Constructing a justice model based on Sen's capability approach

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Submitted to the

Faculty of Arts and Social Sciences

in partial fulfillment of the requirements for the degree of

Master of Arts

Sabancı University

June 2008

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Acknowledgements

Foremost, I wish to thank my thesis advisor Hasan Ersel for his continuous support at every stage of this thesis. His insights and our stimulating discussions were critical for the development of the ideas presented here.

In addition, I would like to thank the members of my thesis defence committee: Ahmet Alkan and Nedim Nomer. Furthermore, I'm grateful to my family - Sevinc Yuksel, Zumral Erciyas and Deniz Yuksel for their support. Finally, I owe thanks to Deniz Cuylan who has persistently challenged me on many issues surrounding this thesis for the last two years.

I dedicate this work to my grandfather Ismail Azmi Yuksel whose never-ending intellectual curiosity has inspired me to pursue an academic path in life.

Abstract

The thesis provides a possible justice model based on Sen's capability approach.

For this goal, we first analyze the general structure of a theory of justice, identifying the main variables and issues. Furthermore, based on Sen (2006) and Kolm (1998), we look at 'transcendental' and 'comparative' approaches to justice and concentrate on the sufficiency condition for the comparative approach.

Then, taking Rawls' theory of justice as a starting point, we present how Sen's capability approach emerges as a justice model in light of its criticisms against Rawls. Analyzing the capability approach, we show that it satisfies the sufficiency condition of the comparative approach to a theory of justice.

Building on the relation between freedom and equality as determined by the capability approach, and taking diversity in human condition as a key element, we construct a formal justice model. The justice model gives lexicographic priority to basic capabilities, existence of which are considered as a precondition for other potential functionings to develop. Then social states are ranked by lexicographically comparing their common and aggregate capability sets, where the first is defined as the intersection and the second as the union of the capability sets of the members of the society.

We argue that giving priority to the common capability set captures the egalitarian aspect of the capability approach, while subsequently focusing on the aggregate capability set reflects its emphasis on freedom. Moreover, we adopt a cardinality method for ranking individual capability sets.

Özet

Bu tez Sen'in yapabilirlik yaklaşımı üzerine kurulu bir adalet modeli sunmaktadır.

Bu amaç için, önce bir adalet teorisinin genel yapısını oluşturan ana değişkenler ve konular tanımlanmıştır. Daha sonra, Sen (2006) ve Kolm (1998)'dan yola çıkarak adalet teorisine 'transandantal' ve 'karşılaştırıcı' yaklaşımlar incelenip, karşılaştırıcı yaklaşım için yeterlilik koşulları üzerine yoğunlaşılmıştır.

Rawls'ın adalet teorisini başlangıç noktası olarak alarak, Rawls'a karşı eleştiriler ışığında Sen'in yapabilirlik yaklaşımının nasıl bir adalet teorisi olarak belirdiği sunulmuştur. Yapabilirlik yaklaşımının, adalet teorisine karşılaştırıcı yaklaşım için yeterlilik koşullarını sağladığı gösterilmiştir.

Yapabilirlik yaklaşımı ile belirlenen özgürlük ve eşitlik kavramları arasındaki ilişkiden yola çıkarak, ve insanlar arası farklılıkları temel alarak, formal bir adalet modeli oluşturulmuştur. Adalet modeli, diğer potansiyel seçimlerin oluşabilmesi için ön koşul olan temel becerilere öncelik verir. Daha sonra, sosyal durumlar önce ortak ve sonra toplu yapabilirlik kümeleri karşılaştırılarak sıralanır. Ortak yapabililik kümesi bireysel yapabilirlik kümelerinin kesişimi, toplu yapabililik kümesi ise birleşimi olarak tanımlanmıştır.

Tez, ortak yapabililik kümesine öncelik verilmesinin yapabilirlik yaklaşımının eşitlikçi tarafını takip ettiğini, daha sonra toplu yapabililik kümesine odaklanmanın da yaklaşımın özgürlük vurgusunu yansıttığını savunmaktadır. Ek olarak, bireysel yapabilirlik kümelerinin sıralanması için kardinal bir yaklaşım benimsenmiştir.

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Chapter 1

INTRODUCTION

1.1 Question of Distributive Justice

The theory of distributive justice is the study of a basic, but vital question:

> **How should a society allocate its limited resources among its members who have competing claims and needs in such a way to respect concerns of equality, reciprocity, and respect for freedom?**

In Serge-Christophe Kolm's concise summary: Justice "is the justified answer to this question and its science is the theory of justice." [Kohm (1998, p. 3)] Rawls, in his masterwork, *A Theory of Justice*, which is also the origin of most of the ideas discussed in this thesis, highlights how distributive justice lies at the heart of social justice. He offers the following definition: "social justice...is the way in which the major social institutions distribute fundamental rights and duties and determine the division of advantages to form social cooperation." [Rawls (1999, p. 6)]

The smooth functioning of a society requires such decisions to be made often. How should we distribute funds among research groups or environmental agencies fighting against global warming beyond taking into account concerns of efficiency? What kind of a health care system should we adopt? How should resources be allocated different members of a society? Should wheel chairs be provided for the handicapped for free, or should we instead invest in facilities to educate the brightest in our society with that money?

It is important to note that it is especially when resources are scarce, and trade-offs are inevitable that distributive justice weighs heavy on our consciousness. A decision on whether or not to allocate resources to provide free wheel-chairs for the handicapped is fundamentally different in nature than a decision on which sectors should be supported for growth in the upcoming year. While there might a right or wrong decision in both situations, the first one has moral weight - the decision must be defended in reference to concepts such as justice and fairness.[1]

Traditional methods used in economics to tackle these questions tend to overlook this difference. Basic approach on maximizing social utility disregards the difference between these two situations. Would it be fair to buy perfume for all instead of providing a more comprehensive health care system to maximize total utility? Though, there is a lot more criticism to come against traditional approaches in the upcoming sections, the main message should be stated clearly. *A society's method of allocating resources is essentially a normative issue.* Thus, any economic model on resource allocation will inevitably have roots in a moral theory. Kolm states elegantly: "the modern theory of justice is the product of a new alliance between economics and philosophy. It can be thought of as a philosophical mind in an

[1] Sen elaborates on this issue:

> Welfare economics is concerned with policy recommendations. It explores the ways of arriving at such conclusions as "Given the choice between social states x and y, x should be chosen.". It is obvious that welfare economics cannot be "value free", for the recommendations it aims to arrive at are themselves value judgments. In view of this it must be regarded as somewhat of a mystery that so many notable economists have been involved in debating the prospects of finding value-free welfare economics. [Sen (1970, p. 56)]

For a more detailed account of this see [Sen (1970, pp. 56-70)]. Also on the relation between Ethics and Economics refer to [Sen (1987)].

economic body - and a bodyless mind is as unreal, or at least powerless, as a mindless body can be out place and dangerous." [Kolm (1998, pp. 3-4)]

In this respect, the capability approach is a valuable contribution by Amartya Sen to distributive justice. Founded on Sen's views on freedom and equality, the capability approach has evolved and grown substantially in the last twenty years, receiving input from and influencing many disciplines such as philosophy, sociology, political science. It's influence on theoretical welfare economics has been slow because Sen, though an economist at heart, has refrained from formalizing his approach to provide the necessary tool kit for economists.[2] Hence, this thesis should be evaluated as an attempt to investigate some aspects of the capability approach in mathematical terms to move in this necessary direction.

The structure of the thesis is as follows: Chapter 1 introduces the problem of distributive justice, Chapter 2 looks in depth at Rawls' contributions, Chapter 3 examines Sen's Capability Approach in response to traditional Utilitarianism and Rawls's theory of justice, Chapter 4 proposes and defends a specific justice model based on the Capability Approach, Chapter 5 serves as a conclusion.

1.2 Structure of a theory of justice

1.2.1 Equality and Freedom

> "A theory of justice is a set of considerations whose conclusion is the judgment of justice in a category of problems of justice. Such a theory consists in providing a reason for this judgment. The activity of providing a reason defines rationality. Hence, a theory of justice is an exercise in rationality." [Kolm (1998, p. 35)]

[2] Nonetheless, the capability approach has had significant influence on applied economics. Nussbaum has been leading a new movement to reinterpret and utilize the capability approach in political science and feminist economics. See [Nussbaum 2000, 2003] and [Robeyns 2003].

The capability approach has also provided philosophical ground for the development of many multidimensional inequality measures. The United Nations development index is a significant example for this.

As Kolm emphasizes repeatedly in his works, a theory of justice is a set of reasons we collectively accept to justify our institutional decisions when different people's desires or interests oppose one another and cannot all be fully satisfied. These reasons are rooted in our underlying conceptions of the society and agents that constitute it. The strength of a theory of justice relies on the clear and explicit statement of these conceptions, rather than resting on "intuitions" or "sentiments".

Equality and freedom are two of the key variables in a theory of justice. A theory of justice must characterize and support a balance between social equality and individual freedom. This is because social equality, referring to the fair and equal treatment of all members of a social group, often works contrary to individual freedom. A theory of justice provides a rational basis on which the two main variables of justice - equality and freedom - are to be considered and evaluated with respect to each other. For this, the theory must give a detailed account of the reasons for which these concepts are to be valued, and the dimensions in which they are to be respected.

Historically, for most thinkers on justice, equality is a precondition for justice. Kolm writes: "Equality is a not an arbitrary ethical stance. On the contrary, its essence is non-arbitrariness, and it is not an ethical position but a logical requirement of rationality in the normal sense of "for a reason"." [Kolm (1998, p. 35)] For Kolm when people are the same in the relevant aspects, it is rational to treat them equally since any other method would be unjustified on the assumption that the differentiating characteristics were irrelevant. [3]

Freedom also has critical value for a theory of justice. The many different reasons that could be proposed to value freedom can be put under two major classes. First, freedom plays an indispensable role as a means to achieve our desires/ satisfy our interests. One must be free to pursue the projects and goals that are valuable to him/her in life. Secondly, freedom can be seen as a condition for human existence, being. In other words, freedom

[3] We're only concerned with identifying the key variables of justice. Requirement of equality will be discussed in more detail in the further sections. For Kolm's specific defence of equality see [Kolm (1998, p. 35)]

also has value on its own, not simply as a means to some other ends.[4]

1.2.2 Transcendental vs. Comparative

Sen (2006) articulates another desirable feature of a theory of justice, namely that a theory of justice should be to direct towards a justice enhancing state even when perfect justness is unreachable.

His argument hinges on a differentiation between transcendental and comparative theories of justice: while the first approach focuses on the principle question - *what is a just society* - aiming to identify the perfectly just societal arrangements; the second approach, in contrast, concentrates on ranking alternative societal arrangements as more or less just compared to each other. The two approaches function quite differently; and as Sen shows in his paper, neither approach, in general, subsumes, or entails the other.[5]

Formally, the difference between the two approaches corresponds to how a function, $y = f(x)$ is differentially analyzed to find a social optimum. The transcendental approach only solves for the optimum x^* where $\frac{dy}{dx} \mid_{x=x^*} = 0$ and makes no judgments on any other $x \neq x^*$. In the case of the comparative approach, $x^{'}$ is determined as more just than x if $f(x^{'}) > f(x)$.

Sen points out that despite historical interest and widespread motivation to adopt the traditional approach, practical utilization of a theory of justice relies heavily on comparative judgments. Several reasons contribute to this observation.

- A 'grand partition' between the just and the unjust is often drawn too far from the real state of affairs. Namely, even after most reforms in the name of justice

[4]We will see Rawls and Sen differ in their conception of the value of freedom, and this is difference is reflected in their views on justice.

[5]The transcendental approach often cannot be utilized for comparative judgments if neither of the compared states is perfectly just. The comparative approach, on the other hand, can provide a basis for the transcendental approach only when any two states can be compared which is a very strong requirement. (The comparison relation is complete) For details refer to [Sen (2006, p. 223)]

societies are still left on the unjust side with a million other problems to solve. Such a transcendental account is thus blind to significant justice-enhancing changes that could have been evaluated with a comparative account. Moreover, we are mostly concerned with investigating the effectiveness of different ways of enhancing justice, knowing that perfectly just society is not near in sight.

- Reducing manifest injustices around the world - a crucial step most societies take every day in the name of justice - doesn't require a full transcendental theory of justice. Sen cites introduction of societal policies that abolish slavery, eliminate widespread hunger, or remove rampant illiteracy as examples to such actions.

- Another feature of the transcendental approach to justice is its extremely demanding institutional requirements for accomplishing pristine justice. Most societies currently lack the resources to establish the plethora of institutions that are necessary for the foundation of a just society. Nonetheless, Sen argues that it is still possible to enhance justice - reduce injustice - to a considerable extent. Sen's worry is that transcendental approaches which only deal with pristine justice might put a kind of 'entry barrier', hindering the application of the theory of justice to real life situations.

We have been discussing the desirability of pairwise comparisons in a theory of justice to direct us towards a just state even when pristine justice is unattainable at the time. In relation to this, one could ask about how complete such an assessment needs to be to give us a systematic comparative theory of justice. Sen argues that a systematic and disciplined theory of social justice need not take a "totalist" form. Sen explains: "Incompleteness may be of the lasting kind for several different reasons, including unbridgeable gaps in information, and judgmental unresolvability involving disparate considerations that cannot be entirely eliminated, even with full information." [Sen (2006, p.223)] Furthermore, even after vested interests and personal priorities are taken out (as is envisioned in the Original Position behind a veil of ignorance) possibly conflicting views may remain (despite significant common ground) among the members of a society on what constitutes a just society.

Sen's main conclusion is that such incompleteness must be naturally accepted, since a partial ordering can be very useful and sufficient for most purposes.

1.3 Landscape of issues crucial to the discussion

A theory of distributive justice identifies a list of criteria/rules - constituting a normative system - for a social state to be deemed as just. Such criteria, themselves are preceded by value premises. Different values or priorities give rise to different theories of distributive justice. We try to present a landscape of issues that are crucial to the discussion.

Equality/Fairness: Most of us associate a notion of equality or fairness with justice. We tend to agree that as long as people are treated fairly, resulting social state can be considered as just. This belief originates from the assumption that in a fair society, each individual, regardless of his or her differences, has a right to have equal worth and respect from the perspective of the society. Sen in his cleverly titled work "Equality of what" [Sen (1980)] points out the difficulty in identifying the correct dimension of equality for distributive justice. Equality could be interpreted in many different ways. Should there be equality among the members of a society in the distribution of resources? Or should there be equality on the level of opportunities that are available to people given these resources?[6]

Heterogeneity within the social group: Each person is distinct. We are born with different physical and mental attributes, talents, abilities and handicaps. Moreover, we experience different social, cultural and environmental conditions. Some of us live in areas with abundant natural resources; some of us are raised with strong cultural traditions which socially shape our preferences. These differences affect our choices, prospects in life. How much should a just resource allocation take these differences into account?[7]

Freedom for life achievement: The diversity of the human condition carries on to our individual conceptions of what constitutes a good life. Given the same resources, personal traits, and social/environmental conditions people can choose different paths

[6]Note that these two approaches would lead to distinct actions, since people make use of the resources given to them differently.

[7]Note that a simple equal division rule would be dismissing these differences.

in life. For most of us this freedom is crucial. We believe that, as long as we're the ones living out the consequences of our actions, no one should have a right to interfere with this freedom. In light of these intuitions, should our personal choices play any role in determining the justness of a resource allocation?

Personal responsibility: The issue of personal responsibility comes hand in hand with freedom for life achievement. We utilize the resources given to us in different ways. For some of these differences - namely, differences arising from personal traits, social/environmental conditions that are not in our control - we don't hold moral responsibility. For example, it is inevitable that brighter people have a chance to excel more in school. Someone with borderline IQ clearly cannot be held responsible for not getting the top scores in school. But in other cases, we must take responsibility for our actions. If I lose my entire wealth to gambling, can I expect a social redistribution of resources to compensate for my loss? Supporting freedom for life achievement, many argue that people should be left alone in their choices, as well as living out the consequences of their actions they are responsible for. How can these notions be integrated robustly into a theory of justice?

The role of efficiency: Efficiency is a leading concern in many problems of economics. Adopting the most efficient resource allocation is often considered for the good of the whole. But, is it also just? The question often emerges in situations where efficiency and equality come in conflict? Should efficiency play any role in determining a just resource allocation? Could we accept a trade-off between efficiency and equality?

Self-ownership/ Protection of private property: Advocates of the minimal state oppose coercive, state-enforced redistribution or resources. According to this view redistribution should take place only if voluntary. They take respect for self-ownership to be the primary value of justice. This opens up a more general question on the basis of justice. Should we look at the resulting distribution of resources, or should we instead look at the nature of the procedure that resulted with this specific distribution to make a judgment of justice? We can identify these two lines of thought as substantive vs. procedural justice.[8]

[8] Libertarians take self-ownership and protection of private property as the defining value of justice. This

We have listed the major issues that are at the heart of philosophical debate on distributive justice. Some of them work in harmony; some of them make opposing claims. The endeavor to come up with alternative systems of justice deriving from the consideration of the above values goes back at least two millennia. From Aristotle and Plato to Locke, Rousseau, Hobbes, and contemporarily most important Rawls, many great thinkers have put their mind to this question.

1.4 Social Assumptions

First, we start with a note on Rawls' ideas on public reason. Rawls claims, in a democratic society, the principle of legitimacy holds that the exercise of political power is authorized only when it is in accordance with a system (constitution) that "all citizens may reasonably

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line of thinking has roots in the writing of John Locke. Locke (1988) argues that if a person mixes her labor with an unowned part of the natural world, then she is entitled to appropriate the product as her own, as long as she thereby leaves "enough and as good for others" of that natural resource. There is a never ending historical debate on how to interpret Locke's proviso in a world of scarcity, where making use of natural resources inevitably leaves less for others.

However, it is clear that the starting point of libertarianism is respect for self-ownership, and personal responsibility. People should be able to enjoy the fruits of their efforts, be responsible for their actions regardless of the distribution of resources this leads to.

Robert Nozick refers to this as procedural justice, where the conditions of justice exist in the procedures of acquisition and transfer of goods. Nozick (1974, p. 151) relates these to the notion of entitlement as follows:

1. A person who acquires a holding in accordance with the principle of justice in acquisition is entitled to that holding.
2. A person who acquires a holding in accordance with the principle of justice in transfer, from someone else entitled to the holding, is entitled to the holding. And he adds
3. No one is entitled to a holding except by (repeated) application of 1 and 2. The key definitions become the principle of justice in acquisition and transfer, but the crucial fact remains that the same distribution of resources may be just or unjust, depending on the procedure which has resulted in it.

Libertarians point out that a libertarian perspective on justice reinforces self-regard to the members of the social group and leads to 'internalized' individual responsibility. However, as noted with regards to Nozick, problems remain because morally arbitrary inequalities can be deemed as just.

be expected to endorse in light of the principles and ideals acceptable to them as reasonable and rational." [Rawls (1993, p. 217)] Application of this principle, further demands that disputes concerning constitutional essentials, or basic questions of justice be settled, so far as possible, by principles and ideals that people can similarly endorse. This requirement of public reason suggests that people should exercise political discussion and power only in situations where they believe that the reasons they provide for their claim can be reasonably accepted by public as a whole.

Rawls' idea of public reason is too developed to do justice here as a side remark. But Rawls' main objective is to define a framework for how to legitimately establish political authority in a pluralistic society. For the survival of a democratic society Rawls takes it as a precondition that despite ideological differences, competing preferences, and religious diversity, the public can agree upon main principles and ideals.

Similarly, for questions of distributive justice to be properly analyzed, we assume we're dealing with a society with the following characteristics:

- Some form of public reason is present
  - We describe a society consisting of diverse groups, which can nonetheless reach agreement on main principles and ideals to guide their collective actions.
- Social/economic development of the society as a whole is beyond a minimal point where basic human needs can be satisfied
  - The economy is capable of offering beyond subsistence requirements to the members of the society.

It might be argued that the last condition is necessary for the first. The last condition is especially important; because it separates the type of distribute justice problems we're focusing on from problems of poverty/deprivation. We can talk about a just distribution only when there are enough resources to be distributed beyond that of simply meeting basic human needs such as nourishment and shelter. Otherwise, a theory of justice loses its

meaning when we start comparing distribution of resources among people who are starving to start with.

In analyzing issues of distributive justice, we consider these two conditions to be satisfied in the society.

Chapter 2

RAWLS

2.1 Countering Utilitarianism

In response to the commonly held traditional view - utilitarianism - Rawls proposes an alternative theory on justice based on the social contract tradition. His account of "justice as fairness" reconciles freedom and equality in a principled way. Starting with the assumption that people are both rational and reasonable with different needs and aspirations, Rawls attempts to find the principles that would nonetheless be acceptable to each of us. For this end, he offers a modern interpretation of the social contract tradition by modeling a hypothetical fair choice situation called the Original Position. Before analyzing Rawls' theory on justice we concentrate on objections against utilitarianism.

We separate general criticism from Rawls' specific objections against utilitarianism.

2.1.1 General

Consequentialism According to utilitarian theory, the justness of a distributive rule must be judged entirely by the goodness of the consequent state of affairs. The main tenet of

utilitarianism is that the just resource allocation in a society is that which maximizes the sum total of utility over all the members of the society. The motivating idea "greatest good for the greatest number of people" - in more of less the same form with varying interpretations of *good* - goes back a long time. Note that according to this line of thinking, in comparing different social states, individuals are taken into account only to the degree that their individual utility is added to aggregate utility. This allows for undesirable trade-offs between human dignity and total aggregate utility.

Consider the following situation. Upon much tedious work, a person has delicately carved a beautiful bracelet from wood. Then someone else comes along and steals this bracelet, and justifies her action by claiming that this bracelet will give her much further utility. To steal is wrong, but in utilitarian terms this new redistribution of wealth has increased the sum utility. To evaluate if the resulting social state is justice enhancing compared to the initial state, it is not sufficient to consider only the consequent aggregate utility since the new state was reached by a process we consider as immoral/unjust.

Welfarism Utilitarianism is a welfarist approach in that the justness/goodness of a state of affairs depends only on information about the utility levels of the individuals in that state; no other information is taken into account. In response, philosophers have objected that for judgments of justice people should not be considered only to the extent that they have achieved happiness or preference satisfaction. It has been argued that utilitarianism ignores the Kantian aspects of agency and autonomy of human beings.

Sen's example of the housewife in Bangladesh illustrates this point perfectly. This poor housewife is objectively deprived of some economic/social conditions that we consider as necessary. But, she was raised in a culture where she was taught to accept her disadvantaged position, and scale down her aspirations in life. Thus, she is happier, and feels more satisfied with the resources/rights/opportunities that were given to her than a rich banker from NYC with a private jet. Note that we have an information problem here: our preferences can be socially shaped by putting constraints on our

information set.[1] Given this very real problem, is it sensible to extract any information at all from the comparison/contrast of the utility levels of these two individuals? Could we then base any distributive justice decision involving these two people on the information of their utility levels?

Sum-ranking When we assume people to have von-Neumann Morgenstern utility functions[2] Utilitarianism could be considered an egalitarian theory of justice in the sense that it requires that all members of the social group to have equal weight in determining a just distributive rule. As mentioned several times already, the only criteria for the justness of a resource allocation is that it maximizes aggregate sum utility. No person's utility is considered more or less important than the others. Running into the same problems as due to its consequentialist nature - since ranking of social states are only based on the total sum utility - there is no protection on the individual level.[3]

What if large gains in aggregate utility require small sacrifices that are morally unacceptable? Note that utilitarianism approves of these sacrifices without any inquires into the nature of these sacrifices? Though in theory all people are treated equally, no one's basic rights are protected against the goal of maximizing social utility. In other words, the individual has no intrinsic worth.

[1] We assume that the housewife in Bangladesh would change her preferences if she was further informed about possibilities for her in life.

[2] von-Neumann Morgenstern utility functions are cardinally measurable, thus interpersonally comparable.

[3] John Harsanyi has been a leading name defending utilitarianism in the contemporary literature. Moreover, Harsanyi introduced the idea of a veil of ignorance. Placed behind the veil of ignorance members of the society are deprived of information about the individuating characteristics of the citizens they represent. Thus, they are unaware of their own talents, abilities, gender, ethnicity and the social/environmental conditions they are in, but they see the total society as a whole without knowing who they are within it. Harsanyi (1975) purported to show that utilitarianism would emerge as they system of distributive justice from the contemplation of people behind such a veil of ignorance. Harsanyi aggress that fairness is the defining value of distributive justice, and goes on to argue that weighing each person equally in taking the total sum represents fair treatment of people.

2.1.2 Objections from Rawls, A Theory of Justice

In the preface of *A Theory of Justice*, Rawls begins by stating that his foremost aim is to offer an alternative to utilitarianism. Rawls' pivotal contribution to distributive justice raises too many issues against Utilitarianism to do justice here; however, it is useful to present Rawls main two objections.

Firstly, similar to the general criticisms mentioned above, Rawls notes that utilitarianism in the pursuit to reach maximal social utility fails to consider the conditions of distinct individuals crucial to justice. Rawls repeats in many parts of A Theory of Justice that people have intrinsic rights that should not be subject to any calculus of social interest. Rawls clearly opposes the utilitarian view that individuals might have to make sacrifices for the good of the whole no mater what these sacrifices consist of.

On the contrary, Rawls presupposes that a social system can be separated into two aspects from the perspective of a theory of justice: first aspect defining and securing basic liberties, and the second aspect applies to "the distribution of income and wealth and to the design of organizations that make use of differences in authority and responsibility." [Rawls (1999, p. 53)] The first aspect of the social system takes absolute priority and is protected. Political liberty (the right to vote and hold public office), freedom of speech and assembly, liberty of conscience and freedom of thought, freedom the person, which includes freedom from psychological oppression and physical assault and dismemberment (integrity of the person), the right to hold personal property and freedom from arbitrary arrest and seizure [Rawls (1999, p. 53)] are examples to basic liberties that cannot be sacrificed under any utilitarian calculus.

Secondly, Rawls criticizes the utilitarian presumption that only one conception of good, denoted as utility, is sufficient as a knowledge base for an evaluation of justice in a society. Rawls embraces a pluralistic reality, namely he accepts the existence of many conflicting conceptions of the good and believes that an adequate political theory should not be prone

to problems that might arise from this.[45]

2.2 Justice and reciprocity

Rawls is the most important contemporary representative of the social contract tradition in distributive justice. The social contract tradition holds that a legitimate social system must derive its authority from the consent of the governed. It's followers go back to Thomas Hobbes and Jean-Jacques Rousseau.

Thus, Rawls aims to formulate (against the prevalent utilitarian view) a modern, substantial contractarian theory of justice based on fairness, reciprocity, and mutual recognition. Rawls begins with the premise that justice is a virtue of social and economic institutions, a virtue that can be identified by its choice worthiness in a hypothetical choice situation where there are competing claims of justice. This choice situation is referred to as the Original Position. Note that different form historic thinkers following the social contract tradition, for Rawls the Original Position is a hypothetical situation distinct from the state of nature. He is rather concerned with people who are already integrated into certain institutions. Rawls is interested in finding what kind of principles such people *would* refer to in justifying their social systems if they were faced with such a choice situation, and furthermore connecting these principles with a theory of justice.

[4]This objection has roots in the writings of Kant. According to Kant, empirical concepts such as utility can't serves as the basis of a moral law, since they fail to respect the inherent dignity of individual people.

[5]"... a contrast between the right and the good is that it is, in general a good thing that invdividuals' conceptions of their good should differ in significant ways, whereas this is not so for conceptions of right. ... Since the principle of utility is to maximize the good understood as the satisfaction of rational desire, we are to take as given existing preferences and the possibilities of their continuation into the future, and then to strive for the greatest net balance of satisfaction. But as we have seen, the determination of rational plans is indeterminate in important ways. The more evident and easily applied principles of rational choice do not specify the best plan; a great deal remains to be decided. This indeterminacy is no difficulty for justice as fairness, since the details of plans do not affect in any way what is right or just. Our way of life, whatever our particular circumstances, must always conform to the principles of justice arrived independently." [Rawls (1999, pp. 393-394)]

A conception of reciprocity among individuals of a social group becomes a key element of Rawls' understanding of fairness and justice. First, Rawls observes that justice - same as fairness - is a virtue of the institutions/practices we enter voluntarily. Since questions of justice arise when there are competing claims of justice, Rawls concludes that justice and fairness both have a in their roots the idea of reciprocity. Contemporary philosophers expound that the notion of reciprocity is what distinguishes the social contract tradition from utilitarianism. Rawls thinks it should be built into our theory of justice that as an individual we recognize the others also as people having reasonable legitimate competing claims. This sense of reciprocity forms the foundation of a just social group. Note that this relates to Rousseau's worry on aggregation vs. association in the formation of a social system as well. Unlike utilitarianism where information about individual utility levels are simply aggregated to reach total sum utility, in the social contract tradition, it is only when members recognize each other reciprocally that a just association can be formed.

2.3 Original Position and the Veil of Ignorance

Rawls invites us to imagine a hypothetical choice situation, an Original Position where people are endowed with a point of view from which a fair agreement can be reached. Rawls believes that it is in this Original Position that all members of the society agree on the principles of a just and fair society.

The Original Position is state in which people are knowledgeable about the plurality of the human condition but deliberate behind a veil of ignorance, blind to their own specific place within this plurality. Specifically, the contracting parties are ignorant concerning: their personal abilities, talents, physical condition, the social/environmental circumstances into which they are born. Deprived of knowledge of their own personal state within the society, the mutually disinterested[6] contracting parties deliberate impartially as free, equal, rational

[6]That the contracting parties have no altruistic motives is a key assumption that's been greatly criticized. But since we begin with the fact that the need to come to the Original Position results from the existence of competing claims in the society, it is natural assume that the parties are mutually disinterested.

persons. This lays the foundations for the principles representing a just society, reflecting the general will to be reached.

2.4 Two principles of Justice

From the Original Position, Rawls famously predicates that people will unanimously agree on two principles according to which our social and economic institutions should be governed. The principles are taken to be lexicographic with the first one taking priority.

(Liberty) Each person is to have an equal right to the most extensive scheme of equal basic liberties compatible with a similar scheme of liberties for others [Rawls (1999, p.53)][7]

(Difference) Social and economic inequalities are to be arranged so that:

(a) Offices and positions must be open to everyone under conditions of fair equality of opportunity

(b) They are to be of the greatest benefit to the least-advantaged members of society [Rawls (1999, p.303)]

The much debated difference principle takes all resources in a society (including even natural talents of individuals) to be common assets, and allows inequalities resulting from the assignment/distribution of them to individuals only when it will be for the benefit of the worst off in the society. Rawls doesn't claim to be making any psychological assumptions here, but believes that the set up of the choice situation enables mutual recognition and reciprocity, thereby allowing the parties to see clearly what matters to them the most. In conclusion, Rawls argues, it simply becomes rational to choose in this certain way.

[7]Basic liberties include freedoms of conscience and thought, association, expression, political liberty (to vote ad run for office), right to hold personal property, freedom from arbitrary arrest. Note that liberties associated with private ownership of property, and contractual exchange are limited for Rawls, distinguishing him from classical liberalism of Locke, or the libertarian stance of Nozick.

Note that Rawls' theory satisfies the main structure of a theory of justice. Following the contractarian tradition, he builds his conception of fairness and equality on choice worthiness in the Original Position. While basic liberties get lexicographic priority, the difference principle determines how liberty and equality are reconciled. Furthermore, as will be explored further in the upcoming section, the difference principle allows pairwise comparisons of two different states, enabling comparative judgments on justice enhancing/reducing policies even when absolute justice is unattainable.

2.5 Formalization of Rawls' difference principle

We start by assuming that the liberty principle is satisfied, namely each member of the society enjoys a compatible set of basic rights and liberties. Now we are concerned with the distribution of primary goods according to the difference principle.

We present two simple models representing Rawls' difference principle. In the first model, we take a person's welfare level (associated with one's effective use of the primary good allocated to him/her) to be representable with a utility function, and interpret the difference principle as a *maxmin* rule on welfare levels of the members of the society. The second model is more general, and the difference principle is formalized only in terms of orderings without reference to any welfare measures.

2.5.1 Difference principle as *Maxmin*

Consider a society of N people. For each person h we take a utility function u^h which measures happiness, or equivalently the degree or extent to which one's life plan is being carried out. Roemer gives this interpretation to a utility function for a Rawlsian model based on the following passage.[8]

[8]For details refer to [Roemer (1996, pp. 172-183)]

> ... a person is happy when he is in he way of a successful execution (more or less) of a rational plan of life drawn up under (more or less) favorable conditions, and he is reasonably confident that his intentions can be carried though. Thus we are happy when our rational plans are going well, our more important aims being fulfilled, and we are with reason quite sure that our good fortunes will continue. [Rawls (1999, p. 548)]

However, note that Rawls does not propose to apply the difference principle over the utility functions of the people making up the society, but only over some index of primary social goods. Roemer shows (1996, pp. 165-172) that each individual's index of primary goods is ordinally equivalent to his measure of happiness. Furthermore, since Rawls requires that the indices of primary goods be ordinally measurable and fully comparable, we can continue our analysis using utility functions.

We consider than an individual h's circumstances - genetic characteristics as well as social/environmental conditions to be represented by a vector $r^h \in \mathbf{R}^n$. Following Rawls, we assume that the primary goods a person enjoys are a function both of his circumstances as well as the social goods allocated to him. In particular, primary goods at person h's use can be represented by $u^h(x^h, r^h)$ where x^h is the social primary goods allocated to him by the allocation x.

Given these, we can state the difference principle as finding the just allocation $x \in \mathbf{X}$ which solves:

$$\max_x \min_h u^h(x^h, r^h) \tag{2.1}$$

Or comparatively we say x is justice enhancing relative to $\bar{x}$ if

$$\min_h u^h(x^h, r^h) > \min_h u^h(\bar{x}^h, r^h) \tag{2.2}$$

2.5.2 Difference principle on orderings

This approach has been developed by Sen (1970, pp. 156-158).[9]

We refer to $\widetilde{R}$ as either the extended ordering of a single person h, $\widetilde{R}_h$, with the subscript dropped, or alternatively as $\widetilde{R}_h$ for all $h = 1, ..., N$ under the axiom of complete identity.[10] Following the first interpretation, the difference principle will yield a particular person's judgment on justice. Likewise, according to the second definition, the difference principle will reflect the perspective of the society as a whole. We define D to represent an ordering on social states based on the difference principle.

Definition For all $x, y \in \mathbf{X}$:

$$xDy \leftrightarrow [\exists k : \{\forall h : x^h \widetilde{R} y^k\}] \tag{2.3}$$

Namely, social state x is preferred at least as much as state y if being any person in state x is at least as good or better than being person k in state y.

[9] A similar axiomatization of the lexicographic maxmin rule can also be found at [Sen (1976, p. 251)].

[10] According to the Axiom of complete identity $\forall i, j : \widetilde{R}_i = \widetilde{R}_j$. Namely all people in the society share the same ordering.

Chapter 3

SEN'S CAPABILITY APPROACH

3.1 Criticism of Rawls

Sen's main critique to existing theories on distributive justice - especially Rawls' theory of justice - was their failure to take into consideration the fundamental diversity in individuals' ability to utilize what has been given as available to them. A dreamer learns less from the instructor than a focused student, and Mozart can make better use of his music lessons than us. While we are responsible as agents for some of these differences, we hold no moral responsibility for some other differences. Maybe the dreamer can be blamed for not paying enough attention in class, but there is surely nothing we can do about not being born with Mozart's music genes in 18th century Austria. Sen emphasizes the importance of human diversity:

> "Human diversity is no secondary complication (to be ignored, or to be introduced 'later on'); it is a fundamental aspect of our interest in equality." [Sen (1992, p. 85)]

As noted earlier, Rawlsian distributive justice strives for equality of primary goods: the first principle demanding equality of basic liberties and the second allowing for inequalities in other primary goods only to the extent that the introduction of such inequalities improve the situation of the worst-off. Thereby, Rawlsian theory answers three main problems of traditional welfarism: 'expansive' or 'offensive' tastes and the difficulty arising from the incommensurability of different people's welfare levels. By taking primary goods as the conceptual level at which to seek equality, Rawls was not prone to problems in maximizing social welfare arising from people gaining welfare from unfairly expansive things or other people's suffering. Also since primary goods are more tangible than welfare levels, comparison across people was no longer a problem.

Despite always honoring the contributions of Rawls in his writings, Sen claimed that Rawls went too much in the other direction in countering the problems of traditional welfarism. Sen takes Rawls' focus on primary goods as an element of fetishism.

> "Rawls takes primary goods as the embodiment of advantage, rather than taking advantage to be a relationship between goods and persons." [Sen (1979, p. 216)]

Sen, on the other hand, argued vehemently that instead of focusing on primary goods, distributive justice required focusing on what goods can do for people.[1] This is exactly where Sen's approach diverges fundamentally from Rawls' to account for human diversity. Given the same holdings of goods, due to individual differences, social/environmental conditions, some people will be better or worse than others in utilizing these goods to achieve the necessary things to satisfy their needs, and to lead to a life they see as valuable.

[1] "If people were basically very similar, then an index of primary goods might be quite a good way of judging advantange. But in fact, people seem to have very different needs varying with health, longevity, climatic conditions, location, work conditions, temperament, and even body size(affecting food and clothing requirements). So, what is involved is not merely ignoring few hard cases, but overlooking very widespread and real differences. Judging advantage purely in terms of primary good leads to a partially blind morality." [Sen (1979, p. 216)]

For example, given an absolutely equal distribution of resources, a cripple clearly will not have the same opportunities in life as someone else without his disability. Since the cripple holds no moral responsibility for the physical state he was born in, Sen argues that concerns of justice would require the distribution of resources to be adjusted to compensate for his disability and allow him to enjoy opportunities similar to his fellow citizens.

3.2 A first look at the capability approach

In light of the criticisms outlined above, the core characteristic of the capability approach is to focus on what people are *effectively able to do and to be*. As in the examples above, what we can effectively do and to be is determined by our natural talents/abilities, the social/environmental conditions we are in, and or course the resources that are given to us. Sen proposes that in making evaluations of justice, we should look at what kind of things people can actually do if they choose to do so, and the kind of lives they can lead which they have reason to value. Following this, Sen concludes, the main goal of social policy making should be to remove the obstacles from people lives to enhance the freedom people have to lead the life they value.

Evaluation of individual freedom is a central theme in Sen's writings. The capability approach involves

> "judging individual advantage by the freedom to achieve, incorporating (but going beyond) actual achievements... The 'capability approach' builds on a general concern with freedoms to achieve (including capabilities to function). The capability approach points to the need to examine freedom to achieve in general and capabilities to function in particular." [Sen (1992, p. 129)]s

Taking freedom as a focal point, the key analytical distinction in Sen's approach is between the means to create capabilities and specific functionings as ends. Here, the means are the resources given to us, our natural talents and abilities, cultural/social/environmental

circumstances surrounding us that support or restrain us in our projects. Functioning on the other hand, is what we choose to become with these means - consisting of multiple dimensions including health, knowledge, education, social relations, subjective feelings.

Sen argues that evaluations of justice require examination of the extent of freedom one has to pursue ends rather than just the means to freedom. Sen writes: "freedom has to be distinguished not merely from achievement, but also from resources and means to freedom." [Sen (1992, p. 37)]

Two key concepts for Sen need clarification before we delve further in the approach. Sen describes a person's well being as being dependent upon the manner in which the person lives his life, or his activities. These Sen calls "functionings". In relation to this a person's capability set is defined to reflect the person's freedom to choose his "functionings"; namely, his freedom to choose between different activities and ways to lead this life. Sen draws our attention to the relation between capabilities and functionings:

> "Capability is primarily a reflection of the freedom to achieve valuable functionings. It concentrates directly on freedom as such rather than on the means to achieve freedom, and it defines the real alternatives we have. In this sense it can be read as a reflection of the substantive freedom. In so far as functionings are constitutive of well-being, capability represents a person's freedom to achieve well-being." [Sen (1992, p. 49)][2]

In essence, if we take the associated freedom as the 'opportunity to be able to realize certain things in life', Sen's capability approach makes 'opportunity' a key notion for distributive justice.[3] According to the capability approach, the goal of well-being, justice and devel-

[2]Sen evaluates well-being in the space of functionings. Thsese achieved functionings fully describe the kind of life an agent leads since working, resting, being literate, being healthy, being part of a community, being respected can all be considered as functionings. Thus, these functioings together constitute what makes a life valuable. We can interpret well-being as a measure on the degree of overlap between one's achieved functionings and the kind of life s/he strives for. Consequently, one's capability set reflects the limits on his/her freedom to achieve such well-being.

[3]Though opportunity is a key notion for Sen, the capability approach shouldn't be considered as a theory

opment should be to support and enhance the freedom and opportunity people have to undertake the actions and activities that they want to engage in, and be whom they want to be. In Sen's terminology, distributive justice should strive for equality in the different capability sets people have. This is because the capability set represents the vector of possible functionings that are effectively possible to the individual. Thus, the difference between capability and functioning is a difference between what is effectively possible and what is realized, or between freedoms or opportunities of achievements to choose from and actual achievements.

Note that the capability set, reflecting the opportunities available to a person, is used to capture the notion of advantage mentioned in the above quote as a critique to Rawlsian theory. (3.1) Sen believes that if justice requires equality of advantage, due to human diversity advantage should be represented by the capability set of a person, not by resources that are at her command.

One might question why Sen chose to focus on capabilities, rather than functionings? The key idea is to hold a robust notion of 'personal responsibility' and freedom in equilibrium within a framework for distributive justice. Consider this famous example by Sen: among two people who have not eaten anything for a couple of days, the first is a rich idealist fasting as a political statement; the second is in extreme poverty with no access to any food. On the face of it, both are starving severely, and they might both die as a result of the situation. Is it correct to reach a conclusion by simply comparing their functionings - which just gives us information about their nutrition levels? Certainly not. The fact that the situation arose as a result of a conscious, voluntary choice for the first person is a crucial part of the story. While the second person has a constrained capability set, the fist person has the freedom to stop fasting and eat plenty. The second person has no choice in the situation.[4] By concentrating on capabilities, Sen's framework of distributive justice leaves

based on equality of opportunity. Comparison and contrast with Dworkin's views on opportunity in section 3.4 will further illuminate this point.

[4]This example points out the difference between having a capability and not using it versus being in a state in which such a capability is denied. One might argue that the difference is not significant for someone who wants to save these people, but for a policy maker who is concerned with justice, capturing this difference could be critical.

open what people actually do with the opportunities given to them. It endows people with full personal responsibility and freedom in utilizing their capability sets.

Note that Sen's capability approach satisfies the main structure of a theory of justice. The capability approach is built on enhancing two key notions: freedom and equality. Sen believes that each person must have the freedom and opportunity to pursue the kind of life he wants to lead. Sen takes this freedom as essential to the human condition, and criticizes traditional approaches to distributive justice for dismissing this and focusing only on the means given to achieve freedom such as primary goods, or on measures of achievement such as utility. The capability approach also allows for comparative judgments: the enhancement of the capability sets of people and reducing inequalities between them are regarded as improvements in terms of justice. A detailed account of how these comparative judgments are to be evaluated requires further formalization of the capability approach. The aim of this thesis is to contribute to efforts in this direction.

3.3 How does Sen's approach differ from Rawls'?

Rawls begins by asserting that the "conception of good" held by different people are incommensurable. Consequently, utilitarianism is problematic because utility is not interpersonally comparable. Rather, he argues we should focus on a vector of primary goods that is measurable and necessary for the well being of every person in the society. Thus, he outlines the mandate of justice as to choose institutions that maximize the well being of an individual who is worst of in the society.

The critical remark Sen brings to this discussion is a conceptual differentiation between a bundle of goods, and what these goods can actually do for people. Sen argues that goods are valuable to the extent that they enable people to achieve certain life goals. Thus, he interprets the requirement of justice as equality over functionings available to a person, which is represented by the capability set.

The four common characteristics of the theories can be summarized as

- Both views are nonwelfarist. Rather than focusing on utility, Rawls looks at primary goods, while Sen looks at capability sets.
- Both views are egalitarian.
- Both views leave an important role for personal responsibility.
- Both capture a notion of equality of opportunity that differs significantly from the traditional account.

Sen's approach is an improvement over Rawls in following areas:

A differentiation between goods and what goods can do for people. This differentiation accounts for the heterogeneity of social, environmental circumstances and personal characteristics that effect how we convert resources available to us into achievements. It also clarifies why goods are valuable to us.

Explicit significance given to freedom. Sen defines a person's capability set as the set of functionings which are available to him. While traditional approaches to justice consider information in the space functionings, Sen insists that evaluations of justice should be concerned with individual's capability sets. Thus, the capability approach shifts primary focus from what people have achieved to what they can *potentially* achieve with the resources available to them. This brings freedom into the center stage of an evaluation of justice. Freedom (reflected in the extent of the capability set) is not valued simply as a means to achieve certain functions; on the contrary, it is considered as an essential element of human existence.

Multiple ways of evaluating the human condition. Sen believes that there is no unique best way to measure the human condition. He differentiates between well-being, standard of living, happiness, agency achievement, and opulence.

Non uniqueness of distributive justice. Since there are multiple ways of measuring human advantage, Sen argues that there is no unique recipe to distributive justice. By focusing on capability sets for justice, Sen makes a clear statement that questions of justice by nature must be analyzed multi dimensionally (which cannot be reduced to a single dimension such as utility). Sen believes that for practical purposes, we can order social states on the basis of different factors serving to that purpose.

3.4 Contrasting Sen's capability approach to Dworkin's views

We'll look more closely at Dworkin's take on distributive justice since it is similar to Sen's in taking opportunity to be a key notion for evaluation of justice. Nonetheless, Dworkin and Sen differ fundamentally in how they treat opportunity: while Dworkin focuses on *opportunity* on a general level, Sen is interested in equality on the level of *opportunity (capability) sets*. A detailed look at the differences between these two views will illustrate this point.

3.4.1 Dworkin on Equality of Opportunity

Dworkin's contribution to the debate on distributive justice is a detailed account of how personal responsibility is to be preserved as a robust notion when considering demands of justice.

For this end, Dworkin argues that justice requires people to be compensated for aspects of their condition which they cannot be held responsible for. In addition, he states that evaluations of justice should be independent of aspects of individuals' conditions that are under their control, and thus should be held morally responsible for. Moreover, Dworkin believes that people are not responsible for the social, environmental conditions they are born in, or for their genetic handicaps. Nonetheless, he takes the view that people are responsible for their preferences as long as they identify with them. This distinction allows

Dworkin to bring personal responsibility to the center stage of his theory.

People are born into distinct situations with different social, environmental attributes and different handicaps. These circumstances are considered as a part of his/her resource endowment such that the individual has no personal responsibility over these attributes. Individuals also differ on "preferences and ambitions". These determine how people make use of their resource endowment. Since it is assumed that people have control over these, these characteristics hold personal responsibility.

3.4.2 Reaching a just social state

Given a group of individuals with different preferences who find themselves on an island, Dworkin argues that a first step to achieving distributive justice within this small society would be to divide all resources equally among the group. Differences across preferences wouldn't be taken into account.

But, once the initial equal division is done, at the second step, a different distribution of goods would evolve, as Walrasian equilibrium is reached upon people trading their goods freely in the market according to their preferences. However, this second step doesn't take into account differences of handicap among people. Dworkin considers a handicap as "something that prevents a person from efficiently transforming external resources into welfare or into the ingredients of a successful life." [Dworkin (2000, p.247)]

At the third step, Dworkin defines a hypothetical insurance market to account for differences in handicap. Similar to Rawls' description of the Original Position where people consider questions of justice behind a veil of ignorance, Dworkin envisions all members of the society to be evaluating their situation behind a veil. Contrary to Rawls' setup, people are fully informed about their preferences and ambitions, but lack knowledge of their handicaps, though the actual distribution of handicaps in the society is known. Given such a situation, Dworkin imagines an insurance market, where people can purchase additional external resources as insurance against being born with a certain handicap with their initial allotment

of resources. In a sense, they are buying insurance to guarantee compensation if they turn out to be a person with a handicap.

There will naturally be an equilibrium with contingent claims for external resources in possible states of the world, where each possible state represents a different combination of handicap assignments in line with the known distribution. Consequently, this equilibrium will indicate a specific distribution of goods in the actual world which is one of the possible states described behind the veil. Dworkin believes that this is the last step in distributive justice, since handicaps are also taken into account. In other words, Dworkin argues that justice requires distribution of external resources to be determined by an insurance market where people are blind to their handicaps, but knowledgable of their ambitions and preferences.

3.4.3 Challenges to Dworkin

Justice as compensation. According to Dworkin, a just distribution of external resources in a society is reached by implementing a hypothetical insurance market which works to compensate people for circumstances they are not responsible for. However, the mechanism works by asking how much people are willing to pay for insurance against such circumstances. It seems problematic that the operating nature of a justice system is built on risk taking behavior of the individuals. Also, what gives us confidence that the hypothetical situation described by Dworkin provides sufficient conditions for just decisions to be made?

Value of freedom. Dworkin's account does not focus on the value of choice. It only allows for life choices to be determined by the preferences of a person, but does not give additional value on having more choices.

Judgments skewed by preferences. This issue ties to the first problem outlined above. In the hypothetical insurance market people are fully knowledgable about their preferences, and make insurance decisions accordingly. This is subject to the objection of "cheap tastes". Some women, for example, who are conditioned to have lower expec-

tations with preferences reflecting these, might give less insurance to be handicapped.

Reducing the problem to a single dimension. Dworkin's account assumes that the problem of distributive justice could be reduced to a single dimension. This is a presumption of the insurance market, since handicaps are taken to be fully insurable. We already discussed Sen's objections to this issue with respect to Rawls.

Talents. As noted, Dworkin does not take into account differences in talents. Thus, it fails to recognize that people can make use of the resources available given to them at different levels. This is one of the key strengths of Sen's capability approach.

3.5 Towards a formal model

The capability approach has found wide resonance in a number of disciples including sociology, gender studies, and political science.[5] However, its impact and development within economics as an alternative approach to problems of distributive justice has been slow and limited. The main explanation for this is probably the fact that the existing literature on the capability approach is characterized by predominantly philosophical presentation and argumentation on a conceptual level. In this regard, it lacks (or is simply underdeveloped) in the modeling and formalization that economists are used to thinking with. Also, as we have hinted to above, the current literature does not give a clear direction on how to apply the capability approach to a real problem at hand. There are many open questions surrounding formal ranking of capability sets and social states. In conclusion, it is clear that to understand exactly what the capability approach can bring to economics, a basic formalization - its translation into the language of economics - is needed. We'll be focusing on these issues in the next chapter.

At this stage, the reader naturally asks the following question: "Why hasn't Sen developed a formalization to his own capability approach?" It is a difficult question to answer. A modest guess is it that Sen insists on contributing to the discussion on a general/conceptual level,

[5] [Nussbaum 2000, 2003] and [Robeyns 2003], UN development index

the same way he refrains from providing a full list of capabilities. One of the key propositions of the capability approach is that a problem of distributive justice cannot be reduced to a single dimension; it must necessarily be analyzed on multiple dimensions. With this in mind, Sen notes that it is with each application of the capability approach that the relevant dimensions must be identified. Sen also believes that the formulation of these dimensions should be the result of a democratic process. Sen also grants that the selection might be geographically, culturally and historically influenced. Finally, Sen emphasizes the importance of public discussion and reasoning to reach a better understanding of the value and role of the specific capabilities. He wants to lay down the conceptual framework, leaving further interpretation and formalization up to specific applications.

Chapter 4

JUSTICE MODEL BASED ON THE CAPABILITY APPROACH

4.1 Introduction

Before translating Sen's capability approach into a formal model, it is important to clearly restate the main variables and tenets of the theory. Sen's capability approach is built on two main concepts: functionings and capabilities.

A *functioning* is a vector of realized achievements. It represents the actual "beings and doings" of a person, and thus corresponds to a specific set of choices made by that person.

The *capability set*, on the other hand, is simply the set of functionings that are available to the person. It represents the different ways he can choose to live. It is the set of *potentially* realizable achievements that he can attain. Whether or not a functioning is in his capability set depends on several factors:

1. Resources available to him (more specifically, set of characteristics that are extracted

from these resources).

2. Social and environmental factors, and personal traits (talents, physical handicaps, intelligence, etc.) that cannot be controlled by the agent, which determine how effectively the available resources can be utilized.

3. Availability of basic capabilities (such as sufficient nutrition, shelter, primary education, etc.) that constitute a precondition for other functionings to develop.[1]

Formally, an agents i's capability set, C^i, can be represented as correspondence such that $C^i = \mathcal{C}(r^i, t^i, b^i)$ where r^i represents the vector of resources available to him, t_i his vector of traits, and b^i his associated vector of basic capabilities.[2][3] The relation is a correspondence, not a function, since it gives us a *set* of available functionings among which an agent chooses from in real life. Moreover, how effective resources are in producing capabilities depend on the basic capabilities that are available to that person as well as his personal traits.[4] Thus, we can say that resources, personal traits, and basic capabilities work together to produce the capability set.

In a sense, the "capability set" has a misleading name. It is formally a set of potential functionings, not of capabilities. Nonetheless, since it represents the set of potentially realizable achievements, it gives us information about all the different things a person is *capable* of doing. Thus, it is called the capability set.[5]

[1] Basic capabilities will be discussed further in section 4.

[2] Formally, $\mathcal{C} : \mathbb{R}^r \times \mathbb{R}^t \times \{0,1\}^K \twoheadrightarrow \xi$, where we have assumed that resources and personal traits are represented on respectively r and t dimensional real space, K basic capabilities are represented in a binary form either taking the value 0 or 1, and ξ denotes the space of all functionings. Thus any capability set $C^i \in \xi$. We will discuss why basic capabilities are best represented in a binary form in section 4.4.

[3] Sen adopts a similar approach in [Sen (1985)], though he doesn't take basic capabilities as an input.

[4] Here, by personal traits we denote social and environmental factors as well.

[5] Sen also defines separately "refined functionings". Refined functionings includes the description of the realized functioning as well information about the set out of which this particular functioning was chosen. Fleurbaey (2002, 2005, 2006) questions if the goal of the capability approach is to shift the ethical perspective altogether from a theory of achievement to a theory of opportunities. He argues that information on achieved functionings matter as much as opportunities in making ethical evaluations. Hence, he concedes that refined functionings, considered as a pair (opportunity set, achieved functioning), not capability sets as we have

The capability approach, introduced by Sen, is meant to provide criteria for the evaluation of the social justness of collective decisions. Many decisions undertaken by the government - could be decisions regarding the allocation of resources, as well as the establishment of social rights - have effects on the individual capability sets of the agents who constitute that society. For example, an increase in public spending for making more government offices accessible to the disabled will enhance the capability sets of the disabled members of the society, often to the expense of some capabilities enjoyed by some other group.

Now we come back to how these concepts are to be utilized in the capability approach dealing with questions of distributive justice. According to the capability approach, the goal of justice should be to give equal opportunity and freedom to all members of a society to choose the kind of life they want to lead. Formally, distributive justice should be egalitarian on the level of people's capability sets, not on some dimension of functionings such as utility or well-being like many traditional approaches hold.

However due to the vast diversity in the human condition - from cultural/ economic/ environmental conditions we live in to our personal traits (appearance, physical/ mental abilities, talents) - no allocation of resources can produce the exact same capability set for all members of a society. In conclusion, absolute equality of the capability set among all people is unattainable. In light of this, a criteria for improvement in terms of justice needs to be formulated.

This leaves open several questions about how to formally apply the capability approach:

- How to rank different social states in terms of Sen's capability approach?
- How to interpret egalitarianism on the level of capability sets given significant diversity in individual conditions?
- Which criteria to use in comparing individual capability sets? (which are sets of multi-dimensional vectors)

defined them, could be viewed as a broader informational basis.

We'll tackle these questions in the following sections. The plan of the chapter is as follows. Section 2 concentrates on the problem of ranking social states in line with Sen's capability approach. Three different social ranking methods are introduced, and axiomatically analyzed, all primarily focusing on the maximization of the common capability set. In section 3, one of these ranking methods - in which the maximization of the aggregate capability set is taken as a second criteria - is defended as befitting to a justice model that rests on Sen's capability approach. Section 4 introduces basic capabilities as a separate class. Section 5 summarizes our findings as a formal model for distributive justice that rests on Sen's capability approach. Section 6 completes the model by showing that a freedom-based ranking on individual capability sets is compatible with the capability approach. Section 7 outlines a possible application of the model.

4.2 Ranking social states à la Sen

4.2.1 Focusing on the Common Capability Set

We begin with the proposition that taking human diversity as a given fact, the most effective method of adopting an egalitarian stance on the level of the capability sets is to focus on the common capability set of the society, where the common capability set is defined as the set of *potential* functionings that are available to all members of the society.

Following the goal of improving people's capability sets as much as possible while respecting concerns of fairness in line with the capability approach, a social planner planner chooses policies in order to maximize[6]the common capability set in order to reach the the most egalitarian state (in terms of Sen) attainable.[7]It must be noted that for meaningful application of this approach, only social states in which there is significant overlap of individual

[6]Formal characterization of "maximizing" the common capability set will be discussed in detail in the following sections.

[7]See Herrero et al. (1998), and Bossert et al. (1999) for different justifications of focusing on the common capability set. For literature survey on ranking sets refer to Barbera et al. (2004).

capabilities are considered. But we have already taken this as an assumption for meaningful application of distributive justice problems in the first chapter.

Maximizing the common capability set captures the fundamental strength of the capability approach by establishing a strong relation between freedom and equality. Policies motivated by traditional approaches to equality usually come in contradiction with respect for freedom. Reaching a fair state often requires putting constraints on what people can do. Sen, on the other hand, gives primary value to freedom by claiming that *potential* functionings rather than functionings should be the dimension to seek fairness. Maximizing the common capability set reflects this duality between freedom and equality: individuals' capability sets are maximized to enhance their freedom, but this is done in a way to primarily increase common capabilities for equality.[8]

This coincides with the view that the planner has no information on the individuals' preferences over capability sets, or has no objective way of comparing different peoples' preferences. Moreover, as we have noted in earlier chapters, referencing individual preferences

[8]Sen elaborates further on the relationship freedom and development in [Sen (1999)], emphasizing how freedom is both a basic constituent of development in itself as well as an enabling key element for other aspects of development. Freedoms, he argues, are not only the primary ends of development, they are also among its principal means. [Sen (1999, p. 10)] If freedom is what development advances, then there is a major argument for concentrating on that overarching objective, rather than on some particular means, or some chosen list of instruments. [Sen (1999, p.3)]

poses significant problems.[9]

However, granting that the focus should be on the enhancement of the common capability set for egalitarian concerns, there are still multiple ways of ranking social profiles of capability sets.

Herrero et al. (1998) introduce three different ways of ranking profiles of capability sets, all of them looking at the common capability set first.[10] The three different methods could be summarized as follows:[11]

Lexmin opportunity relation First the common capability set is maximized. Then, as a second step, individual capability sets are improved one by one starting with the worst[12] one.

Utilitarian opportunity relation First the common capability set is maximized. Then,

[9]Some major problems are:

- We go back to the problem we're trying to avoid with utilitarianism, namely interpersonal comparability of preferences. There are expensive, offensive, cheap tastes. Rawls and Sen have argued against utilitarianism that these shouldn't play any role in questions of distributive justice.
- Moreover, it could be argued that preferences are determined by social/environmental conditions. Taking individual preferences into account opens up a question about whether or not people should be held responsible for their preferences. This contradicts the motivational stance of the capability approach as respecting above all human diversity and people's freedom to use the opportunities that are given to them in any manner they want.
- Given that any society is made up of many individuals with distinct preferences, we face the basic problem of aggregating individual preferences to come up with a single social ordering. Any aggregation method is subject to criticisms of fairness and subjectivity.

[10]Literature on this subject, including Herrero et al. (1998) use the more general terminology 'opportunity profiles' and 'opportunity sets' that is not specific to the capability approach.

[11]The three analyzed methods here are representative of the main approaches to the issue. Though other alternative methods can also be proposed, arguments presented here will be applicable in relation to these methods as well.

[12]Identification of the *worst* or *best* capability set requires an ordering on capability sets, R^*, which is taken as an assumption now. R^* is formally characterized in section 4.6.

the aggregate capability set (defined as the union of all individual capability sets) is maximized to enhance all capabilities open to the society.

Common opportunity relation First the common capability set is maximized. Then, the difference between the capability sets of the best and worst off individuals in the society are minimized.

Now we analyze these rankings formally.

4.2.2 Introducing notation

Let $N = \{1, 2, ..., n\}$ denote the set of agents in a society. A capability set is a set $C \in \xi$ where ξ is the space of functionings available to the society. ξ is closed with respect to finite unions and intersections.[13]

The capability sets of the agents can be represented all together as a profile $\mathbf{C} = (C^1, ..., C^n) \in \xi^n$ where $C^i \in \xi$ for all $i \in N$. For any $\mathbf{C} = (C^1, ..., C^n)$, let $C^0 = (\cap_{i \in N} C^i)$ and $C^N = (\cup_{i \in N} C^i)$. Note that C^0 is the *common capability set* representing capabilities that are available to all members of a society. While, C^N is the *aggregate capability set* consisting of all the functionings that are available to at least one person in the society.

Consider a social ranking - a complete, reflexive, transitive relation R^* on - defined on ξ. For now we take R^* to be given. We leave the question of defining R^* on capability sets to the following sections. Then, for a given profile $\mathbf{C} = (C^1, ..., C^n)$ consider a permutation $s : N \to N$ such that $C^{s(n)} R^* C^{s(n-1)} R^* ... R^* C^{s(1)}$. With this, $s(\mathbf{C}) = (C^{s(1)}, ..., C^{s(n)})$. Note that taking R^* as given, a permutation $s(\mathbf{C})$ allows us to list individuals in social profile C from worst off to best off.

Moreover, if $\mathbf{C} = (C^1, ..., C^n) \in \xi^n$ is such that $C^1 \subseteq C^2 \subseteq ... \subseteq C^n$, we call $\mathbf{C}$ a *nested profile*. $\mathfrak{N}^n$ denotes the class of nested profiles in ξ^n. Also, when a nested profile $\mathbf{C}$ is such

[13] Formally ξ is closed if $C, D \in \xi$ then $C \cup D, C \cap D \in \xi$.

that $C^1 = C^2 = ... = C^n$, $\mathbf{C}$ is called a *uniform profile*, and is denoted by $\mathbf{C} = (C)$.

Now we define three methods of ranking profiles mentioned above formally:

Lexmin opportunity relation For $\mathbf{C} = (C^1, ..., C^n)$ and $\mathbf{D} = (D^1, ..., D^n)$, R_{lo} is defined by:[14]

$$CP_{lo}D \Leftrightarrow [C^0, C^{s(1)}, ..., C^{s(n)}] >_L [D^0, D^{s(1)}, ..., D^{s(n)}] \tag{4.1}$$

where the lexicographic relation, $>_L$, is defined in the following way: For any two profiles of sets $[X^1, X^2, ..., X^n] >_L [Y^1, Y^2, ..., Y^n]$ iff for some $k = 1, ..., n-1$, $X^j I^* Y^j, j = 1, ..., k$ and $X^{k+1} P^* Y^{k+1}$.

The utilitarian opportunity relation For $\mathbf{C} = (C^1, ..., C^n)$ and $\mathbf{D} = (D^1, ..., D^n)$, R_u is defined by:

$$CP_uD \Leftrightarrow [C^0, C^N] >_L [D^0, D^N] \tag{4.2}$$

For the next, we assume that R^* is representable by means of a real-valued function $\phi : \xi \to \mathbb{R}$ in such a way that $CP^*D \Leftrightarrow \phi(C) > \phi(D)$.

Moreover, we can define an equality measure on a profile, $\delta(\mathbf{C}) = \phi(C^{s(1)}) - \phi(C^{s(n)}) \leq 0$. As the difference between the best and the worst capability set shrink, value of $\delta(\mathbf{C})$ grows.

Common opportunity relation For $\mathbf{C} = (C^1, ..., C^n)$ and $\mathbf{D} = (D^1, ..., D^n)$, R_{co} is defined by:

$$CP_{co}D \Leftrightarrow [\phi(C^0), \delta(\mathbf{C})] >_L [\phi(D^0), \delta(\mathbf{D})] \tag{4.3}$$

To recap, these rankings when used as a guide to resource allocation can be interpreted as follows:

- R_{lo}: Choose a resource allocation that first improves the common capability set as much as possible, then focuses on improving the capability set of the worst off.

[14] For any preference relation R, the strict relation P is defined as: for any x and y [$xPy \leftrightarrow xRy$ and $\neg(yRx)$]. Similarly, the indifference relation I is defined as [$xIy \leftrightarrow xRy$ and yRx].

- R_u: Choose a resource allocation that first improves the common capability set as much as possible, then focuses on improving the aggregate capability set.
- R_{co}: Choose a resource allocation that first improves the common capability set as much as possible, then focuses on minimizing the difference between the capability sets of the best and worst off individuals in the society.

4.2.3 Axioms considered

Preliminary axioms on R:

Weak Efficiency on Uniform Profiles **(WEUP)** For any $\mathbf{C}, \mathbf{D} \in \xi^n$, s.t. $\mathbf{C} = (C)$ and $\mathbf{D} = (D)$, if $C \subseteq D$ then $\mathbf{D}R\mathbf{C}$.

According to WEUP if the common capability set of a uniform profile expands, then the resulting profile should be considered as least as preferable as the old profile.

Strong Efficiency on Uniform Profiles **(SEUP)** For any $\mathbf{C}, \mathbf{D} \in \xi^n$, s.t. $\mathbf{C} = (C)$ and $\mathbf{D} = (D)$, if $C \subset D$ then $\mathbf{D}P\mathbf{C}$.

SEUP states that when the common capability set of a uniform profile expands non-trivially then the resulting profile should be considered as socially preferable.

Richness **(RIC)** For any $\mathbf{C}, \mathbf{D} \in \xi^n$, s.t. $\mathbf{C} = (C)$ and $\mathbf{D} = (D)$, such that $\mathbf{C}R\mathbf{D}$, there exists $\mathbf{E} = (E)$ such that $D \subseteq E$ and $\mathbf{C}I\mathbf{E}$.

Richness* **(RIC*)** For any $\mathbf{C}, \mathbf{D} \in \xi^n$, $\mathbf{E}$, s.t. $\mathbf{C} = (C)$ and $\mathbf{D} = (D)$, $\mathbf{E} = (E)$ such that $\mathbf{C}P\mathbf{E}$, $\mathbf{D}P\mathbf{E}$, there exists $\mathbf{F} = (F)$, $\mathbf{G} = (G)$ with $E = F \cap G$ such that $\mathbf{C}I\mathbf{F}$, $\mathbf{D}I\mathbf{G}$.

RIC and RIC* put conditions on ξ^n. According to RIC, when one uniform profile is more preferable than another uniform profile, it should be possible to take a uniform profile made of a superset of the worse profile that is indifferent to the better one. RIC* states that when there are two uniform profiles preferred to a third one, the third one can be expanded to form two different profiles that are indifferent to the first two considered.

Note that RIC* $\rightarrow$ RIC.

Intersection and worst-off difference **(IWI)** For any $\mathbf{C} \in \xi^n$, $C^{s(1)} I^* C^0$.

IWI puts conditions on the types of profiles considered. It states that the worst capability set should be indifferent to the common capability set of the society.

Completeness **(COM)** For any $\mathbf{C}, \mathbf{D}, \mathbf{E} \in \xi^n$, if $\phi(C) = \phi(D) + k, k \geq 0$, there exists $\mathbf{F}$ such that $\phi(F) = \phi(E) + k, k \geq 0$.

COM states that when R^* is representable by a numeric function ϕ, for any three sets, when the first is better than the second one by a degree of k, then there exists a fourth set that is equally better than the third set.

Additional Axioms:

Strong Pareto Efficiency **(SPE)** For any $\mathbf{C}, \mathbf{D} \in \xi^n$, if $C^i R^* D^i, i = 0, ..., n$, then $\mathbf{C} R \mathbf{D}$. If moreover, some preference is strict, then $\mathbf{C} P \mathbf{D}$.

Nested Pareto Efficiency **(NPE)** For any $\mathbf{C}, \mathbf{D} \in \mathfrak{N}^n$, if $C^i R^* D^i, i = 0, ..., n$, then $\mathbf{C} R \mathbf{D}$. If moreover, either $C^1 P^* D^1$ or $C^n P^* D^n$ then $\mathbf{C} P \mathbf{D}$.

SPE and NPE are concerned with Pareto efficiency. According to SPE between two profiles, if every set in one profile is at least as good as the second one, then the resulting first profile

should also be ranked as at least as good as the second one. Moreover, when at least one of the relations are strict, the resulting ranking on the profiles should also be strict. NPE differs from SPE in that it is only when there is a strict relation between the best or the worst capability sets of the profiles that one is considered strictly better than the other one.

Clearly, SPE $\rightarrow$ NPE.

***Anonymity* (AN)** For any $\mathbf{C} \in \xi^n$, and any permutation $p : N \rightarrow N$, $\mathbf{C}Ip(\mathbf{C})$.

***Strong Anonymity* (SAN)** For any $\mathbf{C} \in \xi^n$, and any $i \in N$ if $\mathbf{D}$ is such that $D^k = C^k$ for $k \neq i, D^i = C^0$, and $D^N = C^N$, then $\mathbf{D}I\mathbf{C}$.

AN is a basic fairness condition. It demands that agents' identities shouldn't play any role on the ranking of profiles. SAN demands that when the common capability sets, as well as the aggregate capability set of two profiles are equal, the particular distribution of functionings across individuals shouldn't make a difference on the ranking of profiles.

Clearly, SAN $\rightarrow$ AN.

***Nested Extreme Hammond Equity* (NEHE)** For any $\mathbf{C}, \mathbf{D} \in \mathfrak{N}^n$ if $C^k = D^k$ for all $k \neq 1, n$ and $D^1 \subset C^1 \subseteq C^n \subset D^n$, $C^1P^*D^1$, $D^nP^*C^n$, then $\mathbf{C}P\mathbf{D}$.

***Extreme Hammond Equity* (EHE)** For any $\mathbf{C}, \mathbf{D} \in \xi^n$, $\mathbf{C} = s(\mathbf{C}), \mathbf{D} = s(\mathbf{D})$ such that $C^iI^*D^i$ for $i \neq j, k$ and $j, k > 0$, if $D^jR^*C^jR^*C^kR^*D^k$ then $\mathbf{C}R\mathbf{D}$. If moreover, $j = n, k = 1$, and either $D^nP^*C^nR^*C^1R^*D^1$ or $D^nR^*C^nR^*C^1P^*D^1$, $\mathbf{C}P\mathbf{D}$.

***Strong Hammond Equity* (SHE)** For any $\mathbf{C}, \mathbf{D} \in \xi^n$, $\mathbf{C} = s(\mathbf{C}), \mathbf{D} = s(\mathbf{D})$ such that $C^j = C^{j+1} = ... = C^{j+s}, D^j = D^{j+1} = ... = D^{j+s}, C^kP^*D^k$ for $0 < k < j, C^iI^*D^i, i \neq k, j$ and $D^jP^*C^jR^*C^kP^*D^k$, then $\mathbf{C}P\mathbf{D}$.

According to NEHE, when a nested profile is changed in such a way that worst capability set is improved to the expense of the best, if the ordering of the sets remain the same, the

resulting profile should be considered as strictly preferable to the initial one. EHE deals with a similar situation comparing any two profiles (not necessarily nested): Taking any two agents, if the worst one is improved to the expense of the better one without changing the ranking between the two, the resulting profile should be considered as at least as good. Moreover, if the agents are the worst and best agents and if the improvement of the worst, or the decline of the best is strict then the social improvement is also strict as well.

Note that EHE $\rightarrow$ NEHE.

In SHE, changes in more than two agents are taken into account in a similar set up. It is stated when an agent's capability set is strictly improved to the expense of a group of agents who were better of with identical capability sets, without changing the ranking, then the resulting profile should be considered as a strict improvement.

Nested Improvement of worst off agent **(NIWA)** For any $\mathbf{C} \in \mathfrak{N}^n$, and $A, B \in \xi$ such that $C^1 \subset A \subseteq C^2 \subseteq ... \subseteq C^n \subseteq B, AP^*C^1$ if $\mathbf{D}$ is such that $D^1 = A, D^n = B, D^i = C^i, i \neq 1, n$, then $\mathbf{D}P\mathbf{C}$.

According to NIWA, a strict improvement of the worst agent in a nested profile should be considered as a strict social improvement.

Common Improvement **(CI)** For any $\mathbf{C} \in \xi^n$, $\mathbf{C} = s(\mathbf{C})$ and $D \in \xi, C^0 \subset D, DP^*C^0, \mathbf{D} = (D)$ then $\mathbf{D}P\mathbf{C}$.

According to CI, a strict improvement of the common capability set should be considered as a strict social improvement. Note that CI is much stronger than NIWA.

Translation Invariance **(TI)** For all $\mathbf{C}, \mathbf{D} \in \xi^n$ if $\phi(C^0) = \phi(D^0)$ and there is some $k \in \mathbb{R}$ such that $\phi(C^i) = \phi(D^i) + k, i = 1, ..., n$, then $\mathbf{C}I\mathbf{D}$.

According to TI, when the valuation of the common capability set is unchanged, equal (in terms of value, not in terms of nature) improvements in the valuation of the individual capability sets don't have an effect on the social preferability of the profile.

4.2.4 Axiomatic characterization of R_{lo}, R_u, and R_{co}

Theorem 1. Let (N, L, ξ) be an environment and R a preorder on ξ fulfilling WEUP and RIC*. Then R satisfies moreover Anonymity (AN), Strong Pareto Efficiency (SPE), Strong Hammond Equity (SHE), and Common Improvement (CI) if and only if $R = R_{lo}$.

Theorem 2. Let (N, L, ξ) be an environment and R a preorder on ξ fulfilling WEUP and RIC. Then R satisfies moreover Strong Anonymity (SAN), Nested Pareto Efficiency (NPE), Nested Extreme Hammond Equity (NEHE), if and only if $R = R_u$.

Theorem 3. Let (N, L, ξ) be an environment and R a preorder on ξ fulfilling WEUP and RIC and COM. Then R satisfies moreover Anonymity (AN), Translation Invariance (TI), Extreme Hammond Equity (EHE), and Nested Improvement of the worst-off agent if and only if $R = R_{co}$.

Proof: See Herrero et at. (1998 p. 282-5).

In the table below a compact representation of the axioms, and the three ranking methods is presented. On the table, (+) denotes that the property is satisfied by the ranking. Similarly, (-) denotes that the property is not satisfied. (+*) is used in cases when the property is used for the characterization of the ranking.

First observation is that none of the three ranking methods analyzed satisfy all of the axioms. This is a natural result, since some of the axioms are not compatible with each other. (For example if a ranking satisfies **SAN**, then it must necessarily contradict **EHE**.) This structure allows for a more illuminating axiomatic characterization of the rankings.

Second, all three ranking methods satisfy **AN**, **NEHE**, **NIWA**, and **CI**. **AN** a basic fairness

Table 4.1: Properties of Rankings

.	R_{lo}	R_u	R_{co}
SPE	+	-	-
NPE	+	+*	-
AN	+*	+	+*
SAN	-	+*	-
NEHE	+	+*	+
EHE	-	-	+*
SHE	+*	-	-
NIWA	+	+	+*
CI	+*	+	+
TI	-	-	+*

axiom which demands ordering on social states in terms of justice to be independent of the identities of agents with whom the capability sets are associated. It should be considered as a precondition for any ordering based on justice. On the other hand, **NEHE**, **NIWA**, and **CI** are satisfied due to lexicographic priority given in all three rankings to maximize the common opportunity set. While **CI** is the specific statement of this condition, **NEHE**, **NIWA** are satisfied due to the same reason since they deal with nested profiles.

Third, there is a special axiom that characterizes each ranking and differentiates it from the others. Namely, for each ranking there is at least one axiom that is satisfied only by that ranking. For R_{lo} it is **SHE**, for R_u it is **SAN**, and for R_{co} it is **TI**.

- With **SHE**, an improvement in an agents capability set is considered as justice enhancing if it is to the expense of agents who are better of then him (without changing the ordering of the individuals). This clearly captures the lexmin structure of R_{lo}. It is not satisfied by R_u or R_{co}, since such a change might not have any effect on the common or aggregate capability sets as well as on the capability sets of the worst and best off agents in the society.

- Since **SAN** states that evaluations of justice should only be based on the common and aggregate capability sets of the society, it coincides with R_u. Naturally, it contradicts the second conditions of R_{lo} and R_{co}.
- Assuming no improvement in the common capability set, **TI** states that uniform improvement of all capability sets cannot be considered as justice enhancing if differences between the members remain unchanged. This is consistent with the second condition of R_{co}. It contradicts R_{lo} and R_u, since these improvements will be reflected (necessarily) in the worst off and (potentially) in the aggregate capability set.

4.3 In defense of R_u for Sen's capability approach

4.3.1 Intuition

We are faced with the task of adopting a preference relation on social profiles of capability sets for the formalization of Sen's capability approach. To gain further intuition, lets analyze the three proposed methods (axiomatically characterized above) in terms of a real-life example.

> There are limited resources allocated to education in the government's budget. There are two alternative views on how these funds should be used. According to the first view, all funds should be directed towards improving secondary education (public high schools) across the country. The opposing view is to cut some funds from secondary education and allocate them to support enhancement of higher education across the county (opening up new departments, improving research labs, etc. in public universities).[15]

[15] We don't take funding of primary education into account since it is more appropriate to analyze it separately as a basic capability.

Let's name the two alternative views presented above as A and B: A demanding all funds to be allocated to secondary education, B requesting some funds to be directed to higher education as well while supporting secondary education. Formally A and B represent two different resource allocations. Given differences in people's natural talents/abilities and the social/environmental conditions they live in, A and B will create two different profiles of capability sets for the society. Formulated in this manner, the issue at hand can be seen as a distributive justice problem.

We have assumed that the government has adopted an agenda that makes social justice a priority, and maintains to follow Sen's capability approach on social justice. Thus, the government is committed to using resources to enhance people's capability sets.

Let's look at the three proposed methods: R_{lo}, R_u, and R_{co}. All three start with the premise that the improvement of the common capability set takes first priority in resource allocation. In terms of the specific issue we're analyzing, note that R_{lo} and R_{co} would clearly demand all resources to be directed to secondary education (supporting view A). Allocating any resources to higher education would clearly not be to the benefit of the worst off, or would not serve towards minimizing inequalities.[16] Note that R_u could operate differently. If the common capability set cannot be improved further by enhancing primary education, remaining resources would be directed to higher education to improve the aggregate capability set.

Before we further analyze the differences between the three methods axiomatically, let's step back and see which one is intuitively aligned with the capability approach. Understanding the significance of the individual differences across people who constitute a society is critical for this. We have already noted that due to these differences absolute equality of the capability sets for all members of a society is unattainable. Given this, what should we do beyond maximizing the common capability set?

R_{co} demands minimizing the difference between the capability set of the best and worst off. Thus, R_{co} could be interpreted as a purely *capability egalitarian* approach and consequently

[16]Here were have assumed for this society that it is not the case that all people get higher education.

an attractive candidate for our purposes. But given that there are always exceptionally talented people like Einstein or Mozart, this could only be achieved by artificially restraining the capability sets of the talented. (This could be done by depriving them of basic rights, liberties or resources.) This contradicts the motivational stance of the capability approach. Sen's views on justice hinge on a robust balance of freedom and equality. R_{co}, by giving absolute priority to equality over freedom misses this dynamic and fails to represent the capability approach.

R_{lo}, on the other hand, directs resources towards the improvement of the worst off. This parallels a Rawlsian perspective on resource allocation.[17] But this concern is already reflected in the initial requirement of maximally improving the common capability set. Beyond this point any resource allocation to the worst off is only to the advantage of a single person in the society. Thus, R_{lo} loses the force of it's Rawlsian counterpart since its primary condition of maximally enhancing the common capability already is already a step towards improving the condition of the worst off. Moreover, similar to our objections for R_{co}, R_{lo} fails to emphasize the value of freedom central to the capability approach.

In contrast, R_u strives to improve the aggregate capability set as a second condition. By doing so,

- It allocates resources with the aim of improving the capabilities of the entire society. Thus, makes enhancement of freedom a first priority. This reflects the essential tenet of the capability approach. But equality is also taken into account with the first condition.
- Furthermore, it doesn't differentiate among people. It treats the entire society as a single person and strives to improve the capabilities that are available to it. Thus, enhancement of the aggregate capability is considered as an improvement regardless of the distribution of these capabilities.[18] [19]

[17] Though improvement of the common capability set takes priority for R_{lo}.

[18] Of course this holds true when the common capability set remains constant.

[19] In [Herrero et al. (1998, p. 275)] it is noted that this could also be supported if we assume that all opportunities will eventually be available to all society's members. This would be an argument from

- It disallows any restraining on the capability sets of people for concerns of justice. On the contrary, it supports resources allocations only when it enhances the the common or aggregate capability set. Thus, resource allocations are only directed to where they can effectively enhance individual or social freedom.

R_u could also be supported in line with the capability approach by applying Rawls' *veil of ignorance*. Given a hypothetical choice situation in which people are blind to their own condition, but knowledgable of the overall distribution of capabilities, what kind of a resource allocation would they decide on?[20]

As a first condition, following Rawlsian intuition, they would want to guarantee certain rights, freedoms and basic capabilities for all people in the society. This is because the risk of not possessing these essential capabilities would be unacceptable to any person however small the risk might be.[21] After this, unaware of how they might end up in terms of the social/economic/cultural environmental conditions they are in and the personal traits they are endowed with, they would want to affirm that the set of capabilities shared by all people in the society is maximized. This would correspond to the first condition common to all three ranking methods mentioned above. Note that with the first condition a minimal set of capabilities is assured for even the worst off in the society. At this point, among all the different states of the world where the first two steps mentioned above are satisfied in the same manner, a rational person would want to live in that state where the total capability set is the greatest. This would correspond a society with the most number of options. Given that any person has an equal and positive chance of possing any of these capabilities, this would be a logical choice for a person who has already appeased his

externality based on a reasonable assumption that the enhancement of the aggregate capability set of the society has positive effects on the all members individual capability sets. An example should give further intuition. We can consider that once a world-class composer emerges in society, musical capabilities of all members of that society will enhance due to his influence on that culture. Similarly, in Sid Meier's Civilization computer strategy game, evolution of societies are modeled such that once a society bears a great thinker, scientist or artist, this consequently effects the capabilities of all the members of that society.

[20] Here, we are reinterpreting Rawls' thought experiment on the dimension of capabilities.

[21] We will discuss how basic capabilities can be incorporated in our ranking method in the following sections.

concerns about the case where he turns out to be a disadvantaged person in a society. Note that the first two steps are conditions of equality, but the third step deals fundamentally with enhancing freedom. Thus, R_u captures the balance of equality and freedom emphasized in the capability approach.

4.3.2 Back to the Axioms

In this section, we will argue from an axiomatic approach that R_u is a befitting social ranking for justice model based on Sen's capability approach. We look at the axioms one by one.

SPE: The fact that R_u doesn't satisfy **SPE** fits in with the capability approach. An improvement in the capability set of a single agent should not have significance if it doesn't correspond to an improvement in the common or aggregate capability set. As an example, consider an improvement in the capability set of the already most advantaged member of the society. This should not be considered as a preferable state in terms of justice unless it reflects an improvement in the common or aggregate capability set.

NPE: This axiom captures a defining characteristic of the R_u relation. Given a nested profile, $C^0 = C^1$ and $C^N = C^n$, an improvement on C^1 or C^n corresponds to an improvement in the common or aggregate capability set.

AN: This axiom serves as a basic fairness condition, and is satisfied by all three methods.

SAN: This axiom is a defining condition for R_u. With **SAN**, it is stated that any ranking in terms of justice should be based only on information about the common and aggregate capability sets of the society. According to this axiom, a society is treated as a whole. It is for this reason that improvement of the aggregate capability set is considered as justice enhancing. However, individual states are also taken into account by ensuring foremost that the common capability set is maximized.

NEHE: This axiom states that in a nested profile improvement of the worst capability set (equivalently the common capability set) takes priority over improving the best (equivalently the aggregate cap. set). It makes the two demands of R_u strictly lexicographic. It is also satisfied by all three rankings.

EHE: R_u doesn't satisfy **EHE** because it is not concerned specifically with the improvement of the capability set of the worst off person if this improvement is not to be reflected in the common capability set. This is inline with Sen's approach.

SHE R_u doesn't satisfy **SHE** for the same reasons outlined above.

NIWA This axiom is automatically satisfied for all three methods since an improvement in the common capability set is a first requirement for all.

CI Similar to **NIWA**, **CI** is automatically satisfied for all three methods since an improvement in the common capability set is a first requirement taking priority over other conditions for all.

TI This axiom demands that keeping the valuation of the common capability set same, an equal value of improvement in all capability sets shouldn't be considered as justice enhancing. R_u contradicts TI since an improvement in the individual capability sets might amount to an improvement in the aggregate capability set.

In conclusion, axiomatic characterization of R_u is consistent with the capability approach.

4.4 A closer look at basic capabilities

In his departure from utilitarianism, Sen insists on the need to use a broader informational base, "focusing particularly on people's capability to choose the lives they have reason to value," in making evaluations of distributive justice [Sen, (1999, p. 63)]. The focus on capabilities reveal the existence, or lack off, freedoms to achieve certain functionings that are valuable to the person (such as being nourished, having shelter, access to education, etc.).

But it's been pointed out that this doesn't provide a full account of what is valuable for the person. How do we proceed from here to objectively assess which capability set provides a better alternative for the well-being of a person? Sen is not clear on this subject. He is reluctant to give a full account of which functionings should be considered as contributing to a valuable life. Answering this question is crucial for constructing a ranking on opportunity sets.

Consider the following example:

> There are limited resources and the local government is trying to decide which of the following two projects to fund: The first is a housing project for the underprivileged, and the second is the construction of a new medical center. The government program makes social justice priority and officially follows Sen's capability approach on the issue. Which project should the government support?

Naturally, any policy maker would demand further information to make a decision. Is there currently another medical center in this neighborhood? What kind of health-care system is already in place? What is the condition of the underprivileged? Are they simply demanding better housing, or are they living in refugee camps? These details are crucial to our decision. Notice that this information is necessary because we believe that every person must have proper shelter, proper access to basic medical services. We consider these among basic capabilities, capabilities that should take priority over other ones when resources are limited.

Lets change the example such that the second project considered is now the construction of a high-tech 3-D movie theater. Though, access to a nice movie theater is certainly a valuable capability, the decision is much simpler. This demonstrates the validity of differentiating basic capabilities as a separate class.

In the literature[22], it has been argued that a proper solution to this, in line with the capability approach, requires an objective method to evaluate functionings with respect to

[22][Nussbaum (1988), (2000)], [Robeyns (2003)]

each other. Nussbaum states that the problem can be solved "by introducing an objective normative account of human functioning and by describing a procedure of objective evaluation by which functionings can be assessed for their contribution to the good human life". [Nussbaum (1988, p. 176)] Here Nussbaum is approaching the problem from more of a political science perspective, interested primarily in securing access to "basic capabilities"[23] for all people. Thus, she has been leading a literature aiming to define these basic capabilities.[24][Nussbaum (2000, ch 1)]

We put aside the literature headed by Nussbaum on defining a set of basic capabilities. We propose the following conceptual differentiation: Basic capabilities are those capabilities that are essential for the development of other capabilities. Regardless of all musical resources provided, an individual will not be able to develop any musical capabilities if he is severely malnourished. Similarly, without access to primary education[25] professional skills cannot flourish. Thus, some capabilities such access to primary education and vital nourishment should be differentiated as basic capabilities because their availability constitute a

[23]By basic capabilities Nussbaum refers to capabilities such as physical health, mental well-being, bodily integrity and safety, basic political empowerment, access to education and knowledge, shelter, social respect, freedom of religious practice. For discussion on specifying basic capabilities see [Robeyns (2003)].

[24]Sen chooses to keep his approach at a general level, and responds to the literature aiming to introduce an objective normative account of human functioning int the following way:

> "I accept that this would indeed be a systematic way of eliminating the incompleteness of the capability approach.[...] My difficulty with accepting that as the *only* route on which to travel arises partly from the concern that this view of human nature (with a unique list of functionings for a good human life) may be tremendously over-specified, and also from my inclination to argue about the nature and importance of the type of objectivity involved in this approach. But mostly my intransigence arises, in fact, from the consideration that the use of the capability approach as such does not require that route, and the deliberate incompleteness of the capability approach permits other routes to be taken which also have some plausibility. It is, in fact, the feasibility as well as the usefulness of a general approach (to be distinguished from a complete evaluative blueprint) that seems to me to provide good grounds for separating the general case for the capability approach (including, *inter alia*, the Aristotelian theory) from the special case for taking on *exclusively* this particular Aristotelian theory." [Sen (1993, p. 47)]

[25]Definition of primary education is subject to discussion.

precondition for other capabilities to develop.

4.5 Sen's capability approach based justice model

4.5.1 Two steps

First we present our proposal for how the capability approach can be effectively applied to actual situations; then, we'll go into depth about its structure, and defend our proposal.

There are two steps in our proposal, each taking lexicographic priority over the next one.

1. Basic capabilities are guaranteed for all.
2. The utilitarian opportunity relation, R_u, is used to rank profiles of capability sets corresponding to different social states. This is a lexicographic process as well consisting of maximizing:
   - First the common capability set,
   - Then the aggregate capability set.

With the first step, we state that basic capabilities take absolute priority over all other concerns. Before providing these basic capabilities, we cannot consider the justness of a social resource allocation. Conceptually, we identify basic capabilities as those capabilities the availability of which are essential for the development of other capabilities. This conceptual separation clarifies why basic capabilities take absolute priority.

Also note that a minimal equality on the level of basic capabilities will not be sufficient for the fulfillment of the first condition. It is only when *all* basic capabilities are provided for *all* members of the society, that a resource allocation problem can move to the next stage where other criteria can be considered. This strict requirement rests on our definition of

basic capabilities. Before all members of the society have the means[26] to naturally develop their capability sets further, resources must be devoted to providing these means.

After considering basic capabilities, in the second step, we search for a resource distribution that is optimal according to the R_u relation. This lexicographic structure ensures that no basic capabilities are traded for the maximization of the common capability set.

As we have examined in detail in the previous sections, the first condition of R_u, namely maximizing the common capability set, satisfies Sen's main justice requirement. It aspires to enhance peoples capability sets while finding fairness on the level of capabilities. The second condition follows from the same spirit. After directing resources to maximally improve the common capability set, the remaining resources are used to enhance the capability set of the society as a whole.

4.5.2 Formal statement

As in the previous sections, let b^i denote a vector of basic capabilities. For simplicity, we built b^i such that each of its components are either 0 or 1: $b^i_k = 1$ if agent i has the k^{th} basic capability, $b^i_k = 0$ otherwise. Assume there are K basic capabilities in total. We can rewrite the first condition as follows:

1. $\forall k \in K$, and $\forall i = 1, .., n$, $b^i_k = 1$

Given limited resources, assume the set of attainable social states in which basic capabilities exist is denoted by $\mathbb{S}$.[27] A typical member of $\mathbb{S}$, denoted by $\mathbf{S} = (S^1, ..., S^n)$, is a social profile of capability sets as described in the previous section. Following the same notion, the second condition can be written as:

[26] This requires all basic capabilities to exist.

[27] Formally, $\mathbb{S} = \{\mathbf{S} = (S^1, ..., S^n)$ such that $\forall i$, $S^i = \mathcal{C}(r^i, t^i, b^i)$ and $\forall k$, $b^i_k = 1$ and $\sum_{i=0}^{n} r^i \leq \mathbf{R}\}$ where $\mathbf{R}$ corresponds to the total resources in the society.

2. Choose a program corresponding to $\mathbf{S} \in \mathbb{S}$ such that $\forall \grave{\mathbf{S}} \in \mathbb{S}$, $\mathbf{S} R_u \grave{\mathbf{S}}$.

4.6 Ranking capability sets - defining $\mathbf{R}^*$

There is only one remaining issue to fully describe a justice model that rests on Sen's capability approach. In the third section, while constructing a ranking on social profiles, we have taken R^* as given. R^* is a ranking on capability sets, not on social profiles of capability sets such as R_u. It is used, for example, in comparing two different common capability sets. Below, we argue that a freedom-based ranking, where capability sets are compared by a measure on the amount of opportunities they present, is compatible with the capability approach.

4.6.1 Freedom-based Rankings of Capability Sets

Sen argues repeatedly that considering individual freedom is a crucial strength of the capability approach. Thus, a ranking on capability sets must take into account the extent of freedom provided by these sets. This perspective is supported by a growing literature building on the assumption that the extent of freedom a person enjoys can be assessed by using a measure on her capability set.

As a major representative of this line of thinking, we present below the axiomatic characterization of freedom-based ranking of opportunity sets in Pattanaik and Xu (1990).[28] Firstly, every unit set is considered as freedom-wise indifferent to every other:

INS: indifference between no choice situations

$$\forall x, y \in X,\ \{x\} \sim \{y\} \tag{4.4}$$

Second, enhancement of the opportunity set should mean more freedom.

[28] For an alternative approach see Puppe (1996).

SM: strict monotonicity

$$\forall x \neq y \in X,\ \{x, y\} \succ \{x\} \tag{4.5}$$

Third, if one set is judged to provide as much freedom as another set, then this judgment should be unaffected by the identical addition to or subtraction of an alternative to/from both sets.

IND: independence

$$\forall A, B \in Z \text{ and } \forall x \in X - (A \cup B),\ A \succeq B \Leftrightarrow A \cup \{x\} \succeq B \cup \{x\} \tag{4.6}$$

These axioms yield the cardinality result:

$$\forall A, B \in Z,\ A \succeq B \Leftrightarrow |A| \geq |B| \tag{4.7}$$

The simple cardinality result ranks capability sets according to the number of functionings they contain. This result only applies to capability sets existing in a finite space of alternatives, but similar analysis have been carried through for infinite opportunity sets.[29] Note that this kind of analysis is impartial to all the functionings that constitute the capability sets as it makes no judgements about 'quality', 'desirability', or 'similarity'/ 'closeness' of the alternatives in the opportunity sets. Though this aspect of the cardinality relation has been subject to criticism as we shall examine in the next section, we believe the method's 'impartiality' between functionings should be considered as a strength.

4.6.2 Countering a possible objection by Sen

Sen (1990, 1991, 1992, 1993) has argued that capability sets cannot be ranked according to the extent of freedom they provide without taking into account the agent's preferences over alternatives. Sen writes,

[29] See Pattanaik and Xu (1990,1998) Gaertner and Xu (2008)

> The evaluation of freedom I enjoy from a certain menu must depend to a crucial extent on how I value the elements included in that menu.... while it is certainly easy to maintain that ... an additional opportunity cannot reduce a person's freedom... it may be too much to claim that there is necessarily an actual expansion of freedom. For example, the new alternative may be very uninteresting (e.g., the option of being beheaded at dawn), or thoroughly dominated by one of the existing ones (e.g., having another car much like the one already on offer except for a defective gear box). [Sen (1993)]

Note that the above example is meant as a clear objection against the strict monotonicity axiom, **SM**. Sen also objects to the indifference between no choice situations axiom, **INS**, with the below example.

> Suppose I wish to go home from the office by taking a short walk. Consider now two alternatives: (1) I can hop on one to home, but I am not permitted to walk, and (2) I can walk normally to home, but I am not permitted to hop on one leg. Given my preferences (in the sense of what I would choose given the choice) it would be absurd to say that I have exactly as much effective freedom in the first case (i.e., hop, not walk) as in the second (i.e., walk, not hop). [Sen (1990)]

Sen's main argument with the example is that for a person who has a clear preference over hopping on one leg versus walking home, the distinct opportunity sets consisting of a single one of these alternatives cannot be considered to provide the same extent of freedom. Clearly, the opportunity set with the alternative of walking home should be assessed as better.

In conclusion, Sen criticizes the conceptual framework represented by Pattanaik and Xu (1990) above where preferences play no role in the freedom-based ranking of opportunity sets. Sen's forceful examples, and strong arguments have raised a difficult question on how to incorporate information about preferences over alternatives in making assessments about

the extent of freedom provided by an opportunity set.

However, we must be reminded that we are interested in the social ranking of sets that represent the overall capability distribution in the society such as the common or aggregate capability sets. This method is not meant to apply to individual rankings on capability sets. More specifically, we're interested in a social ranking which is independent of individual preferences.[30] Moreover, as it is an important aspect of Sen's capability approach, we have assumed in the beginning of the second section that the social planner has no information on the individuals' preferences, or has no objective way of comparing, weighing them. Thus, the cardinality method should not be subject to criticism of leaving out individual preferences in constructing a social ranking.

Furthermore, the differentiation and prioritization of basic capabilities in our proposal responds to a similar concern. As demonstrated in our example, access to a nice movie theater shouldn't be considered on the same level as a basic capability such as having proper shelter. But beyond separating out these basic capabilities, putting any order on the remaining capabilities would undermine the principles of the capability approach which endows complete responsibility on the individual to choose his life path. Adding information about individual preferences on the ranking of capability sets, would undercut this responsibility.

4.7 Outlining a possible application

In this section, we outline a possible application of Sen's capability approach. We assume there is a fixed budget set aside for a special program. The goal of the program is to allocate resources in order to develop educational and health care capabilities in the different regions of the country by following our justice model based on Sen's capability approach.

[30] Pattanaik and Xu (1998), for example choose to consider the preferences of a *reasonable agent* to deal with a similar problem. In such a case, a clear definition of a *reasonable agent* is required.

4.7.1 Setup

Dimensions of capability considered:
For modeling purposes, we represent health and education, each as a single distinct dimension of capability, and disregard other capabilities. Thus, we analyze the problem on a two dimensional capability space.

Resources:
There is a fixed budget devoted only to this program. Budget is set and taken as given in modeling the problem.

Regions:
The country is divided into 3 regions. We make the following assumptions on how these regions compare to each other.

- There may be significant social/economic/cultural differences across regions.
- Differences within regions on the two dimensions listed above are disregarded.[31]
- We assume that natural talents and personal traits are distributed similarly within and across regions. [32]

Representing the Capability sets:
To apply the capability approach to this resource allocation problem, we need to analyze the capability sets for these regions. Since we cannot *observe* these capability sets directly, we need indicators which can be used as proxies for capabilities. Finding the appropriate indicators/measures to correctly estimate the associated capability sets is the fundamental difficulty with any application of Sen's capability approach.

[31] Local administrations could take interregional variations into account in the allocation of their own resources, and adopting local development plans.

[32] There is no reason why one region should statistically differ from another one in terms of personal traits and talents.

For this goal, we re-examine which variables effect the capability set. As formulated in section 4.1, an agents i's capability set, C^i, can be represented as correspondence such that $C^i = \mathcal{C}(r^i, t^i, b^i)$ where r^i represents the vector of resources available to him, t_i his vector of traits, and b^i his associated vector of basic capabilities. Effectively, C^i is the set of possible functionings available to agent i. In reality, agent i realizes only one of these functionings.

Following from this, we try to reach a reliable representation of an agent's capability set by combing two types of information: (i) on variables that effect the capability sets, and (ii) on functionings of that agent observed. To demonstrate this let's consider health capability of a region. Life expectancy at birth is a widely used as a proxy for health capability when combined with the assumption that people often don't choose to live shorter. On the other hand, information on harsh climate conditions (or high levels of pollution) in the region is an environmental factor that effects the health capability of the people living in that region. Hence, data on this could be used as an indicator for health capability as well.

Using such indicators, a capability index, I_c, could be constructed such that $I_c = I(x_1, ..., x_n)$ where $x_1, ..., x_n$ are different proxies/idicators on the capability set. I_c gives us a normalized measure on how developed a region is on that capability dimension.[33] With numerous observations we can get a picture of the boundary of the capability set. Then, assuming a convex, star-shaped structure we can graphically represent the capability set.[34]

[33]Constructing a reliable capability index I_c is separate research area, and for our purposes we take I_c as given. Note that the UN development index uses a similar method. However, in that case, different dimensions of capabilities are aggregated and reduced to a single dimension.

[34]Formally, we make the following two assumptions about the structure of capability sets:

(ii) *convex:* A capability set $C \subseteq \mathbf{R}^n_+$ is convex iff, for all $x, y \in \mathbf{R}^n_+$ and all $\alpha \in [0, 1]$, if $x, y \in C$, then $\alpha x + (1 - \alpha)y \in C$.

(iii) *star shaped:* A capability set $C \subseteq \mathbf{R}^n_+$ is star shaped iff, for all $x \in \mathbf{R}^n_+$ and all $t \in [0, 1]$, if $x \in C$, then $tx \in C$.

Convexity is a reasonable, but limiting assumption. If a person's capability set contains becoming an architect, as well as becoming a pianist, then, following convexity we assume that becoming both an architect and pianist (a mediocre one of both though) should also be included in the set as well. Star shape for capability sets is easier to defend. If becoming a legendary pianist is in the capability set, then becoming a pianist of any level less than legendary should also be a possibility for the person. Or even more clearly, if a person has the capability to receive graduate level education, then he must also has the capability to receive

Now we list possible indicators for the two dimensions of capability considered.

Proxies for health capability:

- Life expectancy at birth
- Death rates at different age periods
- Overall death rate due to basic preventable illnesses
- Average distance/commute to a hospital
- Cost of regular check up to GDP per capita of the region
- Age distribution[35]
- Information on environmental conditions that might have effects on health
- Number of people per doctor and hospital in the region

Proxies for educational capability:

- Adult literacy rate
- Primary, secondary, and higher education gross enrolment ratio
- Average distance/commute to a primary school
- Number of different higher education degrees offered in the region
- Number of people who could be students per teacher and per school (for primary, secondary, and higher education)

primary education.

[35] A region with an older population would need more health services

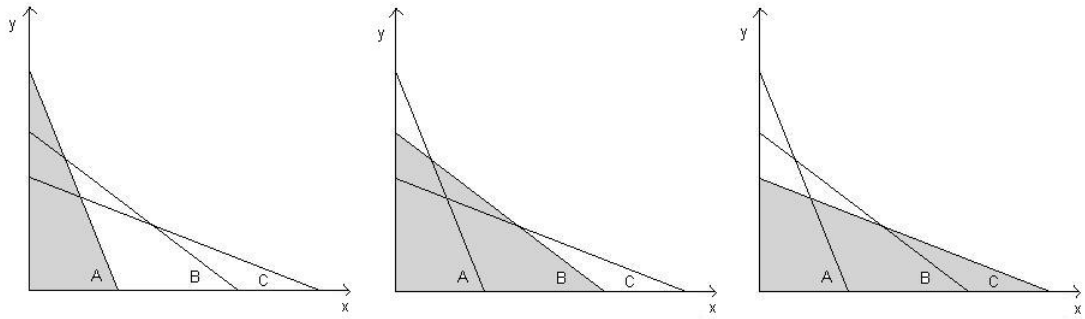

Figure 4.1: Capability sets of Region A, B and C.

In Figure 1, capability sets of three regions, denoted by A, B and C are drawn on a two dimensional capability space. Dimensions x and y can be considered as representing education and health respectively in line with the problem we are analyzing.

Mathematically, the capability sets of the three regions can be represented as follows:

$$C_A = \{(x, y) \mid y + \frac{8}{3}x \leq 8 \text{ and } x, y \geq 0\} \tag{4.8}$$

$$C_B = \{(x, y) \mid y + \frac{6}{7}x \leq 6 \text{ and } x, y \geq 0\} \tag{4.9}$$

$$C_C = \{(x, y) \mid y + \frac{4}{9}x \leq 4 \text{ and } x, y \geq 0\} \tag{4.10}$$

Note that the capability set of region A contains functionings with relatively (i.e. with respect to the other regions) high health levels, but lacks functionings with high-level education. The situation is the opposite for people living in region C. Region B, on the other hand, poses a different situation: it's capability set is not as constrained in education as region A or in health as region C, but it is not as developed in these dimensions as region C or A.

4.7.2 Example

Now compare regional capability sets to apply Sen's capability approach.

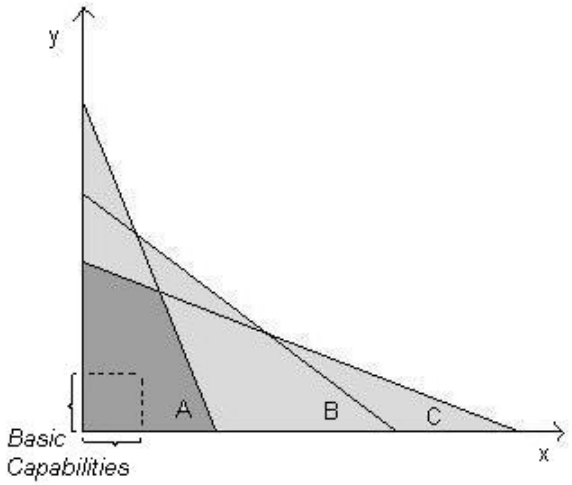

Figure 4.2: Common and aggregate capability sets of the society.

Note that in Figure 4.2 the common and aggregate capability sets are highlighted in dark and light gray respectively.

Firstly, we take it as given that basic capabilities are satisfied for all regions. As discussed in section 4, basic capabilities are a precondition for other capabilities to develop in the first place. Thus, Sen's capability approach can properly be applied only when such basic capabilities exist. Hence, following our formal justice model based on the capability approach, we consider condition 1 as satisfied.[36]

[36]We must emphasize once again that the identification of basic capabilities, and naturally the determination of whether or not they exist in the current situation, is a separate social problem which would require public deliberation that is beyond the goals of this thesis. We are simply taking an ad hoc example to see how an application of Sen's capability approach would theoretically work in the case where basic capabilities are satisfied.

Hence, we move to the second condition of our model.

2. Choose a resource allocation corresponding to profile $\mathbf{S} \in \mathbb{S}$ such that $\forall \grave{\mathbf{S}} \in \mathbb{S}$, $\mathbf{S} R_u \grave{\mathbf{S}}$.

This requires us to first maximize the common capability set, C^0, and then the aggregate capability set, C^N.

We consider three alternatives for resource allocation. We assume that the tree alternatives have the following effects on the capabilities of the regions. Furthermore, we offer potential arguments for how the alternatives can be separately supported.

[1] Since Region A already has a very high health capability, Region A is not given priority and it remains unchanged. Region C's health capability is improved since it is significantly falling behind other regions in this respect. Next the focus is on improving region B overall because B, unlike the other two regions, is not strong in either of the dimensions.

[2] Since Region B is not weak in any capability dimension, it is not given priority and remains unchanged. The other two regions are improved in the dimensions they are falling behind.

[3] Priority is given to improving education capability in Region C, where it is falling behind. Next the focus on improving region B overall because B, unlike the other two regions, is not strong in either of the dimensions.

Mathematical representation of the capability sets associated with the three proposed alternatives are given below:

[Alternative 1]

$$C_A = \{(x, y) \mid y + \frac{8}{3}x \leq 8 \text{ and } x, y \geq 0\} \tag{4.11}$$

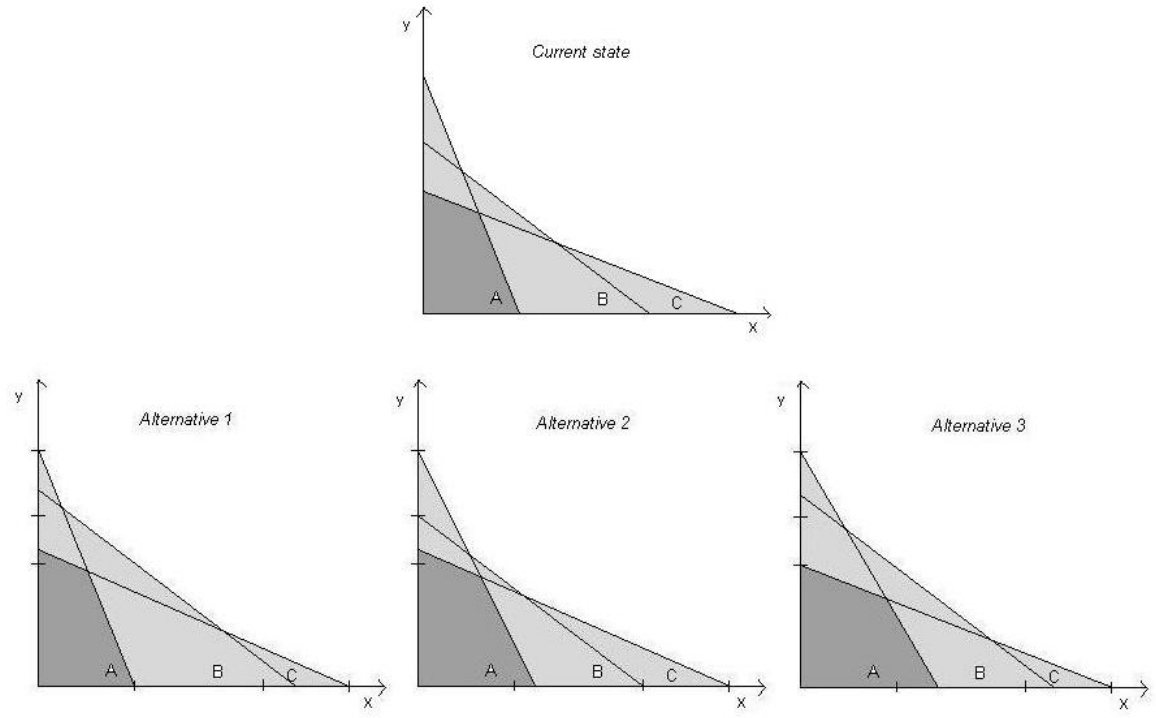

Figure 4.3: Graphic representation of the alternatives.

$$C_B = \{(x, y) \mid y + \frac{7}{8}x \leq 7 \text{ and } x, y \geq 0\} \tag{4.12}$$

$$C_C = \{(x, y) \mid y + \frac{5}{9}x \leq 5 \text{ and } x, y \geq 0\} \tag{4.13}$$

[Alternative 2]

$$C_A = \{(x, y) \mid y + \frac{8}{4}x \leq 8 \text{ and } x, y \geq 0\} \tag{4.14}$$

$$C_B = \{(x, y) \mid y + \frac{6}{7}x \leq 6 \text{ and } x, y \geq 0\} \tag{4.15}$$

$$C_C = \{(x, y) \mid y + \frac{5.1}{9}x \leq 5.1 \text{ and } x, y \geq 0\} \tag{4.16}$$

[Alternative 3]

$$C_A = \{(x, y) \mid y + \frac{8}{5}x \leq 8 \text{ and } x, y \geq 0\} \tag{4.17}$$

$$C_B = \{(x, y) \mid y + \frac{7}{8}x \leq 7 \text{ and } x, y \geq 0\} \tag{4.18}$$

$$C_C = \{(x, y) \mid y + \frac{4}{9}x \leq 4 \text{ and } x, y \geq 0\} \tag{4.19}$$

We apply our justice model based on Sen's capability approach to determine which of the alternatives should be adopted. First, we concentrate on maximizing the common capability set. Note that in Figure 4.3 the common capability sets are highlighted in dark gray.

We first calculate the effects of the alternatives on the common capability set. x_{ac} denotes the $x - value$ of the intersection of the boundaries of the capability sets of A and C.

$$|C^0_{cs}| = \int_0^{x_{ac}} (-\frac{4}{9}x + 4)\,\mathrm{d}x + \int_{x_{ac}}^{3} (-\frac{8}{3}x + 8)\,\mathrm{d}x = 8.4 \tag{4.20}$$

$$|C^0_{alt1}| = \int_0^{x_{ac}} (-\frac{5}{9}x + 5)\,\mathrm{d}x + \int_{x_{ac}}^{3} (-\frac{8}{3}x + 8)\,\mathrm{d}x = 9.9 \tag{4.21}$$

$$|C^0_{alt2}| = \int_0^{x_{ac}} (-\frac{5.1}{9}x + 5.1)\,\mathrm{d}x + \int_{x_{ac}}^{4} (-\frac{8}{4}x + 8)\,\mathrm{d}x = 13.1 \tag{4.22}$$

$$|C^0_{alt3}| = \int_0^{x_{ac}} (-\frac{4}{9}x + 4)\,\mathrm{d}x + \int_{x_{ac}}^{5} (-\frac{8}{5}x + 8)\,\mathrm{d}x = 13.1 \tag{4.23}$$

The following observations are made:

1. Resulting common capability sets in all three alternatives are larger than the current common capability set.

$$|C^0_{alt1}|,\ |C^0_{alt2}|,\ |C^0_{alt3}|,\ >\ |C^0_{cs}| \tag{4.24}$$

2. The common capability set in *Alternative 2* and *3* are the same size.

$$|C^0_{alt2}| = |C^0_{cs}| \tag{4.25}$$

3. The common capability set in *Alternative 2* and *3* are larger than the common capability set in *Alternative 1*.

$$|C^0_{alt2}|,\ |C^0_{alt3}|,\ >\ |C^0_{alt1}| \tag{4.26}$$

Based on Observation 1, all three alternatives are justice enhancing relative to the current state. And due to Observation 3, *Alternative 2* and *3* are preferable to *Alternative 1.* Thus, *Alternative 1* is eliminated. Since the common capability sets of *Alternative 2* and *3* are of same size (Observation 2), further differentiation between the two alternatives in terms of justice must be based on their aggregate capability sets. Note that aggregate capability sets are highlighted in light gray in Figure 4.3. We calculate the size of the aggregate capability sets for the remaining alternatives. Following previous notation, x_{ab} and x_{bc} denote the $x - value$ of the intersection of the boundaries of the capability sets A, B and B,C.

$$|C^N_{alt2}| = \int_0^{x_{ab}} (-\frac{8}{4}x + 8)\,\mathrm{d}x + \int_{x_{ab}}^{x_{bc}} (-\frac{6}{7}x + 6)\,\mathrm{d}x + \int_{x_{bc}}^{9} (-\frac{5.1}{9}x + 5.1)\,\mathrm{d}x = 26.1 \quad (4.27)$$

$$|C^N_{alt3}| = \int_0^{x_{ab}} (-\frac{8}{5}x + 8)\,\mathrm{d}x + \int_{x_{ab}}^{x_{bc}} (-\frac{7}{8}x + 7)\,\mathrm{d}x + \int_{x_{bc}}^{9} (-\frac{4}{9}x + 4)\,\mathrm{d}x = 29.1 \quad (4.28)$$

Observe that:

(*) Aggregate capability set of *Alternative 3* is greater than the aggregate capability set of *Alternative 2.*

$$|C^N_{alt3}| > |C^N_{alt2}| \quad (4.29)$$

Based on Observation (*), we determine that *Alternative 3* is justice enhancing relative to *Alternative 2.* We conclude that from the three possible alternatives, *Alternative 3* is the most preferable one in terms of our justice model based on Sen's capability approach.

Chapter 5

Concluding Remarks

We have analyzed Sen's capability approach as a theory of justice, and constructed a formal model based on it. In the concluding lines, we come back to why the capability approach is a valuable contribution to normative ethics and specifically the problem of justice.

First of all, Sen's capability approach develops a novel relation between the two key variables of justice: freedom and equality. Sen begins with the premise that freedom has an inherent and essential value for human beings. Following from this, the capability approach moves away from traditional accounts of justice which, either explicitly or implicitly, claim the existence a trade-off between freedom and equality. Conversely, the capability approach builds on a complementary relation between these two concepts. For Sen, freedom and equality are two integral parts of his approach to the problem of justice.

Secondly, the capability approach emphasizes that justice should be evaluated in the capability space. Moving freedom with equality to the center stage of the analysis, the capability approach presents an account of justice that focuses on the capability sets of the people. What matters for justice, according to the capability approach, is not what we have achieved, but what we can *potentially* achieve with our personal traits and resources, given the cultural/economic/environmental conditions we live in. Following from this, any eval-

uation of justice based on the distribution of goods or utility levels is misleading, because such methods rely on an incomplete projection of the capability space.

Third, the capability approach's focus on freedom provides a substantive account of social and individual responsibility. Justice endows us collectively with a social responsibility to develop the capability sets of the members our society, while also leaving each one of us with an individual responsibility to utilize our own capability set in line with our life plan. In this sense, the capability approach is more demanding than traditional accounts of justice: it is not satisfied with the redistribution of income through a tax-subsidy scheme, though such redistribution is not ruled out. By focusing on the capability set, Sen emphasizes that a society holds a more fundamental responsibility to reach fairness in the capability space. Distribution of goods in the commodity space is determined consequently by the individuals who have complete freedom, and associated responsibility, to make choices within their capability set.

Finally, the capability space, incorporating human diversity, provides a fair-basis for issues of development and global justice to be evaluated. Though stark injustices are often clear on every level, the capability approach enables us to bring into light other injustices that easily hide behind cultural traditions and conditions. Gender inequality has been one of the leading application areas of the capability approach for such reasons.

The capability approach also presents a basis for thinking about the goal of development and global justice, a goal which consists of enhancing people's capability sets to become the person they want to be, to do the things they want to do. A clear statement of this goal already tells us that global justice is also about improving access to information, freedom of expression and cultural tolerance, not just about fixing clear inequalities in the distribution of wealth as it is often reduced to.

In the end, Sen's capability approach gives us a reason to form a social entity and live together. A vision of justice, grounded in both equality and freedom, endows responsibility on the society to initiate change, and create optimal conditions, for the development of the capability sets of its members, while leaving the individuals free to choose their life path

within that.

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