Many thanks to the reviewer for taking another look at the revised manuscript. The constructive feedback has been very helpful.

I do really appreciate the effort of the Author put into the revised version of the paper. I also do think that the theoretical part of the paper is well written now and may be interesting for the other researchers.

Thanks for the positive assessment of the revision.

But I still have two kinds of problems with an illustrative example/model.
Firstly, the model is presented in such a way that it is difficult to understand it. The Author either provides the very abstract and very general overview (very much the same in a theoretical part) or goes into very detail by presenting a series of mathematical formulas with a lot of different symbols and variables. There is nothing between that could really help to understand the main assumptions of the model without/before going into details. I would like to advise the Author to propose and use the adequate - to ESE framework - protocol, something similar to one of ODDs protocols for example.

Thanks for this suggestion. I have entirely rewritten the model description to follow the ODD protocol, using the latest recommendations (Grimm et al. JASSS, 2020). This took some adjustment of the protocol, since it is designed for ABMs, but this also allowed further discussion of how the approach here differs from ABMs, which was something asked for by Reviewer 2 in an earlier round. Thus, I found it a useful and constructive exercise. I have also revised figure 2 and added a new figure to illustrate two of the submodels.

I hope this rewriting has made the main assumptions easier to grasp.

Secondly, I am also not convinced by the formulas used in the model. Let me consider Eq. (1) as an example. The Author writes "Hunger is given by", then we have the variable m^hunger_provision (what is provision?, why do we need this in the subscript, what does this variable really represent?) and then explains two variables shortage and k_shortage. I do not understand why hunger should be the ration of shortage divided by shortage plus some constant? Why should the hunger not be modelled as a number of undelivered calories in a given day in a given population? What would be straightforward.

What kind of the empirically observed phenomenon does the constant k_shortage measure? Is there any empirical evidence that there are significant differences in hunger resistance between populations, individuals?

Thanks for raising this misunderstanding, 'hunger' (now renamed the provisioning motivational factor, $m_{provision}$) is a population feature, emergent from social characteristics, rather than a physiological difference. Thus, it reflects the response of the population to a food shortage. I can see why this was confusing, and have clarified this in the expanded model description. I have also added a general explanation of how the k and r parameters influence the outcome, and how they are intended to reflect the emergent result of both individual and societal features.

All the equations should be properly motivated and justified, the rationale behind formulas should be carefully explained. Currently, the Author concentrates mainly on explaining the

mathematical construction of the formulas. I still have an impression that the model is unnecessarily complex, but maybe it only due to the way it is presented.

Thanks for raising the existence of this persistent barrier to understanding. I think the apparent complexity may have reflected - at least in part - the natural / social difference in model presentation styles (Grimm et al., 2020 actually provide a discussion of this). I admit that I was also trying to keep the description short, so as to not have this appear to be a 'modeling paper' with a long introduction; the first part is actually more important than the model part, and I do not wish it to appear outweighed by the latter part. However I would hope that the model description would be accessible to all, and appreciated the suggestions to make the model description more accessible and better justified. I hope the revised and expanded description has met this aim.

List of changes:

- Minor improvements to readability in sections 1-4 and 7
- Addition of new topic to section 2 (alternatives to GDP), as this has frequently arisen in discussions with economists
- Thorough revision of model description
- Addition of figure 4 to illustrate motivation function
- Expansion of the table, and subdivision into 2 tables

Thanks again for the help in improving this paper.