Report of "Can heterogeneity in reporting behavior explain the gender gap in self-assessed health status".

Women generally report to be in worse health than their male counterparts, despite the fact that women live longer than men. This paper argues that differences in reporting behavior may explain this gender gap.

... To this end they specify and a health production model and show that within this model gender differences can be explained by differences in discount rates. The author(s) subsequently proxy the discount factors by a set of socio-economic variables and exploit non-linearities to identify the effect of the discount rate on health.
I value the approach taken by the author(s) to explicitly use economic theory to approach problems in applied health economics. However, I also see some major problems with the current paper.

The most important problem that I have with this approach is that ultimately the authors estimate a health production model, with (proxies for) discount factors included as regressors and as such the model explains differences in SAH that can be true health differences (let's label these as HT) as well as reporting differences (let's label these as HR). Indeed, in theory, the discount factor may explain health investment behavior and influences life style choices such as smoking and subsequently health, but this is the health production part (HT). The observed health in the empirical model (SAH) is the joint effect of HT and HR and right now the authors do not disentangle these two components.

Response:

Rather than explicitly disentangling these two effects, the paper aims to show that whenever the true period health valuation is described by the health utility but the reported SAH is measuring the discounted life-cycle health, the discounting differences can produce different SAH even though the current period health valuation is same say for two individuals. Therefore, females reporting lower SAH even though objectively they have same or even better health than males can be explained within such a model since females can have higher current period health utility (a measure that can be used to proxy current health) but still can have lower SAH due to lower discounting compared to men.

Furthermore, indeed, it is difficult to include the discount factor in the empirical model if one does not observe it in the survey. Smoking is a derived outcome, but is also a poor proxy of the underlying discount factor as other factors like risk attitude and contextual factors may explain smoking outcomes. Of course the other individual characteristics can be included to make the proxy better, but ultimately there is much noise there. So, the authors have to convince the reader that this is not a problem in the current context.

Response:

Smoking is a proxy, but of course it is not the only proxy and furthermore may not be the best proxy for assessing the differences in discounting behavior. We agree with the referee that other factors like risk attitude and contextual factors may explain smoking outcomes. However, the estimation already uses the predicted outcomes from the smoking equation to be used in the main estimation to proxy for the discount rates. In other words, the portion of smoking behavior that is explained by the individual characteristics (age, education gender and income) form the basis for the proxy. Still some robustness can be done here

for better establishing the smoking variable's credibility. One such robustness would be to errors from the smoking equation to proxy for the discount rates. In this case the systemic part due to individual characteristics would be eliminated and the remaining part should be related to other factors. This residual part can be expected to be a less efficient proxy for the discount rates. Also some other robustness can be applied with functional form changes. Hence we agree with the referee that some robustness for better convincing the reader can be a good idea. We will extend the corresponding section accordingly.

By the way, in the proxy income plays an important role, but isn't this an important endogenous variable? After all, in the context of a health/human capital production model, the discount factor influences investment decisions in the labor market as well and therefore also income (rather than the other way around).

Response:

The referee's comment is well taken. Income potentially is an endogenous variable. In this context what makes a person's SAH outcome higher can also make her/his income higher and one such factor could be the discount factor. The modelling actually tries to produce a solution to this fact. Since the period utility is a function of age, gender, education and income (which in our model is a proxy for the current period health), current health is a composite measure of these individual characteristics. Given a heterogeneous (can be different for different individuals) but fixed (for the individual) discount factor, particular trajectories are assumed for the variables proposed (such as age evolves deterministically, income evolves at a fixed growth rate). Therefore, given the assumptions the model endogenizes the effect of income. However empirically this is another issue, especially for income and discounting relationship. SAH is sum of discounted life-cycle heath utilities. The proxies used for income likely to include life-cycle effects (some part of it due to discounting, but possibly also some other unobserved factors as well). The paper proposes the theoretical framework in order to account for the possibility that current health valuation (SAH later used as a measure for this) can be a combination of current and future expected health outcomes as the referee expressed. Viewing current health valuation as this has the potential to explain the differences in valuation of health that purely caused by economic behaviors of agents rather than the differences in their fundamental objective health. Therefore, the income coefficients can be biased in the estimation due to the referee's point but the main conclusion we reach on the other hand is that Model 2 (which is the empirical counterpart of equation (15)) produces an insignificant female coefficient with far less variables than Model 1 (base model with interactions), Also the base model produces a significant negative coefficient (gender paradox). Therefore, this result we interpret as the validity of the proposed theoretical model in the paper. However, in the revised version of the paper, this endogeneity issue and the possible implications in terms of the coefficients of the income variables will be disscussed in the subsequent sections.