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BASIC INCOME VERSUS WORKING SUBSIDIES
An assessment of the Vandenbroucke model

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1 Introduction

1.1 The Vandebroucke model of optimal social policy

The present Minister for Social Affairs and Pensions in Belgium, Frank Vandebroucke, has brought a mix of economics and political philosophy to bear on the debate about the renewal of social democracy, in his recent dissertation *Social Justice and Individual Ethics in an Open Society: Equality, Responsibility and Incentives* (Vandebroucke, 1999a). The first three chapters of this remarkable work spell out an abstract model of social policy, which is also highly relevant to the ongoing debate on basic income. This paper will identify and critically discuss some novel elements in Vandebroucke's model, elements which pose a principled challenge to those, like ourselves, who have argued that a basic income, pitched at its maximally feasible (or at least at a substantial) level, is the most desirable policy from the point of view of *egalitarian social justice*. In a nutshell, Vandebroucke's challenge consists of the following two claims. First, while maximum basic income may be among social policies that optimally implement principles of egalitarian justice, one can not rule out that redistributive policies of wage subsidization, or more generally a *mix of basic income and wage subsidies*, may optimally serve such principles as well. In consequence of this, an egalitarian government may have to choose from among a (possibly large) set of optimal policies on grounds extraneous to egalitarian justice. In particular, and this is Vandebroucke's second claim, such a government may have to select the just - responsibility-sensitive egalitarian - policy which it can also best defend as capturing the society's favored conception of the good life, inasmuch as the good life of individuals depends on finding an appropriate balance between the goods of paid work and free time. According to this second claim, the task of a social democratic government, when formulated at the level of political principles underlying the welfare state, is not exhausted by the demands of responsibility-sensitive egalitarian justice. It inescapably includes making choices of an ethical nature on behalf of the governed, choices that are concerned with promoting the conditions of the good life for individuals.

1.2 Two novel features of the model

Before setting out our plan of discussion below, we want to explain how the two topics mentioned above - renewal of social democracy and basic income - are connected, and we give a preliminary exposition of how we interpret Vandebroucke's two main claims. In their contribution to *Basic Income on the Agenda* (2000: 85), Vandebroucke and Van Puyenbroeck state that "... the idea of an active welfare state, which adopts increased participation as a central goal of social policy... should also be

based upon a responsibility-sensitive egalitarian conception of social justice”. To understand what this last requirement means, it is helpful to refer to a recent interpretation of the ideal of ‘equality of opportunity’ (see, e.g. Cohen 1989; 1993; 1999, Roemer 1994; 1996b). On this interpretation, equality of opportunity aims to redress the disadvantages people suffer through no fault of their own. More precisely, equality of opportunity aims to compensate individuals for factors that adversely affect their well-being, and for which they can not reasonably be held responsible, because those factors are held to be beyond any individual’s own span of control, on a reasonable view of what ‘control’ entails. The ‘egalitarianism’ of the concept consists in the aim to either *equalize* the impact of these ‘non-responsible factors’ on people’s well-being, or, alternatively, and less radically, to make those who are worst off in well-being, due to the workings of non-responsible factors, as well-off as is feasible. This last variant, which Vandebroucke adopts as the operative policy goal, aims to offer *maximin* compensation in respect of non-responsible factors. Both of these variants belong to ‘equality of opportunity’, broadly speaking. It is worth noting, however, that the equalizing variant implies that disadvantages arising from non-responsible factors should be completely eliminated. By contrast, the maximin variant accepts, and indeed requires, any degree of inequality arising from non-responsible factors that may be necessary in order to maximize the well-being of the worst off in society.¹

However, both variants of equality of opportunity also imply that any disadvantages which people incur as a result of actions for which they *can* reasonably be held responsible do *not* generate moral claims of compensation, at least not under this particular moral ideal. This corollary explains what Vandebroucke means by ‘responsibility-sensitive egalitarianism’: inequalities in well-being caused by non-responsible factors are *unjust*, hence mandate egalitarian compensation. Inequalities in well-being arising from the responsible choices of individuals - choices deemed to be within the ambit of their genuine control - are *just* inequalities, and should therefore not be subject to programmes of compensation.

How does responsibility-sensitive egalitarianism bear on the active welfare state? Roughly, to require that the welfare state be ‘active’ is to say that its institutions and policies should stimulate social

¹ To include the maximin principle under the label of ‘egalitarianism’ or ‘equality of opportunity’, as is frequently done, may be somewhat confusing. Hence the phrase ‘broadly egalitarian’ in the text above. The maximin principle can be regarded *either* as strict equality constrained by Pareto-optimality (i.e. choose the most equal distribution among the Pareto-optimal ones in the feasible set) *or* as an instance of the Priority View (give moral weight to the distributive claims of individuals inversely to the ranking of how well off they are, in terms of the good that matters). In the first interpretation of the maximin principle, moral importance is given to minimizing comparative inequality between persons consistently with not levelling down, in the second, moral concern is essentially non-comparative: importance attaches to making the worst off as well off as they can feasibly be, regardless of any inequality between them and the others which might then obtain. As Parfit (1997) has pointed out, this second interpretation of maximin is not really egalitarian, lacking as it does the comparative element of moral concern. As will be seen in section 4, however, the comparative and the non-comparative elements of moral concern can be combined in the choice of social policies within the Vandebroucke model.

participation, notably in productive activities, instead of confining the beneficiaries of welfare to a passive and isolated existence on the dole. The phrase 'active welfare state' has become part of the vocabulary of social democracy in Europe, and it usually refers to such goals as getting rid of poverty traps, and improving the productive skills of social security beneficiaries, while stressing their moral duties to seek employment whenever possible. As Vandebroucke critically notes, the political rhetoric of the active welfare state typically seeks to avoid the language of redistribution. Instead, it invokes notions of 'social investment' and 'individual responsibility' as guidelines for welfare reform. (Vandebroucke 1998; 1999b). Responsibility-sensitive egalitarianism of course fits in well with the last of these notions. However, Vandebroucke's plea to include egalitarian justice also serves to bring the currently unpopular idea of redistribution back into the politics of the active welfare state. Arrangements of social security must be 'active' ones, Vandebroucke claims, in the sense that such arrangements serve to redress disadvantages arising through no fault of one's own, and also offer distinct incentives to participate in income-generating modes of behaviour. People on welfare should thus be made to seize the opportunities that egalitarian redress opens up. It is a matter of judgement, not of principle, whether the demands of justice should be carried out by means of in-kind transfers in schooling or retraining ('social investment'), or by means of cash grants and subsidies of various kinds ('redistribution'), or by any mix of these two.

So far, we have tried to clarify the sort of new social democratic policies that Vandebroucke is concerned to promote. The model under review here reflects that concern, though it does so at a high level of abstraction. In respect of the challenge posed to basic income, two features of the Vandebroucke model are worth mentioning in some detail. The first concerns economic theory. The model utilizes the theory of linear optimal taxation, which studies the impact of redistribution on a competitive market economy, when income is taxed proportionally, and the tax yield is then redistributed in the form of a uniform lump-sum grant - a basic income, in other words.² Vandebroucke now complicates the picture, by considering an additional policy instrument of redistribution alongside basic income, to wit, a uniform wage subsidy. This wage subsidy redistributes (a part of) the tax yield, in proportion to hours of work actually performed by workers. Adding the second policy instrument alters the incentive structure of redistribution. In linear optimal tax models, the basic income method of redistribution creates disincentives to work, given the way in which people are assumed to trade off income from work against free time (given their labour supply functions, that is). These disincentives limit the extent to which tax-financed redistribution can improve the situation of the worst off, since the tax yield to be redistributed as basic income crucially depends on the total volume of labour supplied. The uniform wage subsidy added

² In optimal taxation models, basic income is usually a stand-in for the per capita amount of actual transfers, which may be either in kind or in cash, and may be either conditional or unconditional. It thus does not necessarily carry the connotation of unconditionality. In Vandebroucke's application of optimal taxation models, however, basic income is meant to be a fully unconditional income.

by Vandenbroucke, however, represents a method of redistribution which creates a positive incentive to earn income, at least for the beneficiaries of redistribution - these being the low wage earners, whose productivity is correspondingly low. This positive incentive arises, because for low wage earners, a uniform wage subsidy will add more to income than is taxed away from them in order to finance the subsidy, in other words it will increase their *net* wage rate. As a result, low wage earners will supply more labour than they would do without the subsidy.³

The significance of this can be explained intuitively as follows. Suppose that the government can dispose of both kinds of instruments, basic income and uniform wage subsidies, and that both are exclusively financed by a proportional income tax. Next, suppose that this government follows responsibility-sensitive maximin principles, and that it consistently manages to act in the interests of the lowest wage earners, having identified these as the group who is worst off in well-being, due to the non-responsible factor of low productivity (say, because people's productivity is tracked by their social circumstances at childhood, and by their allotment of marketable talent in the genetic lottery, both of which are beyond an individual's control). In the absence of government expenditure on things like education and defence, one might now envisage two quite different optimal tax-redistribution policies. In the first, the government uses basic income as its sole instrument. In this case, it is possible that the lowest wage earners benefit maximally from setting the basic income at its maximum feasible level, at a (uniform) tax rate of, say, 50%. The second policy rejects basic income (which is thus set at zero), and instead seeks to redistribute exclusively by means of wage subsidies. Now it may be possible for the government to maximally benefit the lowest wage earners, by setting the tax rate at 100%. At first sight this may seem implausible, even in the simplified world we are considering here. However, taking into account the fact that the uniform wage subsidy incites low wage earners to earn more income, as noted above, it may now indeed be feasible to tax away all wage income, and redistribute the entire yield by giving each worker a subsidy equal to the *average wage rate*, regardless of that worker's actual productivity. If both of these policies are feasible alternative ways of conferring maximal benefit on the lowest wage earners, then there will also exist a range of intermediate tax-redistribution policies which achieve the same result - maximum benefit for the worst off group - by a judicious mix of basic income and wage subsidies.

Thus, as a result of adding the wage subsidy instrument to basic income, a whole series of tax-redistribution policies may be identified, each of which optimally serves the egalitarian goal of maximizing the position of those who are worst off in well-being through no fault of their own. Some of these policies will improve the situation of the worst off by stressing the instrument of basic income (and

³ At least, this is so if the income effect of the higher net wage is smaller than the substitution effect, as is usually found to be the case.

do not therefore rely heavily on wage subsidies), while other policies emphasize the use of wage subsidies, at the expense of the instrument of basic income. It is this feature of his abstract economic model, then, which underlies Vandembroucke's first claim, namely that a high basic income may possibly be among the optimal policies of responsibility-sensitive egalitarian redistribution, but that one can not rule out the existence of optimal policies which more or less reject basic income, in favor of wage subsidizing.

The Vandembroucke model, however, contains another novel feature, which may be regarded as an original contribution to the problem of specifying the responsibility-sensitive maximin policy goal more precisely. To see what is at issue here, one should realize that such a policy goal generally admits of specification in two ways. First of all, one needs to distinguish the factors affecting people's well-being for which they are not held responsible from the factors for which they are indeed held responsible. In the Vandembroucke model, agents are assumed to be non-responsible for their productivity, which determines their market earning capacity, but they may or may not be held responsible for their own choice of working time. This choice determines the amounts of income and free time they will enjoy, given their productivity. As Vandembroucke points out carefully, the optimal redistribution policy will depend to some extent on whether or not one assumes that an individual's choice of working time - and indirectly, her personal preference for trading off income from work against free time - is a responsible factor, for which egalitarian social policy should refuse to provide any kind of compensation. In our discussion of the model, we shall not be commenting on this aspect. We suppose throughout that choice of working time is indeed within the proper ambit of individual responsibility.

There is a second, and arguably more important, way of rendering the responsibility-sensitive egalitarian objective more precise. Up to now we have been talking rather loosely about how the 'well-being' of individuals depends on factors for which they are, or are not, to be held responsible. But it is unclear what well-being actually means. In pursuing egalitarian policies, one ought to agree on a specific *metric of well-being*, which is appropriate for comparing people's situations from the point of view of justice. For instance, one might suppose that what counts for people's well-being is merely income. Or one might say instead that people care about both income and free time: they derive utility from these goods, depending on how they prefer to trade off the one against the other. One could then measure the utility which some suitably defined 'representative' person derives from income and free time, and consider that to be the proper metric of well-being. Or alternatively, well-being might be captured by some measure of objective well-being, in which the relative value to individuals of income and free time is not determined in accordance with their own preferences, but rather by a *public evaluation* of the benefits and burdens associated with working. Vandembroucke resolutely adopts the latter kind of metric, which he calls 'advantage'. The choice of a responsibility-sensitive maximin policy (based on the

assumption that productivity is the non-responsible factor, and working time the responsible one) will then be driven by the particular ‘conception of advantage’ which the government decides to adopt. This idea motivates Vandebroucke’s second claim, the claim that a social democratic government must base its social policy on egalitarian justice, and, within the constraints imposed by egalitarian justice, on a distinctly ethical conception of the good. It is this ethical conception which underlies the ‘conception of advantage’ that the egalitarian government accepts as the proper metric of objective well-being.

Now it must be clearly understood that Vandebroucke does not try to formulate his *own* view on what conception of advantage the government should adopt. His point is rather that an egalitarian government is inescapably faced with the task of publicly evaluating the relative burdens and benefits of work, in accordance with some view on what constitutes well-being in the society, independently of people’s preferences: “... a government cannot pursue egalitarian justice without some objective notion of well-being’ (Vandebroucke 1999a: 95). This implies that the egalitarian government may review a whole set of optimal policies, each of which maximizes the average well-being of the least productive worker, *for a given metric of advantage*.

For example, the government may consider an extremely work-oriented (‘productivist’) conception of advantage. This holds that in general, working imposes hardly any burden. A productivist conception of advantage could be based on the judgement that the onerousness of giving up free time for working on a job is almost completely outweighed by the non-monetary benefits of working (such as the self-esteem from having the job, the social contacts associated with it, or the self-realisation offered by the challenges it presents), as compared to the non-monetary benefits of activities performed in free time. It would then follow that the advantage of the least productive individuals will predominantly consist in the income they earn from working. As a consequence, egalitarian policies that maximize the income of the least productive group of wage earners will be preferred to egalitarian policies that maximize their free time, while giving them only a relatively low income. In a policy environment where basic income and wage subsidies are available, a productivist conception of advantage would certainly choose to redistribute by means of wage subsidies. It would reject a substantial basic income, because wage subsidies, by inciting the least productive workers to perform more work and earn more income, would increase their ‘objective’ advantage far more than redistribution through a high basic income would be able to do. Conversely, an extremely non-productivist conception of advantage would place a very low value on the non-monetary benefits of a full-time working life, and emphasize instead factors like stress, burn-out, the neglect of care for children and elderly in the family, and the associated poverty of consumption-intensive ‘quality time’. On such a conception, the advantage of a person would be measured by subtracting from his earned income a large portion representing the burden of working, relative to the attractions of activities outside of paid work. Typically, a non-productivist conception of advantage would favor

egalitarian redistribution by means of basic income, rather than through wage subsidies. As one might guess, the reason is that the former would be more efficient than the latter in inciting the least productive persons to take time off from full-time work, which would then be to their ‘objective’ advantage.

At first sight it seems that Vandembroucke’s approach is unacceptably paternalist, since it allows a conception of advantage to rule the choice of social policies without considering what people themselves think about the tradeoff between work and free time. While paternalism undoubtedly enters into the Vandembroucke model, it should be noted that his method of selecting between responsibility-sensitive egalitarian social policies is not entirely independent of people’s actual preferences. To see this, imagine that the government has settled on a predominantly, but not entirely, productivist conception of advantage: it considers income to be the major ingredient of advantage, but nevertheless accepts that the activity of working represents a small net burden. The government now faces the choice between two potentially optimal policies: P1, with only wage subsidies and no basic income, and P2, with somewhat lower wage subsidies and a small basic income. Then the Vandembroucke method for selecting between P1 and P2 takes account of the different preferences for work and free time which exist among the least productive persons. It does so in an impartial way, by selecting the policy in which the *average advantage* of the least productive is largest, following a procedure developed by Roemer (Roemer 1994; 1996a; 1996b). If most such persons actually prefer a life of leisure with low earnings to a life of hard work and high earnings, then the average advantage of the least productive, as defined by the government’s conception of advantage, may turn out to be higher for policy P2 than for policy P1, despite the predominantly productivist metric of advantage.⁴ But if the least productive generally do not care much about free time, then average advantage, as defined by the government, will almost certainly be maximized under P1, hence P2 will be rejected. This shows that the distribution of people’s actual preferences does matter for policy choice. Notwithstanding this indirect dependence on actual preferences, it remains true that Vandembroucke’s ‘objectivist’ way of defining the well-being of individuals may lead to questionable forms of paternalism. We comment on this aspect of the model in section 4 below.

1.3 Plan of discussion

Our presentation of the Vandembroucke model of optimal policy choice differs from the original (Vandembroucke, 1999a, chapter 3) in three respects. Firstly, capital, dividends and capital taxes will be excluded. These variables, though obviously important, do not play a significant role in the model, and in

⁴ We shall be using the terms ‘free time’ and ‘leisure’ as synonyms for the time not spent doing paid work, without assuming (unless expressly stated) that ‘leisure’ is spending one’s time consuming – it might just as well refer to household production, or necessary activities of caring and rearing.

any case hardly affect the results in which we are interested here.⁵ For the same reason, we set aside public spending on education, since the only rationale it has in the original is to remind one of “the necessity of government revenue for other purposes than labour subsidies or basic income” (1999a: 103). Thus in section 2 we assume that all tax revenues are extracted from labour only, and the revenue is used exclusively for redistributive transfers. Secondly, as noted in 1.2, Vandenbroucke distinguishes two specifications of egalitarian justice, depending on whether or not individuals are held responsible for their preferences over income and free time. We concentrate on the case where people are held responsible for those preferences, hence for the corresponding choice of working time, while they are not held responsible for their level of productivity.

Thirdly, and most importantly, we do not assume that the metric of well-being informing responsibility-sensitive egalitarian social policies is necessarily described by Vandenbroucke’s ‘objective conception of advantage’. Indeed, we are concerned to show that the main analytical results that address the issue of labour subsidies versus basic income are independent of this particular metric of well-being. What we do assume, in line with the model, is that people care exclusively about income and free time, and that different people trade off these primary goods against one another in different ways. This important restriction implies that agents will always choose a job that offers maximum remuneration, ignoring the fact that in reality, some may not decide to choose their most productive occupation, because they like to perform some kind of work that happens to fetch a lower rate of return than they are able to earn, given their productivity. In sections 2 and 3, we show that a set of optimal policy choices is generated by stipulating that what people are interested in is having the largest *opportunity set of income-leisure combinations* (‘OS’ for short). The set of optimal policies we have in mind is then described by the objective of maximizing the OS of the least productive type of people (‘maximin OS’ for short). We also show that the range of maximin OS policies is affected by empirical conditions concerning labour supply behaviour on the one hand, and the distribution of productivities on the other. Our reason for choosing the OS metric is that all other metrics in which well-being only depends on income and free time - including Vandenbroucke’s conception of advantage - require maximin OS as a necessary condition for their optimization programs. Maximin OS is therefore the most general approach for describing the objective of the responsibility-sensitive egalitarian government, and for identifying the social policies which satisfy that objective. In this sense, our treatment of the model shows that the challenge which Vandenbroucke poses to egalitarian proponents of basic income policies does not depend on the acceptance of his

⁵ In the version we present, then, individuals only have internal endowments: what their (fixed) talents are worth on a perfectly competitive labour market. In the original model, external endowments do figure, but without an underlying production function that accounts for the market shares of capital and income. Thus, income from capital assets appears out of the blue. Moreover, and implausibly, capital income can be taxed away without any behavioural responses on the part of the owners of the assets.

proposals concerning the metric of well-being.

In view of its generality, the OS metric can be further specified in different ways, which lead to more specific maximin policy objectives. This is shown in section 4, in which we review various possible ways of narrowing down the set of optimal policies. Some of these ways depend on adopting more specific conceptions of well-being. Under this rubric we discuss the real freedom approach, and the utilitarian, or more generally, the ‘welfarist’ approach. We also argue that Vandebroucke’s metrics of advantage can be construed as a (very special) kind of welfarism. Other ways of restricting the optimal policy set depend on various notions of fairness, which are superimposed upon responsibility-sensitive egalitarianism: equality of reward, liberal neutrality, and reciprocity. The reason for discussing these alternative ways for choosing among the potentially large set of feasible maximin OS policies is twofold. First, we want to sharpen Vandebroucke’s most challenging point - that basic income policies need to be justified in the face of strong arguments for labour-dependent rather than unconditional redistribution - in order to ask next (in section 5) to what extent this challenge survives in the real world, when the simplifying assumptions of the optimal tax model are removed. Secondly, we want to question the soundness of Vandebroucke’s claim that a responsibility-sensitive egalitarian government is inescapably driven to justify its policy choices by invoking an ethical conception of the good.

2 The model

2.1 A world called Simplicia

The Vandebroucke model describes a world called Simplicia, in which each individual is characterized by a *productivity type* (one level of productivity w for each type), and a *preference tranche*, with one preference coefficient e for each tranche. The coefficient e expresses the individual’s degree of preference for paid work over free time: the more an individual values working (whether for the income it brings, or for its non-monetary benefits), the higher e will be. Productivity levels and preferences are assumed to be distributed independently from each other, thus the distribution of preferences is the same within each productivity type, and the distribution of productivities is the same within each preference tranche. Simplicia’s government holds citizens responsible for their preferences, *in casu* their choice of working time, but not for their level of productivity.⁶ It is also committed to giving absolute priority to the

⁶As Vandebroucke explains, “‘Working time’ can be seen as a metaphor for several dimensions of *responsible economic choice*, capturing not only hours of work, but effort at work, effort in education”, and “‘productivity’ is a metaphor for several dimensions of productive *talent*, differences in people’s economic position that are not seen as resulting from their choice, but result from social, familial or genetic background” (Vandebroucke, 1999a/2000: 19, fn 6). We comment on the usefulness of both of these ‘metaphors’ in section 5 below.

well-being of those who are worst off in well-being as a result of their productivity level.

Depending on the available information, different tax-and-transfer policies are pursued to achieve a responsibility-sensitive egalitarian distribution of well-being. Vandenbroucke distinguishes two basic types of policy environment, *regime T* and *regime S*. In regime T, which is the one usually assumed in linear optimal taxation theory, the government can observe the gross incomes of people, but not the amounts of time they spend working. Hence, in regime T, there is no way of redistributing income by means of labour subsidies. Gross income is taxed by a uniform tax rate t , and the tax revenues are distributed in the form of an unconditional and uniform basic income, B .

In regime S, by contrast, the government is able to observe people's working time in addition to their gross income. It now disposes of two policy instruments for redistributing the tax yield. The government can redistribute either by means of the basic income B , or by granting a uniform (labour) subsidy s , an equal amount of money granted for each hour of work performed, regardless of productivity type. To summarize, (B, t) is the available policy mix when only gross incomes can be observed (regime T), and the policy mix (B, s, t) obtains when working time is known as well (regime S). The income-leisure opportunities (OS) of any Simplian can then be read off from the following equation, which represents the budget constraint he or she faces:

$$(1) Y = B + [(1-t)w + s]L \quad w \in [w_L, 1]; \quad L \in [0, 1]; \quad 0 \leq t \leq 1; \quad 0 \leq s \leq 1,$$

with $w_L \cdot 0$ the lowest productivity type and $w = 1$ the productivity of the most talented type.

According to (1), net income (Y) comprises three elements: the unconditional payment B , and the income derived from work (L measures working time as a fraction of one unit of available time, which is the same for everybody, so that $1 - L$ is the amount of free time corresponding to working time L). Income from work consists of net wages $(1 - t)wL$ and subsidies sL . Thus the OS generated by the budget constraint is the set of income-leisure combinations $[Y, (1 - L)]$. The boundary elements of the OS are the maximum leisure point $[B, 1]$ and the maximum work point $[(B + (1 - t)w + s), 0]$.

Given that our initial metric of well-being is the person's OS, one can always identify the lowest productivity type with $w = w_L$ as being the worst off in well-being. This can be seen as follows. First, suppose that the government sets the tax rate at 100% ($t = 1$). In that case, individuals of all productivity types will be equally badly off or equally well off, as the case may be, since all then face exactly the same budget constraint. Equation (1) now reduces to $Y = sL + B$, hence all have an identical OS. Next, suppose that the tax rate is set at less than 100% ($0 < t < 1$). In this case, the budget constraints of different productivity types are described by equation (1), and it is easy to see that each productivity type will have

the maximum leisure point in common, while the maximum work point contains income which is graded according to productivity type, with the most productive type having the highest income $B + (1 - t) + s$, and the least productive type having the lowest income $B + (1 - t)w_L + s$. As a result, the income-leisure opportunities of a more productive type will always be superior to those of a less productive type, for $L > 0$, while for $L = 0$ they will be equal. In other words, if the tax rate is less than 100%, then the OS of a more productive type will *dominate* the OS of a less productive type, in the sense that it offers more income at the same amount of leisure, save at the no-work point, in which both types obviously have the same (basic) income. This means that the opportunities of the more productive person are unambiguously superior to the ones available to the less productive person. It follows that the worst off in well-being, as defined by the OS metric, are the least productive under any policy, whether the policy generates equality ($t = 1$), or inequality ($0 < t < 1$) of opportunity.

2.2 Opportunity sets and interpersonal comparisons

Having identified the worst off in well-being as the least productive type, we now consider how various policies affect the well-being of this type, since it is the one which is being targeted by responsibility-sensitive egalitarian policies. In order to get this issue in focus clearly, we must first explain the limits that choosing the OS as a metric of well-being imposes on interpersonal comparisons. In general, one can distinguish three modes of comparison between the well-being of two persons P and Q: (i) either OS of P dominates OS of Q, or *vice versa*; (ii) OS of P and OS of Q are identical, (iii) OS of P and OS of Q are not identical, nor does one of them dominate the other. This last case implies that the maximum work point of P (or Q, as the case may be) is superior to that of Q (P), while the maximum leisure point of Q (P) is superior to that of P (Q). Given these three possibilities, adopting the OS metric implies that the well-being of persons P and Q can be ordinally ranked by the relation 'at least as much well-being as' in cases (i) and (ii), while in case (iii) the well-being of P and Q can not be compared. Now if P and Q are two persons with a different or identical productivity, who are subject to one and the same policy (B, s, t) , then only cases (i) or (ii) obtain, due to the form of Equation (1). We have just made use of this point in designating the least productive type as the one which is worst off in well-being, regardless of the policy adopted by the government.

However, when we start to compare different policies in terms of their impact on the well-being of the least productive, then case (iii) can obtain, and matters become more complicated. To illustrate this, consider individuals A and B. both are of type w_L , but A is subject to a different policy than B. Then, depending on the values of (B, s, t) in each of these two policies, either of cases (i), (ii) or (iii) are possible. In particular, case (iii) will obtain, whenever A's maximum work point (or B's as the case may

be) is superior to B's (A's), while B's (A's) maximum leisure point is superior to that of A (B). We can then say, as a convenient shorthand, that in case (iii), the two policies in question do not dominate each other (in respect of the well-being of the least productive persons)

2.3 The maximin OS policy set

This last comparison entails something of importance, if the government is in search of policies that make the least productive as well off as possible in terms of the OS metric. There will always exist a (non-empty) subset of feasible policies Y_L , such that every element of Y_L is undominated by any feasible policy (whether in- or outside of Y_L). The subset Y_L will be designated as the *maximin OS policy set*. Any policy belonging to Y_L is a 'maximin policy' in the following sense: the well-being of type w_L can not be unambiguously improved by moving to any other policy. Under certain conditions, moreover, at least some policies in Y_L will give the least productive more well-being than they would have under some policies outside of Y_L .

We now identify the extreme maximin policies as follows, depending on whether or not the subsidy instrument is available. If it is not available, then we are in regime T. The most redistributive maximin policy is realized by choosing the tax rate t^* which maximizes tax revenues, and hence maximizes the level of B . As noted earlier, t^* is well below 1, given the disincentive effect of redistributing unconditionally. Under certain conditions, which will be discussed in the next section, the least redistributive maximin policy is the no-redistribution policy ($t = 0$). This is the policy which preserves the unequal 'natural distribution' of earning capacities generated by given productivity types. The OS belonging to these two extreme maximin policies are labelled as B^+ and ND , respectively. Figure 1 pictures each OS as a straight line in income-leisure space, given the corresponding values of B and t in equation (1).

Figure 1 here

If the subsidy instrument is available, then we are in regime S. Now one extreme maximin policy gives rise to policy B^+ which again results when (t, s) is chosen in such a way that B is maximized, at $t = t^*$ and $s = 0$. In contrast to regime T, this maximin policy now turns out to be the least redistributive one. The other extreme maximin policy has an OS which we label as B^\bullet . This policy puts the subsidy instrument to its limits, and thus requires the government to minimize basic income B . It sets the subsidy s at its maximum value, which is unity, according to Equation (1) ($0 \leq s \leq 1$). This requires setting $t = 1$, hence the policy belongs to the most redistributive ones. Moreover, policy B^\bullet minimizes basic income by

imposing the largest *negative* B on everyone (a uniform poll tax, in other words). In section 3, we discuss the reasons why policy B^+ is the least redistributive in regime S, and the most redistributive in regime T.

Having located the extreme maximin policies in each of the two regimes, we must now identify the intermediate maximin policies. In regime T, this is easy enough. For, if ND and B^+ both belong to the maximin OS policy set, it must be the case that all policies whose tax rate is between 0 and t^* (and whose basic income level B is accordingly between 0 and B_{max}) belong to this set as well, since each of them will be an undominated policy. So, assuming that both ND and B^+ indeed belong to the maximin OS policy set, it is quite large. It only excludes the policies with inefficiently high tax rates, that is, ones that set $t > t^*$, and hence generate basic income levels that could have been achieved just as well by a lower tax rate $t < t^*$. From the point of view of egalitarian policy-makers, this is hardly a helpful result. We shall presently examine circumstances, however, in which the maximin OS policy set in regime T excludes the natural distribution, and is limited to only one single policy, namely the basic income-maximizing policy B^+ .

2.4 The maximin OS objective in the model

As one might guess, it is more difficult to identify the entire set of maximin OS policies in regime S. In order to address this issue, it will first be necessary to look at the nuts and bolts of the Vandebroucke model. We start by specifying the behavioural relations that determine labour supply. Then, taking into account that total income uniquely depends on labour supplied, we identify the set of feasible policies arising from the government's balanced budget constraint.

Individuals maximize utility subject to the individual budget constraint (1). The utility function is of the following general form:

$$(2) U_e(Y, L) = Y - \frac{L^2}{2e}$$

where the parameter e expresses the propensity to perform paid work ($e_L \in [0, 1]$), with $e_L = 0$ the preference of the most work-averse individuals. From (1) and (2), we derive the individual's labour supply function L^S , as jointly determined by her personal characteristics w and e , and the policy values t and s :

$$(3) L^S(w, e, t, s) = e[(1-t)w + s]$$

The term in brackets on the RHS of (3) represents the *reward to labour* after tax and subsidy. It represents the work incentive resulting from the government's choice of (s, t) , which individuals with different propensities to work respond to. Assuming the propensity to work varies between zero and unity, the amount of labour an individual is willing to supply may thus vary between zero (for $e_L = 0$) and the

reward to labour $((1 - t)w + s)$, for $e = 1$). Note that the labour supply given by (3) has a net wage elasticity of 1 under regime T, and that in regime S the elasticity with respect to the reward to labour (net wage plus subsidy) is always equal to 1:

$$E_{w(1-t)+s}^{L^S} = \frac{\partial L^S}{\partial (w(1-t) + s)} \frac{(w(1-t) + s)}{L^S} = 1$$

Thus, Equation (3) describes a labour supply function with unitary elasticity and no income effect.⁷ Later on we shall consider labour supply functions with other (non-unitary) elasticities.

The set of feasible policies is described by the government's balanced budget constraint, which basically says that per capita tax revenues must be equal to per capita transfers:

$$\int_{w_L}^1 \int_{e_L}^1 f_{we}(w, e) twL \, de \, dw = B + \int_{w_L}^1 \int_{e_L}^1 f_{we}(w, e) sL \, de \, dw$$

where the LHS gives per capita tax revenues, and the RHS per capita transfers: basic income B plus the average amount of money distributed as proportional working time subsidies,⁸ once all behavioural adjustments of utility maximizing agents to the policy values are taken into account. Since w and e are independently distributed, and substituting (3), this equation can be rewritten as:

$$(4) \quad B(w, e, t, s) = \bar{e}[t(1-t)(S_w^2 + \bar{w}^2) + (2t-1)\bar{w}s - s^2]$$

where S_w^2 is the coefficient of variance, and the symbols with bars denote the average values of e and w . Equation (4) is the pivotal one of the model, since, as noted above, it incorporates the incentive effects of taxation, subsidies, and basic income on the total labour supply into the balanced budget constraint. It thus excludes all the combinations of (B, s, t) which, taking these incentive effects into account, are infeasible.

We now define the government's objective Y_L : to maximize the OS of the least productive type w_L . In Equation (5), the budget constraint of the least productive type is written as a function of the parameter $L(0 \cdot L \cdot 1)$.

⁷ This is not to say that a basic income has no disincentive effect on labour supply. It does, but indirectly. Under the balanced budget constraint (see (4) below) the disincentive effect operates through the level of t (and/or s) which maintaining a given level of B requires.

$$(5) \max_{t,s} Y_L(L | B, t, s) = B + [(1-t)w_L + s]L$$

Maximizing the budget constraint of type w_L for a given L implies choosing the policy at which an individual of this type, who might want to work exactly that amount of labour, would earn the highest possible income. Because of the government's balanced budget constraint, choosing (t, s) necessarily determines B . Thus, the income-maximizing policy-values B , s and t determine the budget constraint of this individual, hence they determine his OS. Since there exists no other policy that could give him a higher income at the given amount of labour L (hence, at the amount of free time $(I - L)$), it follows that the OS determined by maximizing the budget constraint in (5) must be undominated by any other policy. By definition therefore, that OS belongs to the maximin OS policy set. In other words, the objective Y_L selects from all feasible policies (B, s, t) only the ones that generate an OS for the least productive type which is undominated by the OS corresponding to any other feasible policy. Each of these undominated policies corresponds to a unique value of the parameter L in the range $[0, I]$.

For this procedure of generating the maximin OS policy set to be valid, one must show that any value of L in the range $[0, I]$ could indeed be chosen by a utility maximizing agent of type w_L , under the corresponding maximin policy. To show this, only the case of $L = I$ needs to be verified. In this case, as is shown in the Appendix, the objective Y_L selects the policy $B^* = (B_{min}, I, I)$. Under that policy, the reward to labour of any productivity type is the subsidy s , which equals 1. It now follows from the labour supply function (3) that the most workaholic agent of type w_L (with $e = I$) will then be willing to work exactly one unit ($L^S = I$), hence reap the full reward to labour. Thus, under the policy generated by setting $L = I$ in the objective Y_L , there can indeed be agents who would maximize their utility at that amount of labour.

For an example of an intermediate case consider $L = \bar{e} \bar{w}$. From the Appendix, it can be seen that the policy corresponding to this value of the parameter L is $(B, s, t) = (0, \bar{w}, 1)$. From (3), this value of L is the amount of labour that a utility-maximizing individual of type w_L is willing to work, if he has the average propensity to work \bar{e} , and if in addition, his reward to labour ($w_L(1-t) + s$) equals the average productivity \bar{w} . This last condition is indeed fulfilled under the policy in question, since it taxes away all gross wage income, and it gives every worker a subsidy in return equalling the average productivity: $s = \bar{w}$. The case $L = \bar{e} \bar{w}$ is of special significance, because it produces the maximin OS policy that sets basic income B at zero. In section 4, we shall have a lot more to say about that policy.

To conclude our exposition of the model, we have shown that the objective Y_L generates the optimal policy set from the standpoint of maximin responsibility-sensitive justice, provided that one defines the well-being of agents by the OS metric. This definition may not be acceptable to everyone. Some may

⁸ The last term vanishes if we are in regime T.

claim that having more options to choose from (in our case: income-leisure combinations) adds nothing to a person's well-being, if the additional options are not valued more than already available options are - just like adding spinach to your options of ice cream and chocolate will do nothing for your well-being when you happen to detest spinach. In defense of the OS-metric, others may claim that having additional options increases well-being even apart from their current desirability for the agent, either because the agent's preferences over options may change over time, or because well-being sometimes depends on having freedom of choice, *simpliciter*.

Our reason for using the metric of OS to discuss the optimal policy exercise within the Vandebroucke model (in particular within regime S) does not depend on any particular stance in this debate. Analytically, the OS metric is a general one. It underlies more specific notions of what well-being may consist in. For example, if one defines the well-being of a person as her *utility* - here described by Equation (2) - then it is easily seen from the foregoing that in order to maximize the utility of least productive persons with a particular utility function $U(\hat{e})$, that is, a particular propensity to work \hat{e} , the government must necessarily select a particular budget constraint under the objective Y_L , the one corresponding to $L = \hat{e}[(1-t)w+s]$. This is so, since someone's highest achievable utility across the set of feasible policies must always be supported by an undominated budget constraint. Now, if for whatever reason the government wants to maximize the utility of the least productive persons with \hat{e} , the set of maximin utility policies will be restricted to one single policy, namely the one that generates exactly the right budget constraint. Thus, whatever utility function one would want to propose as the appropriate metric of responsibility-sensitive maximin justice, it will always generate a policy that belongs to the maximin OS policy set. We return to this point in section 4.

3 Optimal choice of policies and the challenge to basic income

In this section, we shall be more specific about the challenge which the Vandebroucke model poses to those who hold that granting the highest feasible basic income is the best way to take care of the interests of the worst off. For the time being, we stick to the OS metric of well-being. Following Vandebroucke's terminology, the maximin OS policy set will be called the 'optimal policy track'. The optimal policy track of regime T (no subsidy instrument available) is denoted by P^T , and the optimal policy track of regime S (subsidy instrument available) is denoted as P^S . To clarify the challenge, we use a numerical example to make the world of Simplicia more concrete. The details of the example are given in the legend of Figure 2 below. Imagine four persons, two of them with the highest productivity ($w = 1$), the other two with the lowest ($w_L = 0.5$). Of the productive workers, one has the maximum propensity to work $e = 1$, while the other has the minimum propensity $e_L = 1/2$. The same holds for the less productive

workers. The example can be generalized by assuming a continuous (log)normal distribution of productivity, such that the average, variance, the minimum and maximum productivity and work propensity of the population is the same as in the case of our four persons. Using these merely illustrative data, we can now specify P^T and P^S .

3.1 The optimal policy track in regime T

As was shown in Figure 1, the maximin OS policies in regime T can vary between two extremes, the B -maximizing policy B^+ and the no-redistribution policy ND . In Figure 2, the former policy corresponds to point A, the latter to point O. The line OA represents the optimal policy track P^T , which is obtained by letting the parameter L in objective Y_L range between 0 and 1 (see Equation (5)).

Figure 2 here

For someone with $L = 0$, the second term in (5) is zero. Maximizing the objective Y_L then requires choosing the B -maximizing policy (point A, with $t = t^*$). In other words, for the least productive with the lowest propensity to work ($e = 0$), the best policy is the one with the highest feasible basic income. For those with $L = 1$, the best policy is not using the instruments (B, t) at all, hence the natural distribution (point O in Figure 2).⁹ This is counter-intuitive, bearing in mind that the Simplician government is supposed to be redistributing for ‘egalitarian’ maximin reasons.¹⁰ Including the natural distribution as one of the *maximin* policies in regime T is to say that it may be defensible, from the point of view of responsibility-egalitarian justice (in its maximin interpretation), to let the existing inequalities in respect of the non-responsible factor of productivity prevail, and hence reject any demand for redistribution by means of basic income. Obviously, if the optimal policy track is like that, then supporters of the highest feasible basic income can not appeal to responsibility-sensitive egalitarian justice in order to make their case,

⁹ On the labour supply function (3), the least productive person with $e = 1$ will never work full time in regime T. However, it would not be difficult to think of an alternative labour supply function on which $L = 1$ would correspond with the preferred labour time of a utility maximizing agent in the model. To vary L between zero and one is the most general approach one can take, leaving open various kinds of labour supply functions.

¹⁰ The intuitive argument in favor of maximum feasible basic income is that any positive level of basic income always fetches the least productive workers a larger transfer than the tax it imposes on their low earnings, even if they earn full time. Thus the higher basic income is, the larger their income-leisure opportunities will be across the board, since they are always net beneficiaries of redistribution no matter how long they decide to work. As our numerical example shows, this reasoning does not hold under all circumstances. Granting a positive basic income may push net income below gross income at full time, because of disincentive effects. In this case, full time workers will maximize income at $t = 0$, and zero-time workers will maximize income at $t = t^*$, hence these policies do not

despite the fact that is the most income-redistributive policy in regime T.

However, a closer look at the model shows that this particular challenge to basic income can be satisfactorily answered. For it turns out that there are two interrelated empirical factors that determine the conditions under which the natural distribution ($t = B = 0$) is part of the optimal policy track. This can be seen by studying the numerical example underlying Figure 2. In that example, the productivity of the least productive workers is chosen at a level amounting to half that of the most productive ones ($w_L = 1/2$, and $w = 1$). However, if w_L were reduced to zero, then obviously the highest feasible basic income policy would be the only optimal one in regime T.¹¹ But one need not even make that extreme assumption. Given the labour supply function (3), the maximum value that w_L must take in order to make the B -maximizing policy the best one for all values of L in (5) can be derived by considering the following condition:

$$(6) \quad B - t^* w_L > 0$$

This condition says that the least productive full-time worker pays less taxes than she gets back as basic income. Using (4), and given that $t^* = 0.5$,¹² condition (6) reduces to:

$$(7) \quad w_L < \bar{e}(s_w^2 + \bar{w}^2)/2$$

Condition (7) is not fulfilled in the numerical example we just chose above. In that example, as well as in similar ones where (7) does not hold, the no-redistribution policy will belong to the maximin OS policy set, hence be part of the optimal policy track, which then ranges from $t = 0$ to $t = t^*$, as shown in Figure 2. However, under other constellations of data, in which w_L is closer to zero, and the gap between the least and the most productive types is therefore wider than it is in our numerical example, condition (7) does hold.¹³ Then, as the tax rate rises from $t = 0$ to $t = t^*$, and basic income rises from 0 to B_{max} , even the workaholic among the least productive workers will receive more net income, hence all members of the type will gain in well-being. In those cases, therefore, setting basic income at B_{max} produces an OS that dominates the OS of all lesser levels of B . It follows that the optimal policy track of regime T is strictly limited to the basic income-maximizing policy.

So far, we have identified one empirical factor which determines the range of the optimal policy

dominate one another, and as a result, the natural distribution belongs to the set of maximin OS policies. As will be shown in the text below, however, the circumstances of our numerical example are not empirically plausible ones.

¹¹ For, with $w_L = 0$, the least productive have no tax liabilities, and the policy (B_{max}, t^*) will dominate any other policy with $t < t^*$.

¹² Differentiating B (see Equation (4)) with respect to t yields the B -maximizing tax rate $t^* = 0.5$.

¹³ Note that when the gap increases, the variance of w will increase as well, making condition (7) less stringent.

track in regime T: the inequality between the top and bottom productivities. But there is a second empirical factor which bears on the question of whether or not the optimal policy track will be limited to the basic income maximizing policy. This factor concerns the disincentive effects of distributing the tax yield as a basic income. In section 2, we noted that the elasticity of labour according to Equation (3) is unity: one per cent change in the reward to labour will result in one per cent change of labour supplied in the same direction.

Now if we suppose, contrary to the Vandebroucke model, that the elasticity of labour is less than unity (holding everything else constant), then it may well be that successively increasing the tax rate from 0 to t^* , thus of basic income from 0 to B_{max} , will give the least productive type an increasingly superior OS. If in the extreme case, the individual's labour supply were to be completely inelastic, then obviously there would be no disincentive effect from an increase in the tax rate, and basic income could then be equal, at $t = 1$, to what the average product of labour would be at $t = 0$. In that case obviously, the least productive workers would benefit from complete redistribution. In less extreme cases, however, some non-zero labour supply elasticity below unity may also designate maximum basic income in regime T as the unique maximin OS policy. To look at this possibility, we now delete Vandebroucke's labour supply function (3), and substitute it for an iso-elastic labour supply function of the following form:

$$(3') L^S(w, e, t, s) = e[(1-t)w + s]^e,$$

which implies that $E_{w(1-t)+s}^L = e$, where e is the elasticity of labour supply. Our reason for this modification is as follows. Empirical research invariably finds that e is between 0 and 1, with the elasticity of male labour supply highly inelastic (e close to 0), and with women's labour supply more elastic than that of men, but probably also significantly below 1. If this rather mild overall labour supply response holds in the world of Simplicia as well, then Vandebroucke's labour supply function (3) - with its unitary supply elasticity - may not be the most appropriate one to use. Therefore we want to see whether the conclusions concerning the maximin OS set in regime T are affected by varying the labour supply elasticity. Thus, substituting equation (3') for (3), and (plausibly) assuming that productivity is lognormally distributed with variance σ^2 , the corresponding balanced budget equation of regime T then becomes:

$$(4') B(w, e, t, s) = \bar{e}t(1-t)^e (\bar{w} \exp^{\sigma^2/2})^{e+1}$$

The tax rate that maximizes basic income is derived by differentiating (4') with respect to t :

$$(5') \quad t^* = \frac{1}{1+e}$$

a result well-known in the optimal taxation literature. By this extension of the Vandenbroucke model, the optimal policy track of regime T will undergo a shift. In Figure 2, with $\bullet = 1$ hence $t^* = 1/2$, the basic income maximizing policy corresponds to point A of P^T . When the parameters describing productivity levels and preferences of the population are held constant, and the responsiveness of labour supply to incentives is made to vary downwards from unity (that is, we vary \bullet in the range $[0, 1]$), point A shifts rightwards, depending on the chosen value of \bullet . For instance, for $\bullet = 1/3$, the tax rate t^* which maximizes basic income would increase from $1/2$ to $3/4$, and point A would shift to point A' in Figure 2. Substituting (4') and (5') into (6'), condition (7) can now be reduced to

$$(7') \quad w_L < \bar{e} \left(\frac{e}{e+1} \right)^e (\bar{w} \exp^{es^2/2})^{e+1}$$

Figure 3 here

Condition (7') is illustrated in Figure 3 by the curve PQ. The area to the left of PQ shows all combinations of \bullet and w_L which satisfy condition (6'). For instance, for $\bullet = 1$, the highest value w_L can take, given the data of our numerical example is 0.23.¹⁴ Given that $w = 1$ denotes the highest market productivity, e.g. that of chairmen of the board of large firms, it is reasonable to assume that w_L is well below 0.23, in real world cases. Moreover, as noted above, in the real world the overall labour supply elasticity is also bound to be well below 1. If both of these empirical specifications are fed into the Vandenbroucke model, then the model, as duly modified with respect to labour supply, will show that the optimal policy track P^T reduces to the basic-income maximizing policy. For, given the wage inequality and the responsiveness of labour supply to rises in the tax rate then obtaining, it will be the case that every rise of the tax rate up to t^* will unambiguously improve the OS of the least productive, hence improve their well-being, whatever their propensity to work may be. Provided that these empirical specifications are indeed in place, the assertion that the highest feasible basic income is justified on maximin OS-grounds is vindicated, at least as long as we stay within regime T.¹⁵

¹⁴ If $\bullet = 0$, thus $t^* = 1$, then condition (7') amounts to $w_L < \bar{e} \bar{w}$, corresponding to point Q in Figure 3.

3.2 The optimal policy track in regime S

Regime S assumes that the government is able to deploy the subsidy instrument s , which, by contrast to basic income B is compatible with maintaining incentives to work on the part of the least productive individuals. As shown in Figure 1, this leads to a broad range of maximin OS policies, which can vary between B^+ and B^\bullet , with B^+ the policy that maximizes the level of basic income, and B^\bullet the policy with the maximum working time subsidy ($s = 1$) and the largest poll-tax, or negative basic income. Thus, in Figure 2, P^S , the optimal policy track of regime S, is given by ACF, with point A corresponding to the B -maximizing policy which caters to the wishes of the least-productive who might have $L = 0$, and point F corresponding to the B^\bullet -policy which corresponds to those with $L = 1$. Those determined not to work ($L = 0$) will not benefit from redistribution in the form of labour subsidies. They will benefit from the highest level of basic income. By contrast, for $L = 1$, the extreme workaholics among the least productive will benefit from a maximum labour subsidy. In the model, the upper limit of s is unity. To reach this limit, the government must (a) redistribute all gross income to pay out a subsidy equalling the average productivity \bar{w} , and (b) obtain the remainder $(1 - \bar{w})$ from levying a poll tax on everyone, that is to say it must institute a negative basic income to finance the subsidy at $s = 1$. The two conditions imply the policy $(B, s, t) = (B_{min}, 1, 1)$. This drastic policy is feasible, due to the combined incentive of the poll tax and the maximum subsidy, which incites - and in part forces - even the most leisure-oriented persons to supply labour effort. As we have noted in section 2, the workaholics among the least productive will then choose to supply the full unit of labour.

Thus Figure 2 shows how the optimal policy track P^S ranges from point A, at policy B^+ , to point F, at policy B^\bullet . Starting from point A, we have the least redistributive of all maximin OS policies in this regime, which is due to the fact that the government has decided to forego the use of the subsidy instrument, wishing to redistribute exclusively by means of basic income. As we noted earlier, point A represents the most redistributive policy in regime T, at an upper limit determined by tax rate t^* . In regime S, however, the government can do far better than that. Moving along P^S up to point C, each successive policy becomes more redistributive, because when government decides to make more use of the subsidy, and keep on the optimal policy track, it must do so at the expense of basic income. This downward shift in the basic income-subsidy mix makes it possible to set the tax rate increasingly above t^* . As a result, the basic income-maximizing policy is now the least redistributive of all policies in regime S. As noted above in connection with the basic income-minimizing policy in point F, the larger scope for redistribution in regime S is explained by the positive incentive effect of the subsidy on labour supply, when that subsidy is being financed at the expense of basic income. Raising the subsidy will make it possible to keep on raising

¹⁵ This assertion is made in Van der Veen 1991: Ch 3.

t above t^* , while at the same time increasing the tax yield to be redistributed among subsidies and (progressively diminishing) basic income. The feasibility of the maximin OS policies on the upward-sloping section AC is explained in this way. In point C, the tax rate is set at 100%.¹⁶ At this point, the reward to labour consists exclusively of the subsidy. The policies on the vertical section CF of P^S thus exhibit equal income per hour of work ($B + sL$) for every productivity type. These maximin policies are both responsibility-sensitive (income differentials depending only on the amount of work chosen) as well as completely egalitarian. Now, moving upwards along CF, the subsidy will be raised further at the expense of basic income, which becomes zero at $t = 1$ and $s = \bar{w}$, at point E in Figure 2. From E to F onwards, finally, basic income will become negative, as the subsidy is now above average productivity \bar{w} .

In our discussion of regime T, we have shown that both the distribution of productivities and the elasticity of labour supply are among the empirical conditions determining whether or not the basic income-maximizing policy (point A) is the unique maximin OS policy. It is important to see that while variations in these data do affect the shape of the optimal policy track of regime S, they do not affect the range of feasible policies. In particular, holding all else constant, the effect on P^S of a more dispersed distribution of productivity - which amounts to decreasing w_L - is to locate point C at a lower level of the subsidy, as shown in Figure 2 by the dotted line AC'.¹⁷ This in turn implies that basic income will be higher at the point C', where the tax rate reaches 100%, than it can be in C. Also, as can be seen from Equation (5'), the effect of lessening the elasticity of labour will be to shift point A to the right, so that basic income is maximized at a higher rate t^* of tax, as is shown by the boldface dotted line A'C in Figure 2.

¹⁶ It may seem implausible that policies with $t = 1$, which tax away all labour income for redistributive purposes are at all feasible. To understand better why this is so in the model, consider what one might call the *effective tax rate* t' , defined as the amount of tax (at the proportional rate t on gross income wL) on gross income *minus* labour subsidy, divided by gross income: $t' = [(tw - s)L]/wL$. Since w ranges from w_L to 1, t' will be differentiated according to productivity type. For any given policy (t, s) , the effective tax rate will then be $(t - s)$ for the most productive type with $w = 1$ and $(tw_L - s)/w_L$ for the least productive type. This shows that the combined effect of t and s amounts to raising the net reward to labour of the less productive types at the expense of the more productive ones. If one would want to characterize the Vandenbroucke model (for regime S) in terms of the effective tax rate t' and thus consider 'redistribution' to be exclusively a matter of granting everyone the unconditional basic income, then obviously the model can no longer be described as a linear tax model. It is then a model which imposes differentiated tax rates, for all points on P^S , save in the point A of Figure 2, where one would then have maximal redistribution, in the sense just mentioned, at the uniform effective tax rate $t' = t^*$. Conversely, point F, with the negative value B_{min} , would now be the least redistributive policy, which imposes a zero effective tax rate on the most productive and a negative effective tax rate $t' = (w_L - 1)/w_L$ on the least productive. On this construal of the model, it is easier to see that the incentive effect of raising the subsidy at the expense of basic income consists in making everyone work harder at an increasingly equalized structure of returns to labour (section AC of P^S), and then, at equal returns to labour, making everyone work harder still by a further decrease of basic income up to the point where $s = 1$ (section CF of P^S).

¹⁷ This has the rather strange implication that if $w_L = 0$, hence the least advantaged have a zero market contribution, one can still redistribute in their favor by means of labour subsidies in specially created jobs.

3.3 The challenge to basic income

Having explained the economic properties of regime S, we now return to the challenge to basic income which the Vandenbroucke model poses. Three points can be mentioned. First, if a responsibility-sensitive government does indeed possess the information needed to redistribute by means of subsidies (that is, if it knows how long people have worked) then the maximin OS policy objective will generate a host of solutions, in which the instruments of basic income and labour subsidies must be traded off against one another. For, as we have shown in our discussion of the optimal policy track, to favor the one instrument is necessarily to play down the other. Thus the first challenge is this: policies that propose to maximize basic income will require a special justification. That justification can not be provided by the normative doctrine of responsibility-sensitive egalitarianism itself. (Of course, the same holds with respect to the justification of policies favoring maximum labour subsidies. But this does nothing to diminish the challenge.)

Secondly, the range of maximin OS policies on offer in regime S shows that extreme proponents of either basic income or labour subsidies may have some difficulty in making a case for maximizing the use of their favored instrument. For one thing, many moderate policy mixes are feasible, in which the advantages and disadvantages of each of the instruments can be balanced. This second challenge applies symmetrically to both extreme positions, but is especially acute for a staunch proponent of maximum feasible basic income who *also* thinks that maximin OS solutions which offer straightforward equality of opportunity are more desirable from the point of view of justice than solutions which do not.¹⁸ Unlike the proponent of labour subsidies, he will have to explain why it is better to have the highest basic income with *unequal* net earning capacities between productivity types (as in point A of Figure 2), when it is also possible to have a policy which, thanks to the subsidy, offers *equal* net earning capacities, while still providing a substantial basic income (as in point C).¹⁹

Thirdly, the optimal policy track contains the especially salient policy, which we already mentioned in section 2, the policy $(B, s, t) = (0, \bar{w}, I)$, corresponding to point E in Figure 2. It is the special case which redistributes by making everyone's reward to labour equal to what someone with average

¹⁸ Maximin justice gives priority to the well-being of the worst off, whatever the levels of well-being of the better off that would be necessary to achieve that priority. Strictly egalitarian justice requires that everyone has equal well-being (in so far as this depends on the non-responsible factor), regardless of the level of well-being enjoyed by all. In the present context, the strictly egalitarian goal can be made to enter as a tie-breaker in selecting among policies that satisfy the maximin goal, that is to say the policies on the optimal policy track. This reflects a concern for the *comparative* aspect of distributive justice, to which the maximin rule is insensitive. See also note 1.

¹⁹ For instance, in the numerical example of Figure 2, point A has $B = 0.12$, and point C has $B = 0.09$, which is not very far below the maximum.

productivity would be able to earn under the no-redistribution policy, leaving nothing to be handed out as basic income. Among the egalitarian policies, this is also the one that would maximize the utility of the least productive person with an average propensity to work. Intuitively, it is not difficult to see that both of these features present a powerful normative challenge to those who want to recommend either the basic income-maximizing or basic income-minimizing policies in regime S. We will comment further on this below.

4 Favored points on the optimal policy track

In this section, we discuss various aspects of the challenge to basic income which the Vandebroucke model poses, focusing on regime S. (We assume that regime T uniquely identifies the basic income maximizing policy as the optimal one.) Also, we assess Vandebroucke's claim that an egalitarian government should select among maximin policies by specifying an ethical 'conception of advantage'. To appreciate the many different ways in which the government can select we distinguish four types of considerations. Singly, or in combination with others, each of these considerations may rule out some policies and favor others. First, one may incorporate a specific *metric of subjective well-being* in the overall goal of maximizing the position of the worst-off. This metric should try to capture the diversity in well-being of people with different goals and projects. In this section, we focus on two variants of welfarism, which adopt the metric of utility. Secondly, considerations of *justice or fairness* may be added to the principle of responsibility-sensitive maximin justice which defines the optimal policy track. For example, one might want to favor the strictly egalitarian policies on the vertical section of P^S . Or alternatively, one may bring in a notion of 'fairness as impartiality', in order to balance the interests of members of the least productive type with different preferences, or of the population in general.²⁰ Other fairness considerations which we discuss are ones of neutrality and reciprocity. Thirdly, the government can select policies by appealing to an ethical conception of the good. As mentioned, Vandebroucke thinks that the government will inescapably have to base its choice of policy on the ethical grounds of *objective well-being*. In his model, this means that it must act on a specific 'metric of advantage', which commensurates the interests of individuals, independently of their own judgements about what is good for them.

Fourthly and finally, the government may decide to rest its case for selecting a policy on the procedural criterion of *democratic choice*: it then tries to be as responsive as possible to what a majority of

²⁰ Since productivities and preferences for income and leisure are distributed independently in the model, the former entails the latter.

people wants, following a public debate. In a truly democratic regime, this procedural consideration will always be decisive in the end. We shall not be asking what kinds of policies might be favored by majoritarian constraints in the real world. The procedural criterion of policy selection is mentioned here to indicate that ideally, one would hope that the three substantive types of normative consideration (in short: subjective well-being, fairness, and objective good) are inputs in an informed public debate, in preparation of the democratic decision.

In the rest of this section, we provide an account of some competing normative approaches to the issue of policy selection in regime S. As announced earlier, our purpose is both to obtain a clearer view of the nature of the challenge that labour subsidies pose to basic income, and to assess Vandebroucke's claim that ethical considerations are inescapable in the policy choice of an active welfare state.

4.1 Unambiguous improvement of opportunities: the real freedom approach

Given the way we have set up the Vandebroucke model, a straightforward way of looking at the question of selecting a favored policy is to accept the OS metric as the only appropriate one for comparing people's situations from the point of view of justice. This may be called the real freedom approach. On that approach, what counts for purposes of justice is the real freedom of individuals, defined generally as the opportunities to do whatever it is that they might want to do.²¹ Under present assumptions about what people need to have in order to be able to do whatever it is they might want to do - to wit, income and leisure - real freedom is captured by the OS metric. Now as we have seen, the maximin OS policy set consists of all undominated feasible policies. So it is obviously the case that the real freedom approach *as such* can not select any particular point on P^S . However, it does rule out some policies, provided one adds the following compelling constraint of fairness: *unambiguous improvement on the natural distribution*. The constraint is motivated by the judgement that the inequalities of opportunity obtaining in the natural distribution are morally indefensible, caused as they are by differentials in the non-responsible factor of productivity, at least provided that redistributive dispensations are feasible under which the worst-off in opportunity can be made unambiguously better off. It is this judgement which underlies the policy exercise of the model in the first place.

On the OS metric, this constraint of fairness selects policies that dominate the natural distribution, and it rejects policies that do not. As inspection of Figure 1 shows, the admissible maximin policies must then be ones with a non-negative basic income, ranging from $(B, t, s) = (0, I, \bar{w})$ to $(B_{max}, t^*, 0)$ (section

²¹ This general definition of real freedom was originally proposed by Van Parijs (1987), and it lies at the heart of his *Real Freedom for All* (1995). The definition is operationalized by Van der Veen (1991, Ch. 3) as the OS metric, for contexts where income and leisure are taken to be components of individual well-being as well as material conditions of personal autonomy.

AE on P^S in Figure 2). The non-admissible policies are ones with a negative basic income, ones, that is, which involve a tax liability at zero work (all points on P^S beyond E, up to point F).²²

Since the real freedom approach regards the OS metric as the only appropriate one, it can not be used to choose within the admissible range of policies. It is compatible both with maximizing the level of basic income at zero labour subsidies, and with setting the subsidy equal to average productivity at a zero basic income. If one wishes to select further within this range, then additional criteria beyond unambiguous improvement on the natural distribution must be invoked. We have already mentioned the criterion of strict equality of opportunity. Of course this criterion allows negative basic income policies, which are inadmissible. But equality of opportunity can be used lexicographically, to further rule out all policies on the upward-sloping part of P^S , since such policies do not neutralize the effect of unequal productivity on opportunity. In Figure 2, this would select the vertical section CE of P^S . Alternatively, policies within the admissible range can be guided by more specific notions of fairness, or by ethical considerations of the kind introduced by Vandenbroucke. We examine these possibilities below.

4.2 The welfarist approach

On the welfarist approach, opportunities are important ingredients of subjective well-being only insofar additional opportunities are actually preferred to the ones already available, given the person's utility function. How can this approach contribute to the selection of maximin policies? There is some reason for thinking that *as such*, it can not so contribute. In section 2, we have shown that in regime S, all points on the optimal policy track correspond to policies which maximize the utility of a person with a particular propensity to work \hat{e} . This result follows from two facts. First, the maximin OS objective Y_L (see Equation (5)) contains the parameter $L: (0 \cdot L \cdot 1)$, the value of which determines one particular undominated OS, hence one maximin policy. And secondly, given the utility function underlying the behavioural responses in the model (see Equation (2)), each value of L corresponds to the maximum utility

²² Vandenbroucke and Van Puyenbroeck (2000, 29) remark that the OS metric underlying the real freedom approach 'has no operational value' with respect to the selection of optimal policies. This is misleading in two respects. First, as we have shown, the OS metric underlies the optimal policy track: it selects the entire subset of maximin policies from among the feasible set (including the policies identified on the basis of Vandenbroucke's metrics of advantage, see 4.3 below). Secondly, while the OS metric is (obviously) 'of no operational value' in further selecting among the set of maximin policies it helps to identify - given that each of these policies is undominated by any other policy - it does rule out all negative basic income policies, when it is conjoined with the constraint of unambiguous improvement, which, as argued above, is integral to the real freedom approach. Note also the following complication. If the natural distribution is among the maximin OS policies in regime T, then the constraint of unambiguous improvement will not recommend any redistributive policy in this regime. In regime S, in addition to ruling out poll-tax policies, the constraint will then rule out some policies located on the upward-sloping part of P^S in Figure 2, always including the basic-income maximizing policy. The admissible range is then limited to PE in Figure

of a person with a particular \hat{e} within the same range ($0 \cdot \hat{e} \cdot 1$). This shows that in order to select any specific policy, the government will have to determine which of the possible utility functions of the least productive persons - that is to say which value of \hat{e} - it takes as the *decisive* one in the maximizing exercise. This point is also noted by Vandenbroucke, who regards maximizing the utility of a 'reference preference' ($\hat{e} : (0 \cdot \hat{e} \cdot 1)$) as a form of *conditional egalitarianism*.²³ The conditionality in question is to be made explicit by bringing in additional criteria of fairness or objective good, which then guide the government to some specific value of \hat{e} .

In itself, then, switching from the opportunity metric to the utility metric does nothing to narrow down the government's range of choices. In fact, it actually widens the range, if one accepts the constraint of unambiguous improvement on the natural distribution, as applied to the metric \hat{e} . For, suppose that the government were to decide on the reference preference of the most workaholic individuals ($\hat{e} = 1$). It would then go for the basic income minimizing policy with the largest possible poll tax, since among all maximin policies, that policy would produce the largest possible utility gain over the natural distribution for these workaholics. So unless it is further specified, welfarism will admit decisions to institute a negative basic income consistently with the constraint of unambiguous improvement, depending on the reference preference. As we have seen, such decisions are ruled out on the real freedom approach.

Within the welfarist approach, however, classical utilitarianism offers an obvious way of selecting one distinct reference preference on grounds of impartiality, given that the utilitarian method is restricted to the members of the least productive type, in line with maximin justice. The utilitarian rationale is well-known: every interest is to count for (no more and no less than) one, and this interest is here represented by the least productive persons' actual utility functions. Thus, impartiality in defining the maximin objective requires that the average utility of the least productive should be maximized. This objective implies choosing the average propensity to work as the reference preference: $\hat{e} = \bar{e}$. As noted in 3.3, the policy that maximizes the utility of the person with the average propensity to work is the special case among the maximin policies which, we said, has a special intuitive appeal. This is the policy with zero basic income, and equal reward at average productivity (henceforth the 'zero B-policy'). We have just spelled out part of its intuitive appeal by reference to classical utilitarianism. Note also that the classical utilitarian policy lies within the admissible range of the real freedom approach (as constrained by unambiguous improvement on the natural distribution), and that it is consistent with strict equality as well.

However, it may be objected that classical utilitarianism illegitimately assumes utility to be interpersonally comparable in a way that allows people's well-being to be added up. If one allows utility

2. As we have argued in 3.2, however, there are firm empirical reasons for thinking that the natural distribution is not a maximin policy.

to be comparable only in terms of an ordinal ranking between persons with the same utility function (the same e), then the utilitarian criterion of sum-aggregative impartiality is not available. As we will see presently, however, there are two other criteria of fairness which point towards the zero- B policy as well, independent of welfarism.

4.3 The zero basic income policy: neutrality and reciprocity

The choice of a reference preference (or of a corresponding value of L in the objective Y_L) can be guided by a liberal criterion of neutrality which turns on a ‘principle of natural reward’. (Fleurbaey 1995; 1998). To explain the intuitions behind the criterion, it is helpful to focus on the natural distribution. By definition, the natural distribution is the one without any redistribution. In the natural distribution of the Vandenbroucke model, productivities are regarded as the non-responsible factor, and they are unequally distributed. On any plausible notion of subjective well-being, they cause inequalities of well-being that can not be ascribed to differences in people’s responsible behaviour. This creates a moral presumption for the government to intervene in the natural distribution, as noted above.

But let us now for the moment imagine that productivities were to be perfectly equal in the natural distribution. Then Fleurbaey’s principle of natural reward can be expressed by a fairness axiom which states that the government should leave the natural distribution as it is: ‘no redistribution for uniform non-responsible factors’. The axiom is motivated by two distinct thoughts. First, there is a presumption for a responsibility-sensitive egalitarian government not to intervene, because as things are, no relevant inequalities obtain in the natural distribution, so there is no special reason of justice for intervening in it. But the axiom goes further: it actually *forbids* intervention. This is significant, because the government *could* in principle intervene in redistributive ways that would preserve the equality of the non-responsible factor. For example, it could tax earnings proportionally and grant everyone a uniform basic income. Or it could subsidize returns to labour, from the proceeds of a uniform poll-tax. Each of these policies would be justice-preserving, in the distinct sense that people’s opportunity sets remained equal.

However, both of these redistributive policies may be nevertheless considered unfair, on the second reason that motivates the axiom: they change the shape of the opportunity set that people originally faced under the equal natural distribution. In so doing, these policies cause people to make different decisions in respect of the responsible factor (here, the choice of working time) than they would have made if no one had intervened. In other words, these policies distort the scheme of incentives obtaining in the natural distribution, on which people freely make the choices that best suit their interests. Fleurbaey calls this scheme of incentives the ‘natural reward scheme’, and he thinks that it provides the proper background

²³ Vandenbroucke here follows the terminology of Fleurbaey, 1998.

against which people should exercise their responsible choices, at least if that background is not unjust. For the axiom of ‘no redistribution for uniform non-responsible factors’ implies that the natural reward scheme should be preserved, if it is consistent with a uniform distribution of the non-responsible factor. One way of explaining further why redistributive intervention in the equal natural distribution is unfair is to note that the basic income policy in our example above would benefit the interests of leisure-oriented persons at the expense of the income-oriented ones, while the poll-tax policy would do exactly the reverse. Both of these policies would thus be biased in favor of some preferences in the society, and against others, without there being any reason of justice for artificially creating such biases, given the equality of the natural distribution. This bias violates a strong conception of liberal neutrality, according to which interventions that systematically privilege the interests of some at the expense of others, in the absence of distributive injustice, are unfair.

How can Fleurbaey’s axiom be applied to the world of the Simplian model? Obviously, it does not have a straightforward application, since the natural distribution of Simplia has unequal productivities, hence the antecedent condition of ‘no redistribution for uniform non-responsible factors’ does not hold. Moreover, redistributive intervention is actually required by responsibility-sensitive maximin justice. As we understand it, however, the axiom can be applied *indirectly* to the problem of selecting the most neutral policy among the maximin OS policies. From the point of view of the natural reward principle, the intuitively correct policy would then be the one that compensates according to the appropriate principle of justice (here: maximin OS, or if one so wishes, maximin utility according to some reference preference) and in addition stays *as close as possible* to the natural reward scheme. Let us call this correct policy the *neutral* policy.

To make this intuition somewhat more precise, the neutral policy can be derived by imposing the axiom on the maximin OS redistributive program as follows: (1) construct a *counterfactual natural distribution* by equalizing the distribution of productivities in Simplia, while leaving everything else the same. For the world of Simplia, then, the counterfactual natural distribution is one with equal productivities, pitched at the actually existing average \bar{w} . Next, (2) take the counterfactual natural distribution as the benchmark for policy choice, and apply the neutrality axiom to it. It then follows that the counterfactual natural distribution should be protected against intervention, as illustrated above. Finally, (3) consider the set of just and feasible redistributive policies. If there is one such policy that generates the same scheme of reward as the one of the counterfactual natural distribution, then this must be the neutral policy. In the maximin OS policy set, there is indeed such a policy. For it is feasible to implement maximin OS by equalizing the rate of return to labour. One then needs to set the tax rate at unity, the subsidy equal to average productivity, and basic income at zero. This mimics the equal reward at average productivity in the counterfactual natural distribution. Under this policy, the scheme of

incentives is as close as one can get to the scheme of reward of the existing natural distribution, consistent with removing the injustice of unequal productivities. Thus, by the somewhat circuitous route of the natural reward principle, and the associated conception of liberal neutrality, one again arrives at the zero- B policy.

Finally, and not very surprisingly, basic income policies will be generally disfavored on Stuart White's egalitarian conception of reciprocity (see White 1999). If equality of opportunity can be obtained in such a way that enjoying benefits of redistribution requires the performance of work in return, then policies implementing this are fairer than policies that do not, on this conception. The notion of 'reciprocity' invoked here may be simply understood to mean 'no benefit without work'. On that crude understanding, all maximin policies involving a positive level of basic income are rejected, the more so as the level of B is set higher at the expense of the labour subsidy. Note by the way that White's reciprocity criterion does not necessarily prohibit a positive basic income financed exclusively from a tax on *non-labour assets*. However, in our stripped-down version of the Vandebroucke model, labour is the only source of gross income in Simplicia, so the prohibition does hold. But what about the poll-tax policy alternatives, which also enforce 'no benefit without work'? White does not focus very explicitly on this issue. However, his graded *egalitarian earnings subsidy* scheme exactly coincides with the zero B -policy, implying that reciprocity should be understood as 'neither benefits nor levies regardless of work performed'.²⁴

4.4 Vandebroucke's solution: an ethical conception of well-being

In the last two sections, we have highlighted three types of moral argument centering on fairness: the argument from aggregative impartiality (classical utilitarianism), from liberal neutrality (Fleurbaey's principle of natural reward), and from reciprocity (White's egalitarian earnings subsidy scheme). The first argument depends crucially on a cardinal utility metric, while the last two operate for any plausible metric of subjective well-being. These three arguments uniquely converge on the zero- B policy. They are not based on contradictory premises, and moreover, they are consistent with the arguments underlying the selection of policies that improve on the natural distribution under the real freedom approach, and the arguments for fully equalizing opportunities. It seems that all these arguments present a cumulative case for choosing the zero- B policy in preference to other policies. It is this case that proponents of basic income must clearly confront, we believe, and we regard Vandebroucke's model to be significant

²⁴ The equivalence between the egalitarian subsidy scheme (ESS) and the zero- B policy is discussed by Vandebroucke (1999a, sections 3.14 and 3.15). In terms of footnote 16 above, the scheme involves imposing an effective tax rate $t' = (tw - s) / w$, at $t = 1$ and $s = \bar{w}$. Then for any person with productivity w , $ESS = -t'$.

precisely because it allows one to identify the difficulties for the basic income camp that arise once the possibility of granting labour subsidies is introduced in an optimal tax model. Yet, as we have also seen, Vandenbroucke himself seems to place little weight upon these arguments of fairness. For he insists that the policy choice of a responsibility-sensitive egalitarian government should primarily turn on *ethical* considerations rather than on fairness. Why is this? That question will be addressed now.

As far as classical utilitarianism is concerned, Vandenbroucke simply assumes, without further discussion, that utility is ordinal and non-comparable between persons with different preferences. He does not even mention that on a cardinal interpretation, maximizing average utility of the least productive implies the zero-*B* policy. This oversight is significant, because Vandenbroucke's own approach explicitly claims that it impartially considers the interests of the least productive people with different propensities to work, as we have explained in section 1. His implicit rationale for proposing a metric of objective well-being thus seems to depend on denying that utility can be aggregated. For if utility is cardinally measurable and interpersonally comparable, then one can aggregate equally weighted *actual* preferences. In that case, utilitarian impartiality selects the zero-*B* policy, and on welfarism, that is the policy which will then be preferred. But if utility is ordinal, then using the utilitarian aggregation procedure requires an *artificial* cardinal measure for comparing the well-being of persons with different actual preferences.²⁵ Vandenbroucke proposes such a measure, which is called *advantage* (*A*). It is defined by a function that is structurally similar to the ordinal utility function of Equation (2):

$$(8) \quad A(Y, L) = Y - \frac{L^2}{2g},$$

Equation (8), says that advantage is the difference between income earned (*Y*), and a term expressing the burden which the government associates with the performance of paid work by individuals, in the same way as the individual's own (ordinal) utility is the difference between income earned and a term expressing her personal judgement of the burden imposed by working, given the relative importance she attaches to free time, as expressed by her propensity to work *e* (Compare (8) with (2)). The parameter *g* reflects the government's official stance towards the burden of paid work: the higher the value of *g*, the less paid work is considered burdensome. At the limit, *g* could become infinitely large, in which case the government would be simply equating advantage to income earned (*A* then converges on *Y*). Conversely,

²⁵ This is not to admit, however, that using a utilitarian aggregation procedure on an artificial measure of advantage is true to the utilitarian conception of impartiality. We believe it is not. The utilitarian rationale for equal weighting of preferences requires that these preferences be the ones that reflect people's own views of the good life for themselves, not the views that a government planning agency holds about their lives. Utilitarians would thus deny that Vandenbroucke's 'impartial collective choice rule' is impartial in the sense that really counts.

the lower g is set, the more burdensome the performance of work is considered to be. However, in order to rule out the implausible consequence that lesser productive persons could ever enjoy a higher advantage than more productive ones, at the amounts of labour both choose to supply, it is necessary to impose the condition that g does not fall below $1/2$. This condition ensures that, measured in terms of advantage, the worst-off will always belong to the lowest productivity type w_L .

Having defined his measure of advantage, Vandenbroucke explains that the government's stance on work burden versus income earned - and by implication, the tradeoff between income and free time it favors as a matter of social judgement - is to be determined by an objective public conception of the good for individuals, which takes into account the balance of work and free time that it would be optimal to promote in a society committed to values of participation and self-respect (Vandenbroucke and van Puyenbroeck 2000). Vandenbroucke clearly notes that the model of Simplicia is unable to capture all the relevant considerations that would have to be factored into the explicit formulation of such an objective conception of the good. As we have indicated in our informal exposition of section 1, such considerations must deal with many different qualitative aspects of paid work and activities performed in free time. Nonetheless, in the model, the government's choice of the parameter g , - its chosen *metric of advantage* - is taken to reflect its position on these complex ethical issues. In sum, Vandenbroucke's metrics are of the welfarist type, as Equation (8) clearly shows. But this welfarism, far from representing subjective well-being, is meant to represent the considerations of objective well-being which the government deems relevant.

The objective of a responsibility-sensitive egalitarian government will now be to select the policy that maximizes the average advantage of the least productive, given the antecedent choice of a metric of advantage. This way of setting up the maximin program thus employs the aggregation method of classical utilitarianism. But instead of aggregating actual utility, it aggregates the artificial advantage scores of utility-maximizing agents, as described by Equation (8). Taking account of the budget constraint of Equation (4), the objective is as follows:

$$(9) \underset{t,s}{\text{Max}} \int_{e_L}^1 A(w_L, e; t, s) de = \underset{t,s}{\text{Max}} \{ B + a \bar{e} [(1-t)w_L + s]^2 \}$$

$$\text{with } a = 1 - \frac{(s_e^2 + \bar{e}^2)}{2\bar{e}g} \text{ and } 1/2 \leq g \leq \infty$$

As will be clear from section 2, all policies which the maximin advantage objective selects for admissible values of g must be located on the maximin OS policy track (see also the Appendix). Thus, the

most outspokenly productivist metric of advantage ($g \rightarrow \infty, a = 1$) will select the policy that maximizes the income of the least productive. This is the ‘money is all that matters’ stance. It involves minimizing basic income and setting the subsidy at its upper limit: $s = I$.²⁶ However, due to the lower limit of g , the most leisure-oriented metric of advantage at $g = 1/2$, hence at $\alpha > 0$, will not produce the basic-income maximizing policy. For this policy, as can be immediately seen from (9), requires $\alpha = 0$. Thus, by contrast to the real freedom approach, Vandebroucke metrics of advantage necessarily rule out the highest feasible basic income. In this respect, his proposal is artificially biased, since apart from the construction of these metrics there is nothing that would prevent a government with an extremely leisure-favoring view on the good of individuals to go for maximum basic income. (It can simply set $L = 0$ in the objective Y_L , or choose the reference preference $\hat{c} = 0$.)

4.5 Do we really need the advantage approach?

Nonetheless, the admissible metrics of advantage still cover most of the maximin OS policy track: almost anything goes, if the government has the right ethical story to tell. However, different governments may have different ethical stories to tell about the comparative value of work and free time. We believe that this creates some difficulties for the advantage approach. First, there is a dilemma with respect to the grounds on which a metric of advantage is implemented. If the government’s conception of advantage is not shared by a majority of the governed after it has been debated publicly, then the justification of imposing it is doubtful. For the government has then to claim that its view is objectively valid, while at the same time it is clearly unable to convince large numbers of opponents who hold other views. This horn of the dilemma indicates an unjustified paternalism that merits punishment at the polls. On the other hand, the government can try to justify its view by saying that it represents a synthesis of what most people think about the ethical issues in question, after the debate has come to a close. But then the metric of advantage is in fact being chosen on the procedural criterion of democracy. When pressed, Vandebroucke is clearly attracted to this horn of the dilemma.²⁷

But that position creates another problem. On the one hand, if the advantage approach is claimed to be solidly substantive, as Vandebroucke also holds, then the model must help us to clarify the competing ethical criteria that support different metrics. But from what Vandebroucke himself says about the

²⁶ Since $s = I$ is merely a conventional limit (nothing prevents the government from going for even a higher level of subsidy at $t = I$, through a further increase of the poll tax above B_{min}), it is possible that values of α below 1 will be sufficient to select policy B^* .

²⁷ Vandebroucke and Van Puyenbroeck (2000: 103) state: “Implementing policies presupposes that one makes choices concerning the metric used to evaluate the quality of life; a choice that can only emerge from democratic debate in general and from the political process in particular.”

complex considerations entering into an adequate description of objective well-being, one can hardly expect to be enlightened on that score by studying the world of Simplicia: too much of what goes on in the real world that is relevant for assessing competing conceptions of objective well-being is left out. On the other hand, if the advantage approach is meant to be merely formal; if it merely claims that different views on objective well-being can somehow be linked to different maximin policies in regime *S*, then we do not need to construct metrics of advantage within the model.²⁸ All we need is a metric that plausibly identifies the full range of policy choices under responsibility-sensitive maximin justice, and for this the format of opportunity sets, or the closely related format of the reference preference will do just fine.

But perhaps the main problem with the advantage approach is that it is hard to see why the reasons for selecting a particular mix of subsidies and basic income should be predominantly ethical ones, as opposed to reasons of justice and fairness. As Vandembroucke points out carefully, each metric of advantage corresponds to a single structure of reward, which is determined by the values of *B*, *t* and *s* of the corresponding policy. But we have seen above that policy views which focus directly on the fairness of the reward structure for example (neutrality and reciprocity views, that is) will favor the zero-*B* policy. If such views are powerful enough, then there will be little scope for selecting an entirely different policy on ethical grounds. If reasons of fairness dictate the choice we do not need a metric of advantage to make those reasons clear.

Vandembroucke responds to this problem in a nuanced discussion of the principle of natural reward. He admits that this principle has a powerful appeal, but that it should not be regarded as an indispensable component of responsibility-sensitive egalitarian justice. In some cases it may be justified to override the natural reward scheme, as Fleurbaey also notes, for example if holding people responsible under that scheme harshly punishes them for making even moderately imprudent decisions (Fleurbaey 1998: 212-13). Alternatively, there might be solid paternalistic reasons for stimulating less productive persons to change their lazy preferences, so that they start working hard and earning more money, for example if it can be shown that this brings them long-run developmental advantages which they will welcome in good time, but which the natural reward scheme prevents them from perceiving clearly. Also, the exercise of responsibility under the natural reward scheme may be morally problematic, if preferences under the natural reward scheme are formed by an unjust division of labour between sexes.

All this may be conceded. But our problem remains. For if, as Vandembroucke explicitly says, the natural reward scheme should be taken as a ‘useful benchmark for our assessment of distributive schemes’ (Vandembroucke 1999a: 48), then he is saying that this scheme firmly guides our policy choices; that those choices should thus centre on the zero-*B* policy, in the absence of overriding considerations of an ethical

²⁸ If we are right in claiming that under the empirical conditions set out in 3.2 there is only one optimal policy in regime *T*, there is no room for choosing a metric of advantage in cases where the subsidy instrument is unavailable.

nature. But if that is his view, then his main claim that our policy choices are *inescapably* guided by ethical criteria of objective well-being, can hardly be true. For if it were, then the natural reward scheme simply is not the normative default position that he takes it to be. Moreover, as we have argued above, other reasons of fairness speak in favor of the zero-B policy as well, besides natural reward. We conclude that Vandembroucke's reasons for proclaiming ethical choices to be inescapable in determining the preferred mix of basic income and labour subsidies are not convincing, whatever may be the case in the real world.

How do these comments bear on the challenge to basic income? In a way, the weaknesses of the advantage approach that we have just tried to identify make that challenge even more daunting. For they strongly suggest that in the model, discussions about the desirability of maximin OS policies involving a high basic income will focus predominantly on criteria of fairness, contrary to what Vandembroucke claims. This does not bode well for basic income. The only comforting conclusion one can draw from the Simplian world is that the category of poll-tax policies is ruled out on most of the fairness criteria we have examined. Boosting the subsidy through poll taxes is compatible with favoring equal over unequal maximin distributions, but it is rejected by the real freedom approach, classical utilitarianism, liberal neutrality, and reciprocity. However, boosting basic income at the expense of the subsidy, while compatible with the real freedom approach, is by no means recommended on grounds of real freedom. Admittedly, the same holds for the *zero-B* policy, from the point of view of real freedom. But unlike any high basic income policy, the *zero-B* policy is compatible with maximin equality, and it is uniquely selected by classical utilitarianism, liberal neutrality, and reciprocity. So from the standpoint of fairness, there seems to be hardly anything that speaks in favor of choosing a high basic income in Simplia, and a lot that speaks against it. Now if we had reason to think that these objections could be neutralized by cogent ethical reasons of a leisure-favoring kind, then basic income would still be unfair, but it might still be the best policy, all things considered. We have argued that the advantage approach generates no such reasons. Put somewhat uncharitably, all it does is to suggest that ethical reasons for adopting either basic income or labour subsidy policies, or any mix of the two, will be, or should be, discussed in real world political deliberation. But they can not be articulated in the Simplian model in a helpful way.

5 Exit Simplia, long live basic income?

The great merit of Vandembroucke's optimal taxation exercise is that it makes us aware of how strongly standard liberal egalitarian arguments in favor of basic income depend upon assumptions about the policy instruments of which the government disposes. In the absence of labour subsidies, and under plausible empirical conditions, maximizing the level of basic income is the unique optimal policy

prescription, on a widely (though certainly not universally) shared liberal egalitarian conception of justice: responsibility-sensitive maximin. But this is no longer the case once the government possesses the information to redistribute the tax yield in the form of the labour subsidy. Analytically, Vandenbroucke's notion of the optimal policy track is a wonderfully neat way of examining the policy issues that liberal egalitarians of this kind must then face.

Since we are less impressed by Vandenbroucke's proposal to help sort out these policy issues by introducing metrics of advantage, we will now focus on the challenge to basic income, as identified in the last two sections. What does this challenge amount to in the end? What happens when one exits Simplicia, and the complexities of the real world start crowding in? We are not entirely sure, but we suspect that basic income policies will come out more favorably than they do in the abstract world of Simplicia. By way of conclusion, we tentatively discuss some of the complications that will have to be dealt with, under four catchwords: tax bases, incentives, instruments, and responsibility versus basic security.

5.1 Tax bases: what about external endowments?

In Simplicia, as we have presented it here, labour is the only source of income. Moreover, all that a Simplician needs to do - and can do - in order to earn is to start working at her maximum earning capacity. In other words, Simplicians differ from one another only in their *internal* endowments, and these endowments are given by the fixed productivity index w . However, as Van Parijs (1995) has famously argued, the case for basic income can be made to rest mainly, or even exclusively, on the just taxation of *external* endowments. In the real world, people are differentially endowed in access to natural resources, ecological sources (e.g. pollution rights), and ownership of the produced resources of capital goods. Moreover, outside of Simplicia, imperfect competition obtains on labour markets. This means that people have differential access to the rents of job assets, and these assets can be therefore included among the taxable external endowments as well. On Van Parijs's view, a high basic income appears to be justified by the following argument: (1) the market value of all external assets should be taxed up to the point where the tax yield is maximal, given that it is redistributed in the form of an equal and fully unconditional income grant; (2) unequally distributed internal resources of 'talent' can not properly be compared by market evaluation. It is better to assess the value of talent by other methods ('undominated diversity'). And when this is done against the background of the high basic income which taxation of external assets makes possible, a defensible egalitarian redistribution of internal resources will only improve the position of more or less severely handicapped persons, at no great cost to anyone else.

On this view, then, the Simplician challenge might be quickly set aside as interesting but irrelevant. But this would be too easy a response. In our view, Simplicia's admittedly one-sided focus on differentials

in fixed labour earning capacity enables one to concentrate on a key issue in the normative debate about basic income. The issue is this: if there is a measurable inequality in some non-responsible factor affecting people's well-being (regardless of whether it is an internal or an external resource), then should we redistribute the proceeds of taxing that factor unconditionally? Or should we redistribute the proceeds in ways that are sensitive to people's exercise of responsible choice? Van Parijs's strategy of justification in effect assumes that only the former answer is defensible. But that assumption is not uncontested. Failing an absolutely watertight argument for it, the proceeds of, say a tax on inherited wealth, might be used just as well to finance a labour subsidy instead of a basic income, or to support any mix of the two. In that case, of course, the Simplian challenge remains highly relevant, despite its one-sided focus on internal endowments.

5.2 Incentives: what about human capital formation?

Nonetheless, there are plenty of other reasons for wanting to lift the Simplian assumptions, especially if one is interested in how maximin tax-redistribution policies are constrained by incentives. In Simplicia, the only constraint is the labour supply function. The disincentives of taxation merely affect hours of work supplied. They do not affect the supply of capital, nor, given that productivities are fixed, do they touch on productivity. More realistically, however, the supply of capital can be highly sensitive to tax rates, especially if these differ between countries. We have already noted that Vandebroucke model is not suited to tackle this problem (section 1.3). And we doubt whether the model's strictly egalitarian reward schemes would be included in the set of maximin policies, once unequal capital ownership is introduced. But even if external capital endowments are left out of the picture, there is human capital. As Vandebroucke notes, outside of Simplicia, a person's productivity is the result of combining talent, resource investments and effort. Human capital theory usually assumes that these investments and efforts are triggered by (expected) wage differentials.

How will the optimal policy track change when such incentive effects are included in the model? In particular, will it still have a vertical section of strictly egalitarian labour reward? This is of obvious interest, given the normative salience of the egalitarian zero-B policy. Under that policy, with $s = \bar{w}$, all productivity-induced wage differentials are taxed away, leaving no monetary incentives for human capital formation. In the long run it would seem that the feasibility of this equal reward scheme is jeopardized by a dynamic inefficiency, according to human capital theory. The investment decisions and efforts of students will not be steered by (the signalling function of) relative wage differentials.²⁹ Removal of this

²⁹ If net wage differentials are fully removed by egalitarian subsidies, there is also *static* inefficiency, caused by the disincentives of labour supply: equalization of rewards induces (high) low-productive workers to work (less) more

inefficiency will then require reinstating wage differentials, and this implies that the optimal policy track must be limited to a tax rate below unity. How far below unity the most redistributive policy would have to go will depend on three things: the responsiveness of human capital formation to financial incentives, the way in which different mixes of labour subsidies and basic income shape those incentives, and the distribution of access to educational resources.³⁰ The negative effects of a basic income on human capital formation have been debated, though rather speculatively.³¹ To say the least, a similar debate is invited by Vandembroucke's suggestion that the instrument of labour subsidies enables the government to go all the way towards the socialist ideal of erasing non-responsible wage differentials. If this choice is not open to a maximin-oriented government in reality, then the challenge to basic income within Simplicia becomes far less relevant.

5.3 Instruments: why do we nowhere observe regime S?

Given the major importance of the labour subsidy in Vandembroucke's account one may wonder: where do we find this instrument in actual use? This question needs to be sharpened somewhat. Many actual tax-redistribution systems can be statistically approximated by the linear form of regime T (for a recent survey, see Roemer et al, 2000). If all taxes and social security contributions are lumped together, then income is taxed proportionally at some ' t ', because progressive levies cancel out against regressive ones. The basic income ' B ' is then calculated by converting all welfare state benefits, including in-kind transfers, into a per capita figure which people are assumed to receive, regardless of work or anything else. At this level of aggregation, one would not expect to observe instances of regime S in the real world.

If, however, one looks at actual income tax and transfer systems in a more detailed way, counting social security contributions in with tax, as well as taking account of the conditional form of guaranteed income and other cash subsidies (which tend to be withdrawn as more income is earned), then it is more interesting to start the search for the real-world equivalent of the labour subsidy. What is at stake may be explained as follows. Roughly, the structure of effective marginal tax rates in many welfare states has the

than they would do under differential rewards. This static inefficiency was taken into account, through the balanced budget equation, in the optimization exercise of the previous sections. It implies that equalization of rewards will involve a lower aggregate product than unequal rewards would generate, but this does not prevent reward-equalisation policies from being sustainable maximin policies. However, once the dynamic inefficiency referred to above is added, then reward-equalizing policies may well detract from the well-being of the least talented, and/or the least endowed in external investment resources. If so, this will rule out vertical section of the optimal policy track.

³⁰ See Topel (1997, Figures 3 and 4: 70-1) for the close link between wage ratios and enrolment rates in educational categories.

³¹ See Bovenberg and Van der Ploeg (1995), and de Beer (1995). The same issue was addressed earlier by Van Kempen (1993).

shape of a truncated ‘U’: low income earners (below the threshold of guaranteed minimum income) pay close to or at 100% on each Euro earned, the middle income sections pay far less, say around 40%, while high income earners are effectively taxed at marginal rates above that, but well below 100%, say at 60%. This tax structure appears to be reasonably efficient in raising the revenue needed for public expenditure and transfers. In particular, it can be shown that any attempt to reduce the effective marginal rate of tax on the poor (whether by means of a basic income grant or by other methods) will be difficult to achieve in a budgetary neutral way (see Piketty 1997). Lowering the marginal rate in the lowest income range will require an appreciable rise in the marginal rates of tax of the most numerous income earners in the middle tax brackets. This may even be economically infeasible, for incentive reasons.

But how would these things be if governments were to have labour subsidies at their disposal of the kind discussed by Vandenbroucke? It may then be easier to enforce a more progressive tax structure. If we regard the effective tax rate of a wage earner as the ratio of proportional income tax net of the uniform labour subsidy $(tw - s)L$ and the gross wage wL , the subsidy instrument is a way of implementing a progressive tax system (see also footnote 16). Such a system would be less vulnerable to the difficulty besetting actual tax systems. For, by careful observation of the time worked by every wage earner, the amount of subsidy would be varied in such a way that wage earners are automatically grouped into fine-grained categories of gross wage-earning capacity, each with its own marginal effective tax rate, which would rise with earning capacity. One’s effective marginal rate of tax would thus be tailored to one’s earning capacity in a way it can never be if tax rates are linked to gross income only. Next, suppose that people without work were subject to the same kind of conditional benefits as exist presently. Then of course their effective tax rate would also be 100%. But if the government now again wanted to remove this unemployment trap by making (part of) the benefit unconditional, it would be able to capture the revenue needed by increasing the proportional tax rate as well as the subsidy, without having to tax the middle earners at an especially high rate.

But why do we nowhere observe this kind of taxation? Of course it may be that the instrument of labour subsidy is politically infeasible. However, considered as a mode of redistribution (or what here amounts to the same, a way of making the tax system more progressive) it would seem to be less vulnerable to the politically popular reciprocity objections that basic income proposals invariably encounter. Perhaps the absence of *pro rata* work-subsidization is better explained by the technical difficulties that the tax authority would have in accurately observing ‘time worked’, given the (increasing) diversity of paid activity. If so, then even though labour subsidies would probably meet with less political resistance than a basic income fund of comparable revenue size would meet, they are far harder to implement adequately, outside of Simplicia. This would also diminish the force of the challenge posed by the Vandenbroucke model.

5.4 Responsibility versus basic security: what about the welfare state?

Suppose, however, that the subsidy can be carried through nevertheless. Then there is another major difference between Simplia and the real world which affects the relevance of the challenge. In Simplia, the no-policy alternative is what we have called the natural distribution. In the real world, it is the conditional welfare state. On the one hand, the natural distribution does not compensate for the non-responsible factor of productivity at all. In that respect, it is harsher than the conditional welfare state. But on the other hand, the natural distribution of Simplia has a low *downside*. The least productive Simplians just have to work longer hours to earn the same as the more productive ones: there are no problems of disability and unemployment. There is no danger of the sort of cumulative misfortune, stretching over a whole life, that results from a mixture of bad brute luck, imprudence and bad option luck, in the real world of market economies. The conditional welfare state, however far it may in fact be removed from responsibility-sensitive egalitarian ideals, has emerged as a response to that danger. Its primary rationale is to provide basic security, and to insure against the risk of income loss. Given this, the welfare state's means-testing in general assistance laws, and its work-related social insurance provisions, are a way of reconciling the partly conflicting demands of basic security and insurance with the requirement that individuals make a responsible effort to stand on their own feet.

All this is well-known to the point of boredom. But it is worth repeating in the present context, for two closely related reasons. First of all it reminds us that basic security is a morally important value, which responsibility-sensitive maximin justice must seek to accommodate. The question of subsidies versus basic income in the model must therefore be re-examined in that light. Yet it is difficult to undertake such an examination, because no feasible Simplian policy embodies the rationale of the conditional welfare state. Secondly, if the reason why arrangements of basic security and social insurance have been superimposed on the market economy in the last century is to protect against cumulative misfortune, then maintaining a rigid split between responsible and non-responsible factors in conceptions of egalitarian justice is not helpful. In the model of Simplia, that split is as rigid as one can imagine. It is, moreover, reinforced by the assumption that productivity w is distributed independently of the propensity to work e . But it is more plausible that the factors for which these two variables serve as a modeling proxy are causally interconnected: productivity is partly determined by drive and effort. And the propensity to 'apply oneself' in paid activities is affected by current earning opportunities. Combined with some bad luck and negligence, such causal interconnections can drive people into a corner from which they can not escape without basic security.

Both of these reasons suggest that if, improbably, one had to decide on the starkly Simplian tradeoff

between labour subsidies and basic income *for the real world*, the decision would not be difficult: a high basic income (relative to subsistence needs) would be almost inescapable, to prevent people from ending up in dire straits for which labour subsidies would offer them no remedy. This point also weakens the force of the challenge we have been discussing above.

As Frank Vandebroucke is of course perfectly aware, the political challenge is to design policies that can adapt the conditional welfare state of the previous century to the conditions of the present one. In our view, his work indicates that the question of basic income versus and labour subsidies is more difficult to decide at the abstract plane of normative economics than has been noticed so far. This insight is to be welcomed. When these two instruments (or their real world approximations) are considered as ways of promoting an active welfare state, however, we remain reasonably sure that a substantial basic income is advisable in the policy mix, all things considered, on grounds such as the ones set out in this section..

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APPENDIX

In section 3 two optimal policy tracks were presented, one for regime T and one for regime S. The formulas underlying these optimal policy tracks can be derived by maximizing Y_L with respect to (s, t) , taking into account the requirement of a balanced budget. So, the equations of section 3 which are relevant here are:

$$(4) B(w, e, t, s) = \bar{e}[t(1-t)(S_w^2 + \bar{w}^2) + (2t-1)\bar{w}s - s^2]$$

and

$$(5) \max_{t,s} Y_L = B + [(1-t)w_L + s]L$$

Substituting the balanced budget equation (4) for B into (5) and differentiating Y_L with respect to t and s gives:

$$(A1) t^* = \frac{\bar{e}(S_w^2 + \bar{w}^2) - w_L L}{2\bar{e}(S_w^2 + \bar{w}^2)} + \frac{\bar{w}}{(S_w^2 + \bar{w}^2)} s$$

and

$$(A2) s^* = \frac{L - \bar{e}\bar{w}}{2\bar{e}} + \bar{w}t$$

Equation (A1) expresses the optimal value t^* , given s , and Equation (A2) defines the optimal value s^* , given t . Note that, because the productivity parameters \bar{w}, w_L, S_w^2 and the average preference \bar{e} are given, t^* and s^* are functions of L . Thus, for every particular value of L , a different combination (s^*, t^*) obtains. For instance, consider the optimal values (s^*, t^*) for $L = 0$, $L = \bar{e}\bar{w}$, and $L = I$, respectively (corresponding to the three examples used in section 3 to trace the optimal policy track P^S). Substituting $L = 0$ into Equations (A1) and (A2), and solving both equations simultaneously gives³² $t^* = I/2$ and $s^* = 0$, which corresponds to point A at the optimal policy track. Analogously, the optimal tax and subsidy rate for someone with $L = \bar{e}\bar{w}$ is $t^* = I$, $s^* = \bar{w}$ (corresponding to point E on the optimal policy track), and for someone with $L=I$, it follows that $t^* = I$ and $s^* = I$ (corresponding to point F).³³

³² Using the numerical example of section 2.

³³ If it happens that the optimal t (or s) is larger than 1, then because of the constraints $0 \leq t, s \leq 1$, t (or s) is equal to 1.

Our equations (A1) and (A2) apparently differ from the equations for the optimal t , given s and the optimal s , given t , that Vandenbroucke derived on the basis of maximizing the objective advantage for the least productive workers w_L , where the choice of a particular metric of objective advantage is represented by the parameter α (see Equations (8) and (9)). However, it can be shown that Equations (A1) and (A2) are equivalent to those derived by Vandenbroucke. We will show the equivalence only for the optimal value s^* . First, substitute the labour supply function (3) $L(w, e, t, s) = e [(1-t)w + s]$ into Equation (A2). Solving for s gives:

$$(A3) \quad s^* = \frac{2\bar{e}\bar{w} - ew_L}{2\bar{e} - e} t - \frac{\bar{e}\bar{w} - ew_L}{2\bar{e} - e}$$

Next, in order to relate Equation (A3) to the equation derived by Vandenbroucke, where the optimal subsidy is a function of α , substitute $e = 2\alpha\bar{e}$ in (A3), giving:

$$(A4) \quad s^* = \frac{\bar{w} - \alpha w_L}{(1 - \alpha)} t - \frac{\bar{w} - 2\alpha w_L}{2(1 - \alpha)},$$

which is exactly identical to Equation (29) in Vandenbroucke's model (1999a/2000: 115). In the same way, the expression of t^* as a function of L according to (A1) can be rewritten so that the optimal t is a function of α .

Figure 1. Opportunity sets (OS) for the low productive under the three extremes of policies (B, t, s).

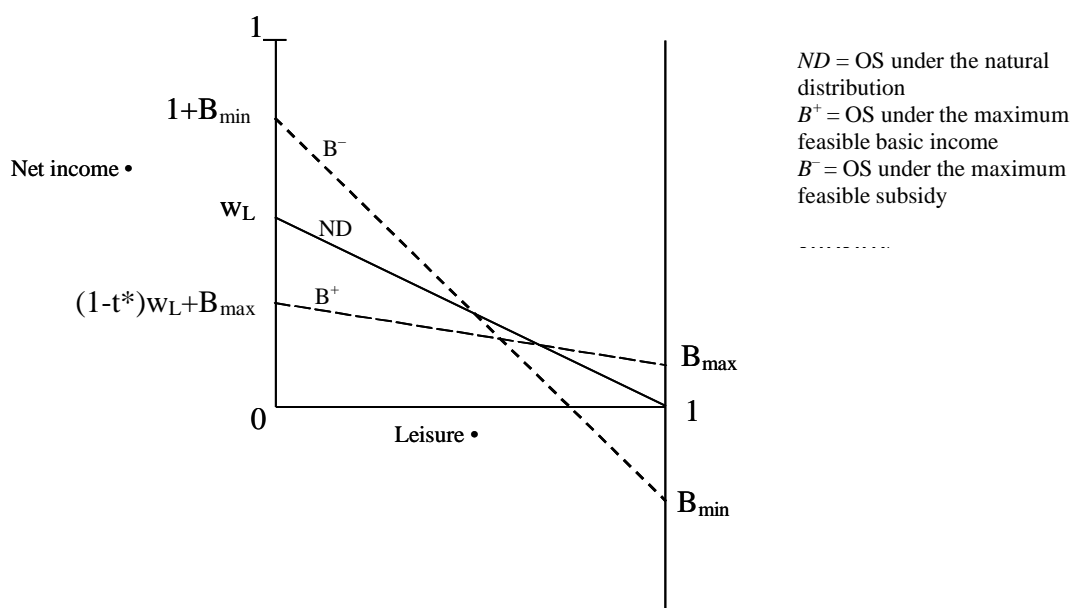


Figure 2. The optimal policy track corresponding to maximizing the opportunity set for the least advantaged w_L .

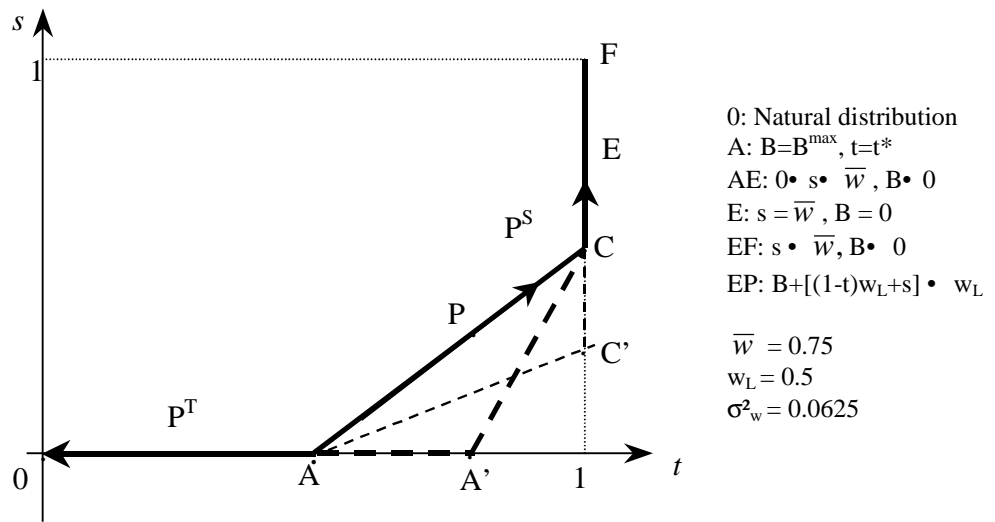


Figure 3. The set (\bullet, w_L) for which the most redistributing policy (t^*, B_{max}) under regime T is an unambiguous OS-improvement for the least advantaged $(B_{max} - t^* w_L > 0)$.

