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Responsibility and redistribution: The case of first best taxation

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Abstract. It is not straightforward to define the ethics of responsibility in cases where the consequences of changes in factors within our control are partly determined by factors beyond our control. In this paper, we suggest that one plausible view is to keep us responsible for the parts of the consequences that are independent of the factors beyond our control. Within the framework of a first best taxation problem, we present and characterise a redistributive mechanism that both satisfies this interpretation of the ethics of responsibility and the ethics of compensation within a broad class of economic environments. However, on a general basis, even this weaker version of the ethics of responsibility is not compatible with the ethics of compensation, and we report an impossibility result that clarifies the source of this conflict.

1 Introduction

The ethics of responsibility, saying that society should *not* indemnify people against outcomes that are consequences of causes that are within their control (Roemer 1993, p. 147), has been assigned a prominent part in recent egalitarian reasoning.[1] However, as is by now well-known, this idea is not easily

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[1]See Roemer (1993, 1996, 1998), Arneson (1989) and Cohen (1989). For critical reviews of parts of this literature, see Fleurbaey (1995a) and Anderson (1999). Notice that the concept of responsibility does not have to be assigned to an agent on the basis of control, but can also be assigned on the basis of delegation (see Fleurbaey 1995a,b). In this paper, we refer to control as the basis of responsibility, but the arguments could as well be reformulated within a framework where we have responsibility by delegation.

combined with the other main aspect of egalitarian reasoning, to wit the ethics of compensation, which states that society should eliminate inequalities due to factors that are beyond the control of people. In a remarkable series of papers, it has been argued that the ethics of responsibility and the ethics of compensation are not necessarily compatible on a general basis, and hence it might seem like we have to make a trade-off between these two principles in the design of egalitarian institutions.[2]

The conflict highlighted in the literature, however, rests on a particular interpretation of the ethics of responsibility, named the principle of natural reward (Fleurbaey 1995d, p. 685). Thus it is of much importance to ask whether there are other plausible approaches to the ethics of responsibility that are more compatible with the ethics of compensation. In this paper, we propose a particular weakening of the principle of natural reward, which, in our view, more accurately captures what follows from the ethics of responsibility.[3] We argue that the agents should be responsible for the consequences that are *independent* of factors beyond their control, but not necessarily for all of the consequences following a change in the factors within their control. On a general basis, even this weaker version of the ethics of responsibility is not compatible with the ethics of compensation, and we report an impossibility result that clarifies the source of this conflict. However, given a rather reasonable restriction on the economic environment, we show that this framework characterises a particular redistribution mechanism.

The arguments will be illustrated in the context of first best taxation, where we assume that effort and talent determine the pre-tax income of individuals. Only effort can be controlled by the individual, and thus our purpose will be to establish a redistributive mechanism that eliminates the effects of talent (the ethics of compensation) but not of effort (the ethics of responsibility). In Sect. 2, we outline the basic conflict between the principle of natural reward and the ethics of compensation. However, we also argue that the principle of natural reward is not the only plausible interpretation of the ethics of responsibility in a general environment. On the basis of this discussion, we suggest a condition that (in our view) provides a reasonable restriction of the ethics of responsibility, and in Sect. 3 we prove that this condition contributes to a characterisation of a particular redistributive mechanism in a broad class of economic environments. This redistributive mechanism assigns to each agent a transfer that equals the part of the consequences of his choice of effort which is independent of talent and moreover a uniform transfer which reflects that everyone has a right to an equal share of the amount of resources produced by the common pool of talent. Within a broad class of economic environments, the outlined redistributive mechanism

[2] See Bossert (1995), Fleurbaey (1994, 1995a, 1995b, 1995c), and Bossert and Fleurbaey (1996).

[3] Other weakenings have been suggested by Bossert (1995), Bossert and Fleurbaey (1996), Fleurbaey (1994, 1995), Sprumont (1997) and Iturbe-Ormaetxe (1997).

is closely related to the class of *egalitarian-equivalent* mechanisms considered by Bossert and Fleurbaey (1996). In fact, in these cases it supports the same post-tax income distribution as the egalitarian-equivalent mechanism defined by the talent of the agent that has the lowest marginal productivity of effort. However, on a more general basis, the suggested mechanism violates the minimal condition imposed on the ethics of responsibility, and in Sect. 3 we prove that this is also the case for any other mechanism satisfying the ethics of compensation. Section 4 contains concluding remarks.

2 The problem

It turns out that even if we agree on how to make a distinction between relevant and irrelevant factors, it is not straightforward to design a redistributive mechanism that satisfies both the ethics of responsibility and the ethics of compensation. This is well-known, but it will be instructive for the rest of the discussion to illustrate the problem in a very simple two-person case.

Assume that we have one person with high talent and one person with low talent, who can either exercise high or low effort. Table 1 gives their pre-tax income, as a function of effort.

Our aim is now to design a redistributive mechanism that compensates for differences in talent but not for differences in effort. In doing this, we assume that there are no efficiency losses from taxation.

The redistributive mechanism has to cover four cases, as presented in Table 2.

Let us first look at Case 1 and Case 4, where both persons exercise the same amount of effort and hence only differ in talent. By the ethics of compensation, talent is an irrelevant factor that cannot justify any inequalities. Thus, in these cases, the redistributive mechanism must assign the same amount of income to the two persons. This is the principle of *full compensation* (Bossert and Fleurbaey 1996, p. 346).

Table 1. Pre-tax income (situation A)

	Effort		
Talent		High	Low
	High	100	20
	Low	70	0

Table 2. The relevant cases

	Low talent		
High talent		High effort	Low effort
	High effort	Case 1	Case 2
	Low effort	Case 3	Case 4

Equal Income for Equal Effort: If two persons exercise the same effort, then they receive the same post-tax income.

To evaluate Case 2 and Case 3, where people exercise different levels of effort, it is instructive to compare these cases to Case 4. The only difference between Case 2 (Case 3) and Case 4 is that the more talented (less talented) exercises more effort, and hence it has been argued that according to the ethics of responsibility the agent should bear the consequences (Fleurbaey 1995d). This is often referred to as the principle of natural reward or *no compensation*, which can be stated as follows within our framework (Bossert and Fleurbaey 1996, p. 349).

Individual Monotonicity in Effort: A change in total pre-tax income due to a change in one agent's effort only affects this person's post-tax income.

However, if we apply the principle of full compensation on Case 4 and then the principle of no compensation when moving from Case 4 to Case 3 and from Case 3 to Case 1, we get the post-tax distributions shown in Table 3.

As it is easily seen, the redistributive mechanism in Table 3 violates the principle of full compensation in Case 1. Hence, we have a problem, which will be present in any economy where we do not have an additively separable pre-tax income function; that is, as long as the gain in pre-tax income following an increase in effort is not *independent* of talent (see Fleurbaey 1995a; Bossert 1995; Bossert and Fleurbaey 1996).

The importance of this problem depends, of course, on the validity of the underlying condition. In the context of an additively separable pre-tax income function, the principle of *Individual Monotonicity in Effort* seems to be an obvious interpretation of the ethics of responsibility. The change in pre-tax income caused by a change in effort is independent of talent, and hence it should be uncontroversial to view this as a consequence of a cause *completely* within the control of the agent. However, the situation is more problematic when we lack additive separability. On the basis of control, we may want to hold a talented person responsible for *exercising high effort*, but not necessarily for *being a talented person* exercising high effort. Hence, it can be argued that from the ethics of responsibility, it follows that the talented person should bear the consequences of exercising high effort per se, but not necessarily that it should bear the consequences of exercising high effort as a talented person.

Table 3. Redistribution mechanism 1 (situation B)

	Low talent		
High talent		High effort	Low effort
	High effort	90, 80	
	Low effort	10, 80	10, 10

But what are the consequences of exercising high effort per se? Obviously, in the face of non-separability, there is no clear answer to this question. In order to make the ethics of responsibility operational, however we need a standard for measuring these consequences. One possibility is of course to follow the framework underlying *Individual Monotonicity in Effort,* where people are responsible for all of the consequences that follow from an increase in effort. However, in our view, an equally plausible approach is to keep people responsible for the consequences of changed effort that would take place *independent* of their talent. But how should we interpret this general idea? There are various possibilities, but we suggest the following definition: The part of the consequences of changed effort that is independent of talent is equal to the part of the consequences that would take place whatever person in society exercised this change. In other words, we suggest that the minimum marginal productivity may equally well serve as a reasonable standard for the ethics of responsibility.[4]

By way of illustration, study the move from Case 4 to Case 3 to Case 1 in Table 3. When we move from Case 4 to Case 3, the less talented person increases his effort. As a consequence, he gains 70 in pre-tax income. *Independent of talent*, as defined by us, an increase in effort would imply at least a gain of this size, and hence it seems indisputable to let the person be responsible for this change. On the other hand, when we move from Case 3 to Case 1, the more talented person increases his effort and by that gains 80 in pre-tax income. In this case, it can be argued that to keep the person responsible for all of this is to overlook the fact that he gains so much *because* he is more talented. If the more talented was the less talented, he would gain 70, and the more talented cannot be held responsible for the fact that he or she is more talented. Consequently, it can be argued that all that follows from the ethics of responsibility in this case is that the more talented keeps 70. Whether or not he should keep the remaining 10 would in this case become an issue of the ethics of compensation.

However, a violation of *Individual Monotonicity in Effort* may imply that equally talented people pay different amounts of taxes (or receive different subsidies). Hence, it may violate the following version of the ethics of responsibility (see Bossert and Fleurbaey 1996, p. 348):

Equal Transfer for Equal Talent: Equally talented people should pay the same amount of tax (or receive the same subsidy).

Some may find this troublesome, arguing that in these cases the implications of the ethics of responsibility should be obvious. The only

[4] The associate editor has suggested that, for example, maximum marginal productivity may be an equally interesting definition the independence part. Even though we agree that it is also possible to focus on maximum productivity within the framework of equal opportunity ethics, we find it hard to see that maximum marginal productivity can serve as a definition of the consequences of changed effort that would take place *independent* of talent.

difference between two talented persons would be the difference in effort they exercise, and hence it seems hard to deny that it follows from the ethics of responsibility that they should bear the consequences of any differences in this respect. But the same argument applies again. Look at the case with two talented persons, one exercising high effort and the other exercising low effort. Both persons can be held responsible for their *effort levels*, but none of them can be held responsible for the fact that they are *talented persons*. Hence, it follows from the ethics of responsibility that we should hold them responsible for any consequences following from differences in effort levels, but not necessarily for all of the consequences following from the fact that these differences in effort levels take place in the context of talented persons. Consequently, given this interpretation of the ethics of responsibility, we may allow for differences in tax levels among equally talented persons.

In sum, we suggest that it is far from obvious how to define the ethics of responsibility in the context of a non-separable pre-tax income function. However, we will consider some restrictions on the set of admissible definitions. First, we demand that the agents *at least* should be held responsible for the actual consequences that are independent of talent. Second, we demand that the agents should not be held responsible for *more* than the actual consequences following an increase in effort. In our view, these restrictions follow naturally from our understanding of the idea of being responsible for something. On the one hand, it seems unreasonable to be held responsible for more than what you have caused by your choices (the second restriction); on the other hand, if the consequences of your choices are partly beyond your control, then it seems reasonable to restrict your responsibility (the first restriction).

The two restrictions allow for a very broad view on the ethics of responsibility, including the position represented by *Individual Monotonicity in Effort*. However, in the next section, we will prove that in combination with the ethics of compensation this framework supports a particular redistributive mechanism.

3 Analysis

Consider a society with a population $N = \{1, \ldots, n\}$, $n > 2$, where agent i's effort is e_i and his talent t_i. We assume that $e_i, t_i \in \Re$, where $\Re$ is the set of real numbers.[5] Let $a_i = (a_i^E = e_i, a_i^T = t_i)$ be a characteristics vector of i, $a = (a_1, \ldots, a_n)$ a characteristics profile of society (which can be partitioned into $a^E = (a_1^E, \ldots, a_n^E)$ and $a^T = (a_1^T, \ldots, a_n^T)$, $\Omega = \Omega_E \times \Omega_T \subseteq \Re^2$ the set of all possible characteristics vectors, where Ω_E is the set of all possible effort

[5] Hence, we do not consider the multidimensional version of this problem: see Bossert and Fleurbaey (1996).

levels and Ω_T the set of all possible talents. We assume that there are at least three distinct effort levels in Ω_E and two distinct talent levels in Ω_T. $\Omega^n \subseteq \Re^{2n}$ is the set of all possible characteristics profiles. Let $\tilde{\Omega}^n = \Omega_E^n \times a^T \subseteq \Omega^n$ for some $a^T \in \Omega_T^n$, where there exist i, $j \in N$ such that $a_i^T \neq a_j^T$. In other words, we do not consider interprofile conditions with respect to talent,[6] but assume that there is a single characteristics profile of talent in society. This profile, however, can be any profile within the set of possible talent profiles, as long as there are some differences in talent in the population. We impose no other restrictions on the set of permissible characteristics vectors and profiles.

The income function $f : \Omega \rightarrow \Re$ is assumed to be strictly increasing in both arguments. The income function is additively separable if and only if there exist functions $g : \Omega_E \rightarrow \Re$ and $h : \Omega_T \rightarrow \Re$ such that $f(e,t) = g(e) + h(t)$, $\forall e \in \Omega_E, t \in \Omega_T$. Moreover, define $\min a^E = \min\{a_1^E, \ldots, a_n^E\}$ and for any $e^1, e^2 \in \Omega_E$, where $e^2 \geq e^1$, $\min \Delta(a^T, e^2, e^1) = \min\{[f(a_1^T, e^2) - f(a_1^T, e^1)], \ldots, [f(a_n^T, e^2) - f(a_n^T, e^1)]\}$. Finally, we introduce a redistribution mechanism, F: $\tilde{\Omega}^n \rightarrow \Re^n$, which for every distribution of effort assigns a post-tax income to each person. We assume that F is efficient, that is, it satisfies the feasibility condition $\sum_{i=1}^n F_i(a) = \sum_{i=1}^n f(a_i)$, $\forall a \in \tilde{\Omega}^n$.

At the outset, let us have a look at the following redistributive mechanism, which is only well-defined if we have additive separability in the pre-tax income function.

$$F_k^0(a) = g(a_k^E) + \frac{1}{n}\sum_{i=1}^n h(a_i^T), \quad \forall a \in \tilde{\Omega}^n, \forall k \in N.$$

Bossert (1995) shows that F^0 is the only mechanism that satisfies the following two conditions.

Equal Income for Equal Effort (EINEE): $\forall a \in \tilde{\Omega}^n$, $\forall i, j \in N$, $a_i^E = a_j^E \rightarrow F_i(a) = F_j(a)$.

Individual Monotonicity (IM): $\forall a, \tilde{a} \in \tilde{\Omega}^n, \forall k \in N, a_j^E = \tilde{a}_j^E, \forall j \neq k \rightarrow F_j(a) = F_j(\tilde{a})$.

Hence, unless f is additively separable, we have an impossibility result.

Theorem 1. *An efficient redistribution mechanism F satisfies EINEE and IM for every $\tilde{\Omega}^n \subseteq \Omega^n$ if and only if f is additively separable, and $F = F^0$.*

[6] See Bossert (1995)

Proof. See Bossert (1995) and Bossert and Fleurbaey (1996).[7]

Next we present an efficient redistributive mechanism that, within the class of additively separable pre-tax income functions, coincides with F^0.

$$F_k^{MIN}(a) := \min \Delta(a^T, a_k^E, \min a^E) + \frac{1}{n}\sum_{i=1}^{n}(f(a_i) - \min \Delta(a^T, a_i^E, \min a^E)), \forall a \in \tilde{\Omega}^n, \forall k \in N$$

This redistribution mechanism consists of two parts: the first part dealing with the ethics of responsibility and the second part with the ethics of compensation. Every agent receives a transfer which equals the part of the consequences of his choice of effort that is *independent of talent* and, moreover, a uniform transfer which reflects that everyone has a right to an equal share of the amount of resources produced by the common pool of talent.

We will now look at a way of characterising this redistributive mechanism. First, we introduce the restriction on the ethics of responsibility that it should never give a compensation smaller than the consequences that are *independent* of talent or larger than the actual increase in pre-tax income of the agent in question.

Restricted Compensation (RC): For any $j \in N$ *and* $a, \tilde{a} \in \tilde{\Omega}^n$, *where* $\tilde{a}_j^E > a_j^E$ *and* $a_i = \tilde{a}_i$, $\forall i \neq j$, $f(\tilde{a}_j) - f(a_j) \geq F_j(\tilde{a}) - F_j(a) \geq \min \Delta(a^T, \tilde{a}_j^E, a_j^E)$.

In the formal analysis, a much weaker version of *RC* is sufficient, saying that a person should be rewarded with his or her marginal productivity if it is

[7] When presenting this result, Bossert remarks that: "For income functions f that are additively separable,..., F^0 seems very plausible. If the effects of relevant and irrelevant characteristics on income can be separated, it seems only natural to assign the entire income portion due to relevant characteristics to each agent, and divide the total income due to irrelevant characteristics equally among agents" (Bossert 1995, p. 4)."
However, notice that the fact that we know that f is additively separable does not necessarily imply that we can separate all of the effects of relevant and irrelevant characteristics on income. More importantly, for the purpose of choosing a redistributive mechanism, it really does not matter in the context of F^0. For any additively separable income function $f(e,t) = g^*(e) + h^*(t)$, where $g^*(e) = g(e) + \epsilon$ and $h^*(t) = h(t) - \epsilon$, $\epsilon \in \Re$, F^0 is invariant to the choice of ϵ.
The proof is trivial (and hence omitted). But still the observation is of some interest, because it highlights the representational nature of F^0. The appealing redistributive mechanism satisfying EINEE and IM can always be represented by F^0, but that does not imply that the numbers assigned to the effects of talent and effort in F^0 should be given complete substantive interpretation. What matters is that the consequences of any difference in effort are independent of talent, which will be reflected for every possible choice of g and h.

equal to the minimal marginal productivity in society for the effort levels in question. In addition, we need to add the trivial assumption that the post-tax income of everyone else should be the same in these cases.[8] In sum, we can capture this by the following assumption as follows.

Weakly Restricted Compensation (WRC): For any $j \in N$ *and* $a, \tilde{a} \in \tilde{\Omega}^n$*, where* $\tilde{a}_j^E > a_j^E$ *and* $a_i = \tilde{a}_i$, $\forall i \neq j$, $f(\tilde{a}_j) - f(a_j) = \min \Delta(a^T, \tilde{a}_j^E, a_j^E) \rightarrow F_j(\tilde{a}) - F_j(a) = \min \Delta(a^T, \tilde{a}_j^E, a_j^E)$ *and* $F_i(\tilde{a}) = F_i(a)$, $\forall i \neq j$.

When studying the implications of *WRC*, we need to introduce the following restriction on the income function f. We will say that f is *regular* if and only if for any $t^1, t^2 \in \Omega_T$ and any $e^1, e^2, e^3 \in \Omega_E$, where $e^3 > e^2 > e^1$, $f(t^1, e^2) - f(t^1, e^1) > f(t^2, e^2) - f(t^2, e^1) \rightarrow f(t^1, e^3) - f(t^1, e^2) \geq f(t^2, e^3) - f(t^2, e^2)$.[9] This condition should be considered widely acceptable. By way of illustration, it is common to assume (for example in labour markets) that the marginal productivity of the more talented is higher than that of the less talented for every effort level. However, the regularity condition does not rule out the opposite case. What it rules out is that there is a change in the ranking of marginal productivity at a certain effort level.

In any case, the regularity condition is needed in order to avoid an impossibility result for the framework of *EINEE* and *WRC*.

Theorem 2. *An efficient redistribution mechanism F satisfies EINEE and WRC for every* $\tilde{\Omega}^n \subseteq \Omega^n$ *if and only if f is regular and* $F = F^{MIN}$.

Proof. (1) We will first prove that there does not exist any F satisfying *EINEE* and *WRC* for every $\tilde{\Omega}^n \subseteq \Omega^n$ if f is not regular. In this case, there exist t^1, $t^2 \in \Omega_T$ and e^1, e^2, $e^3 \in \Omega_E$ such that $f(t^1, e^2) - f(t^1, e^1) > f(t^2, e^2) - f(t^2, e^1)$ and $f(t^1, e^3) - f(t^1, e^2) < f(t^2, e^3) - f(t^2, e^2)$. Suppose $\tilde{\Omega}^n = \{e^1, e^2, e^3\}^n \times a^T$, where for some $k \in N$, $a_k^T = t^2$, $a_i^T = t^1$, $\forall i \neq k$.

(2) Suppose $f(t^1, e^3) - f(t^1, e^1) \geq f(t^2, e^3) - f(t^2, e^1)$. In this case, consider some $a \in \tilde{\Omega}^n$ where $a_i^E = e^2, \forall i \in N$. By *EINEE*, $F_i(a) = F_k(a)$, $\forall i \in N$. Consider $\tilde{a} \in \tilde{\Omega}^n$, where for some $j \in N$, $\tilde{a}_j^E = e^3$ and $\tilde{a}_i = a_i$, $\forall i \neq j$. By the assumption in (1), $f(\tilde{a}_j) - f(a_j) = \min \Delta(a^T, e^3, e^2)$. Hence, by *WRC*, $F_j(\tilde{a}) - F_j(a) = f(\tilde{a}_j) - f(a_j)$ and $F_i(\tilde{a}) = F_i(a)$, $\forall i \neq j$. Consider now $\tilde{\tilde{a}} \in \tilde{\Omega}^n$, where $\tilde{\tilde{a}}_k^E = e^1$ and $\tilde{\tilde{a}}_i = \tilde{a}_i$, $\forall i \neq k$. By the assumption in (1), $f(\tilde{a}_k) - f(\tilde{\tilde{a}}_k) = \min \Delta(a^T, e^2, e^1)$.

[8] Actually, given the fact that F is efficient, this trivial assumption implies the first part of *WRC*. However, in order to see the close link to *RC*, we state the slightly more elaborate version. Notice, though, that if we were to use *RC* in our proof, we would also have to add that the post-tax income of everyone else should be the same in the special case covered by *WRC*. As stated, *WRC* is not a logical consequence of *RC*.

[9] Of course, additive separability implies that f is regular. But there is no equivalence. There are many non-separable pre-tax income functions that are regular.

Hence, by *WRC*, $F_k(\tilde{a}) - F_k(\tilde{\tilde{a}}) = f(\tilde{a}_k) - f(\tilde{\tilde{a}}_k)$ and $F_i(\tilde{a}) = F_i(\tilde{\tilde{a}})$, $\forall i \neq k$. Consequently, $F_j(\tilde{\tilde{a}}) - F_k(\tilde{\tilde{a}}) = \min\Delta(a^T, e^2, e^1) + \min\Delta(a^T, e^3, e^2)$. Finally, consider $\tilde{\tilde{\tilde{a}}} \in \tilde{\Omega}^n$, where $\tilde{\tilde{\tilde{a}}}_k^E = e^3$ and $\tilde{\tilde{\tilde{a}}}_i = \tilde{a}_i$, $\forall i \neq k$. By the supposition in the first sentence of (2), $f(\tilde{\tilde{\tilde{a}}}_k) - f(\tilde{a}_k) = \min\Delta(a^T, e^3, e^1)$. Hence, by *WRC*, $F_k(\tilde{\tilde{\tilde{a}}}) - F_k(\tilde{a}) = f(\tilde{\tilde{\tilde{a}}}_k) - f(\tilde{a}_k) = [f(t^2, e^3) - f(t^2, e^2)] + \min\Delta(a^T, e^2, e^1)$ and $F_i(\tilde{\tilde{\tilde{a}}}) = F_i(\tilde{a})$, $\forall i \neq k$. Consequently, $F_j(\tilde{\tilde{\tilde{a}}}) = F_j(\tilde{a}) = F_k(\tilde{a}) + \min\Delta(a^T, e^2, e^1) + \min\Delta(a^T, e^3, e^2) < F_k(a)$. However, this violates *EINEE*, and hence the supposition in the first sentence of (2) is not possible.

(3) Suppose $f(t^1, e^3) - f(t^1, e^1) < f(t^2, e^3) - f(t^2, e^1)$. By the same line of reasoning as in (2), we can show that this supposition is not possible. The only difference is that we in this case consider an $\tilde{\tilde{a}} \in \tilde{\Omega}^n$, where $\tilde{\tilde{a}}_j^E = e^1$ and $\tilde{\tilde{a}}_i = \tilde{a}_i$, $\forall i \neq j$. Hence, if f is not regular, then there does not exist an F satisfying *EINEE* and *WRC* for every $\tilde{\Omega}^n \subseteq \Omega^n$.

(4) We will now prove that if f is regular and F satisfies *EINEE* and *WRC*, then $F = F^{MIN}$, i.e. for any $\tilde{\Omega}^n \subseteq \Omega^n$ and any $a \in \tilde{\Omega}^n$, $F_i(a) = F_i^{MIN}(a)$, $\forall i \in N$. In this case, the fact that f is regular implies that there exists an $l \in N$ such that for any $e^1, e^2 \in \Omega_E$, where $e^2 > e^1$, $f(a_l^T, e^2) - f(a_l^T, e^1) = \min\Delta(a^T, e^2, e^1)$. Now consider $\tilde{a} \in \tilde{\Omega}^n$, where $\tilde{a}_l^E = \min a^E$ and $\tilde{a}_i = a_i$, $\forall i \neq l$.

(5) Suppose there exists some $k \in N$ such that $F_k(\tilde{a}) - F_l(\tilde{a}) \neq \min\Delta(a^T, \tilde{a}_k^E, \min\tilde{a}^E = \tilde{a}_l^E)$. Consider $\tilde{\tilde{a}} \in \tilde{\Omega}^n$, where $\tilde{\tilde{a}}_l^E = \tilde{a}_k^E$ and $\tilde{\tilde{a}}_i = \tilde{a}_i$, $\forall i \neq l$. But then it follows from the supposition in the first sentence of (5) that $F_l(\tilde{\tilde{a}}) \neq F_k(\tilde{\tilde{a}})$, which violates *EINEE*. Hence, the supposition cannot be correct.

(6) By (5) it follows that $F_i(\tilde{a}) - F_l(\tilde{a}) = \min\Delta(a^T, \tilde{a}_i^E, \min\tilde{a}^E = \tilde{a}_l^E)$, $\forall i \in N$. F is efficient, and hence $F_l(\tilde{a}) = \sum_{i=1}^n f(\tilde{a}_i) - \sum_{i \neq l} F_i(\tilde{a}) = \sum_{i=1}^n f(\tilde{a}_i) - \sum_{i \neq l}[F_l(\tilde{a}) + \min\Delta(a^T, \tilde{a}_i^E, \min\tilde{a}^E = \tilde{a}_l^E)]$. If we take into account that $\min\Delta(a^T, \tilde{a}_l^E, \min\tilde{a}^E = \tilde{a}_l^E) = 0$ and reorganize, we find that $F_l(\tilde{a}) = \frac{1}{n}\sum_{i=1}^n [f(\tilde{a}_i) - \min\Delta(a^T, \tilde{a}_i^E, \min\tilde{a}^E)]$. Moreover, we know from (4) that $f(\tilde{a}_l) = f(a_l) - \min\Delta(a^T, a_l^E, \min a^E)$, $f(a_i) = f(\tilde{a}_i)$, $\forall i \neq l$, and $\min\tilde{a}^E = \min a^E$. Hence, $F_l(\tilde{a}) = \frac{1}{n}\sum_{i=1}^n [f(a_i) - \min\Delta(a^T, a_i^E, \min a^E)]$. Consequently, taking into account (from (4)) that $F_i(\tilde{a}) = F_i(a)$ and $\min\Delta(a^T, a_i^E, \min a^E) = \min\Delta(a^T, \tilde{a}_i^E, \min\tilde{a}^E)$, $\forall i \neq l$, we find that $F_i(a) = \min\Delta(a^T, a_i^E, \min a^E) + \frac{1}{n}\sum_{i=1}^n [f(a_i) - \min\Delta(a^T, a_i^E, \min a^E)$, $\forall i \neq l$. Finally, from (4) it follows that $F_l(a) - F_l(\tilde{a}) = \min\Delta(a^T, a_l^E, \min a^E)$, and then this part of the proof is completed by taking into account that $F_l(\tilde{a}) = \frac{1}{n}\sum_{i=1}^n [f(a_i) - \min\Delta(a^T, a_i^E, \min a^E)]$.

(7) It is easily seen that F^{MIN} is efficient and satisfies *EINEE* for every $\tilde{\Omega}^n \subseteq \Omega^n$. If f is regular, it also follows straightforwardly that F^{MIN} satisfies *WRC* (and *RC*) for every $\tilde{\Omega}^n \subseteq \Omega^n$

Hence, if we accept *RC* (or *WRC*) as a minimal condition on the ethics of responsibility, we either face an impossibility result or a characterisation result. If f is not regular, then there does not exist any version of the ethics of responsibility satisfying *RC* that is compatible with the ethics of compensation. However, in all cases where f is regular, we have a *unique* redistributive mechanism that both satisfies the ethics of compensation and this restriction on the ethics of responsibility.

In fact, the mechanism characterised in Theorem 2 is closely related to a member of the class of *egalitarian-equivalent* mechanisms considered by Bossert and Fleurbaey (1996).[10] This class can be defined as follows:

$$F_k^{EE}(a) := f(\hat{a}^T, a_k^E) + \frac{1}{n}\sum_{i=1}^{n}(f(a_i) - f(\hat{a}^T, a_k^E)), \quad \forall a \in \tilde{\Omega}^n, \forall k \in N,$$

where $\hat{a}^T$ is defined as the reference talent. As remarked by Bossert and Fleurbaey (1996, p. 344), "the choice of a particular reference vector is an important issue". They do not attempt to solve this problem, but suggest a mechanism that can be applied once this decision has been made. In this respect, our result supplements their analysis, because Theorem 2 provides a characterisation of a mechanism that is equivalent to a member of this class when f is regular.[11]

Remark 1. *F^{MIN} supports the same post-tax income distribution as the egalitarian-equivalent mechanism defined by the reference talent to the agent who has the lowest marginal productivity of effort (though not necessarily the least talented in the profile) if and only if f is regular.*

Proof. The only-if part is trivial. If f is regular, then there exists an $l \in N$ such that for any $e^1, e^2 \in \Omega_E$, where $e^2 > e^1$, $f(a_l^T, e^2) - f(a_l^T, e^1) = \min \Delta(a^T, e^2, e^1)$. In this case, as is easily seen, F^{MIN} equals the member of the class of egalitarian equivalent mechanism with a_l^T as the reference talent.

It can be instructive to compare Theorem 2 with the characterisation of the egalitarian equivalent mechanism in Bossert and Fleurbaey (1996, Theorem 1). First, Bossert and Fleurbaey (1996) work within a more general framework that allows for multi-dimensional characteristics of talent and effort, whereas we assume (as Sprumont 1997) that talent and effort are real variables. Second, Bossert and Fleurbaey (1996) rely on an interprofile version of the ethics of compensation (with respect to talent), contrary to our single profile framework. Third, they do not impose any restrictions on f. In particular, they do not demand that f is regular. Finally, they impose a less specific version of the ethics of responsibility, which demands no transfers between agents if everyone has the same level of talent (equal to the reference talent). This is also implied by *RC*, which in addition imposes restrictions on the ethics of responsibility in cases where the agents' talent differ. In sum, roughly speaking Bossert and Fleurbaey (1996) provide a very general interprofile characterisation of the class of egalitarian-equivalent mechanisms, whereas we attain a single profile characterisation of a mechanism equivalent to a particular member of this class by adding some restrictions on the pre-tax income function and on the ethics of responsibility.

[10] See also Fleurbaey (1995c).

[11] See also Sprumont (1997).

4 Conclusion

It is not straightforward to define the ethics of responsibility in cases where the consequences of changes in factors within our control are partly determined by factors beyond our control. In this paper, we suggest that one plausible view is to keep us responsible for the parts of the consequences that are independent of the factors beyond our control, and we present and characterise a redistributive mechanism that satisfies this interpretation of the ethics of responsibility.

Even for the redistributive mechanism outlined in this paper, it will be the case that some people gain more than others in post-tax income from an increase in effort. But this will not produce any unjustifiable inequalities, because the premium assigned to extra effort will be independent of talent. Hence, everyone gains when a person with high productivity increases effort, and as a result the inequalities in post-tax income only reflects differences in effort. As remarked by Rawls (1971, p. 102), the natural distribution of talent is neither just nor unjust, but simply a natural fact. What is just and unjust is the way institutions deal with these facts. We suggest that in the case of first best taxation, (within a broad class of economic environments) we can deal with these facts in a way that satisfies both the ethics of compensation and a plausible version of the ethics of responsibility.

References

Anderson E (1999) 'What is the point of equality'. Ethics 109: 287–337

Arneson RJ (1989) Equality and equal opportunity for welfare. Philos Stud 56: 77–93

Bossert W (1995) Redistribution mechanisms based on individual characteristics. Math Soc Sci 29: 1–17

Bossert W, Fleurbaey M (1996) Redistribution and compensation. Soc Choice Welfare 13: 343–355

Cohen GA (1989) On the currency of egalitarian justice. Ethics 99: 906–944

Fleurbaey M (1994) On fair compensation. Theory Decision 36: 277–307

Fleurbaey M (1995a) Equal opportunity or equal social outcome. Econ Philos 11: 25–55

Fleurbaey M (1995b) The requisites of equal opportunity. In: Barnett WA, Moulin H, Salles M, Schofield N (eds) Social choice, welfare, and ethics. Cambridge University Press, Cambridge, pp 37–54

Fleurbaey M (1995c) Three solutions for the compensation problem. J Econ Theory 65: 505–521

Fleurbaey M (1995d) Equality and responsibility. Eur Econ Rev 39: 683–689

Iturbe-Ormaetxe I (1997) Redistribution and individual characteristics. Rev Econ Design 3: 45–55

Rawls J (1971) A theory of justice. Harvard University Press

Roemer JE (1993) A pragmatic theory of responsibility for the egalitarian planner. Philos Public Affairs 22: 146–166

Roemer JE (1996) Theories of distributive justice. Harvard University Press

Roemer JE (1998) Equality of opportunity. Harvard University Press

Sprumont Y (1997) Balanced egalitarian redistribution of income. Math Soc Sci 33: 185–201