

**DFG Research Group 2104**

**Need-Based Justice and Distribution Procedures**

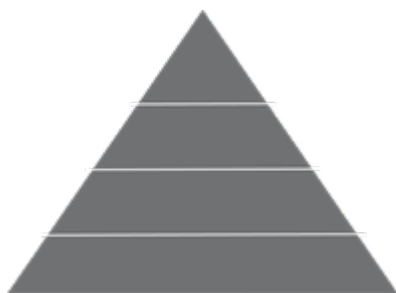
On the Measurement of Need-based Justice

II

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# On the Measurement of Need-based Justice

## II

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**Abstract:** This article is a continuation of an earlier article on the measurement of need-based justice (Springhorn 2022). While the first article focused on the measurement and its argumentative foundation with regard to single individuals, this article focuses on aggregation. For this purpose, I further develop considerations from Springhorn (2022) and point out desiderata that an aggregated measure has to comply with. Then, a measure is given that satisfies these desiderata and other measures are compared with this measure. Measures resulting from the considerations identify avoidable undersupply as the main source of injustice.

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# 1 Introduction

This article is the continuation of an article on the same topic that has been published in *Economics & Philosophy* in 2022 under the title *On the Measurement of Need-Based Justice* (Springhorn 2022). In Springhorn (2022), the focus is on the level of single individuals: What constitutes injustice for a single individual from the perspective of need-based justice and which variables influence the degree of injustice?<sup>1</sup> This article aims in particular at the aggregate level, addressing the overall justice within a group of individuals. Thereby, challenges that have been located on the individual level in Springhorn (2022) become apparent. The individual level is therefore re-addressed, further developing previous considerations.

This article is designed as self-contained. However, the argumentative foundation is only summarised, so it is advisable to consult Springhorn (2022).

By way of introduction, the question of to what purpose need-based justice is to be measured can be answered as in Springhorn (2022): If, for instance, an individual is endowed with 100 units of a good (e.g. income per month, daily food ration, living space) while only exhibiting a need for 50 units, then from a perspective of need-based justice, this case has to be judged differently from cases wherein an individual with the same endowment has a different need, e.g. of either 150 or 200 units. In the first case, the individual is *oversupplied*, while in the second and third cases the individual is *undersupplied* and more strongly undersupplied in the third than in the second case. In broader terms, the reason for measuring need-based justice is that from the perspective of need-based justice, one and the same endowment might be just or unjust to varying degrees.

In Springhorn (2022), it is argued that in addition to the need-based supply situation of an undersupplied individual *i* and the degree of *i*'s undersupply, there is another crucial aspect that must be considered in assessing justice from a perspective of need-based justice: *The opportunity to avoid or at least mitigate i's undersupply*. A necessary condition for *i*'s undersupply to be assessed as unjust is that there is a known opportunity to avoid or at least mitigate *i*'s undersupply. And if such an opportunity is known, its 'degree' has an influence on the degree of injustice: The 'greater' this opportunity is – meaning the easier it is to avoid or mitigate undersupply – the more unjust one and the same case of undersupply is. The argument is broader and not limited to this, but one way to avoid or mitigate *i*'s undersupply is obviously known if another individual *j* exists who has an endowment that can be transferred to *i*. It can also be said that the opportunity of a transfer that is not realised establishes injustice. The greater the in principle transferable endowment of *j*, the greater this opportunity and the greater the injustice for *i*. It is therefore essential, even at the individual level, to take into account not only the endowment and the need of an undersupplied individual regarding whom a justice assessment is to be given, but also the endowments of other individuals and their needs, which provide information about potentially negative consequences of a transfer. In Section 3, I present this argumentation in the context of a summary of Springhorn (2022). Here one also finds summaries of the concept of *need, need-based justice*, the *measurement* of need-based justice and on the used methodology. Prior,

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<sup>1</sup> As will be explained further, both the previous and this article primarily discuss and measure *injustice* and not justice.

Section 2 provides basic definitions and notations used in the summary as well as in further sections.

At the end of Springhorn (2022), there is an example of a measure that meets minimum requirements for a measure of need-based justice at the individual level and a final short outlook on the aggregate level showed challenges. In Section 4, these challenges are concretised. They essentially result from the fact that, following the considerations regarding the individual level, opposing tendencies influence aggregation. For example, given two undersupplied individuals  $i$  and  $j$ , if the supply situation of  $j$  improves, the injustice for  $j$  decreases. However, this also increases the opportunity to improve the supply situation of the other undersupplied individual  $i$ , which is associated with an increase in injustice for  $i$ . This leads to the questions of what is to be weighted more strongly at the aggregate level and whether this applies in all circumstances or only in certain ones.

The considerations from Section 4 lead to a specification of the findings of Springhorn (2022) and as a consequence thereof, to a specification of the requirements for a measure of need-based justice at the individual level as formulated then. These were formulated in such a general way that an improvement in the supply situation of an undersupplied individual  $j$  also leads to an increase in injustice for an also undersupplied individual  $i$  when  $j$  is worse supplied than  $i$ . The guiding argument behind this was that the injustice for  $i$  increases if the opportunity to improve  $i$ 's supply situation increases – which is also the case if the supply situation of an individual  $j$  who is even worse supplied than  $i$  improves. This guiding argumentation is not given up now, but it is restricted: *If the supply situation of an undersupplied individual  $i$  can only be improved at the expense of an even worse-supplied individual  $j$  (or more precisely: only at the expense of an individual who is not better supplied),  $i$ 's situation is not regarded as unjust.* These considerations are elaborated in Section 5. A modified set of requirements for the individual level and a modified proposal for a measure of need-based justice that meets this set are also provided.

In Section 6, requirements are founded and formalised that an aggregated measure of need-based justice has to fulfil and which allows statements about overall justice. Central to this is the claim that a transfer from an individual  $j$  to an individual  $i$  leads to a decrease in overall injustice if and only if  $i$  is undersupplied and  $j$  is better-supplied than  $i$  before the transfer – especially if  $j$  is oversupplied – and is not worse supplied than  $i$  as a result of the transfer. In short, this can be summarised as *neediest first*.<sup>2</sup> That the arithmetic mean of the individual measure proposed in Section 5 satisfies the requirements is discussed in Section 7. Here you will also find a brief comparison of the argumentation presented here and an argumentation that focuses on equality in supply. Section 7 also elaborates on limitations of the approach proposed here resulting from simplifications and on how these limitations can be overcome.

Section 8 is dedicated to comparisons of the measure for the aggregate level proposed here and measures proposed by other authors. I compare measures that are exemplary for four, in my view, categorically different approaches in the attempt to measure need-based justice. I argue that my approach can be understood as a fifth approach that avoids the other four's weaknesses while combining their main ideas (as I understand them).

Section 9 gives a brief outlook on fields of application and desirable empirical studies.

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<sup>2</sup> And not only, as sometimes claimed, *needy first*; see e.g. Traub et al. (2017).

Finally, Section 10 summarises the most important results. In my view, the most important one is that neither undersupply nor inequality are decisive factors to assessing a group in terms of need-based justice, but rather avoidable undersupply.

## 2 Notations and Definitions

A set of individuals  $I$  is presupposed. The total number of individuals is denoted by  $\#I$  in order not to get confused with several notations of need that use the letter  $n$ , which is typically used to denote this number. The need of a specific individual  $i, j, \dots \in I$  is denoted by  $n_i, n_j, \dots$ . The profile (vector) of the need of all individuals is denoted by  $\mathbf{n} := (n_1, \dots, n_{\#I})$ . It is assumed that every individual  $i$  that is considered has a need of the good in question  $n_i > 0$  because individuals without need are irrelevant from the perspective of need-based justice. Analogous to the need, the endowment of specific individuals  $i, j, \dots \in I$  is denoted by  $e_i, e_j, \dots$ . Every individual  $i$  is endowed with an endowment  $e_i \geq 0$ . That means that they are endowed to a certain non-negative degree with the good in question or not, but for the sake of simplicity I do not take into account any negative endowments which in some cases could be interpreted as debts. The profile of endowments is denoted by  $\mathbf{e} := (e_1, \dots, e_{\#I})$ .

Note that there is an essential difference between endowment and need: The need and endowment of an individual can change intrinsically. A child usually has a different need than an adult; the endowment at the beginning of the month is typically greater than at the end. But while the total endowment can be distributed differently by transfers, entailing a change in the endowment of both concerned individuals – which, however, is not intrinsic but extrinsic –, the total need cannot.

The need and the endowment of an individual allow assessments regarding the individual's supply situation or need satisfaction. If  $e_i = n_i$ , the individual is exactly supplied, their need is exactly satisfied or met; if  $e_i \geq n_i$ , the individual is supplied, their need is satisfied or met; if  $e_i > n_i$ , the individual is oversupplied, their need is more than satisfied; if  $e_i < n_i$ , the individual is undersupplied, their need is not satisfied or met.

A measure of overall need-based justice is a mapping  $J$  from at least  $(\mathbf{e}, \mathbf{n})$  to at least a subset of  $\mathbb{R}$ . Some authors<sup>3</sup> – and I follow them – explicitly consider measures of need-based justice for single individuals in addition to measures of need-based justice for overall justice. In such a case, the measure  $J$  is indexed:  $J_i$ . Unless otherwise stated, I assume – following the prevailing convention – that injustice is mapped onto the negative numbers.

In the following, these notations, definitions, and terminology are transferred to approaches of other authors in order to discuss them in a uniform framework.

## 3 Preliminary Remarks/Summary of Springhorn (2022)

The following sections are deliberately brief in the sense of a summary. For details and more references, please see Springhorn (2022).

### 3.1 Need

The term *need* is ambiguous: If an individual is endowed with 100 units and their need is 60 units, there are two ways to comprehend it: It may mean that they have 100 units at their

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<sup>3</sup> Jasso in particular should be mentioned here; see especially Jasso 1978, 1980, 1999.

disposal but only need 60 units, therefore they have 40 units *more* than necessary. It may also mean that they have 100 units at their disposal but need 160 units; therefore 60 units are missing, which defines the need. I will follow the former understanding. Need is the threshold the endowment should meet and not a gap that should be filled. In the following, I will also adapt references to the best of my ability where necessary.

The question of what the need of an individual is cannot be discussed without reference to the question of what the endowment of the individual should be sufficient *for*. The answers differ widely.<sup>4</sup> However, this article is about measuring need-based justice and not about identifying or measuring need. I assume that in a first step, *need* must be acknowledged at a social level.<sup>5</sup> I will assume that this acknowledgement procedure takes individual need-generating attributes into account.<sup>6</sup> And I will assume that an acknowledgement procedure has already taken place and that there is a consensus that the endowment of an individual should not fall below their individual need. In this sense, I take the individual needs as given.

### 3.2 Need-Based Justice

I follow for example Konow (2001, 2003) and Konow and Schwettmann (2016) in the belief that justice in a general sense results from an interplay of different justice principles, one of which is need-based justice, or in other words: the concept of justice in general is a concept superordinate to need-based justice. Because the topic of this article is (measuring) need-based justice – as one of several justice principles which interplay – for reasons of readability, I will henceforth often speak of *justice* when in fact I mean need-based justice. Thereby I dispense with cumbersome phrasing such as “just from the perspective of need-based justice” or “unjust concerning need”. If another or a general concept of justice is meant, then this will be stated explicitly. But this does not mean that I assign a higher status to the principle of

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<sup>4</sup> The possibly most influential approach to classify needs is Maslow's (1943) theory of human motivation. The theory holds that there is a hierarchy of needs with physiological needs at the bottom, outranked by safety, love/belonging, and esteem needs, and with self-actualization at the top. The lower the need is in the hierarchy, the stronger it is. Absolute concepts of poverty like the *basic needs approach* (Streeten et al. 1981) rely on expert knowledge regarding the minimum cost diet that secures the physical survival of an individual (Seidl 1988). Studying the living conditions of the working class in York, Rowntree (1901, p. 86) for instance defined “families whose total earnings are insufficient to obtain the minimum necessities for the maintenance of merely physical efficiency” as *poor*. Living standards in a society can grow or shrink. Restricting needs purely to physical survival would ignore the fact that the satisfaction of both physiological and psychological needs contributes to mental health and thus the well-being of people (Deci and Ryan 2000; Ryan and Deci 2000). Sociological *relative deprivation theories* (Runciman 1966; Townsend 1974) carry the subjectivity of needs to the extreme. According to Runciman (1966), a person is in need if they do not have something, somebody else has it, they want to have it, and they think that obtaining it is realistic. Both the purely absolute and the relative view of need and poverty were harshly criticized by Sen (1983). Instead, he proposed the concept of *absolute neediness*. A person is absolutely needy if they do not have the capability, say, in terms of income, to partake in the commonly accepted activities of the community. This is the so-called *capabilities approach* (Sen 2009; Nussbaum 2000, 2011). But there are more. For example, Braybrooke (1987) argues for the goal of a *normal course of life*, Daniels (1981) for a normal *range of opportunities*, Schuppert (2013) for *agency* and Sher (2014) for *leverage*, meaning the capacity to acquire additional goods. A general discussion of the goals at which need fulfilment could aim is given by Miller (1999, Chapter 10).

<sup>5</sup> This acknowledgement procedure should generally be carried out in compliance with democratic principles, in particular in compliance with general human and minority rights, and should be guided by the maxim of meeting a need that allows participation in society. However, there may also be situations in which other acknowledgement procedures and/or other maxims are more appropriate.

<sup>6</sup> For example, as part of such an acknowledgement procedure, it could be stated that the size of certain attributes, such as age or health status, results in a need for a certain number of nappies. The stipulation of attributes and their manifestations then applies generally without regard to the person; the individual manifestations of the attributes then determine the need acknowledged for the individual.

need-based justice as compared to other principles of justice, or that I intend to equate need-based justice with justice.

### 3.3 Methodology – The Axiomatic Approach

The axiomatic approach is widely appreciated as it reduces the state of a theory to its core and allows an elegant and concise representation. Taken to the extreme, the whole theory can be traced back to as small a number of axioms as possible, from which all propositions of the theory can be derived. The axioms must be necessary and sufficient to derive the entire theory from them. But there is another reason for using the axiomatic approach, described by one of the great specialists of the deductive method, Tarski (1965).<sup>7</sup> According to Tarski, the axiomatic approach can be understood as a research methodology. I will sum it up and adapt it to the development of measures.

An essential part of the procedure is the reasoning and collecting of single properties that a measure should possess. These requirements are noted in axioms. Based on a set of axioms, one can answer various questions using this technique. For example, you can show the compatibility – which I do by giving a measure that meets all requirements – or non-compatibility of properties, you can deduce further properties that are given if single or multiple axioms are fulfilled, you can categorise measures by the axioms and the deduced properties, you can show the uniqueness of a measure – if given –, or otherwise the (mathematical) class to which a measure belongs, and more. But the real strength of the axiomatic method – according to my understanding of Tarski – lies in its ability to examine various combinations of well-founded axioms. For example, if the original or an extended combination is not compatible, you must take a step back and adjust at least one axiom – which is what I do in Section 5 – or drop it. It is the same when a combination leads to unsustainable, implausible, or undesirable consequences. On the other hand, anyone who accepts the axioms must accept the consequences. But the development of measures of need-based justice is not yet concluded, which is why I do not exhaust the potential of the axiomatic approach in this article. The focus of Springhorn 2022 as well as this article is on the reasoning of fundamental properties that such a measure should possess. Therefore, it might be a bit exaggerated to say that the axiomatic method is used here. Although I regard the contributions presented in this article as important, I do not think that they answer all questions of measuring need-based justice. They are only a next step. That is why this article is designed to ensure that further work can be carried out within the framework of the axiomatic method,<sup>8</sup> and this is why I do not use the term *axioms* but the weaker term *desiderata*.

### 3.4 Measuring Need-based Justice on the Individual Level

I start the research at the individual level, where justice for single individuals is evaluated. In doing so, I follow Jasso, who has explicitly and extensively studied justice at the individual level.<sup>9</sup> In my eyes, this has the great advantage that it is much easier to justify and understand in detail why changes in justice evaluations occur (this is not necessarily the case with authors who only look at the aggregate level – see Springhorn (2022)).

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<sup>7</sup> I think that in this respect, in addition to the great theoretician Tarski, the great practitioner Sen should also be mentioned; see especially Sen 1976.

<sup>8</sup> My hope is that one day a similarly comprehensive picture will emerge as already exists for poverty measurement, as e.g. presented in Kockläuner (2012).

<sup>9</sup> See, e.g. Jasso 1978, 1980, 1999.

### 3.4.1 Guiding Principles

The central issue of need-based justice is how to deal with undersupply. There might be questions of various degrees of justice or injustice in cases of oversupply. If for instance a patient receives more medicine than they need, this might not only be dangerous, it might also be seen as unjust. Questions like these resolve themselves if *endowment* is understood as *endowment at one's disposal*, as I will do here. The medicine is at your disposal, but you don't have to take all of it. If the endowment at disposal of an individual at least meets their need, from a perspective of need-based justice this is just (or not unjust, as argued further below). If it does not, it can be unjust and unjust to different degrees. Do not misunderstand me: Oversupply can cause injustice if there are undersupplied individuals. But it is not unjust per se if an individual is oversupplied, otherwise we would have to judge the situation of individuals in a land of milk and honey as unjust. Therefore, as I will explain in the following, I associate injustice with undersupply and not with oversupply. Consequently, I focus on measuring *injustice*. The situations of supplied individuals are judged to be the same: They are just, which from a perspective of measuring *injustice* means that they are not unjust.

I follow the common view that one can measure the degree of the *need satisfaction* of an individual based on their endowment and their need. But in cases of undersupply, neither can we assess the degree of justice or injustice from a perspective of need-based justice, nor can we say anything about need-based justice at all solely on the basis of the individual's endowment and need. In my view, only the existence and awareness of at least one feasible, better alternative to the supply situation of an undersupplied individual allow the situation to be judged as unjust.<sup>10</sup> If, for example, a lonely castaway *i* stranded on a desert island needs 100 units but has only 50 units and there is no chance of endowing *i* better, then it is sad, it is bad, but it is not unjust.

At this point it is important to be cautious: In everyday speech, it is permissible to say that *i*'s endowment is not need-based in the sense of *being not in line with their need*. If nothing more is to be expressed than that the castaway's endowment does not satisfy their need, then this is unproblematic. However, that is a judgment regarding the need satisfaction or the supply situation of an individual, not a judgement on justice. In my eyes, a judgement of justice can only be made if there is an alternative to the issue being judged.<sup>11</sup> That, for example, the sun will one day become a red giant and burn the earth is without alternative and can no more be judged as just or unjust than an undersupply that may result from it. Note that in this sense *not unjust* does not have to mean *just*. There are issues that are not just *and* not unjust.

In this sense, the situation of the stranded *i* is quite different if *i* is not stranded alone but is accompanied by a second individual *j* who also needs 100 units but has 200 units at their disposal. In this second case the situation of *i* must be judged differently than in the first case, because in case 1 there is no known, feasible opportunity to improve the situation of *i* (this is how the example is constructed), while the undersupply of *i* in case 2 can obviously be avoided by a transfer of endowment from *j* to *i*. From a perspective of need-based justice, this is a fundamental difference. If undersupply cannot be avoided (or at least mitigated – I will come to this later) it is sad, it is bad, but it is not unjust. It is the opportunity to avoid

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<sup>10</sup> The alternative has to be feasible because one can always construct purely hypothetical better alternatives, and it has to be known because if there are feasible better alternatives nobody is aware of, these alternatives may as well not exist.

<sup>11</sup> For further information see Springhorn (2022).



undersupply that makes a situation unjust. I explicitly do not want to equate known, feasible, better alternatives with the opportunity of a transfer, but if the opportunity of a transfer exists, a known, feasible, better alternative exists. For the sake of simplicity, however, I will limit myself to this in the following.

The opportunity to avoid or at least mitigate undersupply can be understood as varying in the following sense: If the endowment of the stranded  $j$  increases, the opportunity to avoid the undersupply of  $i$  increases and thus the injustice for  $i$  increases. If the endowment of  $j$  decreases, the opportunity of avoiding or at least mitigating  $i$ 's undersupply decreases, and thus the injustice for  $i$  decreases. If the endowment of  $j$  decreases to 0, there is no known feasible way to improve  $i$ 's situation and  $i$ 's situation is not unjust despite the undersupply. It can also be said that the easier it is to avoid or mitigate the undersupply of  $i$ , the more unjust it is. The same goes for the lower the negative consequences associated with avoiding or mitigating undersupply are: If  $j$  has 800 units, a transfer in favour of  $i$  means a significantly lower burden for  $j$  than if  $j$  has 100 or 25 units. The latter is all the more true if one takes into account the supply situation and thus the need of  $j$ . If  $j$  has a need of 100 and an endowment of 800 units, a transfer of 50 units covering  $i$ 's need would only slightly reduce  $j$ 's large oversupply, while starting from an endowment of 100 units,  $j$  would slip into undersupply with each transfer. In the case of an endowment of 50 units, each transfer would not only increase  $j$ 's undersupply but would also mean that  $j$  is worse supplied than  $i$  as a result of the transfer. This draws attention to  $j$ 's need: the smaller  $j$ 's need is, the more the absence of a transfer in  $i$ 's favour is unjust for  $i$ , and the larger  $j$ 's need is, the less unjust the absence is.

### 3.4.2 A First (old) Set of Desiderata for the Individual Level

The explanations of the previous section lead to the following desiderata (these are a selection of the most important desiderata of Springhorn (2022)):

**Desideratum I1 (Point of no injustice)** There is one and only one function value  $J_{\text{no injustice}}$  so that for all  $i \in I$  the following holds:

$$J_i(\mathbf{e}, \mathbf{n}) = J_{\text{no injustice}} \text{ if and only if } e_i \geq n_i \text{ or } \sum_{j \in \mathbb{N} \setminus \{i\}} e_j = 0.$$

$\sum_{j \in \mathbb{N} \setminus \{i\}} e_j = 0$  means, that there is no potential transfer donor, which means, in the simplified version discussed here, that no known, feasible, better alternative to the supply situation of  $i$  exists or in other words, that in a case of undersupply of  $i$ , there is no known, feasible opportunity to mitigate it.

Note in the following monotonicity statements that, following convention, injustice is mapped onto the negative numbers. If the function value increases, this means a decreasing injustice.

**Desideratum I2 (Monotonicity in the endowment of the other)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and  $\sum_{j \in \mathbb{N} \setminus \{i\}} e_j > 0$ , then the following applies to a measure of need-based justice  $J_i$ :

$$J_i \text{ is strictly monotonically decreasing in } \sum_{j \in \mathbb{N} \setminus \{i\}} e_j.$$

The conditions for this and the following desiderata are explained as follows: The desiderata are only relevant in cases of undersupply of  $i$  because otherwise the situation is not unjust for  $i$ . That is why  $e_i < n_i$  is presupposed. Accordingly, in the simplified version discussed here, where the opportunity to mitigate the undersupply of  $i$  is reduced to the existence of a

potential transfer donor, its existence is assumed by  $\sum_{j \in \mathbb{N} \setminus \{i\}} e_j > 0$ , because otherwise the situation for  $i$  is not unjust. The assumption  $e_i > 0$  is as mentioned assumed for the purpose of simplification because otherwise we would be dealing with comparatively complex limit value considerations that are not decisive for the central line of thought.

**Desideratum I3 (Monotonicity in the need of the other)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and  $\sum_{j \in \mathbb{N} \setminus \{i\}} e_j > 0$ , then the following applies to a measure of need-based justice  $J_i$ :

$J_i$  is strictly monotonically increasing in  $\sum_{j \in \mathbb{N} \setminus \{i\}} n_j$ .

**Desideratum I4 (Monotonicity in the individual's endowment)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and  $\sum_{j \in \mathbb{N} \setminus \{i\}} e_j > 0$ , then the following applies to a measure of need-based justice  $J_i$ :

$J_i$  is strictly monotonically increasing in  $e_i$ .

**Desideratum I5 (Monotonicity in the individual's need)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and  $\sum_{j \in \mathbb{N} \setminus \{i\}} e_j > 0$ , then the following applies to a measure of need-based justice  $J_i$ :

$J_i$  is strictly monotonically decreasing in  $n_i$ .

### 3.4.3 A first (*old*) Measure of Need-based Justice on the Individual Level

The following measure, developed in Springhorn (2022), fulfils the desiderata from the previous section:

$$J_{\text{Springhorn\_old}_i}(\mathbf{e}, \mathbf{n}) := \min \left\{ 0, \ln \left( \frac{e_i}{n_i} \right) \times \frac{\sum_{j \in \mathbb{N} \setminus \{i\}} e_j}{\sum_{j \in \mathbb{N} \setminus \{i\}} n_j} \right\}.$$

The measure can be understood as weighting a measure of need satisfaction ( $e_i/n_i$  or  $\ln(e_i/n_i)$ ) with the opportunity to avoid or mitigate undersupply and the associated negative consequences ( $\sum_{j \in \mathbb{N} \setminus \{i\}} e_j / \sum_{j \in \mathbb{N} \setminus \{i\}} n_j$ ) and setting it to 0 in the case of need satisfaction.

## 4 (Resulting) Challenges for the Measurement of Need-Based Justice on the Aggregated Level

Based on the considerations described above, there are some opposing tendencies in various respects. This is particularly clear in the case of two undersupplied individuals  $i$  and  $j$  who both have an endowment greater than 0. An increasing endowment of  $j$  leads to an improvement of their supply situation and thus – as long as  $j$  remains undersupplied – to a decrease in injustice for  $j$ . The situation for  $j$  is unjust because  $j$  is undersupplied and the opportunity to improve their supply situation by means of a transfer from  $i$  to  $j$  exists. However, this also means that the opportunity to improve  $i$ 's supply situation by a transfer from  $j$  to  $i$  increases and that the negative consequences for  $j$  associated with such a transfer decrease. This is shown in the following figure for  $e_i = 50$ ,  $n_i = n_j = 100$ , the individual measures  $J_{\text{Springhorn\_old}_i}$  and  $J_{\text{Springhorn\_old}_j}$  from the previous paragraph and an aggregated measure that is the arithmetic mean of the individual measures:

$$J_{\text{Springhorn\_old}}(\mathbf{e}, \mathbf{n}) := \frac{1}{\#I} \sum_{i \in I} J_{\text{Springhorn\_old}_i}(\mathbf{e}, \mathbf{n}) = \frac{1}{\#I} \sum_{i \in I} \min \left\{ 0, \ln \left( \frac{e_i}{n_i} \right) \times \frac{\sum_{j \in \mathbb{N} \setminus \{i\}} e_j}{\sum_{j \in \mathbb{N} \setminus \{i\}} n_j} \right\}.$$

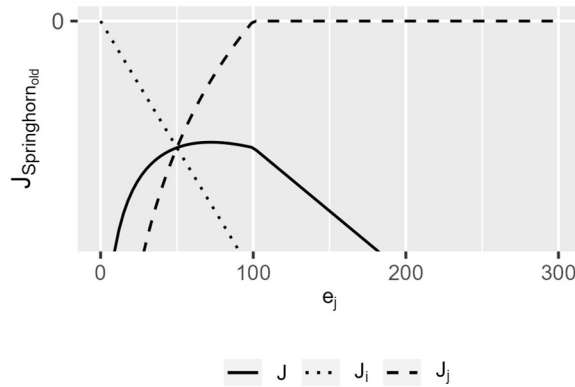


Figure 1: The measure proposed in Springhorn (2022) for  $i, j$  and an aggregation.

To avoid irritation, it seems useful to point out once again that *injustice* (and not justice) is measured and, following convention, injustice is mapped onto the negative numbers. The smaller the function values are/the larger the absolute values, the greater the injustice; if a function takes the value 0, no injustice is found. This means that an increasing function indicates a decrease in *injustice*.

In the considered case, the injustice for  $j$  decreases (logarithmically), the injustice for  $i$  increases (linearly), the total injustice first increases and then decreases, with the minimum total injustice (the maximum of  $J_{\text{Springhorn\_old}}$ ) being reached at approximately  $e_j = 70$ . As I will explain in the following section, I think it makes sense that the total injustice decreases at first and increases again after a certain point, but it is not clear to me why this tipping point should be at (approximately)  $e_j = 70$ .

## 5 Updating the Measure of Need-Based Justice on the Individual Level

The tipping point mentioned in the previous section arises because the injustice for  $j$  decreases more strongly than it increases for  $i$  up to this point and this relationship reverses from this point onwards. This raises the question of how strongly injustice should decrease for  $j$  and increase for  $i$  under the given conditions and in relation to each other. I answer the question as follows: If  $j$  is worse off than  $i$ , it should be considered more unjust if the opportunity to improve  $j$ 's supply situation is not realised – i.e. a transfer from  $i$  to  $j$  is omitted – than if the opportunity to improve  $i$ 's supply situation is not realised, i.e. a transfer from  $j$  to  $i$  is omitted. If one wanted to deviate from this, one would have to give  $i$  some kind of priority over  $j$ , which would give greater weight to the better supply of  $i$  over  $j$ , which would not be justifiable in view of the presupposed neutral recognition process. This draws attention to the question of whether it can be considered unjust at all if a transfer to an undersupplied individual  $i$  by an even worse supplied individual  $j$  is not realised or, in other words, if an improvement in supply of an undersupplied individual could only be realised at the expense of an even worse supplied individual. This does not seem justifiable. Rather, I would stipulate that an unrealised opportunity for the better supply of an undersupplied individual is only to be regarded as unjust for the individual in question if a realisation of this opportunity is not at

the expense of an even worse supplied individual and more precisely, an individual worse supplied as a result of the transfer. In other words, the absence of a potential transfer in favour of an undersupplied individual is only unjust for the potential transferee if the potential transferor would not be worse off than the potential transferee as a result of the transfer.

### 5.1 A New Set of Desiderata for the Individual Level

The considerations of the preceding paragraphs make it necessary to adapt most of the desiderata of Springhorn (2022). This is not a revision of the desiderata and their justifications remain essentially the same. Only their scope is clarified: The situation is not unjust for an individual not only if they are sufficiently supplied or if there is no opportunity to improve their supply situation (this is the old version), but if they are sufficiently supplied or if there is no opportunity to improve their supply situation *the realisation of which would not have the consequence that another individual would become worse supplied than the individual in question*. Otherwise – i.e. if an individual is undersupplied and there is not only the opportunity to improve their supply situation but there is the opportunity to improve the supply situation *and its realisation would not have the consequence that another individual is worse supplied than the individual in question* – the situation is unjust for this individual. These changes compared to the version from Springhorn (2022) mean that the degree of injustice depends on how large the undersupply of the individual in question is: if it increases (i.e. the endowment decreases or the need increases), the injustice also increases. And it also depends, as in Springhorn (2022), on how great the opportunities to improve the supply are (in the new version without this being at the expense of worse-supplied individuals) and how great the associated negative consequences would be. As in Springhorn (2022), this is determined by the endowments and needs of other individuals as potential transferors, although in this article, only those individuals that are better off are taken into account. The desideratum concerning the strength of growth in the endowment of an undersupplied individual is also adjusted accordingly, but it remains under the changed conditions that the strength of growth increases as the endowment of the individual decreases, since the loss or gain of one unit in the case of severe undersupply can be a matter of survival while the loss or gain of one unit in the case of only slight undersupply falls more into the grey area where, for example, issues such as social participation are negotiated. The same is true under these conditions – with the opposite sign – for the need of an undersupplied individual: If the need increases, the undersupply increases and at the same time the strength of the growth of injustice increases. And – also as before – with a different reasoning, the statements – again with reversed signs – also apply under the changed conditions to the endowments and needs of other individuals who are better supplied than the individual in question: If their supply situation improves (because their endowment increases or their need decreases), the injustice for the undersupplied individual in question increases more or less, depending on how much better the other individuals are supplied. This is particularly evident in the comparison of better-supplied individuals who are also undersupplied and individuals who are not only better supplied but are particularly heavily oversupplied: If the supply situation of the latter improves, the injustice for an undersupplied individual increases more than if the supply situation of the former improves, because in the case of extremely oversupplied individuals not only the opportunities to improve the supply situation of an undersupplied individual increase, but the associated negative consequences are also (much) less significant than in the

case of better but insufficiently oversupplied individuals. The preceding considerations are specified in the following desiderata:

**Desideratum I1 (Point of no injustice)** There is one and only one function value  $j_{\text{no injustice}}$ , so that for all  $i \in I$  the following holds:

$$J_i(\mathbf{e}, \mathbf{n}) = j_{\text{no injustice}} \text{ if and only if } e_i \geq n_i \text{ or if there is no } j \in I \setminus \{i\} : e_j/n_j > e_i/n_i.$$

The situation is not unjust for  $i$  if and only if  $i$  is not undersupplied or if there is no individual who is better supplied than  $i$  because then there is no opportunity to improve  $i$ 's supply situation without this being at the expense of an individual who is worse supplied than  $i$  as a consequence. This applies under the simplifying assumption – which is always made here – that the opportunity of improving the supply situation of  $i$  is reduced to the opportunity of transferring endowment.

The four following desiderata refer to changes in the supply situation of an undersupplied individual (if an individual is not undersupplied, its situation is covered by desideratum I1). They are largely common sense, except for the crucial point that I restrict them not only to the case that the opportunity to improve the supply situation of the undersupplied individual  $i$  exists (as in the old version), but to the case that the opportunity exists to improve the supply situation of the undersupplied individual  $i$  *and* a realisation of this opportunity is not connected with the consequence that another individual becomes worse supplied than the individual in question (as in the new version).

**Desideratum I2 (First derivative with respect to the individual's endowment)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and there exists  $j \in I \setminus \{i\} : e_j/n_j > e_i/n_i$ , then the following applies to measure of need-based justice  $J_i$ :

$$\frac{\partial}{\partial e_i} J_i > 0.$$

In short: If  $e_i$  increases (under the constraining conditions), the injustice for an undersupplied  $i$  decreases.

**Desideratum I3 (Second derivative with respect to the individual's endowment)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and there exists  $j \in I \setminus \{i\} : e_j/n_j > e_i/n_i$ , then the following applies to measure of need-based justice  $J_i$ :

$$\frac{\partial^2}{\partial e_i^2} J_i < 0.$$

In short: If  $e_i$  increases (under the constraining conditions), the injustice for an undersupplied  $i$  decreases more when  $i$  is severely undersupplied than when  $i$  is only slightly undersupplied.

**Desideratum I4 (First derivative with respect to the individual's need)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and there exists  $j \in I \setminus \{i\} : e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice  $J_i$ :

$$\frac{\partial}{\partial n_i} J_i < 0.$$

In short: If  $n_i$  increases (under the constraining conditions), the injustice for an undersupplied  $i$  increases.

**Desideratum I5 (Second derivative with respect to the individual's need)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and there exists  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice  $J_i$ :

$$\frac{\partial^2}{\partial n_i^2} J_i > 0.$$

In short: If  $n_i$  increases (under the constraining conditions), the injustice for an undersupplied  $i$  increases more when  $i$  is severely undersupplied than when  $i$  is only slightly undersupplied.

The four following desiderata relate to how changes in the supply situation of another individual affect the injustice of an undersupplied individual; this is not common sense and, to my knowledge, has not received attention so far apart from Springhorn (2022).

**Desideratum I6 (First derivative with respect to the endowment of another individual)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and there exists  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice  $J_i$ :

$$\frac{\partial}{\partial e_j} J_i < 0.$$

In short: If  $e_j$  increases (under the constraining conditions), the injustice for an undersupplied  $i$  increases.

**Desideratum I7 (Second derivative with respect to the endowment of another individual)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and there exists  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice  $J_i$ :

$$\frac{\partial^2}{\partial e_j^2} J_i > 0.$$

In short: If  $e_j$  increases (under the constraining conditions), the injustice for an undersupplied  $i$  increases more strongly when  $j$  is significantly better supplied than  $i$  (and even more so when  $j$  is oversupplied) than when  $j$  is only slightly better supplied than  $i$ .

**Desideratum I8 (First derivative with respect to the need of another individual)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and there exists  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$ , then the following applies measure of need-based justice  $J_i$ :

$$\frac{\partial}{\partial n_j} J_i > 0.$$

In short: If  $n_j$  increases (under the constraining conditions), the injustice for an undersupplied  $i$  decreases.

**Desideratum I9 (Second derivative with respect to the need of another individual)** For all  $i \in I$  the following holds: if  $0 < e_i < n_i$  and there exists  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice  $J_i$ :

$$\frac{\partial^2}{\partial n_j^2} J_i < 0.$$

In short: If  $n_j$  increases (under the constraining conditions), the injustice for an undersupplied  $i$  decreases more strongly when  $i$  is severely undersupplied than when  $i$  is only slightly undersupplied.

Finally, some technical aspects need pointing out:<sup>12</sup> justice cannot be measured in the unit of the considered good (e.g. number of fruits, kilograms, or dollar). That is why measures of justice must be unitless. Also, the justice evaluation should not change with changes in scale (e.g. from kilogram to gram or dollar to euro). That is why measures of justice have to be scale-invariant.

**Desideratum I10 (Unitlessness and scale invariance)** The following applies to a measure of need-based justice  $J_i$ :

$J_i$  is unitless:  $\text{unit}(J_i) = \mathbf{one}$  and

$J_i$  is scale invariant:  $J_i(\mathbf{e}, \mathbf{n}) = J_i(\mathbf{a}*\mathbf{e}, \mathbf{a}*\mathbf{n})$ ,  $\mathbf{a} \in \mathbb{R}^+$ .

## 5.2 A New Measure of Need-Based Justice on the Individual Level

The following measure is a refinement of the measure  $J_{\text{Springhorn\_old}_i}$  which corresponds to the previous considerations and desiderates:

$$\begin{aligned}
 J_{\text{Springhorn}_i}(\mathbf{e}, \mathbf{n}) := & \\
 & \frac{1}{\#\mathbf{I}} \sum_{j \in \mathbf{I} \setminus \{i\}} \min \left( 0, \log \left( \frac{e_i/n_i}{e_j/n_j} \right) \right) \\
 & * \frac{1}{\#\mathbf{I}} \sum_{j \in \mathbf{I} \setminus \{i\}} \left( \min \left( 0, (e_i/n_i - e_j/n_j) \right) \right)^2 \\
 & * \begin{cases} 0 & \text{if } e_i \geq n_i \\ 1 & \text{else} \end{cases} .
 \end{aligned}$$

For a better understanding of this measure, it is worth taking a brief look at its components. For simplicity's sake, two individuals  $i$  and  $j$  and  $e_j = 50$ ,  $n_i = n_j = 100$  are assumed. First, consider the following part of the measure:

$$\text{Part}_{1_i}(\mathbf{e}, \mathbf{n}) := \min \left( 0, \log \left( \frac{e_i/n_i}{e_j/n_j} \right) \right)$$

and compare it with the old measure  $J_{\text{Springhorn\_old}_i}$ :

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<sup>12</sup> See also Springhorn 2022.

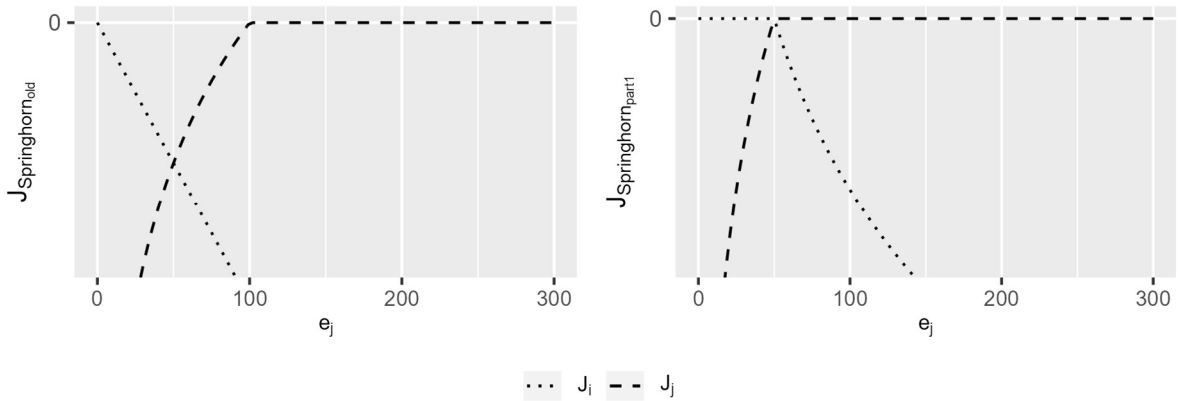


Figure 2: The measure proposed in Springhorn (2022) compared with a part of the new measure proposed here

Here, it is only the (absolute) gradient of the functions that matters. The absolute function values can be ignored.<sup>13</sup> Crucially, according to the old measure  $J_{\text{Springhorn\_old}}$  the injustice for  $i$  increases starting at  $e_j = 0$ , but according to  $\text{Part}_{1_i}$  it increases only from the point at which  $j$  is better supplied than  $i$  ( $e_j = 50$ ). The injustice for  $j$ , according to  $J_{\text{Springhorn\_old}}$ , is only minimal from  $e_j = 100$ , but according to  $\text{Part}_{1_i}$  already from  $e_j = 50$ . This corresponds to the modified, sharpened argumentation: The injustice for  $i$  (respectively  $j$ ) does not increase if there is the opportunity to mitigate the undersupply of  $i$  (respectively  $j$ ) without this only can be realised at the expense of an even worse supplied individual. However, it also immediately reveals one of several ugly properties of  $\text{Part}_{1_i}$ : If  $j$  is better supplied than  $i$  and  $e_j$  increases, the strength of the increase of injustice for  $i$  decreases. Thus, if  $j$  is extremely oversupplied and their endowment continues to increase, the injustice for  $i$  increases less than if  $j$  is only slightly better supplied than  $i$  and  $j$ 's endowment continues to increase. This is not justifiable. It should rather be the other way around: If  $j$  is better supplied than  $i$ , and even more so if  $j$  is oversupplied and their supply situation continues to improve, the strength of the increase in injustice for  $i$  should increase. This is corrected by the following part of the measure:

$$\text{Part}_{2_i}(\mathbf{e}, \mathbf{n}) := \left( \min \left( 0, \left( e_i/n_i - e_j/n_j \right) \right) \right)^2$$

<sup>13</sup> To draw attention to the gradient behaviour,  $J_{\text{Springhorn}_i}$  was multiplied by 0.5 for the plot and  $\text{Part}_{1_i}$  by 0.1.



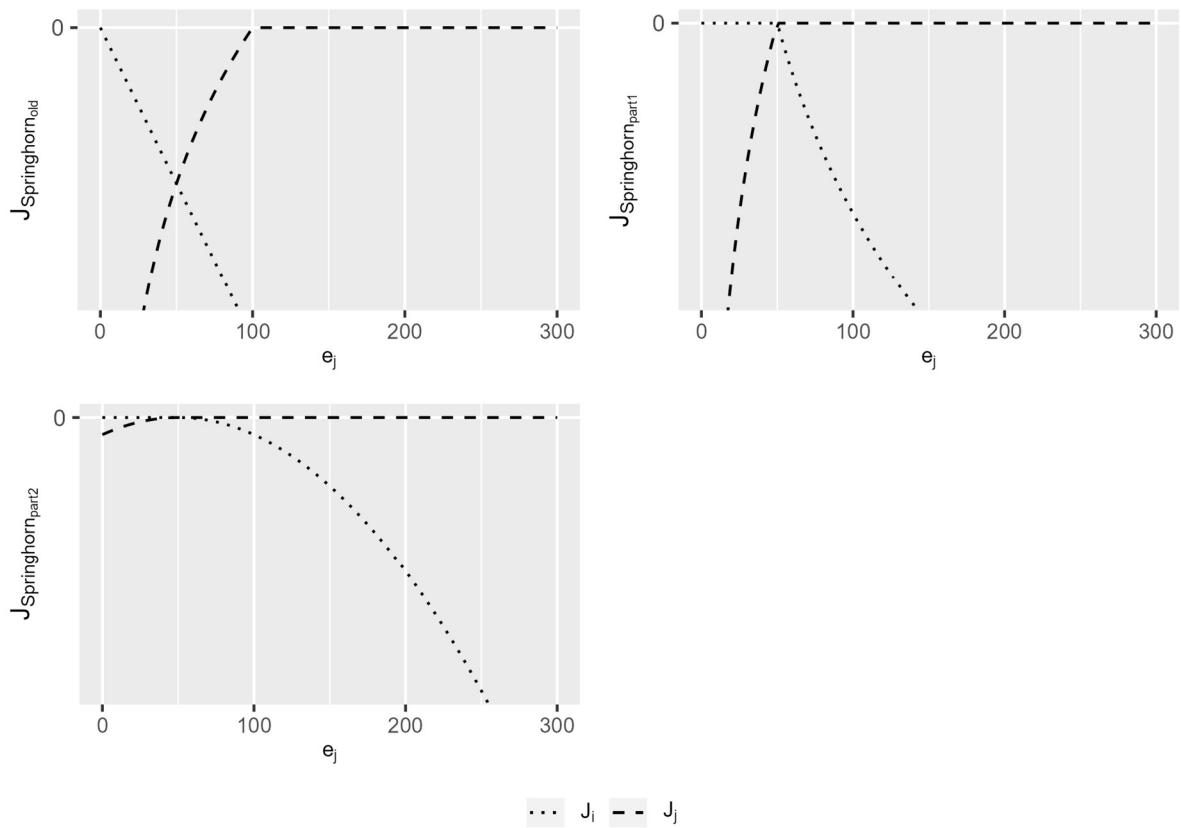


Figure 3: The measure proposed in Springhorn (2022) compared with two parts of the new measure proposed here

Again, only the (absolute) gradient is relevant.<sup>14</sup> If  $\text{Part}_{1_i}$  and  $\text{Part}_{2_i}$  are multiplicatively joined, the result is already a measure that fulfils the desiderata I2, I3, I6, and I7 under the condition that one of the individuals is undersupplied but has an endowment greater than 0:

<sup>14</sup> For better comparability,  $\text{Part}_{2_i}$  was multiplied by -0.1 for the plot.

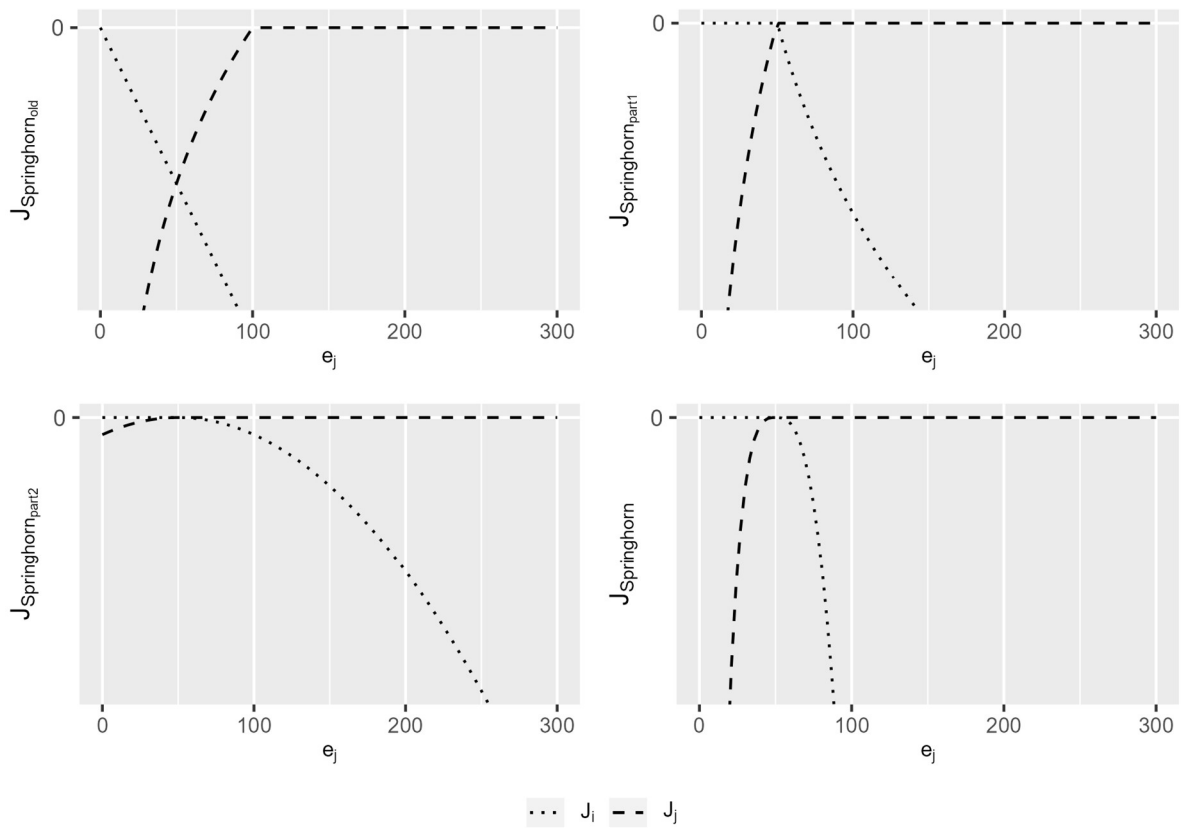


Figure 4: The measure proposed in Springhorn (2022) compared with two parts of the new measure and the new measure proposed here

The factor  $\begin{cases} 0 & \text{if } e_i \geq n_i \\ 1 & \text{else} \end{cases}$  is added in order to rule out any injustice in the case of sufficient supply. A final picture of the measure for all desiderata is given in the following illustration ( $e_i = 50$ ,  $e_j = n_i = n_j = 100$  were chosen for the non-variable quantities):

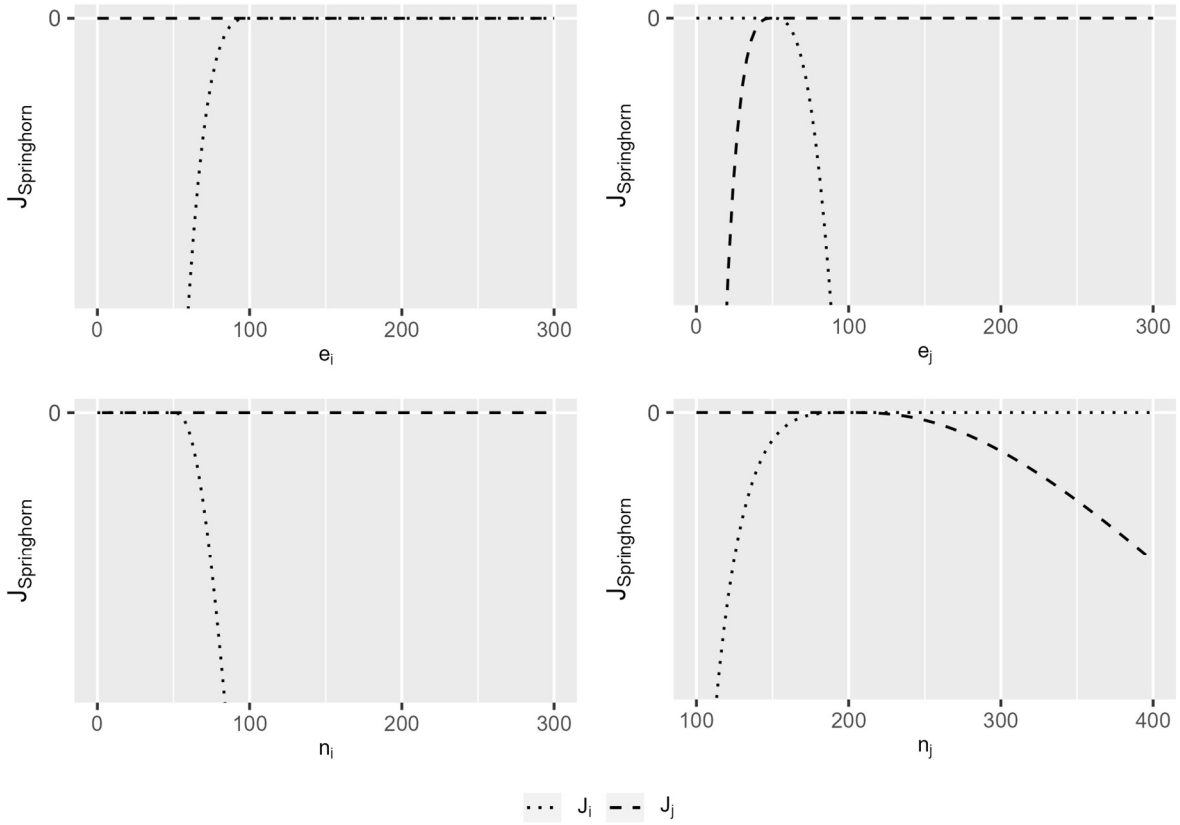


Figure 5: Overview of the new measure on the individual level

Note that  $J_{\text{Springhorn}_i}$  on the interval  $(-\infty, 50]$  for  $i$  in  $e_j$  increases stronger than  $-\text{Part}_{2_i}$  on the interval  $[50, \infty)$  for  $j$  in  $e_j$  decreases and that  $\text{Part}_{1_i}$  on the interval  $(-\infty, 50]$  for  $i$  in  $e_j$  increases more than  $-\text{Part}_{2_i}$  on the interval  $[50, \infty)$  for  $j$  in  $e_j$  decreases. This circumstance has a special significance which explains the comparatively complicated construction and is discussed in the following sections.

## 6 Measuring Need-Based Justice on the Aggregated Level

### 6.1 Guiding Principles

On the individual level, the claim that a situation is unjust for an individual is justified by the fact that the individual is undersupplied and that there is the opportunity to improve their supply situation without this going at the expense of worse-supplied individuals. Such an opportunity exists if there is at least one individual who is better off than the individual in question: A transfer of endowment from the better-off individual to the worse-off individual would be a realisation of this opportunity. This reasoning can be transferred to the aggregate level by adapting the judgements (and desiderata) so that they apply in the case of the *existence* of an undersupplied individual whose supply situation could be improved without this going at the expense of a worse-supplied individual: If such an individual exists, the situation is not only unjust for the individual in question, but the overall situation is also to be regarded as unjust. If such an individual exists and their supply situation worsens, not only the injustice for this individual increases but also the overall injustice. If such an individual exists and the supply situation of a better-supplied individual improves, not only the injustice for the individual in question increases but also the overall injustice; and so on. The following first

ten desiderata state this analogously to the individual level. The decisive extension is the following: If there is an individual whose supply situation could be improved without this going at the expense of a worse-supplied individual, and if a transfer of endowment takes place from a better-supplied individual to a worse-supplied individual, under the condition that the transferor is not worse supplied than the transfer recipient in consequence, the overall justice decreases. This fits into the overarching reasoning because it is the *realisation* of an opportunity to improve the supply situation of an undersupplied individual without this going at the expense of a worse-supplied individual.

## 6.2 A Set of Desiderata for the Aggregated Level

**Desideratum A1 (Point of no injustice)** There is one and only one function value  $j_{\text{no injustice}}$ , so that the following holds:

$$J(\mathbf{e}, \mathbf{n}) = j_{\text{no injustice}} \text{ if and only if there is no } i \in I: e_i < n_i \text{ or if there is no } j \in I \setminus \{i\}: e_j/n_j > e_i/n_i.$$

This desideratum has far-reaching consequences which are discussed separately in the following section.

**Desideratum A2 (First derivative with respect to the individual's endowment)** If there exist  $i \in I: e_i < n_i$  and  $j \in I \setminus \{i\}: e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice  $J$ :

$$\frac{\partial}{\partial e_i} J > 0.$$

In short: If the endowment of an undersupplied individual decreases (under the constraining conditions), the overall injustice increases.

**Desideratum A3 (Second derivative with respect to the individual's endowment)** If there exist  $i \in I: e_i < n_i$  and  $j \in I \setminus \{i\}: e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice  $J$ :

$$\frac{\partial^2}{\partial e_i^2} J < 0.$$

In short: If the endowment of an undersupplied individual decreases (under the constraining conditions), the overall injustice decreases more strongly if the individual is severely undersupplied than if the individual is only slightly undersupplied.

**Desideratum A4 (First derivative with respect to the individual's need)** If there exists  $i \in I: e_i < n_i$  and  $j \in I \setminus \{i\}: e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice  $J$ :

$$\frac{\partial}{\partial n_i} J < 0.$$

In short: If the need of an undersupplied individual increases (under the constraining conditions), the overall injustice increases.

**Desideratum A5 (Second derivative with respect to the individual's need)** If there exist  $i \in I: e_i < n_i$  and  $j \in I \setminus \{i\}: e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice  $J$ :

$$\frac{\partial^2}{\partial n_i^2} J > 0.$$

In short: If the need of an undersupplied individual increases (under the constraining conditions), the overall injustice increases more strongly if the individual is severely undersupplied than if the individual is only slightly undersupplied.

**Desideratum A6 (First derivative with respect to the endowment of another individual)**

If there exists  $i \in I$ :  $e_i < n_i$  and  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice J:

$$\frac{\partial}{\partial e_j} J < 0.$$

In short: If the endowment of an individual j, who is better supplied than an undersupplied individual i, increases (under the constraining conditions), the overall justice increases.

**Desideratum A7 (Second derivative with respect to the endowment of another individual)**

If there exist  $i \in I$ :  $e_i < n_i$  and  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice J:

$$\frac{\partial^2}{\partial e_j^2} J > 0.$$

In short: If the endowment of an individual j, who is better off than an undersupplied individual i increases (under the constraining conditions), the overall justice increases more strongly if j is significantly better off than i than if j is only slightly better off than i.

**Desideratum A8 (First derivative with respect to the need of another individual)**

If there exist  $i \in I$ :  $e_i < n_i$  and  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice J:

$$\frac{\partial}{\partial n_j} J > 0.$$

In short: If the need of an individual j, who is better supplied than an undersupplied individual i, decreases (under the constraining conditions), the overall injustice increases.

**Desideratum A9 (Second derivative with respect to the need of another individual)**

If exist  $i \in I$ :  $e_i < n_i$  and  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$ , then the following applies to a measure of need-based justice J:

$$\frac{\partial^2}{\partial n_j^2} J < 0.$$

In short: If the need of an individual j, who is better supplied than an undersupplied individual i, decreases (under the constraining conditions), the overall injustice increases more strongly if j is significantly better supplied than i than if j is only slightly better supplied than i.

**Desideratum A10 (Unitlessness and scale invariance)** The following applies to a measure of need-based justice J:

J is unitless:  $\text{unit}(J) = \mathbf{one}$  and

J is scale invariant:  $J(\mathbf{e}, \mathbf{n}) = J(\mathbf{a}^* \mathbf{e}, \mathbf{a}^* \mathbf{n})$ ,  $\mathbf{a} \in \mathbb{R}^+$ .

The following desiderata have no counterpart at the individual level since they are judgements about what relationships exist between the justice evaluation for individuals when influencing variables change: first, the case in which the overall endowment increases is examined, then, the case in which the endowment is redistributed. The corresponding desiderata are closely related to each other and, depending on how they are formulated, they imply each other. Here, they are formulated separately from each other because, as I said, the aim is to justify a collection of relevant properties and not to formulate the smallest possible axiom system.

**Desideratum A11 (Neediest first)** If there exist  $i \in I$ :  $e_i < n_i$  and  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$  and  $e \leq n_i * e_j/n_j + e_i$ ,<sup>15</sup> then the following applies to a measure of need-based justice J:

$$J((e_1, \dots, e_i+e, \dots, e_{\#I}), \mathbf{n}) > J((e_1, \dots, e_j+e, \dots, e_{\#I}), \mathbf{n}).$$

In short: If the total endowment increases (under the constraining conditions), the overall injustice decreases most if the worst-off individual receives the allocation.

**Desideratum A12 (Transfers)** If there exist  $i \in I$ :  $e_i < n_i$  and  $j \in I \setminus \{i\}$ :  $e_j/n_j > e_i/n_i$  and  $t \leq (e_j * n_i - e_i * n_j) / (n_i + n_j)$ ,<sup>16</sup> then the following applies to a measure of need-based justice J:

$$J((e_1, \dots, e_i+t, \dots, e_j-t, \dots, e_{\#I}), \mathbf{n}) > J(e, \mathbf{n}).$$

In short: Transfers from individuals who are better off than an undersupplied individual  $i$  to  $i$  reduce the overall injustice (under the constraining conditions).

## 7 A Measure of Need-Based Justice on the Aggregated Level

The following measure – the arithmetic mean of the measure  $J_{\text{Springhorn}_i}(\mathbf{e}, \mathbf{n})$ :

$$\begin{aligned} & J_{\text{Springhorn}}(\mathbf{e}, \mathbf{n}) \\ & := \frac{1}{\#I} \sum_{i \in I} J_{\text{Springhorn}_i}(\mathbf{e}, \mathbf{n}) \\ & = \frac{1}{\#I} \sum_{i \in I} \left( \frac{1}{\#I} \sum_{j \in I \setminus \{i\}} \min \left( 0, \log \left( \frac{e_i/n_i}{e_j/n_j} \right) \right) * \frac{1}{\#I} \sum_{j \in I \setminus \{i\}} \left( \min \left( 0, (e_i/n_i - e_j/n_j) \right) \right)^2 * \right. \\ & \left. \begin{cases} 0 & \text{if } e_i \geq n_i \\ 1 & \text{else} \end{cases} \right) \end{aligned}$$

is an example for a measure that satisfies the requirements from the previous section (that is no coincidence;  $J_{\text{Springhorn}_i}(\mathbf{e}, \mathbf{n})$  is designed in such a way that it allows this simple aggregation, and this is a major reason why measuring injustice at the individual level is relatively complex). The essential properties can be taken from the following illustrations. As before,  $e_i = 50$ ,  $e_j = n_i = n_j = 100$  were chosen for the non-variable quantities:

<sup>15</sup> This means that the statement is only (unrestrictedly) true if the allocation is not so large that  $i$  is better supplied than  $j$  as a result of the allocation.

<sup>16</sup> This means that the statement is only (unrestrictedly) true if the transfer is not so large that  $i$  is better supplied than  $j$  as a result of the transfer.

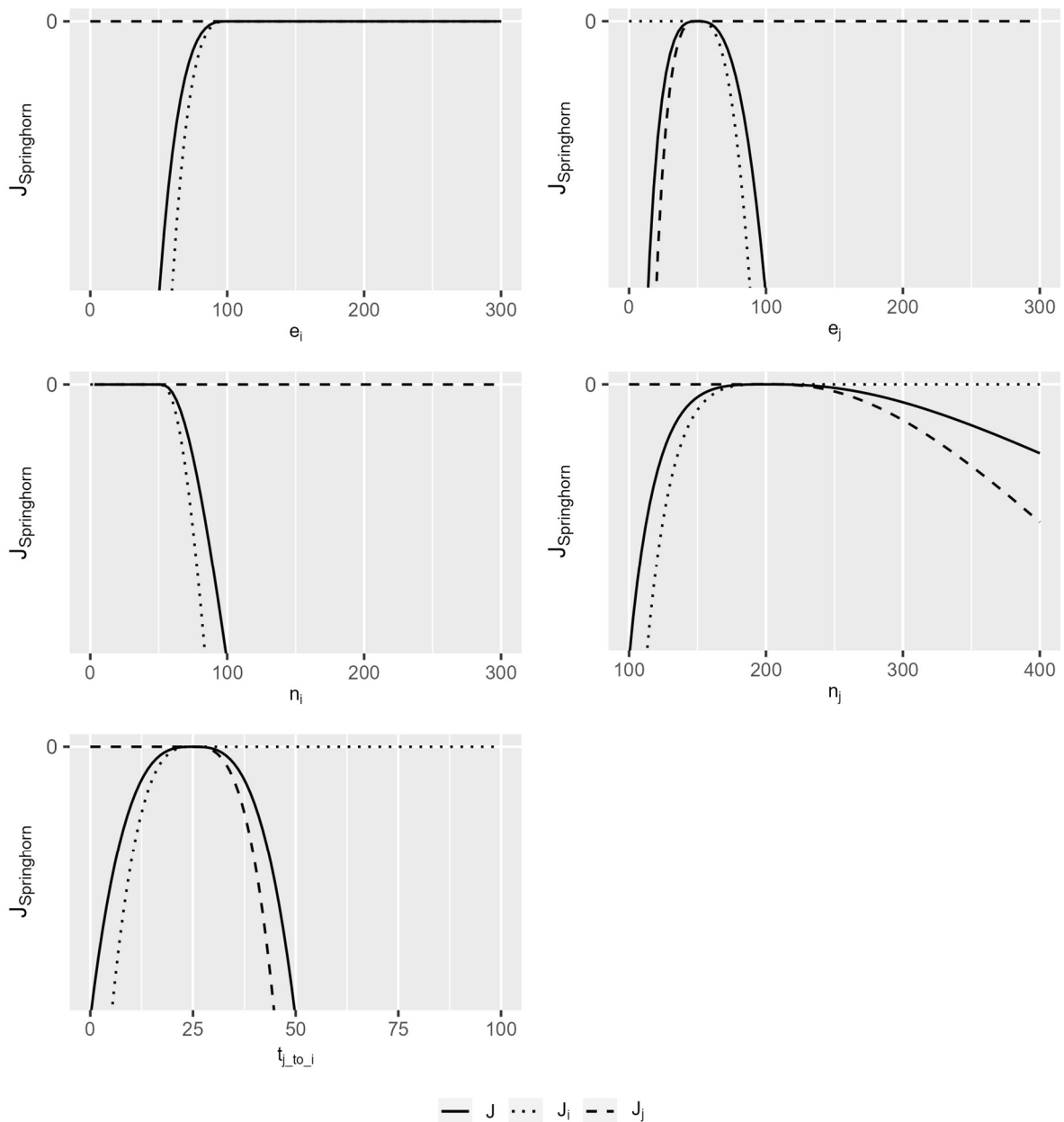


Figure 6: Overview of the new measure including the aggregated level

### 7.1 A Special Remark on (In-)Equality

An aspect that deserves special attention is that, following this approach, in the case that the overall endowment is smaller than the overall need, the overall injustice is not only minimal if all individuals are equally well or equally poorly supplied but no injustice is shown at all. In Springhorn (2022) it is argued against such a property of a measure of need-based justice, joining other critics including Miller (1999), who finds this property of his own approach unsatisfactory. I think that the criticisms of such a property can be summarised as follows:

- a Groups whose members are severely undersupplied in the case of equal supply for all are not distinguishable in terms of need-based justice from groups whose members are nearly supplied in the case of equal supply for all. For the approach proposed here, this

also applies to groups in which all are sufficiently supplied, regardless of whether all members are equally supplied.

- b The overall injustice can be reduced by taking away so much of the endowment from the individuals who are better off that they fall to the level of the worst-off (*levelling down*).
- c There is no justification as to why equality in the satisfaction of needs should be more just than inequality. One could argue that any form of (additional) need satisfaction reduces injustice, even if it increases inequality.

On a: The central argument here is that avoidable undersupply constitutes injustice. Groups are assessed and compared in terms of their opportunities to avoid or at least mitigate undersupply. If these opportunities are used optimally, no injustice is found and the groups are considered equally (in)just, regardless of how well the individuals are supplied. The main difference is with groups that do not use their opportunities optimally and this to varying degrees (see also Section 9). As I see it, it is justified, in terms of need-based justice, not to distinguish between groups that make optimal use of their opportunities. And I see a difference between, on the one hand, the argumentation presented here, which is focused on the neediest individuals, with the consequence that in the case of unavoidable undersupply, no injustice can be found if all individuals are undersupplied to the same degree, and on the other hand, a corresponding (unfounded) requirement (see the paragraph after next). The question of whether no injustice can be found because there is no undersupply or because there is no opportunity to at least mitigate an existing undersupply has to be answered separately by a measure of need satisfaction. This is already pointed out in Springhorn (2022), but from today's point of view, it was not considered consistently enough.

On b: It is, of course, a downright perverse idea that injustice can be minimised by the destruction of endowments (successively, starting with the endowment of the best-off individual)<sup>17</sup>. But I think one has to accept this – depending on the complexity of the model – because if the destruction of endowment is unavoidable (for instance as a consequence of climate change) and thus the opportunities to avoid or mitigate undersupply decrease, it is right and reasonable that injustice decreases if first the best-endowed individuals lose endowment. The approach proposed here (not the measure given as example) is conceptually designed to do justice to the difference between a deliberate destruction of endowment for the purpose of minimising injustice as a result of which undersupply arises or increases, and an unavoidable destruction of endowment as a result of which undersupply arises or increases, because it focuses on the opportunity to avoid or mitigate undersupply (and transfers are, as said, only one such opportunity). In the case of deliberate destruction, there obviously is an opportunity to avoid (the thereby caused) undersupply. The modal-logical approach originally pursued (see Springhorn 2022), in which possible worlds are considered as a whole, would show an increase in injustice in the case of deliberate destruction because the possible worlds in which deliberate destruction does not occur are reachable whereas in the case of

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<sup>17</sup> As a side note: As far as I know, there is no discussion so far that the same effect could also be achieved by growing the need of the less needy, for example by making them sick.



unavoidable destruction they are not.<sup>18</sup> However, this would significantly increase the complexity of the model.

On c: I will refrain from discussing the arguments of the advocates for equality here, but I want to at least briefly point out that I sometimes have the impression that equality is the ad hoc fallback position when better arguments are missing: If not everyone can be supplied according to their need, equality is propagated because of a lack of alternatives. What matters to me is that this approach does not require that equality minimises injustice in the case of unavoidable undersupply or that there is no injustice in such a case but that this is a consequence of desideratum A8 or A9 in combination with desideratum A1: If it is required that in the case of existing undersupply, injustice decreases the most, if in the case of an increasing overall endowment, first the worst-supplied individuals are taken into account or the worst-supplied individuals are at least taken into account more than better-supplied individuals, or if transfers from better-supplied individuals to worse-supplied individuals lead to a decrease in injustice, minimal injustice results from this in the case of equal (under)supply of all individuals. And if it is required that in the case of undersupply there is no injustice if the undersupply could only be mitigated at the expense of worse-supplied individuals, no injustice can be found in the case of equal undersupply of all. So there is a good rationale why, in the case that not all needs can be met, there is no injustice in the case of equality in supply, without establishing equality in supply as a requirement.

## 7.2 A Brief Remark on Disincentives and Effort-Based Justice

In addition to the comments on b, there is also the danger that endowment could be destroyed in a certain sense because individuals consume endowment for (unnecessary, luxury) purposes solely in order to avoid the loss by a transfer or that endowment is not even generated for the same reason. In both cases, the opportunities to avoid or mitigate undersupply, which are so important for need-based justice, would be diminished. I therefore think that it is problematic to limit opportunities for avoidance and mitigation to transfers. In

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<sup>18</sup> The modal-logical approach originally came up in order to develop a much more comprehensive measure compared to the measures presented here and in Springhorn (2022) that does not reduce the opportunities to avoid or mitigate undersupply to opportunities of transfers. In very simplified terms, the core idea is to set the number of possible worlds, in which an undersupplied individual  $i$  is better supplied, that can be reached from a given world (the concept of reachability is strictly formal in modal logic), in relation to the number of all reachable possible worlds in order to make statements about justice based on this. If no worlds can be reached in which  $i$  is better supplied (i.e. there is no possibility for a better supply of  $i$ ), such a measure takes the value 0. The more worlds are reachable in which  $i$  is better supplied (the more opportunities there are/the greater the opportunities are for a better supply of  $i$ ), the greater the injustice. Following this approach, in addition to transfers, for example, it is also taken into account whether there are opportunities to increase the total endowment and, in this way, increase the endowment of  $i$ .

Assuming that human behaviour is not (completely) determined, this approach would differentiate between a deliberate destruction of endowments and the destruction of endowments without alternatives, because in the case of a deliberate destruction, the worlds in which the endowment is not destroyed would be indicated as reachable whereas in the case of necessary destruction, they would not. For example, worlds in which not all endowment on earth is destroyed by the use of nuclear weapons are reachable; worlds in which not all endowment on earth is destroyed by the sun turning into a red giant, on the other hand, are not. For the modelling of a measure, it is crucial that the number of all reachable worlds does not change in the case of a destruction without alternatives but does in the case of a destruction to which there are alternatives. I have refrained from elaborating on the modal logic approach here due to the high complexity and the good results in many respects that can be achieved with the much simpler way presented here and in Springhorn (2022).

particular, aspects of disincentives and effort-based justice should be taken into account. This would also significantly increase the complexity of the model; however, the modal-logic approach is in principle suitable to capture this (see Springhorn (2022) and the footnote in the section bevor).

## 8 Comparisons of Different Approaches to Measuring Need-Based Justice

There are a number of authors who have commented on need-based justice and its measurement. It seems to me that their approaches can be summarised in four classes:

- a Injustice is explained by undersupply.
- b Injustice is explained by inequality in supply.
- c Injustice is explained by undersupply and inequality in supply.
- d Injustice is explained by undersupply and inefficiency.

I see exemplary representatives for these classes in a) Plato (1973), b) Aristotle (2009), c) Siebel (2017) and Miller (1999) and d) in Traub et al. (2017). There are some reservations regarding the form of the measures as presented here:

Plato and Aristotle did not give a formal version of their measures, I thus refer to Siebel's (2017) interpretation. Siebel probably made a small mistake in the version of his own measure, which I correct here. Miller does not give a formal version of his measure either but discusses concrete numerical values, which is why I assume that he had a formula in mind – I am trying to reconstruct it on the basis of his explanations (Hassoun (2009), Siebel (2017) and Siebel and Schramme (2020) discuss this point in detail). The measures of Siebel and Traub et al. include parameters that I have chosen for simplicity so that no extremes are considered. I think that this is a good reflection of the class-forming core idea of the approaches, even if the details of the formalisation given are debatable. Somewhat more detailed discussions on the measures can be found in Springhorn (2022).

On a: Injustice is explained by undersupply – Plato (according to Siebel 2017, p. 5, 13):

$$J_{\text{Plato}}(\mathbf{e}, \mathbf{n}) := \frac{1}{\#\mathbf{I}} \sum_{i \in \mathbf{I}} \left( \left| \min \left( \ln \left( \frac{e_i}{n_i} \right), 0 \right) \right| \right)$$

This is the sum of the (logarithmised) undersupply.

On b: Injustice is explained by inequality in supply – Aristotle (according to Siebel 2017, pp. 3-4, 13):

$$J_{\text{Aristotle}}(\mathbf{e}, \mathbf{n}) := \frac{1}{\#\mathbf{I}} \sum_{i \in \mathbf{I}} \left| \ln \left( \frac{e_i}{n_i} \right) - \ln \left( \frac{\sum_{i \in \mathbf{I}} e_i}{\sum_{i \in \mathbf{I}} n_i} \right) \right|$$

Here, the difference between the supply situation of an individual and the supply situation as it would be in the case of equal supply (related to the need) is calculated.

On c: Injustice is explained by undersupply and inequality in supply – Siebel (2017, p. 14) and Miller (1999, pp. 217-218):

$$J_{\text{Siebel}}(\mathbf{e}, \mathbf{n}) := -0.5 * J_{\text{Plato}}(\mathbf{e}, \mathbf{n}) + 0.5 * J_{\text{Aristotle}}(\mathbf{e}, \mathbf{n})$$

$$= -0.5 * \frac{1}{\#I} \sum_{i \in I} \left( \left| \min \left( \ln \left( \frac{e_i}{n_i} \right), 0 \right) \right| \right) + 0.5 * \frac{1}{\#I} \sum_{i \in I} \left| \ln \left( \frac{e_i}{n_i} \right) - \ln \left( \frac{\sum_{i \in I} e_i}{\sum_{i \in I} n_i} \right) \right|$$

This is a weighted mean of the measure of Plato and the measure of Aristotle.

$$J_{\text{Miller}}(\mathbf{e}, \mathbf{n}) := \sum_{i=1}^{\#I-1} \sum_{j=i+1}^{\#I} \left| |\min(e_i - n_i, 0)| - |\min(e_j - n_j, 0)| \right|$$

Here, the (absolute) differences between the undersupply of two individuals each are added up.

On d: Injustice is explained by undersupply and inefficiency – Traub et al. (2017, p. 8)

$$J_{\text{Traub}}(\mathbf{e}, \mathbf{n}) := \frac{1}{\#I} \sum_{i \in I} \min(e_i/n_i, 1)^{.5} * \Gamma^{19}$$

with

$$\Gamma := \begin{cases} 1 - \sum_{i \in I} \max(e_i - n_i, 0) / \sum_{i \in I} e_i, & \text{if an undersupplied individual exists} \\ 1, & \text{else,} \end{cases}$$

Here, cases of undersupply are weighted with a factor, so that the larger the part of the overall endowment that is not used to meet needs, the more unjust the undersupply; Traub et al. call this an inefficient use of this part of the overall endowment.

The work of Jasso should not go unmentioned. With her research on justice and the measurement of justice, she has also made significant contributions to need-based justice and its measurement, both in the theoretical field and in empirical research, which were an inspiration for both of my articles and whose impact can be seen in many works, including the measures listed here. While I have discussed Jasso's work in some depth in Springhorn (2022), I do not include it here because it deals with much more general issues of justice and justice measurement, because there is room for interpretation in relation to need-based justice and its measurement, and because her work can thus neither be clearly assigned to a class nor form its own class.<sup>20</sup>

In the following, a comparative graphical overview of the measures is shown. The non-variable values are as follows:  $e_i = 50$ ,  $e_j = n_i = n_j = 100$  (again, only pay attention to the gradient of the functions, the sizes of the function values are not comparable):

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<sup>19</sup> Traub et al sum over another group and therefore add another summand, which I do not do, in order not to have to define further quantities.

<sup>20</sup> See Jasso 1978, 1980, 1999; for more references, see Springhorn (2022). An excellent introduction to the work of Jasso is provided by Liebig (1997, pp. 131-141).

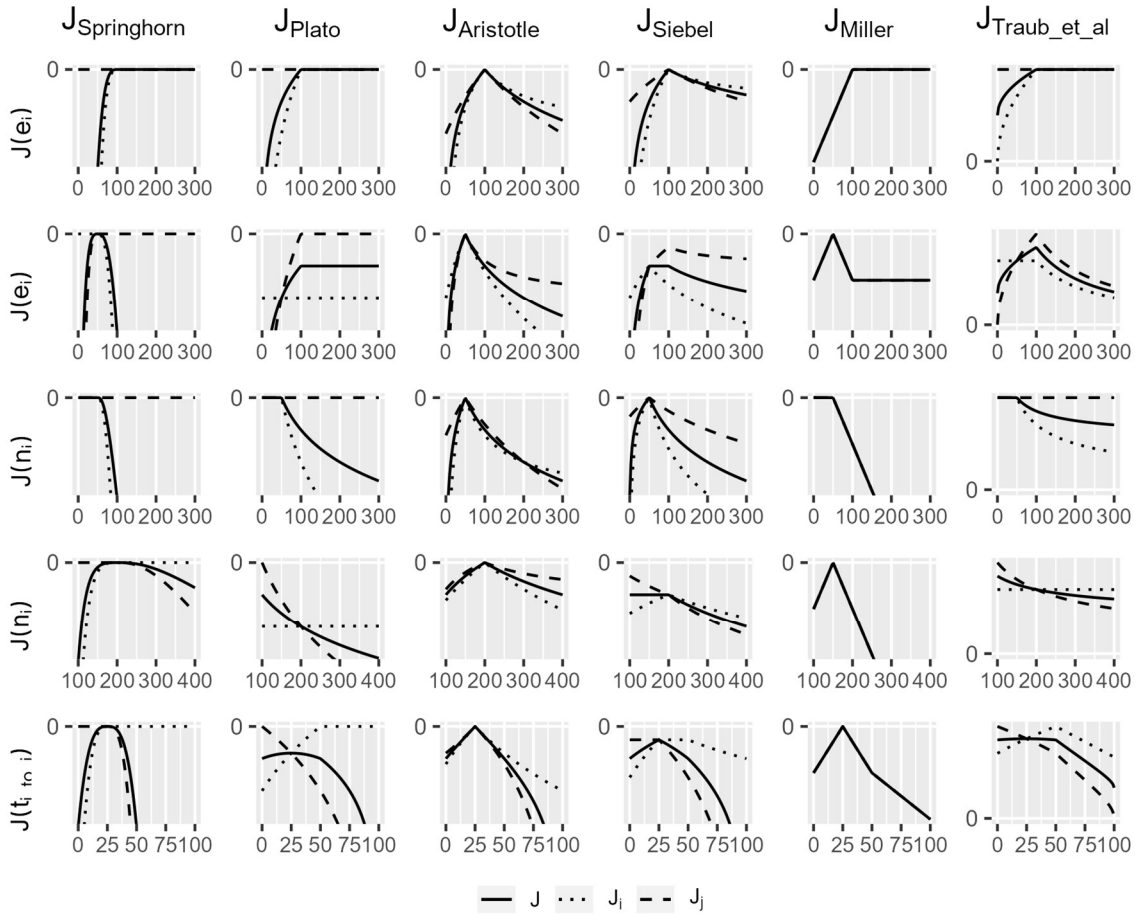


Figure 7: Comparison of the measures of Springhorn, Plato, Aristotle, Siebel, Miller and Traub et al.

I will limit myself to what I consider to be the most important similarities and differences. Only selected cases are considered and even these are not discussed in full.

In the case where  $e_i$  is regarded as variable, the measures of Springhorn, Plato (P) and Traub et al. (T) show the same properties and satisfy DI1, DI2, DI3, DA1, DA2 and DA3 (T can be understood as mapping the interval  $[0, -\infty)$  to  $[1, 0)$ ).

Siebel (S) and Aristotle (A) coincide with Springhorn in overall injustice when  $e_i$  converges to 0. The first question arising, however, is why any injustice is shown for  $j$  in the case of  $e_i < 100$ , because  $j$  is supplied according to need (thus DI1 is violated). Even more serious is that the injustice for  $i$ ,  $j$  and the overall injustice increase when  $e_i$  converges to infinity, even though  $i$  and  $j$  are sufficiently supplied (which is also a violation of DI1). If one tried to explain this with the inequality in supply, the strength of growth should, in my view, rather increase than decrease as it does.

Miller (M) coincides with Springhorn if  $e$  converges to infinity, but here too injustice is shown for  $j$  in the case  $e_i < 100$  (the assessment of individual injustices is the same and therefore coincides with the assessment of overall injustice) and DI6 and DA6 are violated, which is particularly evident in the fact that the injustice for  $i$  and also the total injustice in the case  $e_i = 0$  is finite (unlike for T, the interval  $[0, -\infty)$  cannot be mapped to  $[0, -100)$ ).

In the case where  $e_j$  is regarded as variable, the greatest similarities between Springhorn on the one hand and A and M on the other can be seen. For all three measures, the injustice in the

case of equal supply is not only minimal but non-existent. The biggest difference is that only Springhorn meets DI1 and DA1. With regard to Aristotle, the question arises why, in the case where  $j$  is better supplied than  $i$  and in particular in the case where  $j$  is sufficient and even oversupplied, the situation for  $j$  is shown to be unjust and why all functions show a decreasing strength of increase when  $e_j$  converges to infinity, which, in addition to violating DI1 and DA1 also violates I7 and A7. This is particularly irritating regarding the undersupplied individual  $i$ : The oversupply of  $j$  increases and thus also the injustice for  $i$ , but the strength of the increase in injustice for  $i$  decreases. It seems to me that it is actually one of the most indisputable points: that the injustice for an undersupplied individual – and thus the overall injustice – not only increases when the oversupply of other individuals increases, but that the strength of the increase in individual injustice also increases and thus the strength of the increase in overall injustice.

With regard to M, the same questions arise in a slightly different form (on the entire interval) due to the linear curve, and these questions also arise with regard to P, S and T (albeit on slightly different intervals). Concerning the latter measures, it must also be asked why the situation for  $i$  – and thus also the overall justice – is always assessed as unjust even in the case that  $j$  is worse off or has nothing at all and thus no opportunity is known to improve  $i$ 's situation. I suspect that judgements about the supply situation are confused here with statements about need-based justice, or at least mixed up in an unfortunate way. Provocatively put, it could be said that the noble wish for everyone to be supplied according to need is the cause of this result, but in the case of a lack of opportunities for this, I think, no relevance can be recognised, and reasons for why simple undersupply should constitute injustice have not been put forth.

For the cases where  $n_j$  or  $n_i$  are regarded as variable, analogous considerations can be made under somewhat reversed signs, which is why I come directly to the consideration of transfers.

Here, it is striking that all measures except T show minimal overall injustice for a transfer that leads to equal supply. According to T, in the case where both individuals are undersupplied, there is no difference in overall injustice and thus T violates DA8 and DA9. I cannot think of any justification for this and Traub et al. do not comment on it. Moreover, I find it irritating that the injustice also increases for  $i$  if  $i$  is sufficiently supplied as a result of a transfer. This property is shared by T with all measures except Springhorn and P. Again, however, only Springhorn, A and M exhibit the property of not showing injustice in the case of equal supply. If one disregards the level (on subintervals), however, compared to the variations in other variables, a surprisingly large similarity in the gradient of overall injustice can be found in all measures. From an optimistic point of view, one could draw hope from the similarities that there is a certain basic consensus on the assessment of justice in the case of changes in influencing variables. I do not regard this as self-evident because even behind the same or similar functional forms there are fundamentally different arguments.

It seems to me that the authors have all followed an approach that is convincing in its own sense. But none of the authors have embedded their starting point or focus in a comparably comprehensive, detailed and systematic investigation as has been done here for the proposed measure. This sometimes makes it very difficult to understand the measures and the arguments behind them, and sometimes one enters the realm of mere speculation. However, this also raises the possibility that the criticised aspects are not intended by the authors and

that they would approve of the alternative proposed here. In my view, the chances of that are good because the approach proposed here takes into account many aspects of the other approaches:

On a: Injustice is explained by undersupply.

Yes, but only if the undersupply can be eliminated or mitigated without it going at the expense of worse-supplied individuals.

On b: Injustice is explained by inequality in supply.

Yes, however, inequality is not an immediate reason for injustice. Injustice exists when an individual is undersupplied and there is an opportunity to eliminate or mitigate the undersupply without this going at the expense of worse-supplied individuals. As a result, in the case where the overall endowment is smaller than the overall need –and only then–, there is no injustice if everyone is undersupplied to the same extent.

On c: Injustice is explained by undersupply and inequality in supply.

See a and b.

On d: Injustice is explained by undersupply and inefficiency.

Yes, but adopting the terminology *inefficiency*, inefficiency is not only present when some individuals are oversupplied, and others are undersupplied. It already is present when some individuals are better supplied than others who are undersupplied, whereof the case that some are oversupplied, and others are undersupplied is only a special case.

Finally, a side note: The measure proposed here is the only smooth measure, which is not a necessary property but at least it is a nice one.

## 9 Outlook on Applications and Empirical Research

I do not consider the theoretical work on the measurement of need-based justice as completed, but at least it is far enough advanced that the existing part of the theory can be applied and subjected to first empirical investigations.

On the one hand, it makes sense to compare the justice assessments determined by the measures with empirically surveyed justice assessments. In this respect, the extensive data collected by the DFG research group *Need-Based Justice and Distribution Procedures* could be a good starting point.<sup>21</sup> In this context, however, it must be noted that the measure proposed here, as well as the measures of the other authors discussed here, are not constructed for the purpose of modelling justice *perception*. A potential discrepancy between theory and practice would therefore have to be investigated in both directions: Does the theory neglect central aspects or do people who make assessments about (need-based) justice neglect central aspects?<sup>22</sup> It is quite conceivable, for example, that not just a few people follow Plato or Aristotle because their approaches are comparatively simple and intuitively accessible. In this

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<sup>21</sup> The main overview can be found in Traub and Kittel (2020).

<sup>22</sup> See e.g. Jasso (1996), Bauer and Meyerhuber (2020).

respect, it would be interesting to investigate how they justify this and how they deal with the objections.

On the other hand, a comparison of existing societies would be interesting. I suspect that at least some societies that are considered poor will turn out to be just in the sense discussed here, although one might falsely think, based on a wrong understanding of need-based justice, that they are not. The reason for this is that they realise their opportunities to eliminate or mitigate undersupply although perhaps not optimally but comparatively well. Conversely, I suspect that at least some societies that are considered rich turn out to be less just in the sense discussed here. The reason is that they perform comparatively poorly in realising their opportunities to eliminate or mitigate undersupply. Put simply, it is much more unjust to be undersupplied in a rich society than in a poor one.

## 10 Conclusion

Springhorn (2022) developed the central argumentation which this article also follows: An individual's situation is to be assessed as unjust from the need perspective when the individual is undersupplied and an opportunity to eliminate or at least mitigate the undersupply is known. One way to avoid or mitigate undersupply is obviously known if another individual exists who has an endowment that can be transferred to an undersupplied individual. The greater the endowment that can in principle be transferred, the greater this opportunity and at the same time the smaller the possible negative consequences for the potential transferor. Therefore, not only the endowment and need of the individual in question are taken into account in the individual assessment of justice but also the endowments and needs of other individuals who are potential transferors.

In this article, I sharpened the argumentation: an individual's situation is to be assessed as unjust from the need perspective precisely when the individual is undersupplied and a way is known to eliminate or at least mitigate the undersupply without this going at the expense of worse-supplied individuals. This modification is to be understood in such a way that potential negative consequences of a realisation of the opportunity to eliminate or mitigate undersupply are considered more strongly than before in the central argumentation or that positive and negative aspects are considered less isolated from each other. This sharpened argumentation makes it possible to formulate a measure of need-based justice at the individual level which, using the arithmetic mean, makes it possible to formulate a measure of need-based justice at the aggregate level that satisfies all central desiderata required for this level. In particular, this measure satisfies the requirement that the overall injustice decreases when the supply situation of the worst-supplied individual improves, be it through external allocations or transfers from better-supplied individuals, in particular, cases where the potential transferor is oversupplied. This can be summarised as *neediest first* (and not just, as is sometimes formulated, *needy first*).

In analogy to Springhorn (2022), I simplified the considerations by making the opportunity to avoid or mitigate undersupply without it going at the expense of a worse-supplied individual dependent on the endowments and needs of the individuals involved and thus their supply situation. This follows the concept that if there is an individual next to an undersupplied individual who is better supplied, by a transfer a way is known to avoid or mitigate the undersupply without this being at the expense of a worse-supplied individual. The advantage of this approach is that it is possible to make judgements of justice on the basis of only the

two influencing variables of endowment and need. Both the theory and a practical application of the resulting measures are thus comparatively manageable. However, I also drew attention to the fact that important aspects, especially disincentives and closely related other forms of justice next to need-based justice, remain unconsidered. It is one of the tasks of further research to develop the theory further – I think the modal-logic approach offers a good starting point – and to investigate what level of detail is appropriate for practical use.

With regard to the comparison of existing measures, I identified the following categorically, fundamentally different approaches in the literature: Firstly, those who see the reason for injustice from the need perspective in undersupply, and secondly those who see it in inequality (in the supply), and thirdly those who combine these approaches. A fourth group takes the approach that undersupply must be weighted in relation to the part of the total endowment that is not used to meet needs; the larger this part is, the more unjust one and the same degree of undersupply is. The approach I propose can be seen (in result, not in reasoning) as a combination of all these approaches: Undersupply is unjust; but not per se, only if there is an opportunity to at least mitigate it. Thus, group 1 is represented, though with reservations. The extent to which undersupply can be mitigated depends on the part of the total endowment that is not used to meet the needs of the worst-off individuals, as this part correlates positively with the opportunities to mitigate undersupply and negatively with the negative consequences associated with realising these opportunities. Since this includes the part of the overall endowment that is not used to meet needs, this is a generalisation of the approach of group 4. The proposed approach also has the consequence that – given the case that not all needs can be met – the overall injustice is not only minimal but non-existent if all individuals are undersupplied to the same degree. However, this does not result from a requirement of equality but essentially from the fact that transfers from better-off individuals to worse-off individuals minimise the overall injustice. Thus although the justification might differ, in the result group 2 is also represented in this approach and thus, in combination, also group 3.

It could be considered a weakness of my new approach that societies in which all individuals are equally undersupplied and societies in which all individuals are sufficiently supplied cannot be distinguished from the perspective of need-based justice: they are designated as not unjust. This objection is also faced by approaches that make equality the decisive criterion or take it into account, and Springhorn (2022) was very critical of this. My critical attitude towards approaches that require equality has not changed. Here, however, the outcome results from other requirements: Arguing that such societies are to be considered equal in terms of their ability to avoid or at least mitigate undersupply and are for this reason to be judged equal in terms of need-based justice, I consider the result to be appropriate. The difference is in the supply situation and not in the assessment of justice. In order to get a complete picture, a combination of the supply situation and the justice assessment should therefore always be given. There can be societies with high levels of undersupply as well as with low levels of undersupply that are very just or very unjust from a perspective of need-based justice, depending on whether the possibly limited opportunities to avoid or mitigate undersupply are realised to a high or low degree. One consequence is that societies in which no individual is undersupplied are not to be regarded as unjust from a need-perspective, even if there is great inequality in supply, since here the opportunities not only to mitigate but even to eliminate undersupply are fully realised. Most importantly, for this reason, societies in which undersupplied individuals are confronted with oversupplied individuals are to be regarded as



extremely unjust: Here, opportunities to mitigate or even avoid undersupply, without this entailing negative consequences from the perspective of needs, are obviously not realised.

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