country-specific-information.htm`).

To conclude, all current unemployment insurance or social security systems in developed countries impose conditions on the beneficiaries, and these conditions, in spite of differences, all boil down to limiting eligibility to those who are ready to take jobs when they are available.[28] Introducing UBI would be a clear departure from all existing systems, with the consequence that those who decide not to participate in the labor force, typically as the result of a rational decision at the household level, would suddenly be entitled to basic income. This would hardly incentivize them to go back to the labor force, and granting them UBI is likely to be a major additional cost for social security budgets.

5.3 UBI in a Mirrleesian framework

Let us begin our analysis of optimal second-best taxation with the classic framework of Mirrlees (1971). Mirrlees pioneered the study of income taxation by being the first to derive theoretical results on how labor incomes have to be taxed if the

[28] In this context, Kasy (2018) makes an interesting point that moving from a policy of subsidising low-wage work such as the Earned Income Tax Credit (EITC) to UBI may save on budgetary resources in net terms by lowering the inefficient form of transfer through EITC.

objective is to maximize a social welfare function. The novel features of his approach were: taxation is not necessarily linear, which means that different income levels could be taxed at different rates; the policymaker is assumed to have an objective in terms of distribution of utilities rather than the utility of a representative agent; information constraints are explicitly taken into account by the assumption that only gross income (as opposed to wages or labor times) are observed; and individuals are assumed to freely choose their labor time (and, therefore, their pre-tax income) knowing the tax function and being able to compute how much net income they will be able to derive.

The most restrictive assumption, on the other hand, was that all individuals have the same preferences. This assumption has the nice consequence that it is normatively appealing to use the same utility function for all individuals, so that interpersonal utility comparisons are not problematic. As we already studied in the previous section, the natural model in which justifications to UBI should be discussed is one in which preferences are heterogenous, but it is worth identifying the relationship between the optimal taxation system when all individuals have the same preferences and UBI.

If we stick to our assumption of Cobb-Douglas preferences, the Mirrlees model amounts to assuming that all individuals have the same α and all non-labor incomes, m, are equal to 0. The result that is of interest for our purpose is that at the second-best optimal taxation scheme, all individuals who are idle in the optimal first-best allocation continue to be idle in the second-best optimal taxation and many more are induced by the tax system not to work.[29] This is the distortive effect of taxation in the second-best: the larger is the redistribution from the rich to the poor, the larger is the incentive of the rich to mimic the poor by working less and earning less.[30] The only way to decrease this incentive to mimic the poor is to incentivize the poor to work less and earn less, which makes the resulting situation of the poor less appealing for the rich.

As a result, at an optimal allocation, there is a threshold $w^* > 0$, such that all individuals with a wage below this threshold do not work and receive $-\tau(0)$. As only gross incomes are observed, no discrimination can be made on the basis of differences in w. Given that all individuals have the same utility function, all idle individuals also have the same utility.

The optimal Mirrlees taxation scheme is therefore a UBI scheme. By definition of the optimum, all individuals prefer the bundle they get (because they choose it freely and the set of available gross income/net income bundles is identical for all individuals) compared to the bundle of any other individual, including those who do not work. Consequently, $-\tau(0)$ can be thought of as a minimal basic income (all other individuals earn and consume more than that amount) and a universal one, because no individual strictly prefers not working and getting $-\tau(0)$ over their actual situation.

In conclusion, the optimal taxation scheme of Mirrlees and the ones of many

[29] See, for instance, Piketty and Saez (2013) and Boadway (2012) for excellent surveys of this literature.

[30] Mimicking an individual here means to earn the same gross income as that individual.

of his followers do include UBI, but the universality of the basic income is derived from the assumptions that: first, all individuals have the same preferences; and second, no screening device exists that would allow the policymaker to make the basic income conditional on a very low (or even zero) ability to earn income. If such a device was introduced in the literature, then conditionality would be optimal. We view the failure to take conditionality of unemployment benefit or social assistance on ability to earn income into account to be a serious shortcoming of the optimal taxation literature. We try to take it into account in the next section in which we reintroduce preference heterogeneity.

5.4 Interpersonal welfare comparison and heterogeneity of preferences

We studied in Section 4 the desirability to UBI in a first-best world. In Section 4.2.1, we raised the question of whether a benevolent policymaker could wish to allocate the same lump-sum transfer to low-wage-high-willingness-to-work and high-wage-low-willingness-to-work individuals. We saw that such a policy could only be seen desirable by a policymaker who refrains from redistributing from high to low-wage individuals but wishes to redistribute large amounts from high to low-willingness-to-work individuals. The conclusion, though, was that most intuitive normative stances would lead to the opposite objective, that is to the objective of redistributing more to low-wage-high-willingness-to-work individuals than to high-wage-low-willingness-to-work individuals. Assume the policymaker endorses the latter, more intuitive, normative stance. The question that we address in this section is: could the information asymmetry faced by this policymaker lead her to find it optimal to transfer the same amount to all idle individuals?

As explained in the previous paragraph, social assistance and unemployment benefits in all OECD countries are awarded under the condition that beneficiaries are ready to take jobs whenever they become available. We have interpreted this condition as a screening device between the low-wage-high-willingness-to-work individuals, who will not find jobs and the high-wage-low-willingness-to-work individuals, who will find jobs (if properly monitored in their job search) and will then be excluded from social assistance or unemployment benefit if they refuse them. Here again, the answer to our question will crucially depend on whether such a device is available or not.

Let us begin by assuming that such a screening device is not available. Then, given the information asymmetry between individuals and the policymaker, individuals choose their labor time, and, therefore, their pre-tax income by taking (15) into account. As a result, all individuals who do not work consume the bundle $(0, -\tau(0))$. Consequently, as soon as the optimal allocation has $-\tau(0) > 0$, UBI is optimal. That means that adding heterogeneity of preferences into the Mirrlees framework does not change anything as soon as the interpretation of $-\tau(0)$ as a UBI is concerned. Note that under these assumptions there is no difference between UBI and the negative income tax proposal of Friedman. However, such screening devices do exist and the important question is then: should the

policymaker use them or not?

Let us assume, following Atkinson (1995), that wages are either 0 or above some minimal legal wage $\underline{w}$.[31] The tax system can then be described by a function τ describing the tax paid, as a function of their income, by those who have a positive wage $w \geq \underline{w}$, and b, the benefit allocated to the other individuals, having $w = 0$.[32] Adapting (12), we can derive that all non-constrained individuals having a type (α, w)[33] such that

$$w\frac{1-\alpha}{\alpha} \leq \frac{-\tau(0)}{(1-\tau'(0))T} \tag{19}$$

prefer not to work, where $\tau'(0)$ stands for the derivative of τ at income level 0, that is the marginal tax rate at the zero earning level.[34]

In this condition, one essential feature of the first-best optimal tax and transfer scheme immediately applies to the second-best optimal tax scheme - if the policymaker adopts the normative view (which we found counter-intuitive) that all idle individuals should be treated identically, then the screening device should not be used, $b = -\tau(0)$, and UBI is optimal.

If, on the contrary, the policymaker considers that individuals with the lowest wage (in this case $w = 0$) should be assigned a strictly larger amount, then it cannot be optimal to impose $b = -\tau(0)$, because it would amount to imposing an additional constraint to the social welfare maximization problem, with the necessary consequence that social welfare would be lower. In all the cases in which $b > -\tau(0)$, the optimal tax system can take the form of a basic income of $-\tau(0)$ transferred to all those who do not work, complemented with a conditional additional benefit of $b - (-\tau(0))$ for those who agree to go through the screening device (i.e., to look for jobs) and whom no employer is ready to hire, thereby revealing a zero wage.

This proves that the optimal second-best taxation scheme can take one out of three possible forms:

The first form is a pure UBI system, replacing all other social assistance program: $b = -\tau(0) > 0$. It is optimal only when the social welfare function requires not to make any difference among the idle individuals.

The second form is an hybrid system in which a smaller UBI coexists with a conditional supplement, available only to those who have a zero wage, and this

[31] In Atkinson's work, however, individuals with a zero wage are "the sick and retired" and not the workers (temporarily) unable to find jobs.

[32] We could generalize this discussion to the case in which the constrained individuals have pre-tax incomes in an interval $[0, \underline{\underline{y}}]$, with $\underline{\underline{y}} < \underline{w}T$. We would then have to design a function $b : [0, \underline{\underline{y}}] \to \mathbb{R}$.

[33] Given that we do not study the optimal design of the tax on m (for the reasons explained at the beginning of this section), we assume, for the sake of simplicity, that $m = 0$ for all individuals.

[34] This first-order-condition is necessary but it is actually not sufficient, as sufficiency requires that the budget set is convex. The additional condition is that marginal tax rates on low incomes are non-decreasing.

supplement implies the use of the screening device that is used in existing conditional social assistance systems: $b > -\tau(0) > 0$.[35] All those who refuse to go through the screening device because they prefer not to work will be treated identically, independently of their true ability to earn income, as it is not observable (this is the main difference with a first-best system, in which the policymaker could discriminate among them, by giving lower and lower transfers to higher and higher-wage individuals).

The third form is a pure conditional system, in which only those who have a zero wage are eligible for social assistance: $b > -\tau(0) = 0$. This is optimal when the recommended transfer to those who could work but prefer not to work is not positive. This corresponds to most current systems.

In conclusion, UBI is easier to justify in a second-best world. The easier system to justify, however, is an hybrid system in which a plausibly modest UBI is combined with a supplemental benefit conditional on a zero ability to earn income. In this case, UBI means that a certain amount of money is allocated to all non-working individuals, independently of the reason why they do not work, but UBI does not mean that all individuals who do not work are treated identically: a part of the transfers dedicated to non-working individuals remains conditional on a zero-ability-to-work, and the same screening device as the one existing in current systems is used to discriminate among non-working individuals.

We should emphasize that our conclusion heavily depends on the assumption that the redistribution tools available to the policymaker include the possibility of distinguishing between those whom no employer wishes to hire, revealing a (perhaps, temporary) zero wage, and those whom some employers are ready to hire, and who can choose not to work only by giving up on conditional transfers. This assumption reflects the monitoring of unemployment status that almost all developed countries implement. It is interesting that optimal income taxation theory does not take it into account. In our view, only by taking it into account one can undertake a thorough analysis of UBI.

5.5 Poverty reduction

In a first-best world, we saw in the previous section that the fight against poverty in the sense of guaranteeing all individuals, including those who do not work, a minimal consumption, was a clear and almost direct justification of UBI. It turns out that when applied to a second-best world, there is a literature that has challenged this simple justification. We review this literature in this section in order to check under which conditions UBI can still be justified by the objective of poverty reduction.

The literature on the ability of second-best labor income taxation to reduce poverty can be divided in two sets. In the first set, the policymaker does not try to maximize a social welfare function satisfying Pareto efficiency. In Besley and Coate (1992, 1995), an income poverty line is fixed and the policymaker

[35] We realize many people would refrain to call such a system UBI, as social assistance or unemployment benefits remain partly conditional.

wishes to minimize the total amount of money transferred to the poor under the constraint that they all reach the poverty line. In Kanbur et al (1994a, 1994b), the policymaker maximizes a combination of a Paretian social welfare function and a statistic of income poverty, again defined as having an income below a fixed poverty line. In all these papers, the optimal policy consists in incentivizing poor individuals to work hard and earn as much as they can so that the income increment that is needed to help them reach the poverty line is not too high. In both cases, this policy does not help increase the utility of the poor, and in Kanbur et al (1994a, 1994b) it even decreases it compared to the policy that would be optimal without this poverty reduction objective.

One key assumption in these papers is that the poor individuals are productive, which we could capture in our model by assuming that their wage is low but strictly positive. As we argued above, this is a reasonable assumption for developing countries in which poor individuals work a lot in the informal sector to reach the subsistence level. If we want to apply the argument to developed countries, we need to introduce in their model individuals with a zero wage. In this case, again, an essential assumption would be whether a screening device exists that allows the policymaker to distinguish between those who are unable to earn income and the others. Absent such a device, the optimal policies would be to transfer money to the most needy and maybe to complement this transfer with a lower transfer to those who earn some income in such a way as to neutralize their incentive to mimic the needy.[36] If such a screening device is available, then, like in most of the cases above, it is optimal to use it, with the consequence that the transfer to those who do not earn income on their own becomes conditional, and individuals with a strictly positive ability to earn income should be treated like in these papers, with the consequence that these individuals should be incentivized to work more and earn more, without an impact on their utility.

In conclusion, this literature proposes redistribution systems aimed at reducing poverty that sharply differ from UBI. However, it does not follow that UBI may not be the optimal policy given the objective of poverty alleviation. The desirability of the policies studied in Besley and Coate (1992, 1995) comes from the implicit assumption that individuals care about the income of the poor and have a utility function such as:

$$u(y, \ell, y_p) = \alpha \log y + (1 - \alpha) \log \ell + h(y_p) \tag{20}$$

where y_p is the income of the poor and $h(\cdot)$ is an increasing function, which means that these individuals are willing to give up their own income provided it increases the income of the poor. Notice that the utility of these individuals does not depend on the *utility* of the poor (in which case the income support policy would not be desirable) but on the *income* of the poor, that is the consumption of the poor has a positive externality on the utility of the rich.

[36] Note that the optimal policy in Besley and Coate (1995) share this feature that the amount of transfer may vary as a function of how much poor individuals earn on the private market, so that they end up with strictly more than the poverty line.

In his influential 1970 contribution, Sen has shown that when preferences exhibit this kind of consumption externalities, imposing Pareto efficiency may yield outcomes in which freedom of choice is impeded. As a consequence, it has become customary to develop welfare analysis after preferences are cleansed of these consumption externalities as we have implicitly done in the previous sections. If the policymaker has good reasons to respect these consumption externalities, though, then Pareto efficiency should be applied to preferences represented by (20).

Suppose we adopt the latter point of view and think of how to increase the utility of rich individuals with the utility function (20). These individuals care about the income of the poor independently of how much poor individuals have had to work to reach such an income level, Therefore, these rich individuals are ready to treat, among the poor, high-wage-low-willingness-to-work and low-wage-high-willingness-to-work individuals in the same way, which seems like a promising way to justify UBI. What contributions like Besley and Coate (1992, 1995) teach us, then, is that in spite of the rich having this kind of preferences, UBI is not the optimal policy.

Most of the defenders of UBI, however, do not seem to argue in favor of UBI based on its ability to satisfy the preferences of rich individuals who care about the income levels of the poor with utility functions like (20). Rather, they adopt more standard normative positions, often related to poverty alleviation (see, for instance, Tobin et al, 1967, or Galbraith, 1969).[37] Consequently, we assume away consumption externalities and stick to our benchmark model and ask the question that under this assumption, does the goal of poverty alleviation justify UBI in a second-best world?

A second strand of literature proposes a more direct challenge to UBI. Saez and Stantcheva (2016) and Maniquet and Neumann (2017) study the taxation scheme that can be derived from maximizing a social welfare function that favors transfers from rich to poor individuals as long as they do not decrease the utility of the poor. In both cases, if an allocation exists that allow all individuals to receive incomes above the income poverty line, this allocation is optimal and we can think of it as offering a UBI to all individuals who do not earn income. The relevant case, however, seems to be the one in which such an allocation does not exist. All OECD countries turn out to have (conditional) income guarantees that are below the income poverty line.[38] If this income guarantee becomes unconditional, it is quite likely that the amount will decrease. As a result, it is plausible that the maximization of a universal income guarantee will not reach the income poverty line.

If an allocation in which all individuals get incomes above the poverty line does not exist, then both Saez and Stantcheva (2016) and Maniquet and Neumann (2017) show that a UBI lower than the poverty line is not optimal. In both cases, the optimal taxation scheme includes negative marginal tax rates on low

[37] For a review of the main arguments that were put forward by defenders of UBI, see Van Paris and Vanderborght (2017).

[38] See Maniquet and Neumann (2017) for a detailed account of the difference between what we refer in this paper as $\tau(0)$ and the income poverty line.

incomes, thereby incentivizing individuals to earn income and reach the poverty line. In Maniquet and Neumann (2017), the optimal taxation scheme is the one that minimizes the labor time it takes to minimal wage individuals to reach the poverty line, and this may require very low transfers to those who do not work.

These two papers, however, share the assumption that the minimal wage is positive: by working, individuals earn some income even if not sufficient to reach the poverty line. They do not cover the case in which some individuals are involuntarily unemployed and (temporarily) have a wage equal to 0. Again, we can look at what the optimal taxation scheme would be if we add a group of zero wage individuals and a screening device aimed at identifying them. Not surprisingly, the optimal scheme would be to transfer money directly to the zero wage individuals to complement what Saez and Stantcheva (2016) or Maniquet and Neumann (2017) identify as the optimal scheme. That is, the transfer received by those who do not earn any income should be conditional on not being able to earn income and, therefore, is not a UBI. This illustrates that the ability of a tax and transfer system to alleviate poverty is not necessarily measured by the distance between the poverty line and the lowest income in the population. In Maniquet and Neumann (2017), for instance, the criterion that is proposed to evaluate tax schemes is the labor time it takes individuals working at the legal minimal wage to reach the poverty line.

To sum up, poverty alleviation becomes more difficult to use as a justification of UBI in a second-best compared to a first-best world. This is true under the (plausible) assumption that guaranteeing a basic income equal to the poverty line is infeasible. As a result, minimizing poverty does not necessarily require to be generous to those who do not work and to treat them all identically. It may be optimal, on the contrary, to incentivize these individuals to work, by applying negative marginal tax rates on very low incomes, so that they choose the labor time that allow them to obtain an after-tax income above or equal to the poverty line.

Before we move on to studying the third-best context, let us stress again that the analysis in this section builds on the assumption, common in the optimal labor income taxation literature, that those who earn the lowest income are to be found among those who do not work. This captures the formality of the labor market in developed economics but not the widespread informality of the labor market in developing countries .

5.6 The stigmatization cost of conditionality

An argument often put forward to justify the unconditionality of social assistance is that it removes the stigma associated to requesting help and revealing one's lack of resources. We do not fully address this question here, but make some observations that raise some reservations about the absence of stigma argument.

The conditionality of social assistance at least in theory must lead to some stigma, with the resulting decrease in utility of those who request assistance and low take-up of the others. However, the literature on take-up has not been able

to prove that stigma is a major explanation of low take-up (see, for instance, the review of Currie, 2006).

Also, even if UBI removes stigma, it is likely to decrease utility in another, symmetric, way - all those who live in rich families and who have decided to quit the labor force may be ashamed to be entitled to UBI and they may suffer a disutility because of this form of stigma. Some of them may even decide to go back to the labor force to avoid this cost, thereby decreasing their utility and affecting the labor time or wages of others.

Because of the absence of enough evidence on UBI, it is impossible to estimate the extent of utility loss among those who prefer not to work and not to receive any transfer. What we already know, however, is that people who currently do not work and do not request any transfer because their partner is sufficiently rich are much more numerous than those who benefit from social assistance.[39]

To sum up, the stigma argument seems much more of an argument to make social assistance an indisputable right rather than an argument to justify transferring large amounts of money to those who have decided to quit the labor force because they live in rich families.

6 In a third-best world

In this section, we allow for imperfections in the tax and benefits system and examine the case for a UBI from a "third-best" point of view - namely, when not only there is possibility of various informational and incentive issues that arise on the side of beneficiaries but also on the side of those in charge of administering the tax and benefits system.

An argument often made in favour of a UBI is that it cuts administrative costs - namely, as it does not involve targeting, it avoids inclusion and exclusion errors associated with screening as well as administrative costs (direct costs, inefficiencies of various kinds including delays and waste, and corruption).[40] In an economy in which public agencies cannot be relied to deliver benefits to the targeted groups, due to corruption (or lack of accountability more broadly) or due to limited state capacity, there is a risk that those who need transfers most are at risk of being excluded from the benefits. In such a setting, the less is the scope for discretion, as is the case with any uniform and universal policy, the lower will be such risks. Accordingly, an egalitarian policymaker may prefer to divide the budget equally rather than ask public agencies to target.

[39] In the U.S., for instance, the Bureau of Labor Statistics estimates that the non-participation rate in the labor force is currently around 36.8% (see https://www.bls.gov/news.release/pdf/empsit.pdf), whereas the Census Bureau estimates that 13.5% of all households received SNAP benefits at some point in 2013.

[40] It is not that there are no administrative costs associated with cash transfers or that there is no potential for corruption. Also, for cash transfers to be feasible, a well-functioning financial infrastructure is necessary. This is often not the case in developing countries, though mobile banking is making a dent in the problem.

As we discussed earlier, if y^g is perfectly observable, then any tax system τ, such that $y^n = y^g - \tau(y)$ can be reinterpreted as a UBI system if $\tau(0) < 0$ in which everybody receives a UBI equal to $-\tau(0)$ and pays $\tau(y) - \tau(0)$. In such contexts, unless there is a way to discriminate among those who do not earn any labor income, any proposal in which there is a positive transfer at zero income is by definition a UBI. In this case the debate about UBI is clearly not very interesting.

If there is no way to discriminate among individuals other than income (or any other measure of means) and that in turn is noisily measured, is there a stronger case for UBI? The literature on targeting (see Besley and Kanbur, 1990 for an overview) is relevant here, as it deals with situations where actual income is not costlessly observable.[41]

Let us consider an economy where income is not perfectly observed. Suppose the tax authorities observe a noisy signal about gross income y^g, which we denote by s and any tax and transfer scheme has to be based on s. With probability $p(y^g)$, $s = y^g$ where $p(y^g) \in [0, 1]$ and $p(0) < 1$. We consider two forms of noisiness in the measurement of income when $s \neq y^g$.

First, suppose that with probability $1 - p(y^g)$ a completely uninformative signal $s = \varphi$ about y^g is obtained, which has the same support as y^g but is uniformly distributed.[42] In this case, for a given y^g, the signal s takes two values y^g and φ where $s = \varphi$ denotes a null or uninformative signal. If an uninformative signal is observed, the level of income could be anything, from the lowest possible to the highest possible and so the question arises as to what should be the transfer in this case.

Suppose our goal is to transfer a net amount $-\tau(0)$ to those whose income does not exceed a certain threshold $\underline{y}^g \geq 0$. Do we make the same net transfer $-\tau(0)$ to all individuals whose observable income is $y^g \leq \underline{y}^g$ as well as to individuals for whom we do not observe y^g but observe the uninformative signal or do we make a net transfer of a different amount (which can be zero) to the latter group?[43] Or, should we adopt a UBI scheme with the same *net* transfer to those with $y^g \leq \underline{y}^g$ as well as $y^g = \varphi$ while for others, namely whose income is observed and exceeds $\underline{y}^g$, $-\tau(0)$ is a gross transfer accompanied by a tax $\tau(y^g)$? Clearly the desirability of UBI will increase with the degree of inequality aversion of the policymaker. Alternatively, for a given level of inequality aversion, as the noisiness of income measurement goes up, UBI would appear more attractive. After all in the limit case where income cannot be measured at all (i.e., $p(y^g) = 0$), UBI is the only possible fiscal instrument for making a transfer that is available to the policymaker, although in this extreme case, it cannot be funded by direct income

[41] A "proxy-means test" (PMT) is usually used to estimate the income or consumption when precise measurements are not available or difficult to obtain. This typically involves collecting information on assets owned by the household (such as, type of house, ownership of livestock, and various durable consumer goods) as proxies for income or consumption.

[42] This is the same formulation as in the model of supervision in Tirole (1986).

[43] We do not provide a full characterization of the tax schedule $\tau(y^g)$ here. Presumably taxes can only be levied on those whose observable income signal y^g is positive and above a certain threshold.

taxes and must be funded from other sources, such as indirect taxes.

Second, consider a variant of frictions in the tax and benefits system above and suppose that with probability $p(y^g)$, $s = y^g$ where $p(y^g) \in (0,1)$ and $p(0) < 1$ as before, but with probability $\sigma\{1 - p(y^g)\}$, a value of income $y^g(1+\delta)$ that is higher than the true value y^g is measured, while with probability $(1-\sigma)\{1 - p(y^g)\}$, a value of income $y^g(1-\delta)$ that is lower than the true value is measured. If the goal is to make sure that those with an income level below a threshold receives a net transfer of $-\tau(0)$, a similar dilemma arises. Unless the income measurement process is relatively accurate (i.e., $p(y^g)$ is high), or the likelihood of incorrectly overestimating someone's income is low (i.e., σ and δ are small), there is a risk of denying benefits to a deserving beneficiary. A flat transfer does not have this problem, but of course, is more expensive.

The solution to this problem can be less stark than posed above. The central government could tag regions based on characteristics that cannot be manipulated or monitored by these agencies (see Ravallion, 2018). In other words, UBI could be adjusted to regional characteristics such as average income levels or household characteristics such as families with children. Moreover, as a large literature on using various screening devices (such as workfare or in-kind transfers) points out (see Besley and Kanbur, 1990, Currie and Gahvari, 2008) one can make claiming benefits costly for the non-poor. To the extent these cannot be manipulated, these would ameliorate the stark trade off between a UBI and targeted schemes, namely, the former has no screening costs but a larger bill because it is universal.

7 Positive Aspects of a UBI Scheme

After discussing the normative justifications for a UBI in Sections 4-6, in this section, we take the basic income-leisure choice framework introduced in Section 4 and examine some positive implications of introducing a UBI scheme that is funded by an additional linear income tax. In particular, taking into account the effect of a UBI funded by additional taxes on the labor supply decision of both net recipients and net payees, we ask what factors will determine the size of the basic income.

7.1 Labor supply responses to UBI

To address the question what is level of UBI that is feasible, an important consideration is the labour supply effects of a UBI that is funded by additional taxes since that will determine overall income levels and the tax revenue available to redistribute as UBI after such a scheme is introduced.

Compared to the existing tax and benefit systems in developed countries, the introduction of UBI is expected to make it attractive to stop working for some, because of the lack of conditionality, and also the additional taxes needed to finance the additional spending will create incentives for working less. However, for certain groups, this conclusion has to be modified.

First, consider individuals who are rich. Let us take the model of section 4, and set $t(\alpha, w, m) = 0$ in the budget constraint to capture a situation prior to the introduction of a balanced-budget UBI scheme, namely, $y \leq w(T-\ell)+m$. We can see from (5) that leisure being a normal good, as income grows, the consumption of leisure will go up. However, for those with high levels of non-wage income there is a possibility of a corner solution, namely, it is possible that $\ell = T$. Setting $t(\alpha, w, m) = 0$ in (6) and simplifying, the condition for this to happen would be:

$$m \geq \frac{\alpha}{1-\alpha} wT.$$

This will occur when m is relatively high with respect to w, namely, the marginal cost of not working is low, while overall income is high.

Slightly stretching the model, this case can be thought of as representing partners of spouses with higher incomes. Suppose that m in the model can also stand for the labor income of a partner. Then the model illustrates that spouses may prefer to stay home rather than participate in the labor force as a consequence of having a large wage spouse. Of course staying home may mean producing household goods and engaging in social and charitable activities as well as what is typically interpreted as leisure in the sense of a private good.

The second type of individuals/households whose labor supply is likely to remain unaffected by UBI are the very poor. Now let us modify our simple set-up in Section 4 and introduce subsistence considerations not only for consumption but also for leisure in the following way:

$$\begin{aligned} u(y, \ell) &= \alpha \log\left(y - \underline{y}\right) + (1-\alpha)\log\left(\ell + \underline{\ell}\right) \text{ for } y > \underline{y} \text{ and } \ell \geq 0 \\ &= -V, \text{ otherwise} \end{aligned}$$

where $\underline{\ell} \geq 0$ represents the minimal level of non-paid-labor time required for subsistence and $\underline{y}$ and V have the same signs and interpretations as in Section 4. This formulation allows ℓ to take the value of 0 at an optimum, something that the Cobb-Douglas functional form does not permit.

Let us now turn to individuals who are inframarginal. In the case of interior solutions we have:

$$\begin{aligned} \ell &= \frac{(1-\alpha)}{w}\left(wT + m - \underline{y}\right) + \alpha\underline{\ell} \\ y &= \alpha\left\{w\left(T - \underline{\ell}\right) + m\right\} + (1-\alpha)\underline{y}. \end{aligned}$$

For $\ell \geq 0$ we need $wT + m \geq \underline{y} + \frac{\alpha}{1-\alpha} w\underline{\ell}$. Similarly, for $y > \underline{y}$ we need $wT + m > \underline{y} - w\underline{\ell}$. The first condition is more strict than the second. Therefore if

$$\underline{y} - w\underline{\ell} < wT + m < \underline{y} + \frac{\alpha}{1-\alpha} w\underline{\ell}$$

then we have a corner solution with $\ell = 0$ and $y = wT + m$. This needs to be greater than $\underline{y}$ for the subsistence constraint to be met for income (which means it also satisfies the condition $wT + m \geq \underline{y} - w\underline{\ell}$ that applies for interior solutions).

If $wT+m<\underline{y}$ then there is no solution to the optimization problem that satisfies both the budget constraint and the subsistence constraint and whatever is the choice, the individual receives a payoff of $-V$. For simplicity we assume the individual continues to choose $\ell=0$ and $y=wT+m$.

Using the notation z to denote full income and defining $\overline{z}\equiv \underline{y}-\frac{\alpha}{1-\alpha}w\underline{\ell}+\frac{1}{1-\alpha}wT$, we can sum up the above analysis as:

$$\begin{aligned} y &= z \text{ for } 0\leq z\leq \underline{y}+\frac{\alpha}{1-\alpha}w\underline{\ell} \\ &= \alpha z \ +(1-\alpha)\underline{y} \ -\alpha\underline{\ell} \ \text{ for } z\in\left[\underline{y}+\frac{\alpha}{1-\alpha}w\underline{\ell},\overline{z}\right] \\ &= m \text{ for } z\geq\overline{z} \end{aligned}$$

and

$$\begin{aligned} \ell &= 0 \text{ for } 0\leq z\leq \underline{y}+\frac{\alpha}{1-\alpha}w\underline{\ell} \\ &= (1-\alpha)\frac{z}{w}-(1-\alpha)\frac{1}{w}\underline{y}+\alpha\underline{\ell} \text{ for } z\in\left[\underline{y}+\frac{\alpha}{1-\alpha}w\underline{\ell},\overline{z}\right] \\ &= T \text{ for } z\geq\overline{z}. \end{aligned}$$

We assume $\underline{\ell}<\frac{1}{2\alpha}T$ and so $\overline{z}>\underline{y}+\frac{\alpha}{1-\alpha}w\underline{\ell}$.

The take away from this exercise is that in situations where income levels are so low that subsistence considerations are important (i.e., w and m are low relative to $\underline{y}$ and $\underline{\ell}$) a good proportion of the population will be working very hard with $\ell=0$ (equivalently, $L=T$). For them, a UBI that is not large in size may not have any effect on the labor supply. It should also be noted that for those who are below the level of subsistence (namely, $wT+m<\underline{y}$) the utility gains from a UBI that pushes them above the subsistence level is high.

To sum up, even with the classical model of the labor supply there are some theoretical reasons to think that the potential disincentive effect of a UBI on labor supply is more likely to be an issue in developed countries in contrast to developing countries. There are additional channels to this simple framework such as missing markets, price effects from conditions attached to transfers, and dynamic and general equilibrium effects that would tend to reinforce this general conclusion in the context of low and middle income countries.[44]

While we do not have much direct evidence regarding the effect of a UBI scheme on labor supply yet, Banerjee et al (2019) and Hoynes and Rothstein (2019) review the evidence from related studies on the likely labor supply effects of a UBI. The general picture that emerges is consistent with our analysis, namely, for developed countries, a UBI would be expected to lead to lower labor supply, at least in the short run, while in developing countries there is no systematic evidence of various cash transfer programs having a negative effect on labour supply.[45]

[44] See Baird, McKenzie, and Özler (2018) and Ghatak (2015).

[45] One of the very few long-standing nationwide cash transfer programs that most closely resembles a UBI was introduced in Iran in 2011. It faced political criticism for its alleged

7.2 How generous can UBI be?

Now we turn to the analysis of a UBI scheme taking into account its funding through taxation. Such a scheme will lead to some redistribution in net terms within the population, which implies that the sum of the income effects is likely to be low. Also an increase in the tax rates on labor income facing all individuals will result in a standard substitution effect leading to a decrease in the labor supply. This has important consequences on the level of the basic income that an economy can afford. We illustrate the major trade-offs related to this issue here, first in the case of a linear income tax system (as in Atkinson, 1995), and then in the case of a non-linear tax.[46]

Let us go back to the model without subsistence considerations, namely where $u(y^n, \ell) = \alpha \log y^n + (1-\alpha)\log \ell$. Then the revised optimization problem is:

$$\max_{y^n \geq 0, \ell \in [0,T]} u(y^n, \ell) \text{ s.t. } y^n = b + \{w(T-\ell) + m\}(1-t)$$

where b is the basic income and t is the linear tax rate that applies to total income. With $b = 0$ and $t = 0$ we have the benchmark model and so we have the same first-order conditions adjusting for the new budget constraint under a UBI scheme:

$$\ell = \frac{(1-\alpha)}{w(1-t)}\{b + (1-t)(wT+m)\} \quad (21)$$

$$y^n = \alpha\{b + (1-t)(wT+m)\}. \quad (22)$$

Given y^n, we can solve for

$$y^g = \frac{y^n - b}{1-t} = \alpha(wT+m) - \frac{(1-\alpha)b}{1-t}.$$

Using the notation of z we can write:

$$y^n = \alpha\{b + (1-t)z\} \quad (23)$$

$$y^g = \alpha z - \frac{(1-\alpha)b}{1-t}. \quad (24)$$

Observe that αz is the value of gross income in the absence of a balanced-budget UBI scheme. For simplicity, we assume away heterogeneity in α and T. Each individual is then characterized by a pair (m, w). Let the joint distribution of m and w in the population be denoted by the probability density function $f(m, w)$. Without loss of generality, we assume $w \in (0, \infty)$ and $m \in (0, \infty)$.

disincentive for work, especially for the poor. However, careful analysis shows that there was no evidence of reduced labor supply and if anything, the labor supply of women and self-employed men actuall went up (Salehi-Isfahani and Mostafavi-Dehzooei, 2018).

[46] As mentioned earlier, we do not deal with the issue of imperfections in labor or credit markets (other than the formality of labor markets) for simplicity. In their presence, as is well known in the development economics literature, the usual equity-efficiency trade off is muted, if not overturned, because cash transfers can relax liquidity constraints faced by small enterprises.

Let the associated cumulative distribution function be $F(m,w)$. Given that full income $z = wT + m$ is a linear function of m and w, we can derive the distribution of z across individuals in the population from $f(m,w)$ (even when m and w are not independently distributed). Henceforth we work with the pdf and CDF of z, defined over $z \in (0,\infty)$, $g(z)$ and $G(z)$ respectively, which are given by:

$$\begin{aligned} g(z) &= \int_0^{\infty} [f(z - wT, w)\, dw] \\ G(z) &= P(wT + m \leq z) = \int_0^{\infty} \left[\int_{wT}^{z} f(u - wT, w)\, du \right] dw. \end{aligned}$$

Let us define average full income as $\tilde{z} \equiv \int_0^{\infty} z g(z)\, dz$. Since both gross and net incomes are functions of z, this allows us to derive the personal (as opposed to functional) distribution of net and gross incomes from the personal distribution of full income.

For the budget to be balanced on aggregate, we must have

$$t \int_0^{\infty} y^g(z) g(z)\, dz = b. \tag{25}$$

Let us define average gross and net income as:

$$\tilde{y}^j \equiv \int_0^{\infty} y^j(z) g(z)\, dz,\ j = g, n.$$

We can derive $\tilde{y}^g$ and $\tilde{y}^n$ as functions of $\tilde{z}$, using (24) and (23):

$$\begin{aligned} \tilde{y}^g &= \int_0^{\infty} \left\{ \alpha z - \frac{(1-\alpha)b}{1-t} \right\} g(z)\, dz = \alpha \tilde{z} - \frac{(1-\alpha)b}{1-t} \\ \tilde{y}^n &= \int_0^{\infty} \alpha \{b + (1-t)z\} g(z)\, dz = \alpha \{b + (1-t)\tilde{z}\}. \end{aligned}$$

The fact that gross and net incomes are linear functions of full income is a consequence of our assumption that preferences are Cobb-Douglas, which will give us closed-form solutions to some key variables.

Substituting the expression for $\tilde{y}^g$ in the budget balance (25) condition above and solving we get a key budget-balance equation for a UBI scheme:

$$b = \tilde{z} \frac{\alpha t (1-t)}{(1-\alpha t)}. \tag{26}$$

An obvious implication of this expression is, the higher the average income of a country, the easier it is to fund a basic income scheme so long as b does not rise proportionally with average income. A recent report by the IMF (2017) provides a calculation of the fiscal cost of a UBI program as percentage of GDP when the

basic income is set at 25% of the per capita *median* income. The ratio of median to mean income is larger in richer countries reflecting less inequality, and so the fiscal cost of UBI is expected to be larger. This is confirmed by the calculations that are provided in this report. For example, the cost of UBI as a percentage of GDP is 6.4% and 6.7% for the USA and the UK, while it is 3.7% and 2.3% for Mexico and South Africa. In this context, however, we have to keep in mind that the fiscal capacity of poorer countries is more limited and so despite these calculations, raising the relevant tax revenue could be much harder.

A lot of debate about UBI concerns what is the appropriate level of b. Clearly it cannot be the same absolute level (even controlling for purchasing power) across countries that have different levels of average income since standard of living changes with the level of prosperity. So long b does not increase proportionally with average income levels, (26) suggests that it is easier to fund a UBI scheme, the richer is the country.

The formula for basic income in (26) gives an aggregate trade-off between b and t given the need for budget balance, the formula of the so-called Laffer curve. Again, the fact that it only depends on the average full income and not on its distribution is particular and follows from our choice of Cobb-Douglas type of preferences.

The formula in (26) allows us to characterize the largest possible level of b. Differentiating (26) with respect to b and rearranging, we get the following first-order condition:

$$\frac{\alpha t^2 - 2t + 1}{(1-\alpha t)^2} = 0. \tag{27}$$

This gives us

$$t = \frac{1-\sqrt{1-\alpha}}{\alpha}. \tag{28}$$

If, for instance, $\alpha = 0.5$ (which means that individuals like to spend half of their full income in consumption and devote the other half to their leisure), then the income tax rate that maximizes the basic income is equal to 58.58%. Taxing income at a higher rate would be detrimental for everybody in the economy.

The equation (28) also shows that the largest t compatible with efficiency is an increasing function of α. This comes from the fact that a larger α is associated with a lower elasticity of the labor supply.[47] If we take (26) and we fix the average gross income in the absence of taxation, $\alpha\tilde{z}$, we see that b is an increasing function of α: if individuals are more sensitive to taxation (a lower α for a fixed $\alpha\tilde{z}$), then the same tax rate t leads to a lower UBI. All tax rates between zero and $\frac{1-\sqrt{1-\alpha}}{\alpha}$ lead to more or less generous basic incomes, and some individuals, typically the poorer, gain from an increase in t, whereas the others lose.

Another question that (26) allows us to consider is the preferred tax rate of the average individuals, namely, those with full income $\tilde{z}$. Remember that several types of individuals (m, w) have full income $\tilde{z}$. We know from (24) that the gross

[47] The (uncompensated) elasticity of the labor supply, $\frac{\partial L}{\partial w}\frac{w}{L}$ can be computed from Eq. (21) and it is equal to $\epsilon_{Lw} = \frac{1-\alpha}{\gamma\alpha-(1-\alpha)}$, where $\gamma = \frac{w(1-t)T}{b+(1-t)m}$ and it is decreasing in α: $\frac{\partial \epsilon_{Lw}}{\partial \alpha} = \frac{-\gamma}{(\gamma\alpha-(1-\alpha))^2}$.

income of each individual decreases as t increases, and so does the gross income of the average individuals. As the average individuals are precisely those whose net income is equal to their gross income, clearly their net income also decreases with higher t. What is unclear, though, is the effect of t on their utility as the decrease in net income goes together with a decrease in labor time.

The indirect utility of an individual with full income $\tilde{z}$ and wage w is given by

$$v(w, \tilde{z}; \alpha) = \Gamma(\alpha) + \log(b + (1-t)\tilde{z}) - (1-\alpha)\log(w(1-t)). \tag{29}$$

where $\Gamma(\alpha) = \alpha \log \alpha + (1-\alpha)\log(1-\alpha)$. Using the value of b from (26) we get:

$$v(w, \tilde{z}; \alpha) = \Gamma(\alpha) + \log \tilde{z} - (1-\alpha)\log w + \log \frac{(1-t)^\alpha}{1-\alpha t}, \tag{30}$$

so that the sign of the derivative of the indirect utility $v(w, \tilde{z}; \alpha)$ with respect to the tax rate boils down to the sign of the derivative of $\frac{(1-t)^\alpha}{1-\alpha t}$ with respect to t, i.e., the sign of:

$$\frac{\alpha(1-t)^{\alpha-1}}{(1-\alpha t)^2}(t(\alpha-1)). \tag{31}$$

This is negative because $\alpha < 1$. This proves that the average full income individual always prefers a lower tax rate, independently of whether her full income is large because of her wage or non-labor income.

Income distributions are always skewed, so that median income is typically smaller than average income. The result above is independent of the distribution of incomes, which means that the median income may be arbitrarily close to the average one, with the consequence that the median individual would also prefer a lower tax rate. That illustrates the fact that there is no guarantee that a majority of people would benefit from UBI, should it be financed by a linear tax, as proven by Romer (1975), who pioneered the study of voting on the labor income tax when behavioral responses are taken into account.[48]

If labor income tax is allowed to be non-linear, and if the policymaker wishes to implement a generous UBI, what should be the shape of the tax system? The literature suggests that the optimal non-linear tax should be convex, at least on low incomes, which means that individuals earning very low incomes should face higher marginal income tax rates.[49] The intuition of this result is as follows: as the basic income becomes larger, the amount of tax that needs to be collected increases. That requires an increase in the average tax rates. In order not to deter high wage individuals from working hard, this increase in the average tax rates should be accompanied as much as possible by low *marginal* tax rates on large incomes. This is accomplished by having large marginal tax rates on low incomes, thereby increasing the average tax rates on the whole income distribution. This has the drawback that it discourages *low* wage individuals from working but given

[48] Romer also studies the case in which part of the tax return goes to financing fixed government spendings, in which case the preferred tax rate of the median voter is even lower than in the pure redistributive case that we study here.

[49] See Boadway and Jacquet (2008) for a comprehensive treatment of this question.

the lower marginal tax rates on larger incomes, the very productive individuals continue to work and a sufficiently large amount of tax is collected.

The main lesson of this subsection is that the amount of UBI and the labor income tax system that needs to be designed to finance it depend strongly on the behavioral responses of the tax payers. The simple linear tax example above has shown that there is a maximal feasible amount of UBI and a maximal rate of taxation beyond which everybody loses. The example has also illustrated the result that even if low income earners necessarily benefit from an increase in UBI when it is financed by a linear tax, a majority of individuals may strictly prefer a lower tax and a lower UBI. Finally, a quick review of the optimal non-linear taxation literature has shown that the optimal way of financing UBI was typically not through a linear tax but a convex one, in which low income earners face higher marginal tax rates. This is likely to even decrease the set of individuals benefitting from UBI.

The arguments in this subsection are mainly relevant for economies in which all individuals either earn income and pay tax or do not earn income and then receive some form of social benefits. Developing countries, on the contrary, are characterized by low fractions of the population who are income tax payers as well as welfare beneficiaries. We have also shown in the previous subsection that the effect of UBI and its financing on the labor supply is likely to be modest in such economies. However, given that the institutions in charge of tax and social welfare in these economies do not work as well as they do for developed countries, we now introduce imperfections in these institutions along the lines of section 6.

7.3 Allowing Frictions in the Tax System

We now analyze the feasibility of UBI allowing for noisiness in measuring income. We address the following question: if economies differ in terms of both the extent to which the administrative capacity is subject to frictions, as well as the distribution of income, under what circumstances a UBI scheme can provide the same amount of benefits with lower taxes, or higher benefits for the same amount of taxes?

To fund the UBI scheme, taxes would need to be collected and the question arises, what happens in this regard when income cannot be measured? For simplicity, we assume that taxes can only be collected when true gross income is accurately measured, the probability of which is given by $p\left(y^g\right)$, and not when an uninformative signal about income is received, with probability $1-p\left(y^g\right)$. The modified budget-balance condition for a UBI is:

$$t\int_0^\infty y^g(z)p\left(y^g(z)\right)g\left(z\right)dz=b.$$

If $p\left(y^g\right)=p$ for all y^g then

$$tp\tilde{y}^g=b$$

where $\tilde{y}^g=\frac{\alpha}{\alpha+\beta}\tilde{z}-\frac{\beta}{\alpha+\beta}\frac{b}{1-t}$. Therefore, the tax rate has to be higher to fund the same b compared to an economy where income is measured accurately.

Let $\underline{y}$ and $\overline{y}$ be the lowest and highest value of gross income in the economy, corresponding to $\underline{z}$ and $\overline{z}$, the lowest and highest possible values of full income. Also, let us define $\phi(z) \equiv y(z) p(y(z))$.

To consider more interesting possibilities, suppose $y^g p(y^g)$ is increasing in y^g - i.e., as true income goes up, the expected value of the signal of income also goes up. As a lower t is needed to fund a given b, it follows directly that it is easier to fund the same level of UBI in richer countries, and those countries where tax enforcement is better, i.e., the function $p(y^g)$ shifts out.

More interestingly, suppose we compare two economies where the mean value of $y^g p(y^g)$ is constant but one of them has more inequality in the sense of second-order stochastic dominance. Suppose $y^g p(y^g)$ is concave (resp. convex) which implies $y^g p''(y^g) + 2p'(y^g)$ is negative (resp. positive) assuming $p(y^g)$ is differentiable. In the case of concavity (resp. convexity) the more unequal economy will yield lower (resp. higher) tax revenue on average.

Now consider the effect of increasing income inequality. Suppose there is a shift of $g(z)$ in the sense of second-order stochastic dominance. In the case of concavity (resp. convexity), the less (resp. more) unequal economy will have a higher value of $\int_{\underline{z}}^{\overline{z}} \phi(z) g(z) dz$ and so a lower (resp. higher) t will be needed to fund a given b.

We can think of concavity (resp. convexity) of $y^g p(y^g)$ as the case where the richer people find it easier (resp. harder) to evade taxes and so the curvature of $y^g p(y^g)$ can be interpreted as a measure of progressivity of tax enforcement. The case of concavity may be relevant in developing countries where the fiscal capacity of the state is limited and the rich may be better able to hide income. With good tax enforcement, greater inequality raises greater revenue for a UBI while the opposite holds for bad tax enforcement.[50]

We summarize our main conclusion as : when income is noisily measured, this tightens the fiscal budget constraint for funding a UBI-scheme. However, if tax enforcement is progressive then greater inequality in the distribution of income relaxes the fiscal budget constraint, while the opposite holds if tax enforcement is not progressive.

8 Conclusion

Despite our attempt to be broad, our overview falls well short of being comprehensive. For example, we have not paid sufficient attention to dynamics and uncertainty by focusing all through on a static deterministic model. Clearly, a welfare system has important impacts on savings, skill formation, and intergenerational effects such as through human capital investments. Also, by providing a steady flow of income, a UBI is likely to affect risk-taking and entrepreneurship. Also, we did not address the specifics of a UBI scheme, such as in what frequency

[50] Actually, if we compare two economies just in terms of second-order stochastic dominance, the effect of inequality on tax collection depends only on the curvature of $y^g p(y^g)$ and not on its slope and therefore, the same conclusions apply when $y^g p(y^g)$ is not monotonically increasing.

should a basic income be paid out (monthly, yearly), should it be paid before they earn any income or paid *ex post* yearly by the fiscal authorities after they observe gross incomes, should employers be involved in paying out the basic income as they are for withholding taxes and then deal with the social security authorities, will individuals earning less than the basic income have to apply to receive it monthly.

We conclude by making a few points to take away from the debate between UBI and other forms of welfare programmes.

First, UBI does not look like the proposal that all egalitarian policymakers should wish to implement. There are many egalitarian social welfare functions that do not call for closing one's eyes on the reason why people have low incomes.

Second, among the normative values that may be called for to justify redistribution policies, poverty alleviation seems to be the ultimate value to justify UBI. That suggests first to compare UBI with other programs dedicated to the poor. That also suggests that UBI might be more appropriate in developing countries, especially those in which UBI could help circumvent the imperfections of government institutions in charge of helping the poor.

Third, we do not see any reason why guaranteeing a UBI and, through it, a universal minimal consumption, should necessarily be coupled with the crowding-out of other transfer policies. Complementing UBI with other, conditional income support policies are likely to be better than UBI alone.

Finally, in our theoretical framework, we did not allow for the role of public goods and services, or the role of policies that would lead to greater income growth (e.g., better infrastructure). As we argued, a UBI or a cash transfer will provide some relief to the poor. However, we do not suggest that UBI will provide a long-term solution to the problem of poverty. Therefore, even if UBI is accepted to be better than in-kind or conditional or targeted transfers, that does not mean that the entire budget of poverty alleviation or social welfare should be devoted to transfer programs.

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