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Universal Basic Income: Some Theoretical Aspects

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Keywords

universal basic income, unconditional cash transfers, welfare policies, labor supply

Abstract

In this article, 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 justifications 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 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 as a tool to achieve social justice in developed ones.

1. INTRODUCTION

A universal basic income (UBI) is a universal and unconditional stream of cash income paid by the government to every member of society—it is paid irrespective of whether an individual is working, of his or her existing income, and of who he or she lives with.[1] The concept of UBI has a distinguished intellectual tradition starting with radical thinkers, liberals, and utopian socialists in the eighteenth and nineteenth centuries, such as Thomas Paine, Thomas Spence, Charles Fourier, Joseph Charlier, and John Stuart Mill.[2] 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 ends of the political spectrum—for example, versions of it have been proposed by left-of-center 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. It has received support from mainstream politicians in the British Labour Party, the US Democratic Party, the French Socialist Party, and the Green Parties in several European countries, the United Kingdom, Canada, and Australia. It was put up for a referendum (and was defeated) in Switzerland in 2016 and has been tried out on an experimental basis with mixed initial reports in various European countries, such as 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 Department for International Development, toward direct cash transfers, which involve rolling all subsidies into a single lump-sum cash transfer to households.[3]

This review has two objectives—to discuss the desirability and the feasibility of UBI from the point of view of economic theory.

First, we explore the desirability of UBI by examining normative justifications for it in different economic environments. As we are 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 that 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), which determines the extent to which income levels and hours worked are observable to the policy maker; 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 that it is funded by a linear income tax and taking into account the behavioral effect 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 as a substitute for 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 for policies to fund the provision of public goods and services.[4] The natural comparison is with other transfer policies that are not in the form of cash, involve targeting to specific groups, or are conditional on some form of compliance criteria being met.

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[1] As Van Parijs & Vanderborght (2017) observe, membership of society does not refer to citizenship, but to fiscal residence. Also, below, we refer to individuals as she.

[2] Van Parijs & Vanderborght (2017) provide a discussion of the history of the idea.

[3] Banerjee et al. (2019) and Hoynes & Rothstein (2019) provide discussions of UBI in the contexts of the developing world and advanced countries, respectively.

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

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 those who do not earn any labor income should receive the same net transfer independently of their ability to earn income, of their own nonlabor 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? To answer these questions, we start with the observation that an individual's total income is the sum of labor and nonlabor 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, differences in wages, or differences in nonlabor income.

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

In a first-best world, the benevolent policy maker is assumed to have full information about the characteristics of individuals and can tailor tax and benefits 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 the reasons 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, but where there is a large redistribution from high- to low-willingness-to-work individuals, which is hard to justify on normative grounds.[5]

In a second-best world, the characteristics of agents are no longer assumed to be observable to the policy maker. Taxation is assumed to be based on pretax 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 policy maker to identify, among those who do not work, the ones who have the ability to earn income on their own. This consists of monitoring the employment or job search records of individuals who receive unemployment or social assistance and asking firms to verify whether they would be ready to hire these individuals. It is interesting to note that all existing unemployment insurance or social assistance programs in developed countries are in fact based on such devices, 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. Under these circumstances, the goal of poverty alleviation may imply not treating all those who do not work equally generously, but instead providing 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 toward low-wage individuals.[6]

In a third-best world, we introduce imperfections in the tax and welfare system. 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, the same

[5]Throughout this review, wages (or, for those who are self-employed, average earnings) are assumed to reflect the productivity of individuals.

[6]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 worked full time. In our formal analysis, we take them to be zero-wage individuals for simplicity.

egalitarian objectives that do not necessarily lead to UBI in the absence of these imperfections may end up favoring UBI as a way to circumvent 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 review; Banerjee et al. (2019) deal with it fairly comprehensively in the context of developing countries.[7]

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 that vary in terms of the fraction of the population that is very poor, average income levels, the degree of inequality, and the effectiveness of the tax and benefits systems. 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 review is as follows. In Section 2, we discuss in detail various aspects of UBI proposals and identify the ones that we 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 4–6, we review the possible justifications of non-means-tested transfers in first-best (full information), second-best (asymmetric information about beneficiaries), and third-best (imperfect enforcement of tax and benefits systems) environments. In Section 7, we carry out a positive analysis of a UBI scheme that is funded by a linear tax in terms of its effects on labor supply and the determinants of budgetary feasibility. We conclude in Section 8.

2. CHARACTERIZATION OF A UNIVERSAL BASIC INCOME

UBI is a redistribution scheme that has three components. First, it is a cash transfer, as opposed to in-kind transfer providing 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.

The 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:

1. It does not depend on the beneficiary's ability to earn labor income, whereas a large spectrum of current social benefits are restricted to the involuntarily unemployed (those whose effective temporary wage rate is zero);
2. it does not depend on the beneficiary's nonlabor income, in particular, on capital income; and
3. 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, or 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

[7] Baird et al. (2018) and Ghatak (2015) also provide discussions of some of these mechanisms related to cash transfers in the context of developing countries.

worthy, in contrast to conditional transfer schemes that are contingent on parents sending their children 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.[8] They are also 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 the absence of means testing and the following considerations, namely, whether the recipient deserves it and 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 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.

3. CASH VERSUS IN-KIND TRANSFERS

Suppose that individuals care about c (essential consumption) and x (inessential consumption), and that their preferences are represented by the utility function $u(c, x)$.[9] Suppose that 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 pretransfer income. If we assume both essential and inessential consumption to be normal goods, then we would expect $c(y + b, p) > c(y, p)$ and $x(y + b, p) > x(y, p)$. In **Figure 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 an alternative transfer of value b that is either in kind, in the form of a coupon or voucher, or made up of electronic benefit transfer (EBT) cards. For example, in India, fair price shops, also known as ration shops, distribute food and essential items at a subsidized price to the poor. In contrast, in the United States Food Stamp program, 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.[10] The

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

[9] 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 (for a formal treatment, see Matsuyama & Ushchev 2017). 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 to but different from the distinction between merit versus demerit goods, which reflects the distinction on the part of the policy maker between kinds of goods that are potentially deserving of societal support and kinds that are not. Some goods may be considered merit goods in reference to need, which makes them close to essential goods, but other goods may be considered merit goods even if they are not essential, for instance, because they exhibit positive externalities or behavioral biases that lead to underconsumption.

[10] 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

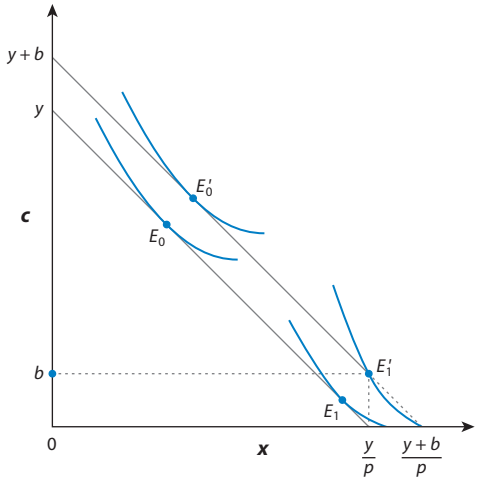

Figure 1

Cash versus in-kind transfers.

new budget line can be written as $\max\{c-b,0\}+px\le y$. For $c\ge b$, 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 pretransfer income y (for a detailed discussion, see Hoynes & Schanzenbach 2009). In **Figure 1**, the budget line under this scheme is the same as the one for the unconditional cash transfer of b for $c\ge b$, and for $c<b$, it is a vertical line with the intercept 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 $c(y+b,p)\ge b$, $\hat{c}(y+b,p)=c(y+b,p)$ 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 $\hat{x}(y+b,p)=y/p$.

In this case, the outcome would be different from the previous case. We highlight 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 $x>y/p$, but she is constrained to choose the point E_1', which involves $\hat{c}(y+b,p)=b$ and $\hat{x}(y+b,p)=y/p$. However, even in this case, the consumption of x is higher than in the pretransfer situation, as $x(y,p)<y/p$.

What this means is that, either way, there is greater consumption of x compared to the pretransfer 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 in the case of an unconditional cash transfer. This simple analysis therefore suggests that the impacts of cash and in-kind transfers are different only for beneficiaries who are marginal—for inframarginal beneficiaries, there is no difference. Evidence in fact seems to suggest that most recipients happen to be inframarginal (Hoynes & Schanzenbach 2009).

From the welfare point of view, the individual is clearly better off with a flat cash transfer of b, and any transaction costs involved in making an in-kind transfer of the amount b will make the

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 preference for cash transfers.

logic stronger from the social efficiency point of view. Only when the in-kind transfer is completely fungible are the two forms of transfers 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 and if the goods involved are necessities of very basic quality.[11]

Second, if the benevolent policy maker has paternalistic preferences that are different from those of the beneficiary, then in-kind transfers may be preferred to cash transfers. This would depend on the extent to which 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 the extent to which intrahousehold resource allocation considerations are relevant (e.g., gender discrimination, insufficient altruism toward children) such 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 transaction costs in accessing markets, then in-kind transfers are effectively larger in real terms. Clearly, in remote rural areas of developing countries, having cash is less useful than it is in more urban areas.[12]

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 it makes voters more willing to pay and does not effectively decrease the utility of the beneficiaries so long as they are inframarginal.

In the end, how cash transfers tend to get spent by beneficiaries is an empirical matter. Evidence from developing countries actually suggests that, on average, cash transfers to the poor do not cause them to spend their money on inessential consumption (see Evans & 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 we focus on for the remainder of this review. 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 nonlabor 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 is the wage. Under this reinterpretation, a paternalistic policy maker would be one who thinks that people are likely to consume more leisure than they should. An in-kind policy would then impose a minimal 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, as well as workfare programs in developing countries, such as the employment guarantee scheme in India (see Ravallion 2018).[13]

4. IN A FIRST-BEST WORLD

Under what circumstances would a benevolent policy maker wish to transfer the same amount of money to different types of individuals? We begin exploring this question in a first-best world. By

[11] In Section 5, where we discuss workfare, the issue of self-targeting in a second-best environment comes up again.

[12] In a study of a bicycle scheme for school children in Bihar (Ghatak et al. 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, i.e., the DBT program, found that costs varied across beneficiaries depending on access to banking.

[13] Arguments to justify such policies are sometimes grounded in 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).

first-best, we mean that the policy maker has full information about all of the relevant characteristics of individuals and can tailor taxes and transfers to these characteristics, and that there are no direct costs or frictions associated with the implementation of these policies.[14] Given that most arguments in favor of UBI refer to informational asymmetries, incentive issues, or administrative costs, the common intuition is 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 policy maker 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 benefits system and then letting individuals choose their labor supply given that labor is rewarded at their actual productivity.[15] Choosing the optimal allocation then boils down to choosing the optimal set of lump-sum taxes and benefits.

We begin by distinguishing two definitions of basic income that come up in debates on UBI. Basic income is sometimes defined as the transfer that an individual would get on top of all of her other incomes, with the amount being independent of these other incomes. It is universal when all individuals in the economy receive the same amount. 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 UNICEF, respectively (for detailed descriptions of such experiments and related references, see Van Parijs & Vanderborght 2017). This is 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.[16] It is funded by taxes paid by working individuals. It is universal when all individuals who do not work receive the same amount, independently of whether they do not work because of their low wage or because of their low willingness to work. This is the topic of Section 4.2.

We study two possible justifications of such a UBI. First, we explore whether there exist good normative reasons to treat all individuals who do not work identically, whether the absence of work is due to low productivity reflected in low wages or low willingness to work (Section 4.2.1). Second, we 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. Throughout, we stick to a static framework of income–leisure choice, so that after-tax income equals consumption. The preferences of an individual are represented by a utility function:

$$u(y, \ell) = \alpha \log(y) + (1 - \alpha) \log \ell, \qquad 1.$$

[14]As mentioned in Section 1, 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 policy maker to use certain screening mechanisms in the design of the tax and benefits policies.

[15]Taxes and benefits are lump sum when they do not depend on the behavior of individuals. 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 benefits. Note that the ability of the policy maker to observe the types of 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 policy maker would assign to them.

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

where ℓ stands for her leisure time and y for her consumption. We assume that 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, $w \geq 0$, which may differ across individuals. For simplicity, we assume throughout that w is exogenous. Finally, we assume that individuals have some exogenous amount of nonlabor 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 nonlabor income, respectively. 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, we consider it in terms of only one factor—a subsistence consumption level. For a developing country, we modify the above setup 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

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

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; this is a further distinction between developed and developing countries that we return to in Sections 5 and 6.

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 ts have to satisfy the government budget constraint:

$$\int_0^\infty \int_0^\infty \int_{\underline{\alpha}}^{\overline{\alpha}} t(\alpha, w, m) f(\alpha, w, m) \mathrm{d}\alpha \mathrm{d}w \mathrm{d}m \geq B, \qquad 2.$$

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

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

This leads to the optimal consumption and leisure time

$$y^*(\alpha, w, m) = \alpha(wT + m - t(\alpha, w, m)), \qquad 4.$$

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

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

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

This yields the following indirect utility function:

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

Otherwise, we get a corner solution:

$$y^*(\alpha, w, m) = m - t(\alpha, w, m),$$
$$\ell^*(\alpha, w, m) = T,$$

with the corresponding indirect utility function

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

This gives us the following expression for labor supply:

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

As this expression makes 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 nonlabor income, m. As we see below, what is an ethically justified way to treat 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

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

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

and the indirect utility function is given by

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

In this first-best world, the policy maker has the freedom to treat income inequalities that arise from differences in labor time differently from those that arise from differences in wages and those that arise from differences in m. For example, the policy maker may well want to distinguish between those who work a lot for a low wage and 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 policy maker considers inequalities in m to be normatively undesirable, then she should tax m at 100% and redistribute the proceeds. If the policy maker does not consider these inequalities to be 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 focusing on heterogeneity in terms of α and w. This is what we do for the remainder of this section. We bring inequalities in m back in the analysis in Section 4.2.2.

The two definitions of basic income that we introduce 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 (in our

notation t is a tax, and so $t < 0$ is a negative tax, i.e., a positive transfer of amount $-t$). We study them in turn in the following sections.

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 sources other 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 nondistortionary; 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 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 (Equation 2). As a result, this way of defining basic income is not very promising from the point of view of justifying UBI, and thus, the Namibian and Indian experiments we mention above are of limited interest.

4.2. A Lower Bound on Consumption

Let us now define basic income as an income guarantee. In this case, we need to distinguish between developed and developing countries. We begin with the former, where those who have the lowest income 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 analysis above, this means that all individuals (α, w) such that

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

do not work at an efficient allocation and receive a basic income of $\underline{b}$. The key normative question is whether it is possible to define social welfare in a way that suggests treating all these individuals identically.

There are two ways of answering yes to this question, which we review in the next two sections. The first is based on normative principles of fairness consistent with interpersonal welfare comparison among individuals with heterogeneous preferences. The second 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 do not work because of low wages or because they value leisure. As Van Parijs & Vanderborght (2017, p. 99) 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."

To deal with this question, we need to develop a notion of social welfare in a world characterized by heterogeneity in productivity, w, and willingness to work, α. Defining social welfare in such a context has been at the center of optimal taxation theory in recent years.[17] The brief discussion that follows builds on these developments.

Assume, for simplicity, that we have two types of preferences, parameterized by $\underline{\alpha}$ and $\overline{\alpha}$, with $\underline{\alpha} < \overline{\alpha}$, and three types of wages, 0, $\underline{w}$, and $\overline{w}$, with $0 < \underline{w} < \overline{w}$, which gives us six types of agents. Let us assume that individuals of three types do not work at an efficient allocation, namely, $(\underline{\alpha}, 0)$, $(\underline{\alpha}, \underline{w})$, and $(\overline{\alpha}, 0)$. For each type (α, w), we need to define $t(\alpha, w)$. As the budget equation needs to be satisfied, we have five instead of six degrees of freedom.

UBI requires that all idle individuals get the same transfer, that is,

$$t(\underline{\alpha}, 0) = t(\underline{\alpha}, \underline{w}) = t(\overline{\alpha}, 0). \quad 13.$$

To begin with, suppose that $t(\alpha, w)$ is decomposed into

$$t(\alpha, w) = t(\alpha) + t(w). \quad 14.$$

Then, Equation 13 requires $t(\underline{\alpha}) = t(\overline{\alpha})$ and $t(0) = t(\underline{w})$. The former equality means that there is no redistribution from high- to low-willingness-to-work individuals, which seems normatively appealing, but the latter means that there is no redistribution from middle-wage $\underline{w}$ to zero-wage individuals, which seems harder to justify, to the extent that redistribution seems to be precisely justified by the desire to alleviate income inequality stemming from wage inequality.

Of course, restricting our attention to Equation 14 comes with a loss of generality. In particular, it implies that

$$t(\underline{\alpha}, 0) - t(\underline{\alpha}, \underline{w}) = t(\overline{\alpha}, 0) - t(\overline{\alpha}, \underline{w}),$$
$$t(\underline{\alpha}, 0) - t(\underline{\alpha}, \overline{w}) = t(\overline{\alpha}, 0) - t(\overline{\alpha}, \overline{w}).$$

These two equalities mean that the redistribution from high- to low-wage individuals needs to be of the same magnitude among high-willingness-to-work individuals as among low-willingness-to-work individuals. Again, this is normatively counterintuitive. Indeed, any social objective that tries to equalize utility among agents of the same preferences will lead to more redistribution among high-willingness-to-work individuals than among low-willingness-to-work individuals. At the extreme, if $\underline{\alpha}$ is so low that even the high-wage individuals with these preferences do not work, then utility equality is achieved even without redistribution, as all individuals consume the same (zero-labor) bundle. 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 utility inequality arising from differences in wages, which is exactly the objective that we are considering.

To take into account this normative intuition that more redistribution should take place among high- than among low-willingness-to-work individuals, we need to complement the tax function (Equation 14) with additional (positive) components $t_{w,w';\alpha}$ for $w < w'$, where $t_{0,\underline{w};\underline{\alpha}}$, for instance, measures the additional amount of redistribution received by zero-wage individuals from middle-wage individuals within the set of low-willingness-to-work individuals. Given that α takes two

[17] Based on the important contribution of Boadway et al. (2002), Fleurbaey & Maniquet (2011) provide a general answer to this question in the framework of the theory of fair allocation. Fleurbaey & Maniquet (2018) provide a survey of the contribution of the fairness approach to optimal taxation.

values, and w takes three values, there would be six such terms, $t_{w,w';\alpha}$.[18] The normative intuition that we discuss above requires these terms to satisfy the following conditions:

$$t_{0,\underline{w};\underline{\alpha}} < t_{0,\underline{w};\overline{\alpha}}, \quad 15.$$

$$t_{0,\overline{w};\underline{\alpha}} < t_{0,\overline{w};\overline{\alpha}}, \quad 16.$$

$$t_{\underline{w},\overline{w};\underline{\alpha}} < t_{\underline{w},\overline{w};\overline{\alpha}}, \quad 17.$$

in addition to the conditions $t_{0,\underline{w};\alpha} < t_{0,\overline{w};\alpha}$ for all α that follow straightforwardly from the objective of decreasing utility inequality arising from differences in wages.

Is it easier to justify UBI with this more general definition of the tax and benefits system? If we focus on the requirement that $t(\underline{\alpha}, \underline{w}) = t(\overline{\alpha}, 0)$, then we need to analyze the following two equations, in which we look at the amount received by these two types of individuals:

$$-t(\underline{\alpha}, \underline{w}) = -t(\underline{\alpha}) - t(\underline{w}) + t_{\underline{w},\overline{w};\underline{\alpha}} - t_{0,\underline{w};\underline{\alpha}},$$
$$-t(\overline{\alpha}, 0) = -t(\overline{\alpha}) - t(0) + t_{0,\underline{w};\overline{\alpha}} + t_{0,\overline{w};\overline{\alpha}}.$$

Taking Equations 15–17 into account, it is clear that individuals of types $(\underline{\alpha}, \underline{w})$ and $(\overline{\alpha}, 0)$ will get the same transfer only if we redistribute from low- to high-wage individuals, $t(\underline{w}) < t(0)$, or if we massively redistribute from high- to low-willingness-to-work individuals,

$$t(\overline{\alpha}) - t(\underline{\alpha}) > t_{0,\underline{w};\overline{\alpha}} + t_{0,\overline{w};\overline{\alpha}} - t_{\underline{w},\overline{w};\underline{\alpha}} + t_{0,\underline{w};\underline{\alpha}} > 0,$$

where the last inequality comes from $t_{\underline{w},\overline{w};\underline{\alpha}} < t_{\underline{w},\overline{w};\overline{\alpha}} < t_{0,\overline{w};\overline{\alpha}}, t_{0,\underline{w};\overline{\alpha}} > 0$ and $t_{0,\underline{w};\underline{\alpha}} > 0$.

In other words, 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 counterintuitive norms of fairness.[19] It is hard to imagine policy makers redistributing from low- to high-wage individuals or from high- to low-willingness-to-work individuals, so UBI cannot be viewed as a first-best policy.

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

To conclude this section, let us turn to the case of developing countries. Remember that in the first-best environment, 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

[18]The budget constraint limits the degrees of freedom that we have to determine these amounts, but we do not need to take it into account in this case because our argument holds even if the budget constraint is ignored.
[19]In the work of Fleurbaey & Maniquet (2011, 2018), precise definitions of fairness principles are proposed to take into account 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.

turns out to have two drastic consequences for the discussion that we carry out above, which can immediately be derived from Equations 9 and 10.

First, in an economy in which subsistence constraints are binding, the individuals with the lowest consumption are not those who do not work until they are employed at a positive wage in a formal sector. Indeed, as studies from developing countries suggest, 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 & Duflo 2011).

Second, the labor time of these individuals is independent of their preferences and depends only on their wage, their nonlabor income, and the tax and benefits system.

As a consequence, the question that we raise in this section, based on what Van Parijs & Vanderborght (2017) pose as a key objection to UBI, does not appear to be 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 Equation 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 Equation 4, the consumption level at an efficient allocation is equal to $\alpha[wT + m - t(\alpha, w, m)]$. It is important to bring m back into the picture, as the policy maker 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 call the subsistence level above. In developed countries, this line is typically relative, and it is fixed in most Organisation for Economic Co-operation and Development (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 that 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 characterize means unconditionality above as having three components, namely, no conditions on the ability to earn income, nonlabor income, and incomes of other household members. While poverty reduction justifies the absence of conditions on one's ability to earn income, it does not justify making the transfer independent of nonlabor 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 world 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 policy maker 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, then only extreme and somewhat implausible normative stances can justify treating individuals who do not earn income independently of whether their lack of income is because their wages are too low or because their willingness to work is too low.

5. IN A SECOND-BEST WORLD

In the previous section, we discuss conditions that a social welfare function has to satisfy to justify UBI in a first-best world, i.e., when the benevolent policy maker is perfectly informed of the characteristics of the individuals. In most debates, however, UBI is presented as a second-best policy. It aims to reform an existing tax and welfare system in which the policy maker does not observe types and, in particular, in which 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 pretax 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 Section 6, 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 and benefits system by the equation

$$y^n = y^g - \tau(y^g), \qquad 18.$$

where y^g denotes gross (i.e., pretax) labor income, y^n denotes net (that is after-tax) labor income, and τ aggregates all the policies that transform pretax into posttax 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 that y^n is an increasing function of y^g.[20]

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

Before we discuss this question, we need to justify our focus on Equation 18. There are two reasons for this.

First, the celebrated Atkinson-Stiglitz theorem (see Atkinson & Stiglitz 1976) states that provided that 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 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 pretax incomes are not well observed, with the consequence that it is fairer to tax consumption, then social welfare maximization may require one to use indirect taxation. We do not address this question in this review.

[20]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, then individuals would indeed work less. An important consequence of this property for our purpose is that y^n is minimal at $y^g = 0$.

Second, by restricting our attention to Equation 18, we disregard capital-income taxation, which can be a part or all of nonlabor income, m. Contrary to the point that we make about indirect taxation, this simplification does not imply that it is not 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. In this section, we focus on how the tax and benefits 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, Weinzierl 2011) is relevant in our second-best world, where the characteristics of an individual, namely productivity or wages, preference for leisure, and nonlabor income, are not known to the tax or welfare authorities. The key lesson from this literature is that, 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 and benefits 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, and indirectly, by making it unnecessary 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 like the very opposite of tagging, but it is not. First, defenders of UBI sometimes think of it as depending on observable and nonmanipulable 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 in which we define it, UBI requires that the transfer to zero-income earners be unconditional, and this does not preclude the use of tagging provided that it only affects taxes and benefits beyond UBI. Of course, if horizontal equity is part of the set of values on which UBI is supposed to be based, then tagging is clearly 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 Equation 18 into

$$y^n = b + y^g - \tau^*(y^g), \tag{19.}$$

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 Equations 18 and 19 are perfectly equivalent, as can be seen by fixing

$$b = -\tau(0), \tag{20.}$$

$$\tau^*(y) = \tau(y) - \tau(0). \tag{21.}$$

When $\tau(0) < 0$, any labor income tax scheme that can be described using Equation 18 is a UBI system in which everybody receives a UBI equal to $-\tau(0)$ and pays a tax $\tau(y) - \tau(0)$. What this suggests is that the UBI proposal is not about everybody receiving an additional income, but rather about making $-\tau(0)$ unconditional. That requires the following two characteristics of the new tax system, which, as we see in Section 5.2, are absent in all existing redistribution systems.

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

Second, 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 social security and not to the worker at the end of the month? Will it instead be paid ex post yearly by the fiscal authorities after they observe all the y^gs? 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 in this review. Rather, we focus on the consequences of UBI on the ex post relationship between earnings and after-tax 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 nonlabor incomes, and/or on the lack of income of other household 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 screening, 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, 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, that 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 2011).

Second, transfers to low-income individuals can be conditional on lack of personal nonlabor 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 the 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.[21] 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 a 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. Universal Basic Income 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 objective is to maximize a social welfare function. The novel features of his approach were that taxation is not necessarily linear, which means that different income levels could be taxed at different rates; the policy maker 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) is observed; and individuals are assumed to freely choose their labor time (and, therefore, their pretax income) knowing the tax formula and being able to compute how much net income they will be able to derive.

The most restrictive assumption, in contrast, 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 study in Section 4, the natural model in which justifications to UBI should be discussed is one in which preferences are heterogeneous, 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 nonlabor incomes, m, are equal to 0. The result that is of interest for our purpose is that the tax is distortive, which means that low-wage individuals are incentivized to work less than in the first-best case (for excellent surveys of this literature, see, e.g., Boadway 2012, Piketty & Saez 2013).

The distortive effect of taxation in the second-best case is that the larger the redistribution from the rich to the poor, the larger the incentive of the rich to mimic the poor by working less and earning less.[22] The only way to reduce this incentive is to induce 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,

[21] In this context, Kasy (2018) makes an interesting point that moving from a policy of subsidizing low-wage work, such as the Earned Income Tax Credit (EITC), to UBI may save on budgetary resources in net terms by improving the overall efficiency of transfers.

[22] Mimicking an individual here means earning the same gross income as that individual.

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: All individuals who do not work receive the same transfer $-\tau(0)$, and all individuals who earn $y^g > 0$ prefer their bundle over UBI.

In conclusion, the optimal taxation scheme of Mirrlees and those of many 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 policy maker 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 benefits 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 Section 5.4, in which we reintroduce preference heterogeneity.

5.4. Interpersonal Welfare Comparison and Heterogeneity of Preferences

Assume that the policy maker endorses the normative stance, which we describe as more intuitive in Section 4, that redistribution should take place from high- to low-wage individuals and not, or at best to a limited extent, from high- to low-willingness-to-work individuals. The question that we address in this section is, Could the information asymmetry faced by this policy maker lead her to find it optimal to transfer the same amount to all idle individuals?

As explained in Section 5.2, 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 interpret this condition as a screening device able to distinguish the $w = 0$ individuals who do not find jobs from the $w > 0$ individuals who will find jobs (if properly monitored in their job search) and will then be excluded from social assistance or unemployment benefits if they refuse them.

Let us begin by assuming that such a screening device is not available. Then, all individuals who do not work have to be treated identically, and they will 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 $-\tau(0)$ is interpreted as a UBI. 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 whether the policy maker should use them.

If the device is used, then the tax system can be described by a function τ, as above, complemented with b, the benefit allocated to the $w = 0$ individuals.[23] Adapting Equation 12, we can derive that all nonconstrained individuals having a type (α, w)[24] such that

$$w\frac{1-\alpha}{\alpha} \leq \frac{-\tau(0)}{[1-\tau'(0)]T} \qquad 22.$$

prefer not to work,[25] where $\tau'(0)$ stands for the derivative of τ at income level 0, that is, the marginal tax rate at the zero earning level.

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

[24] 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.

[25] 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 nondecreasing.

The consequence of the normative stance adopted above is that the policy maker considers that individuals with $w = 0$ should be assigned a strictly larger amount than individuals with $w > 0$, which implies $b > -\tau(0)$. In these cases, 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 programs: $b = -\tau(0) > 0$. It is optimal only when the social welfare function requires one not to make any distinction among the idle individuals.

The second form is a hybrid system in which a smaller UBI coexists with a conditional supplement, available only to those who have a zero wage, and this supplement implies the use of the screening device that is used in existing conditional social assistance systems: $b > -\tau(0) > 0$.[26] 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 policy maker 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 a 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 nonworking 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 nonworking 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 nonworking individuals.

We should emphasize that our conclusion heavily depends on our interpretation of existing monitoring policy of the unemployed as a screening device able to distinguish between the $w = 0$ and the $w > 0$ individuals. It is interesting that optimal income taxation theory does not take this screening device 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, as we see in Section 4, the fight against poverty in the sense of guaranteeing all individuals, including those who do not work, a minimal consumption is a clear and almost direct justification of UBI. It turns out that, when applied to a second-best world, this simple justification has been challenged in a literature that we review in this section.

This literature can be divided in two sets. In the first set, the policy maker does not try to maximize a social welfare function satisfying Pareto efficiency. In the work of Besley & Coate (1992, 1995), an income poverty line is fixed, and the policy maker wishes to minimize the total amount of money transferred to the poor under the constraint that they all reach the poverty line. In the

[26]We realize that many people would refrain from calling such a system UBI, as social assistance or unemployment benefits remain partly conditional.

work of Kanbur et al. (1994a,b), the policy maker 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 of 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 the work of Kanbur et al. (1994a,b), 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 argue 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 into their model individuals with a zero wage. In this case, again, an essential assumption would be whether a screening device exists that allows the policy maker to distinguish between those who are unable to earn income and 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.[27] If such a screening device is available, then, as 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 as they are 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 by Besley & Coate (1992, 1995) comes from the implicit assumption that individuals care about the income of the poor and have a utility function such as

$$u(y, \ell, y_p) = \alpha \log y + (1 - \alpha) \log \ell + b(y_p), \qquad 23.$$

where y_p is the income of the poor, and $b(\cdot)$ is an increasing function, which means that these individuals are willing to give up their own income provided that it increases the income of the poor. Note 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 rather on the income of the poor; that is, the consumption of the poor has a positive externality on the utility of the rich.

In his influential contribution, Sen (1970) shows that, when preferences exhibit this kind of consumption externality, 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 implicitly do above. If the policy maker has good reasons to respect these consumption externalities, though, then Pareto efficiency should be applied to preferences represented by Equation 23.

Suppose that we adopt the latter point of view and think of how to increase the utility of rich individuals with the utility function in Equation 23. These individuals care about the income of the poor independently of how long 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 and low-willingness-to-work and low-wage and high-willingness-to-work individuals in the same way,

[27]Note that the optimal policy of Besley & Coate (1995) shares 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.

which seems like a promising way to justify UBI. What contributions like those of Besley & Coate (1992, 1995) teach us, then, is that in spite of the rich having these kinds 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 Equation 23. Rather, they adopt more standard normative positions, often related to poverty alleviation (see, for instance, Tobin et al. 1967, Galbraith 1969; for a review of the main arguments that were put forward by defenders of UBI, see Van Parijs & Vanderborght 2017). Consequently, we assume away consumption externalities and stick to our benchmark model; we ask the question of whether, under this assumption, the goal of poverty alleviation justifies UBI in a second-best world.

A second strand of literature proposes a more direct challenge to UBI. Saez & Stantcheva (2016) and Maniquet & Neumann (2016) 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 allows all individuals to receive incomes above the income poverty line, then 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 their income poverty lines.[28] If this income guarantee becomes unconditional, then 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 & Stantcheva (2016) and Maniquet & Neumann (2016) 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 incomes, thereby incentivizing individuals to earn income and reach the poverty line, and this may require very low transfers to those who do not work.

Saez & Stantcheva (2016) and Maniquet & Neumann (2016), however, share the assumption that the minimal wage is positive: By working, individuals earn some income, even if it is 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 & Stantcheva (2016) and Maniquet & Neumann (2016) 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.

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 one 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 allows them to obtain an after-tax income above or equal to the poverty line.

[28] Maniquet & Neumann (2016) provide a detailed account of the difference between what we refer to in this review as $\tau(0)$ and the income 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 with requesting help and revealing one's lack of resources. We do not fully address this question in this review, but we do make some observations that raise 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 others. However, the literature on take-up has not been able to prove that stigma is a major explanation of low take-up (for a review, see, e.g., 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.[29]

To sum up, the stigma argument seems to be 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

An argument often made in favor of a UBI is that it cuts the costs and inefficiencies associated with administering welfare schemes. As it does not involve targeting, it avoids inclusion and exclusion errors associated with screening, as well as direct administrative costs, inefficiencies of various kinds including delays and waste, and corruption.[30] 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 there is the possibility of various informational and incentive issues that arise not only on the side of beneficiaries but also on the side of those in charge of administering the tax and benefits system. In an economy in which public agencies cannot be relied on 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 excluded from the benefits. In

[29]In the United States, for instance, the Bureau of Labor Statistics estimates that the nonparticipation rate in the labor force is currently approximately 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.

[30]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, although mobile banking is making a dent in the problem.

such a setting, the smaller the scope for discretion, as is the case with any uniform and universal policy, the lower will be such risks. Accordingly, an egalitarian policy maker may prefer to divide the budget equally, rather than asking public agencies to target.

If there is no way to discriminate among individuals other than income (or any other measure of means), and if that in turn is noisily measured, then is there a stronger case for UBI? The literature on targeting (for an overview, see Besley & Kanbur 1995) is relevant in this case, as it deals with situations where actual income is not costlessly observable.[31] Let us consider an economy where income is not perfectly observed. Suppose that the tax authorities observe a noisy signal about gross income y^g, which we denote by s, and any tax and benefits 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.[32] 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, then the level of income could be anything, from the lowest possible to the highest possible, and so the question arises of what should be the transfer in this case.

Suppose that 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?[33] Or should we adopt a UBI scheme that gives the same net transfer to those with $y^g \leq \underline{y}^g$ as well as $y^g = \varphi$, while for others, namely those 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 policy maker. 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 policy maker, although in this extreme case, it cannot be funded by direct income 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 above, 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 ensure that those with an income level below a threshold receive a net transfer of $-\tau(0)$, then 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 is, of course, more expensive.

The solution to the problem of noisy measurement of income does not have to be as stark as 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

[31] A proxy means test 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.

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

[33] We do not provide a full characterization of the tax schedule $\tau(y^g)$ in this review. We assume that taxes can be levied only on those whose income can be observed and exceeds a certain threshold.

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 & Kanbur 1995, Currie & Gahvari 2008), one can make claiming benefits costly for the nonpoor. To the extent that these methods cannot be manipulated, they would ameliorate the stark tradeoff between a UBI and targeted schemes, namely, that the former has no screening costs but a larger bill because it is universal.

7. POSITIVE ASPECTS OF A UNIVERSAL BASIC INCOME 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 govern the size of the basic income.

7.1. Labor Supply Responses to Universal Basic Income

To address the question of what level of UBI is feasible, an important consideration is the labor 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 benefits 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; furthermore, the additional taxes needed to finance the additional spending will create incentives for working less. However, this conclusion has to be modified for certain groups.

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, so that we have $y \leq w(T - \ell) + m$. We can see from Equation 5 that, leisure being a normal good, as income grows, the consumption of leisure will go up. However, for those with high levels of nonwage income, there is a possibility of a corner solution; namely, it is possible that $\ell = T$. If we set $t(\alpha, w, m) = 0$ in Equation 6 and simplify, then 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, when the marginal cost of not working is low, while overall income is high.

Suppose that we interpret m in the model as 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 high-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 whose labor supply is likely to remain unaffected by UBI are the very poor. 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 nonpaid 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.

In the case of interior solutions, we have

$$\ell = \frac{(1-\alpha)}{w}(wT + m - \underline{y}) + \alpha\underline{\ell},$$
$$y = \alpha\{w(T-\underline{\ell}) + m\} + (1-\alpha)\underline{y}.$$

For $\ell \geq 0$, we need $wT + m \geq \underline{y} + [\alpha/(1-\alpha)]w\underline{\ell}$. Similarly, for $y > \underline{y}$, we need $wT + m > \underline{y} - w\underline{\ell}$. The first condition is clearly more strict than the second, so if

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

then we will have a corner solution with $\ell = 0$ and $y = wT + m$. We need to have $wT + m > \underline{y}$ for the subsistence constraint to be met for income y. 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 that the individual continues to choose $\ell = 0$ and $y = wT + m$.

Using the notation z to denote full income and defining $\bar{z} \equiv \underline{y} - [\alpha/(1-\alpha)]w\underline{\ell} + [1/(1-\alpha)]wT$, we can sum up the above analysis as

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

and

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

We assume $\underline{\ell} < (1/2\alpha)T$ and thus $\bar{z} > \underline{y} + [\alpha/(1-\alpha)]w\underline{\ell}$.

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 will 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 are 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 than in 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 (see Baird et al. 2018, Ghatak 2015).

While we do not yet have much direct evidence regarding the effect of a UBI scheme on labor supply, Banerjee et al. (2019) and Hoynes & 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 labor supply.[34]

7.2. How Generous Can Universal Basic Income Be?

In this section, 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 aggregate income effects are likely to be low. An increase in the tax rates on labor income facing all individuals will also 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 tradeoffs related to this issue, first in the case of a linear income tax system (as in Atkinson 1995) and then in the case of a nonlinear tax.[35]

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

$$\ell = \frac{(1-\alpha)}{w(1-t)}\{b + (1-t)(wT+m)\}, \quad 24.$$

$$y^n = \alpha\{b + (1-t)(wT+m)\}. \quad 25.$$

Given y^n, we can solve for gross income

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

[34]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 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 actually went up (Salehi-Isfahani & Mostafavi-Dehzooei 2018).

[35]We do not deal with the issue of imperfections in labor or credit markets (other than the formality of labor markets). In their presence, as is well known in the development economics literature, the usual equity–efficiency tradeoff is muted, if not overturned, because cash transfers can relax liquidity constraints faced by small enterprises.

Using the notation of z, we can write

$$y^n = \alpha\{b + (1-t)z\}, \tag{26.}$$

$$y^g = \alpha z - \frac{(1-\alpha)b}{1-t}. \tag{27.}$$

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 $m \in (0, \infty)$.

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). Below, we work with the probability density function and the cumulative distribution function of z defined over $z \in (0, \infty)$, $g(z)$ and $G(z)$, respectively, which are given by

$$g(z) = \int_0^\infty \left[f(z - wT, w)\, \mathrm{d}w \right],$$

$$G(z) = P(wT + m \leq z) = \int_0^\infty \left[\int_{wT}^z f(u - wT, w)\, \mathrm{d}u \right] \mathrm{d}w.$$

Let us define average full income as $\tilde{z} \equiv \int_0^\infty z g(z)\, \mathrm{d}z$. 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

$$t \int_0^\infty y^g(z) g(z)\, \mathrm{d}z = b. \tag{28.}$$

Let us define average gross and net income as

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

We can derive $\tilde{y}^g$ and $\tilde{y}^n$ as functions of $\tilde{z}$, using Equations 27 and 26:

$$\tilde{y}^g = \int_0^\infty \left\{ \alpha z - \frac{(1-\alpha)b}{1-t} \right\} g(z)\, \mathrm{d}z = \alpha \tilde{z} - \frac{(1-\alpha)b}{1-t},$$

$$\tilde{y}^n = \int_0^\infty \alpha\{b + (1-t)z\}\, g(z)\, \mathrm{d}z = \alpha\{b + (1-t)\tilde{z}\}.$$

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 gives us closed-form solutions to some key variables.

Substituting the expression for $\tilde{y}^g$ in the budget balance (Equation 28) condition above and solving, we get a key budget-balance equation for a UBI scheme:

$$b = \tilde{z}\frac{\alpha t\,(1-t)}{(1-\alpha t)}. \qquad 29.$$

An obvious implication of this expression is that 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 United States and the United Kingdom, 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 the appropriate level of b is. 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. Equation 29 confirms what we would expect intuitively, namely, so long as b does not increase proportionally with average income levels, the richer the country, the easier it is to fund a UBI scheme.

The formula for basic income in Equation 29 gives an aggregate tradeoff between b and t given the need for budget balance, the formula of the so-called Laffer curve. Again, the fact that it depends only on the average full income and not on its distribution is particular and follows from our choice of the Cobb-Douglas type of preferences.

The formula in Equation 29 allows us to characterize the largest possible level of b. Differentiating Equation 29 with respect to b and rearranging, we get the following first-order condition:

$$\frac{\alpha t^2 - 2t + 1}{(1-\alpha t)^2} = 0. \qquad 30.$$

This gives us

$$t = \frac{1-\sqrt{1-\alpha}}{\alpha}. \qquad 31.$$

If, for instance, $\alpha = 0.5$ (which means that individuals like to spend half of their full income on 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.

Equation 31 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.[36] If we take Equation 29 and 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.

[36]The (uncompensated) elasticity of the labor supply, $(\partial L/\partial w)/(L/w)$, can be computed from Equation 24. It is equal to $\epsilon_{Lw} = (1-\alpha)/[\gamma\alpha - (1-\alpha)]$, where $\gamma \equiv [w(1-t)T]/[b+(1-t)m]$, and is decreasing in α : $\partial\epsilon_{Lw}/\partial\alpha = -\gamma/[\gamma\alpha - (1-\alpha)]^2$.

As the tax rate goes up in the interval $[0, \frac{1-\sqrt{1-\alpha}}{\alpha}]$, it permits more generous basic incomes, and some individuals, typically poorer individuals, gain from an increase in t, whereas others lose. A natural question that Equation 29 allows us to address 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 Equation 27 that the gross 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, their net income clearly 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

$$v(w, \tilde{z}; \alpha) = \Gamma(\alpha) + \log(b + (1-t)\tilde{z}) - (1-\alpha)\log(w(1-t)), \qquad 32.$$

where $\Gamma(\alpha) = \alpha \log \alpha + (1-\alpha)\log(1-\alpha)$. Using the value of b from Equation 29, we get

$$v(w, \tilde{z}; \alpha) = \Gamma(\alpha) + \log \tilde{z} - (1-\alpha)\log w + \log \frac{(1-t)^{\alpha}}{1-\alpha t}, \qquad 33.$$

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 $(1-t)^{\alpha}/(1-\alpha t)$ with respect to t, i.e., the sign of $[\alpha(1-t)^{\alpha-1}/(1-\alpha t)^2]t(\alpha - 1)$, which is negative as $\alpha < 1$. 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 nonlabor 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. This 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.[37]

If labor income tax is allowed to be nonlinear, and if the policy maker wishes to implement a generous UBI, then what should be the shape of the tax system? The literature suggests that the optimal nonlinear tax should be convex, at least on low incomes, which means that individuals earning very low incomes should face higher marginal income tax rates (for a comprehensive treatment of this question, see Boadway & Jacquet 2008). 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 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 section 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 taxpayers. The simple linear tax example above shows that there is a maximal feasible amount of UBI and

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

a maximal rate of taxation beyond which everybody loses. The example also illustrates 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. The optimal nonlinear taxation literature suggests that the optimal way of financing UBI was typically not through a linear tax but through a convex one, in which low-income earners face higher marginal tax rates. This is likely to decrease the set of individuals benefitting from UBI.

The arguments in this section 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 also show in Section 7.1 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 next introduce imperfections in these institutions along the lines of Section 6.

7.3. Allowing Frictions in the Tax System

In this section, we analyze the feasibility of UBI allowing for noisiness in measuring income and ask the following question: If economies differ in terms of the extent to which both the administrative capacity and the distribution of income are subject to frictions, how is the budget constraint relating to a UBI scheme affected?

For simplicity, we assume that taxes can be collected only when true gross income is accurately measured, the probability of which is given by $p(y^g)$, and not when an uninformative signal about income is received, with probability $1 - p(y^g)$. The modified budget-balance condition for a UBI is

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

If $p(y^g) = p$ for all y^g, then we have

$$t p \tilde{y}^g = b,$$

where $\tilde{y}^g = [\alpha/(\alpha + \beta)]\tilde{z} - [\beta/(\alpha + \beta)][b/(1 - t)]$. As we would expect, the tax rate to fund the same b compared to an economy where income is measured accurately would be higher when $p < 1$. More generally, even if $p(y^g)$ is not constant, in richer countries where tax enforcement is better, the function $p(y^g)$ would shift out, so a lower t would be needed to fund a given b.

Note that, with linear taxation and a constant p, the amount of b does not depend on income inequality. To consider more interesting possibilities, assume that richer people find it easier to evade taxes, an assumption that has strong empirical support (see, for example, Alstadsæter et al. 2019). We can capture the progressivity of tax enforcement by the curvature of $y^g p(y^g)$. If it is increasing, as seems reasonable to assume, and concave (reflecting the fact that the rich find it easier to evade taxes), then as true income goes up, the expected value of the signal of income goes up but at a diminishing rate. This implies that a lower level of b can be funded for the same t compared to economies where enforcement of tax collection is more progressive and thus $y^g p(y^g)$ is less concave (or even convex). Moreover, for the same curvature of $y^g p(y^g)$, greater inequality (in the sense of second-order stochastic dominance) would yield less tax revenue for the same value of t. In other words, more equality is associated with a larger UBI (or a lower t to finance the same amount of UBI).

We summarize our main conclusion as follows: When income is noisily measured, this tightens the fiscal budget constraint for funding a UBI scheme. This is reinforced if tax enforcement is not progressive, as one would expect in developing economies, and it is less costly to fund UBI in a more equal economy.

8. CONCLUSION

Despite our attempt to be broad, our overview falls well short of being comprehensive. For example, by focusing throughout on a static deterministic model, we have not paid sufficient attention to dynamics or uncertainty. A welfare system clearly has important impacts on savings, skill formation, and intergenerational effects, such as through human capital investments. By providing a steady flow of income, a UBI is also likely to affect risk taking and entrepreneurship. We also did not address the specifics of a UBI scheme, such as at what frequency a basic income should be paid out (monthly, yearly); whether it should be paid before recipients earn any income or paid ex post yearly by the fiscal authorities after they observe gross incomes; whether employers should be involved in paying out the basic income, as they are for withholding taxes and then dealing with the social security authorities; and whether individuals earning less than the basic income will 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 programs.

First, UBI is not a proposal that all egalitarian policy makers should wish to implement. There are many egalitarian social welfare functions that do not suggest ignoring the reasons that people have low incomes.

Second, among the normative values that may be called for to justify redistribution policies, poverty alleviation seems to be the most compelling to justify UBI. This suggests that one should first compare UBI with other programs dedicated to the poor. It 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 replace all other transfer policies. Complementing UBI with other, conditional income support policies is likely to be better than UBI alone.

Finally, in our theoretical framework, we do 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, governance). As we argue, a UBI will provide some relief to the poor, but we do not suggest that it will provide a long-term solution to the problem of poverty. Therefore, whether UBI is accepted to be better than in-kind, conditional, targeted transfers or viewed as a useful complement to these other kinds of transfer programs, it does not follow that the entire budget of poverty alleviation or social welfare should be devoted to transfer programs.

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