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IRRIGATING KAGAN'S DESERT

Towards a general framework for modeling comparative desert

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Abstract In this paper Shelly Kagan's supposedly intuitive model of comparative desert is explored. Applying Kagan's model to a simple real life situation reveals an implicit bias towards high-desert and technical impracticalities. As a consequence, a new model based on ratio is introduced. While the Ratio Model solves both problems identified in Kagan's model, it is also based on normative assumptions. Under the premises that there is no universally shared conception of desert-based justice, a flexible framework is created, which allows for individual modifications.

1 Introduction

The philosophical problem of distributive justice is all-pervading in a socio-economic context. Companies facing economic short-cuts wonder how to justly distribute wages in times of crisis. Governments in need of increasing taxes seek to do so under the condition that the newly resulting distribution of resources be just. Parents dividing a treat between their siblings seek a just distribution. In this context, justice as desert is commonly referred to by its proponents as the

most intuitive and practical model of distributive justice (McLeod, 2002). If A deserves x she should receive x; if B deserves y she should receive y.

Shelly Kagan (1998) has developed a graphical representation of comparative justice as desert. Under the assumption that the absolute desert of two parties is known, Kagan's model ensures a 'just' distribution. The obvious advantage of such an approach is that justice becomes a rather straightforward enterprise, which is easily applicable. In line with the general claim about desert-based theories of justice, Kagan emphasizes the "intuitive support" of his graphical model, which was "strong and clear" (p. 313). While Kagan claims his model to be intuitive and universally applicable (1998) this claim is questionable. His model is concerned with well-being, an infinite good. In common real life situations however, usually finite, scarce goods are distributed. On the basis of a simple case, it will be argued that Kagan's supposedly neutral model not only fails to perform when dealing with scarce goods, it also heavily relies on debatable premises.

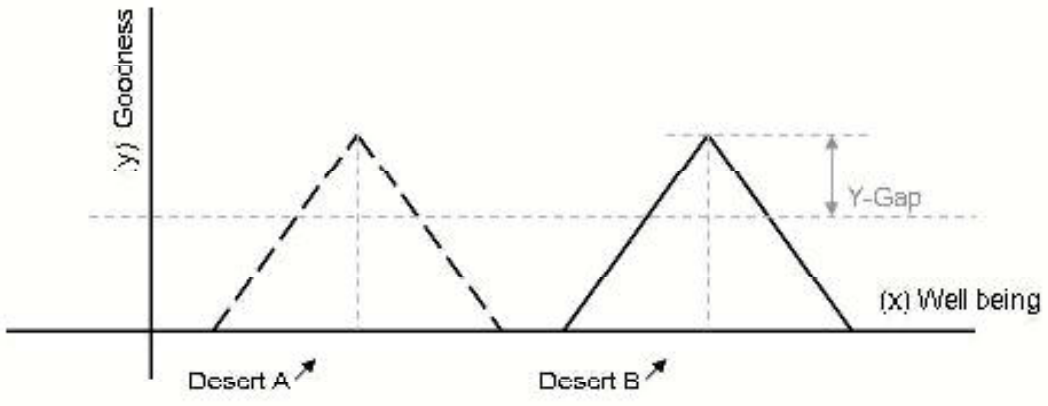
In the following paper a new model based on ratio will be presented. As a point of reference, an outline of Kagan's model of comparative desert will be given. With the help of an example, its underlying assumptions and weaknesses will be identified and explained in detail. Consequently the new model will be introduced and its benefits and shortcomings discussed. In the last sections, a general framework for modeling comparative desert will be developed. This framework allows for modifications dependent on the situation at hand as well as for various conceptions of what is just.

2 Kagan's graphical representation of desert

The functioning of Kagan's absolute desert model can be observed in graph 1, depicting the desert of parties A and B, respectively. The x-axis corresponds to the amount of well-being a party can potentially receive. It is important to stress that Kagan refers to A as a 'sinner' and B as a 'saint'. Thus, the model does not depict a concrete case where resources (such as money) are distributed according to a criterion (such as effort) that results in a certain level of desert. Rather, a person's overall performance is judged and rewarded with general well-being.

On the y-axis, a value of goodness is assigned to each potential level of the parties' well-being. From the standpoint of desert, it is best if A and B receive the exact amount they deserve. Any deviation from this amount of well-being results in a lower valuation than the optimum and is depicted in the 'desert lines' departing from the two peaks. However A's well-being must also be just in comparison to B's well-being. According to Kagan (2003), such a distribution is just if

"the offense against non-comparative desert is the same for all relevant individuals" (p. 107). In other words, an allocation is just if both parties face the same qualitative and quantitative deviation from their respective ideal amount of desert. A and B either have to face excess or shortage. It is not considered just, if one party gains while the other party loses. At the same time, the absolute amount of either loss or gain has to be identical. This is ensured if all distributions lie on a horizontal line. Kagan (2003) refers to this as the Y-Gap method (graph 1).



Graph 1: Shelly Kagan's Model

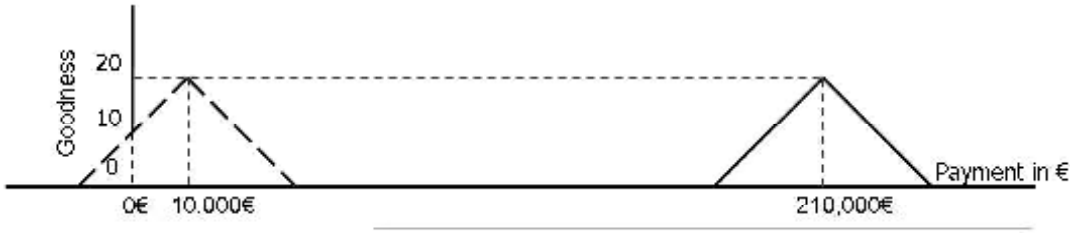
3 Applying Kagan's Model

Kagan claims his model to be intuitive and universally applicable for situations of distributive justice (Kagan, 1998). To test the method's intuitiveness, it will be applied to the following case:

> *A company has two employees, A and B. A does not need a lot of money to be happy and prefers to read books and have lots of leisure time. Consequently she does not put too much effort and time in her professional life. B in contrast is materialist. Her greatest desire in life is to own fast cars and other luxury goods, for which she is willing to work extremely hard and long. For the sake of argument, let us assume that A deserves 10,000€ annually, while B deserves 210,000€ per year based on accomplishment. In an ideal situation, each actor would receive exactly the amount of money they deserved. But what if the total amount of money available was less than 220,000€ How can the money be distributed justly, if desert is seen as the primary determinant of justice?*

To describe this situation in terms of Kagan's model, well-being is defined in monetary units[1]. The dependent variable y remains unaltered from the original model, depicting 'goodness from the standpoint of desert'. In accordance with Kagan's model, the amount of money which is deserved by each party corresponds to the highest amount of goodness (here arbitrarily given the value 20). Any deviation from desert results in a decline of 'goodness valuation'.

Graph 2.1 depicts the case in which 220.000€ are available for distribution between A and B. As the desert claims of A and B match the available amount of money, both receive exactly the amount of money they deserve. In this graph as well as all the following graphs A's desert lines are depicted as dashed lines, while B's desert lines are solid.

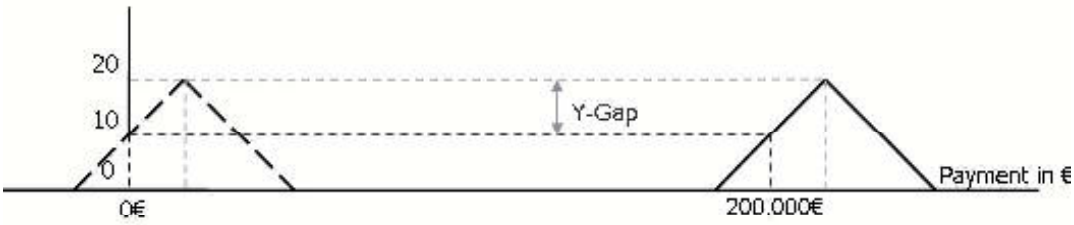


Graph 2.1: Absolute desert of A and B, according to Kagan

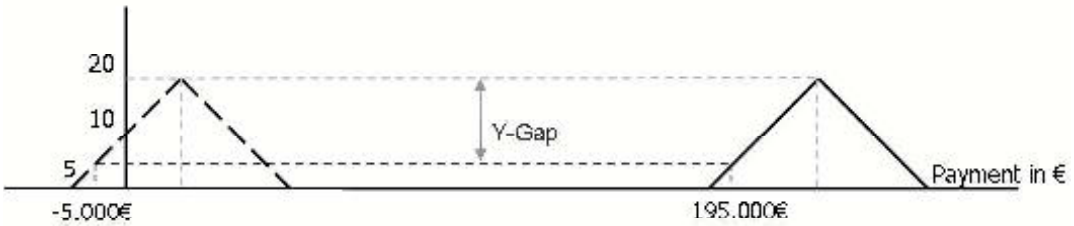
Let us now assume that due to economic problems the company is not able to pay its employees the deserved wage. The total amount of money has decreased to 200.000€. According to Kagan's Y-Gap method it can be guaranteed that a new distribution results in an equal quantitative as well as qualitative deviation for both workers. This is displayed in graph 2.2: A receives nothing and B receives 200,000€ According to Kagan (2003) this distribution is just as "the offense against non-comparative desert" is equal for both parties (p. 107). This clearly is the case: Both A and B receive less than they deserve, and thus there is the same qualitative deviation from desert. In addition, the new allocation results in an identical absolute decrease in goodness valuation: whereas the ideal distribution matched a goodness value of 20 for both A and B, the new allocation has a value of 10.

Consider a third case, where the company only has 195.000€ to distribute. The graphical solution according to Kagan's model is shown in graph 2.3. All conditions for a just distribution are met. Yet, A is faced with negative desert while B receives the total amount of available money.

[1] This change in the x-Axis in allowed for by Kagan (1998, p. 300.)



Graph 2.2: Desert of A and B, using the Y-Gap to find proper allocation of 200.000€



Graph 2.3: Desert of A and B, using the Y-Gap to find proper allocation of 195.000€

The problems of bias and of universal applicability which will now be discussed lead to the conclusion that Shelly Kagan's model of comparative desert is counterintuitive and not as universally applicable as claimed.

Kagan's model cannot be declared intuitive as it clearly favors B over A. Only if this premise is accepted can one also find the model intuitive. This bias becomes apparent in two instances. Though A is less deserving in quantitative terms than B, her claim on the 10.000€ she deserves is (if not further defined) in itself equally strong as B's claim to her 210.000€. The preference for B is also visible in the 'goodness scale' of the y-axis. If A, as happens in graph 2.3 receives a penalty of 5000€ (negative desert) this amount still corresponds to a goodness value of 5. A's penalty is still considered of higher goodness than B receiving 190.000€ which has a goodness value of zero even though the relative deviation of A is much greater than that of B. As one can see, the 'goodness scale' has different implications for both employees.

This preference for B may be deemed appropriate in Kagan's model where a person's overall moral performance (the 'sinner' A and the 'saint' B) is rewarded well-being. If, however, only one aspect of a person's life is evaluated, Kagan's model values high-desert performances more than those activities which lead to a lower desert. In the case described in this paper, A is first 'punished' for having worked less than B: Because she has put less effort and time in her work she

deserves less. Then however she is punished again: because she deserves less than B, it is less important that she receives her desert. This double punishment is only intuitive if one agrees with the assumption that B should be favored over A. Nevertheless, this bias is not explicitly stated but hidden beneath the notion of intuitiveness. Without further notice, Kagan abandons the notion that people might deserve differently, but still have the same right to their desert.

In addition to this bias for high-desert, Kagan's model is not universally applicable. In the given example of A and B, Kagan's model is applied to the distribution of a scarce good. In graph 2.3, correctly applying Kagan's criteria for justice implies a negative payment for A. No clear procedure follows from the model's logic. If A gives money to the overall budget (here the company) or directly to B, the graph no longer functions as an adequate mechanism for distribution[2]. If no money is available for distribution this controversy becomes explicit. Does B still receive 200.000€ due to the generous contribution of A? Does B receive nothing while A pays 200.000€ to the company which can keep the money? Kagan (1998) claims his model to be applicable to real life situations, such as used in the above examples. However, the problems encountered show its limited applicability, at least with regards to scarce goods.

4 The Ratio Model

Based on the difficulties of Kagan's model, the Ratio Model will now be introduced. Amongst other ideas, the Ratio Model, as suggested in this paper, applies reasoning similar to what Kagan (2003) refers to as the ratio view. Kagan himself discarded it, due to the fact that he found it impractical. In Kagan's own words, the ratio model 'simply must be abandoned' (Kagan, 2003). The problems Kagan encountered, can however be solved by defining more clearly what is to be modeled.

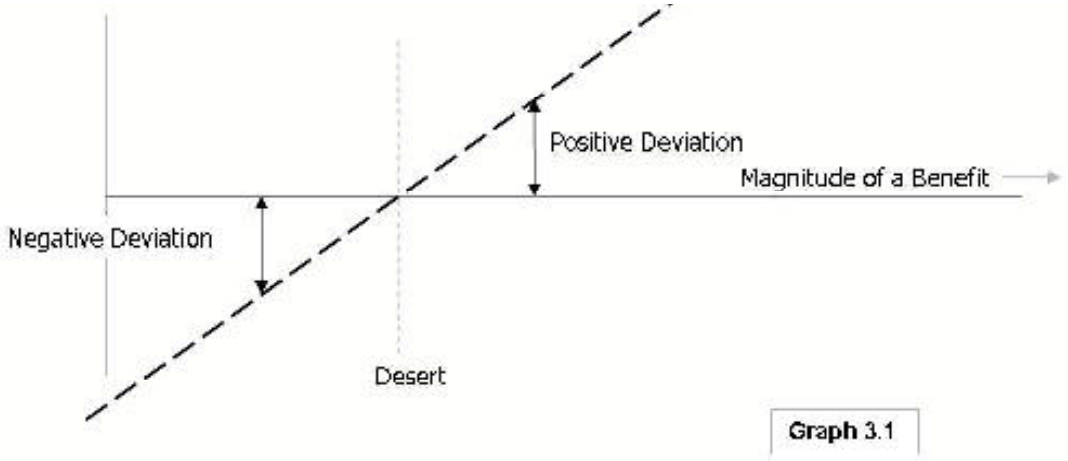
The Ratio Model has two important limitations: It is only applicable for modeling individual situations and only people whose desert is directly related to each other can be taken into account[3]. Additionally, reward and punishment are

[2] If A is punished and has to pay 5.000€ where does this money go? If one considers the options, one inevitably finds oneself caught in a never-ending loop as this payment changes the overall available money.

[3] If B deserves 21 times as much as A, one can assume that the work B accomplished was 21 times as valuable for the company as A's. Thus A's desert can be directly put in relation to B's desert by using work as a relative variable. This is in contrast to Kagan's model which aims at modeling the overall well-being of people who are not required to have any relation to each other, except for the fact that they are morally accountable of their actions. This implies that

assumed to be different categories which are not related and thus cannot be displayed in the same graph. An initial desert of zero will be considered invalid as it implies neither reward nor punishment and thus is not part of this new model[4].

The model is structured as follows: Receiving more than one deserves is displayed as a positive deviation from maximum goodness. In an analogue fashion, receiving less is displayed as a negative deviation. With the x-axis corresponding to the magnitude of a benefit[5] and the y-axis corresponding to the deviation from maximum goodness this assumption can be graphed as seen in graph 3.1:



Graph 3.1

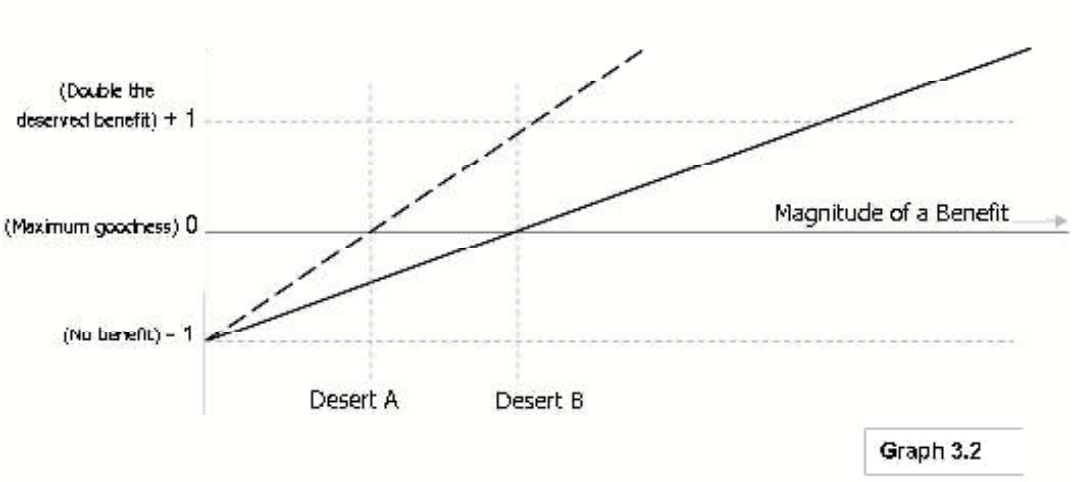
the overall well-being which is used in Kagan's model can not be used as the independent variable for the new framework, as it consists of an accumulation of individual rewards or punishments

[4] The necessity for this restriction becomes clear if one imagines following situation: Anthony, Barbara, Cleo and Darren are students. They are in a room and the professor is about to give them their grades according to their achievements. Anthony has worked very hard, he deserves an 8. Barbara has also worked hard, she deserves a 7.5. Cleo however did not actually take part in the course and therefore does not deserves any grade. Darren is in real trouble, for his final paper was plagiarized. Assuming one wants to create a model which contains their desert one could mark Anthony's desert with 8, Barbara's with 7.5, Cleo's with 0 and Darren's with -10. The fallacy of this becomes apparent if one intends to use the Y-Gap method. If for example it is necessary to change Barbara's grade to an 8 for bureaucratic reasons, Anthony deserves a grade of 8.5 - which is fine. However, all of a sudden Cleo would receive a failing grade for a course that she never attended and Darren's plagiarism would not be considered as bad as before without any intuitive reason.

[5] The term benefit is here used in its broadest sense. This can range from a grading system amongst pupils, to money or actual physical goods which are distributed. Instead of the magnitude of a particular benefit, the x-axis can also be used to model detriment or punishment.

If the aim is to distribute a finite benefit between two people according to desert, the Y-Gap can be used in the same way that it is introduced by Kagan (1998). Furthermore, a unit is necessary for displaying goodness: In the Ratio Model, a positive deviation from desert of 100% corresponds to a goodness of 1; a negative deviation from desert of 100% corresponds to -1. Maximum goodness is reached when there is no deviation from desert, which corresponds to a value of 0.

The application of this goodness scale is depicted in graph 3.2. Both slopes originate in a common point. Receiving nothing corresponds to 0 on the x-axis. Receiving nothing also is a negative deviation of 100% which corresponds to -1. Consequently the point of intersection of all slopes within this model is (-1/0). Any point on these slopes has a deviation from goodness relative to the deviation from desert. Thus using the Y-Gap now shows solutions that preserve the ratio of desert.



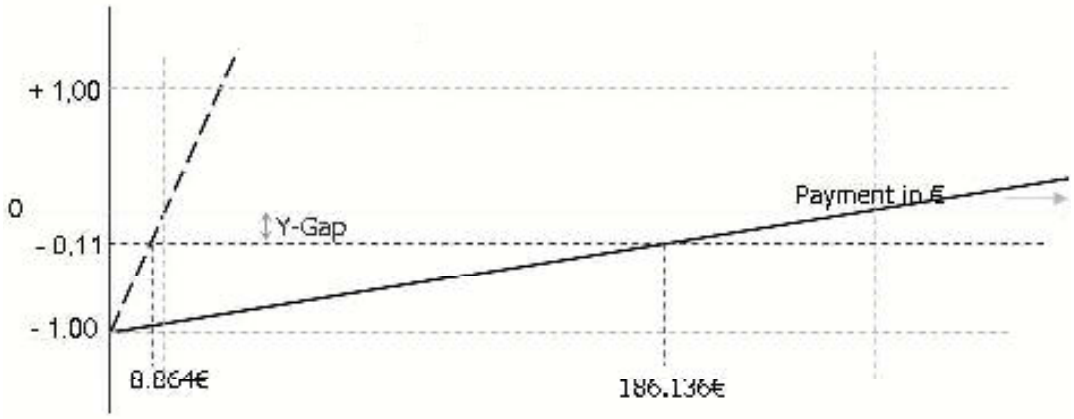
Graph 3.2

The Ratio Model has three advantages. First of all, the ambiguity of the 'goodness scale' is resolved. Desert is measured in deviation from maximum goodness instead of absolute goodness. Therefore, any value on the y-axis relates directly to the amount of money received. A value of -0.1, for example, indicates that someone has received 10% less than their desert. Thus the y-axis gives us qualitatively useful information. Also, the Y-Gap method can now be used without having to apply the criteria of identical qualitative deviation as the Y-Gap cannot cross both surplus and shortage area at the same time. This makes the Ratio Model more useful for practical applications.

By relying on proportional distribution the new model also avoids the bias towards B. To give everything to B and nothing to A is no longer a 'just' outcome. As all slopes originate with an x value of zero, A can no longer be punished for

working, and by preserving proportionality a relative small decline in money for B will no longer amount in a large decline of goodness. This can be seen in graph 4.

A third advantage is that negative desert is avoided. If 195,000€ are distributed according to the Ratio Model as is done in graph 4, it is no longer possible to assign negative desert. The problems that arrive from negative desert (as seen in graph 2.3) therefore no longer can occur.



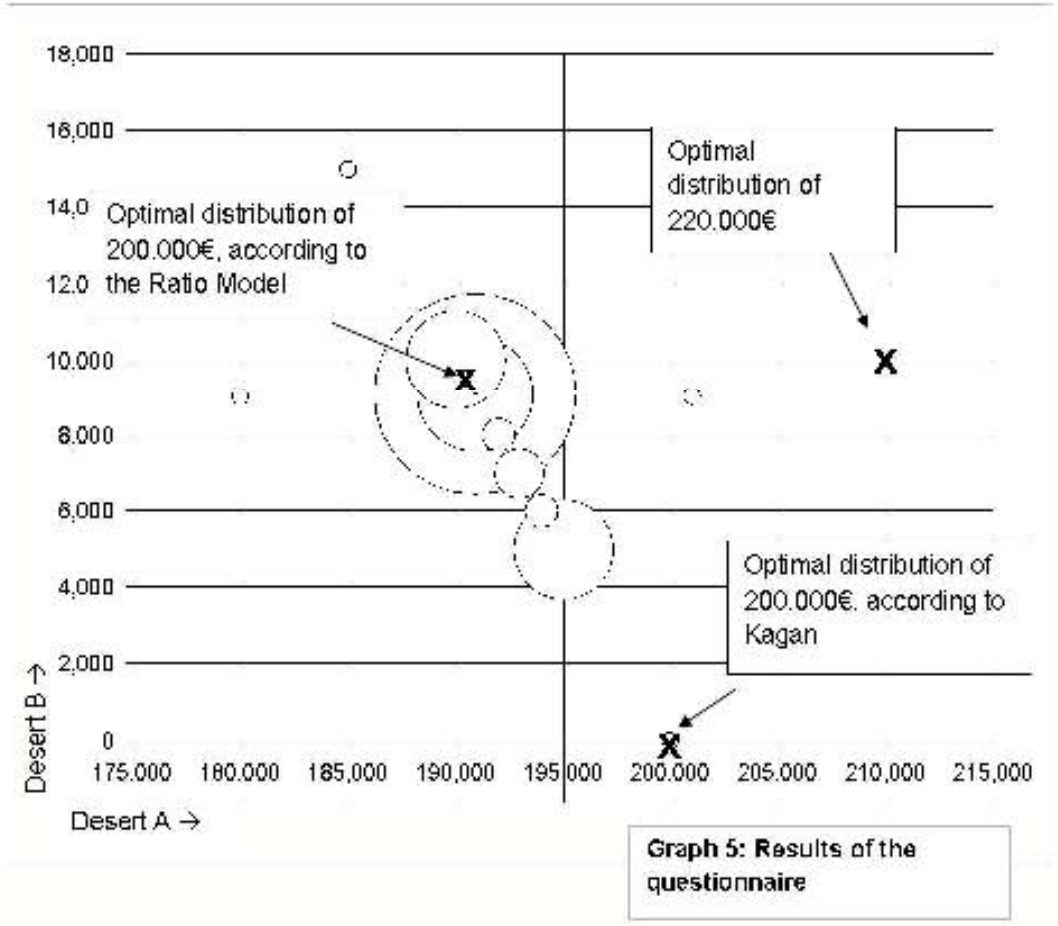
Graph 4: A Practical application of the Ratio Model: Distribution of 195,000€ between A and B

To test the new model's intuitiveness, 43 students of the University College Maastricht where asked to distribute 200.000€ between A and B[6]. The results of this questionnaire are represented in graph 5: The x-axis corresponds to the amount of money allocated to B and the y-axis represents A's share of the money. The different circles correspond to different distributions suggested. The size of the circles corresponds to the amount of people in favor of a particular distribution, whereas the optimum distributions, as well as the distributions suggested by Kagan's model and the Ratio Model, are marked with crosses.

While the result seems to support the Ratio Model at first glance, one must look at the responses more critically. The distribution of 10.000€ and 190.000€ for example, which was highly popular, does not necessarily mean that it was chosen because it is almost proportional; rather it could be based on the assump-

[6] The exact question asked was: A & B work for your company. According to the different amount of time A & B have worked for your company A deserves to receive $ 210.000 and B deserves $ 10.000. Unfortunately, you only have $ 200.000 to distribute between A & B. How would you distribute the money?

tion that giving at least one person his or her desert is more important than proportional distribution. From the heterogeneity of the results, one can conclude that there is not one 'intuitive' way of justly distributing resources. When taking a closer look at the implicit assumptions of the Ratio Model, it becomes clear why these cannot be inevitably shared by everyone. The Ratio Model is based on the assumption that receiving more than one deserves and receiving less then one deserves is equally 'bad'. Additionally it is assumed that the claim to one's desert is independent of the amount of desert. Depending on one's conception of justice, as well as the situation at hand, these assumptions are not necessarily intuitive. This calls for a modular framework of desert-based distribution[7].



Graph 5: Results of the questionnaire

[7] It shall be emphasized that justice as desert is by no means the only theory of distributive justice.

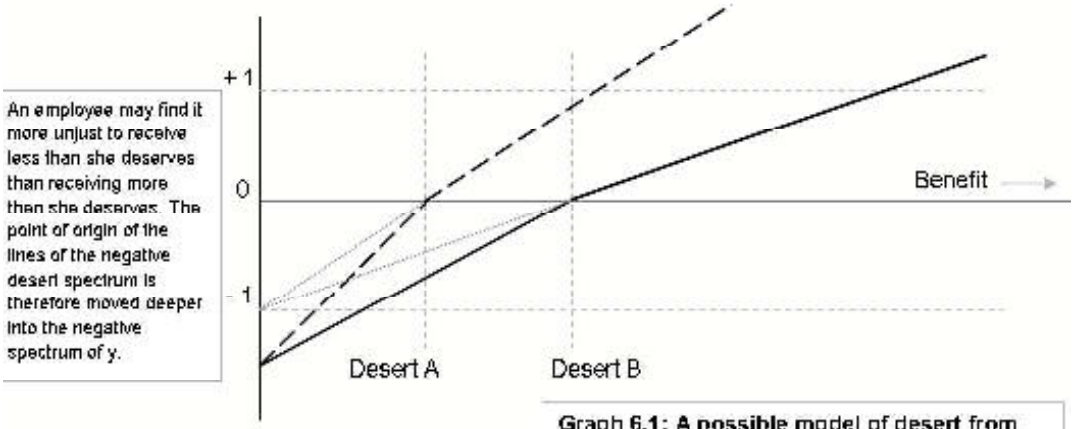
5 Creating a general framework for modeling desert

Graph 5 shows that even in a fairly homogenous group there are very different opinions on distribution. Also different peoples, different cultures, people with different political beliefs etc. will all have even more varied beliefs about what makes a distribution just (Timmons, 2002). Additionally, different distribution cases and one's personal connection to the situation influence and change one's opinion on how to distribute. Thus, for any model to be universally applicable and intuitive, it has to allow for modifications that suit the respective situation at hand. A general framework for modifiable, individual desert-based models will now be introduced.

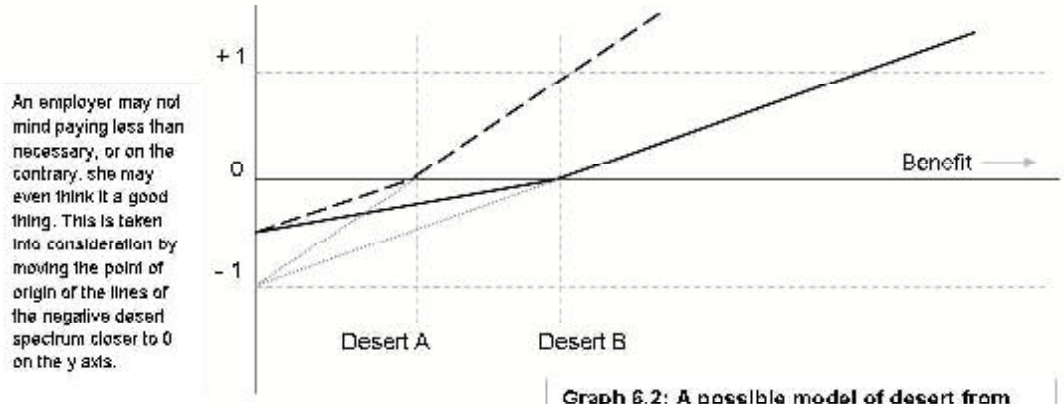
There are two basic types of modification. The first merely changes the scale in which goodness is measured. This is done by moving the point of origin of the desert lines along the y axis (vertical). The second changes the ratio itself. This is done by moving the point of origin of the desert lines in the direction of x (horizontal). These two methods can be combined. Additionally, for more complex situations, two sets of desert lines can be created: one concerning negative deviations from desert and one concerning positive deviations from desert[8]. These can now have individual points of origin allowing for complex models of desert. These modifications will now be demonstrated and explained in further detail using various examples.

The following examples concern the first set of modifications (movement of the point of origin along the y-axis.) For instance, one can assume that an employee prefers a wage that exceeds her desert over one that is considerably lower. The first step is creating two sets of desert lines, one for the positive deviation from desert and one for the negative. Now, one can accommodate for this perception of desert by shifting the origin of the desert slopes of the negative spectrum deeper into the area of negative y. This can be seen in graph 6.1. Following the same reasoning, but instead shifting the origin of the desert lines of the positive spectrum of y closer to 0 creates a model which most likely appears more intuitive to an employer who prefers paying as little as possible to his employees. This scenario is depicted in graph 6.2.

[8] For sake of simplicity most examples in this paper will be limited to two points of origin. There is however no formal reason to do so. In theory one could use an infinite amount of slopes which requires an infinite amount of points of origin. This could be the basis of 'curved desert'.



Graph 6.1: A possible model of desert from the perspective of an employee

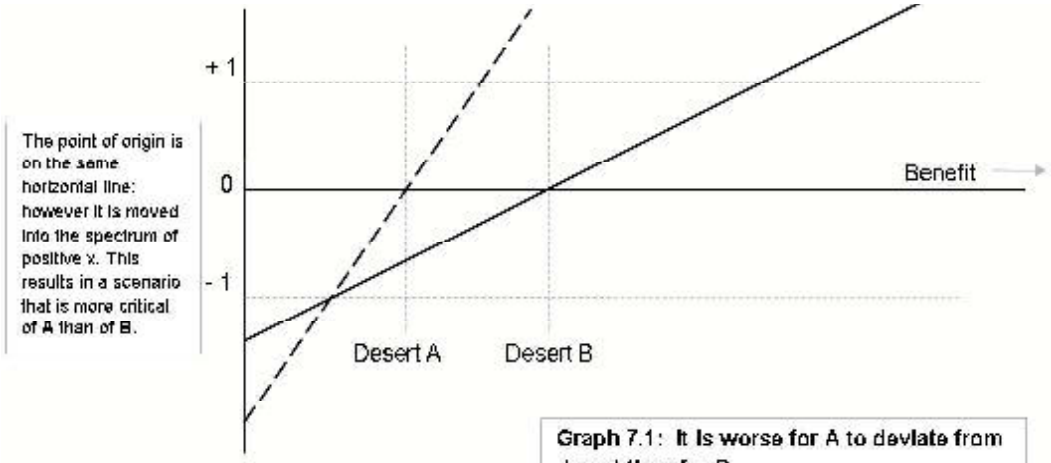


Graph 6.2: A possible model of desert from the perspective of an employer

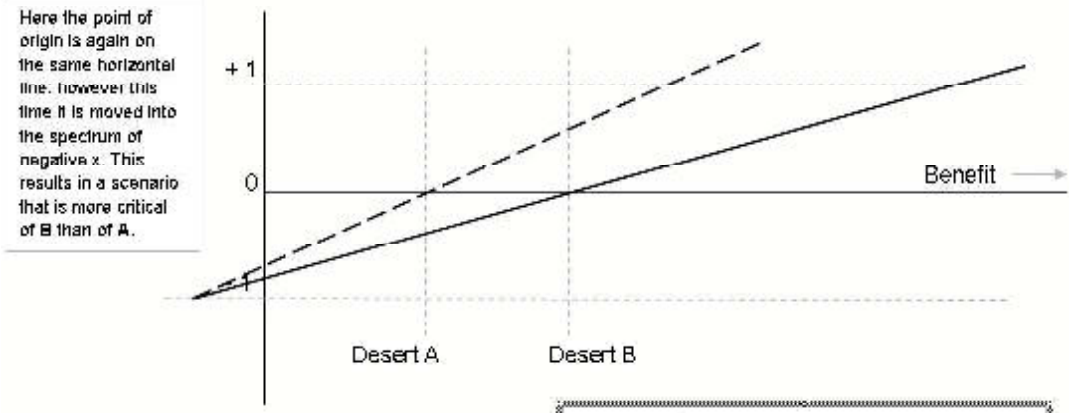
The second set of modifications comes at the cost of an abstract dependant variable[9]. However if one is willing to accept this abstract variable it can be a useful tool. If one moves the point of intersection into the positive or negative spectrum of x individual scales for each person accounted for within the model are created. Some people for example might argue that it is of greater relevance, that A receives her exact desert than that B receives her exact desert. As depicted in graph 7.1, this can be done by moving the point of intersection into the positive spectrum of x, thus creating individual scales which are most critical of people with small

[9] In the unmodified Ratio Model, the goodness scale corresponds directly to the percentage of deviation (0.5 corresponds to plus 50% etc.). With the first set of modifications the scale is shifted, the direct relationship however is preserved. If one moves the point of origin on the x axis however, the dependent variable looses most of its descriptive value, as there is no direct relationship between goodness and deviation from desert

desert deviating from their desert. Graph 7.2 shows that the opposite. Moving the point of intersection into the negative spectrum of x creates scales which are more critical of people deviating from their desert the higher their desert.



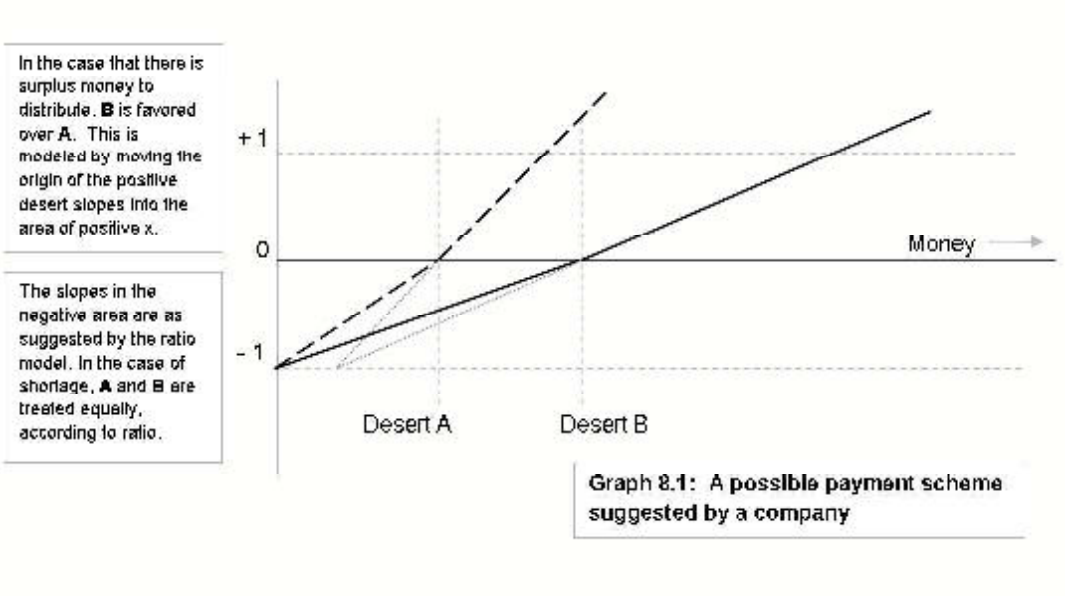
Graph 7.1: It is worse for A to deviate from desert than for B



Graph 7.2: It is worse for B to deviate from desert than for A

A practical application of the second modification is presented in the following example. A company may want to encourage people to put lots of effort into their work. Thus, in case of surplus, employees with high desert should receive a greater bonus than those whose work results in low desert. If the company faces shortages, all staff can be treated equally to avoid protest. Such a scenario is depicted in graph 8.1. Here, the negative deviation from desert is treated according to ratio; it uses the unaltered Ratio Model. Within the area of positive y how-

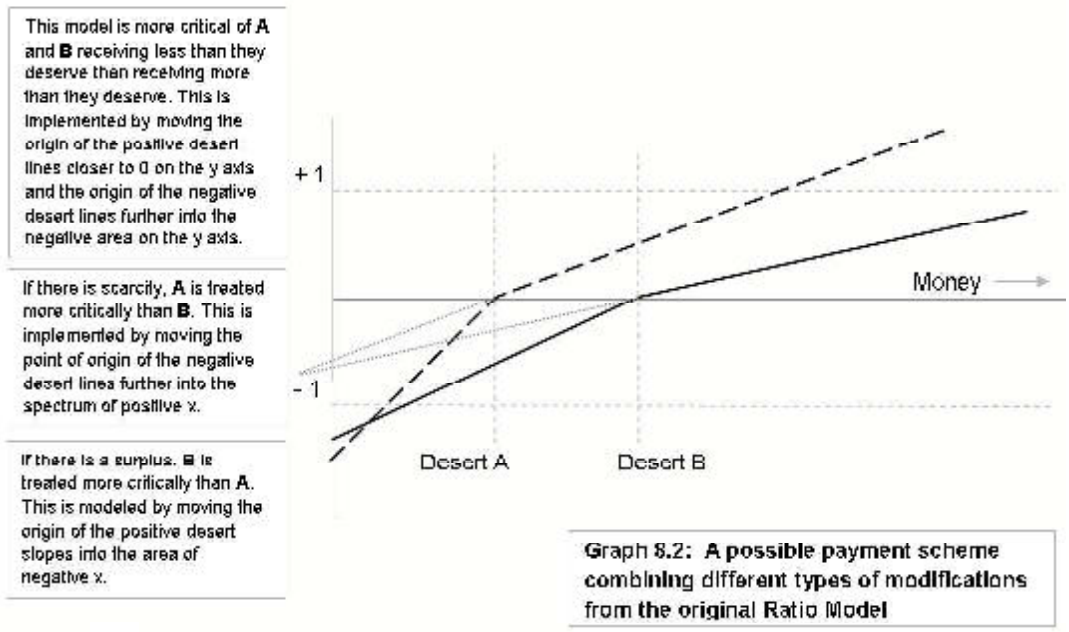
ever, high desert is favored by placing the origin of the desert slopes in the area of positive x.



Graph 8.1: A possible payment scheme suggested by a company

Combining both types of modifications mentioned can create models closer to our complex understanding of desert. It could be claimed that wages below desert should be avoided. Alternatively it could be argued that it is more important for people with lower desert to receive their money than for people with higher desert, and that surplus money should be invested in bonuses for low income employees rather than giving it to those who receive high wages anyways. All these aspects of distributive justice are modeled in graph 8.2, using all types of modifications which have so far been discussed.

Avoiding wages below desert is achieved by moving the point of origin of the desert lines of the scarcity area further into the area of -y. Assigning more value to people with less desert to receive their money, assuming there is scarcity, is reflected by moving the intersection of these desert lines into the area of +x. Finally, favoring people with less desert if there is a surplus, and perceiving it as better to receive more money in general, is accomplished by creating separate desert lines for the surplus area and moving their point of origin towards +y and -x. This example demonstrates the advantages of a flexible, modular framework.



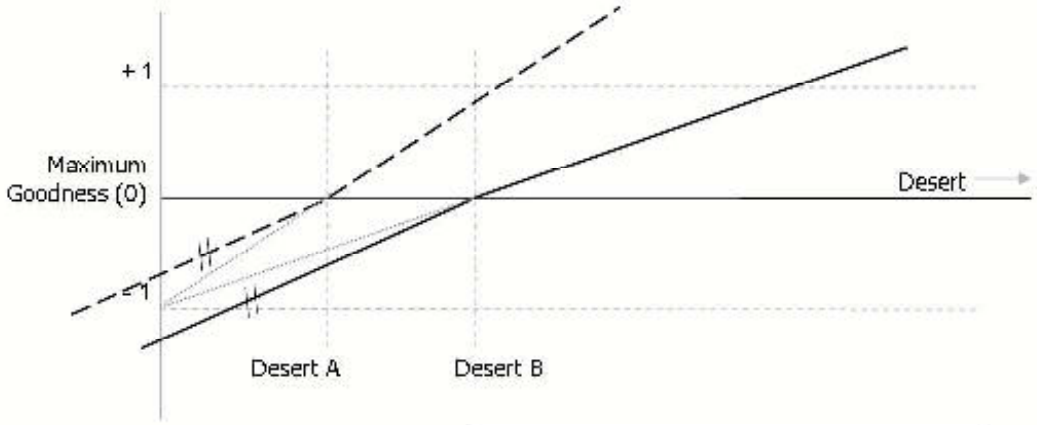
Graph 8.2: A possible payment scheme combining different types of modifications from the original Ratio Model

6 Special Cases, Limitations and future research

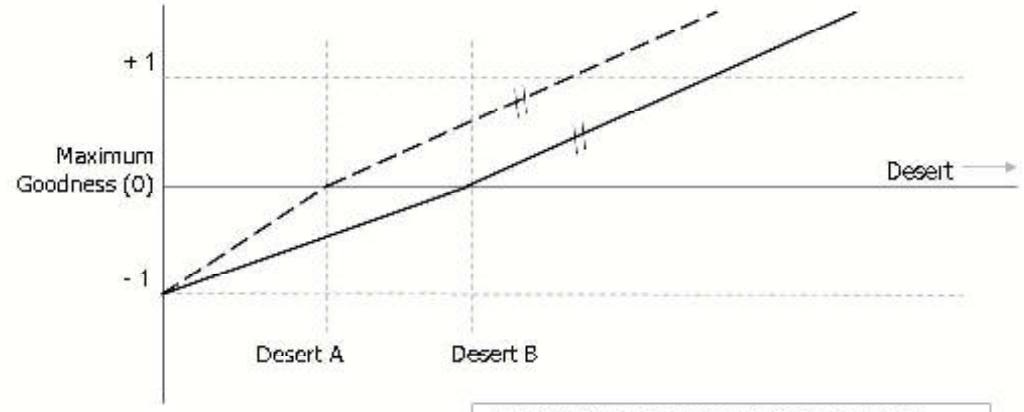
There are several special cases which can occur, depending on where the point of intersection is plotted. By moving the point of intersection further away from 0 and eventually into infinity, parallel lines emerge[10]. Consequently, it becomes apparent that Kagan's model can actually represent a special case of the suggested framework. Imagine that a company assigns A and B to lock a safe in which the money is stored. Imagine that both A and B fail in their duty and the company is robbed in consequence. In this case one can argue that it would make sense to punish both employees equally in absolute terms (graph 9.1). Likewise, the equal distribution of a bonus, such as Christmas money, can be depicted in graph 9.2. Both of these distribution schemes require parallel – absolute – desert lines, as suggested by Kagan.

A further special case is a slope of zero. This simply implies that how much a person receives is irrelevant for the overall goodness. In the scarcity area this means that it does not matter giving a person nothing, her claim to her desert is not valued. In an analogue manner in the surplus area this would mean that we

[10] In extreme cases intersections of parallel lines can re-enter the finite plain in the positive spectrum of y, creating models that do not immediately appear intuitive, but may have practical applications, yet to be discovered.



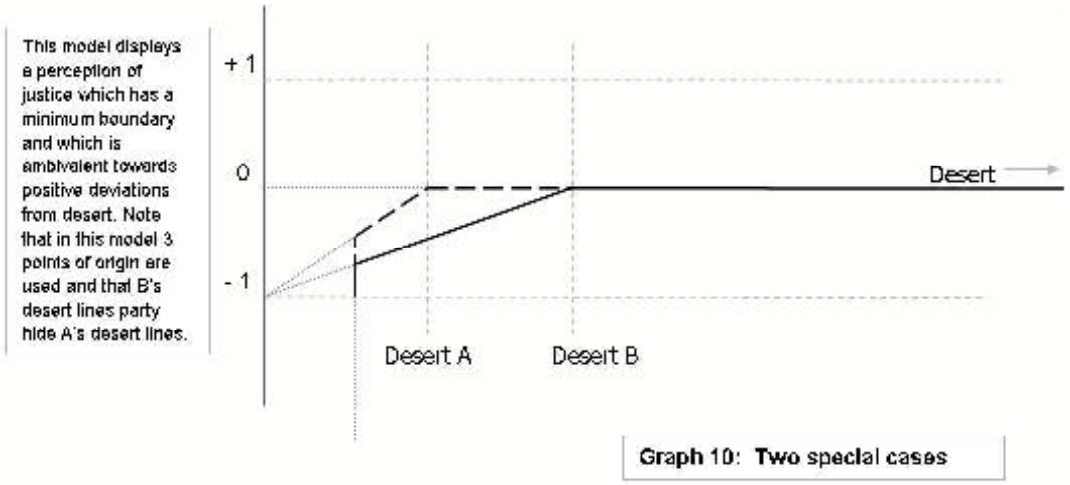
Graph 9.1: A and B are punished equally



Graph 9.2: A and B are rewarded equally

do not mind if she receives more than her desert, no matter how much it is. If there is no slope, the opposite occurs. No slope indicates that a deviation from desert is unacceptable. This could be used for creating boundaries, such as minimal wages or maximum income. If this sounds confusing, graph 10 may shed some light on these special cases. Apart from these modifications, not all mathematically feasible solutions contribute to the functioning of the framework. A desert line with a negative slope for example is invalid and thus must be treated as if it had no slope.

While the modifications suggested in this framework have the apparent benefit of creating flexibility, these modifications do however change the meaning of the dependent variable. The first set of modifications merely changes the scale which is used. In contrast, the second set of modifications changes the depen-



Graph 10: Two special cases

dent variable to an abstract term which does not give immediate information on the allocation of goods. Thus, the flexibility of the framework comes at the cost of receiving a dependent variable which gives far less information than the original Ratio Model.

A further limitation is that all models in this paper are continuous and linear. Neither continuity nor linearity however necessarily represents the way desert is intuitively understood. Nonlinear (what Kagan (2008) describes as 'curved desert') and non continuous models deserve further research. Also, the aspect of efficiency is not taken into account in this framework, though it should be possible to combine this framework with models such as Teun Dekker's (2008) model on desert and distributive efficiency.

7 Conclusion

The distribution of scarce goods is a common societal problem of distributive justice. Thus, a model which aids to determine distribution according to a predefined set of assumptions can be of great potential use. In this context the work of Shelly Kagan has to be seen as a valuable contribution to political philosophy. Yet, this paper demonstrates that the supposedly intuitive model of Shelly Kagan becomes highly problematic in the given example of employees A and B. Despite its reference to common sense, Kagan's model relies on implicit and unstated normative assumptions, which are not necessarily shared by a majority of people and hence universally applicable. The Ratio Model attempts to resolve these problems, however, it also can is caught in a similar trap. Any rigid model of desert-based distributive justice inevitably assumes that there exists only one 'just'

way of distribution. The heterogeneous demands of practical situations, as well as different normative conceptions of justice call for an individualized, modular framework.

The framework consequently presented in this paper is inspired by Kagan's model but by virtue of its flexibility is far more universally applicable. Nonetheless it is only a model, and by its nature a simplification. The Ratio Model and its framework could prove useful in some real life situations, however we appeal to anyone who uses this model (or any model for that matter) not to use it blindly but to be aware of its underlying assumptions.

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