Author's response to reviews

Title: Willingness to pay for social health insurance among informal sector workers in a major Chinese city: a contingent valuation study

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Author's response to reviews: see over
Dear Reviewers and Editors,

We thank the Reviewers for their comments. Please see our responses below and the revised manuscript attached.

With best regards,

Till Bärnighausen, Yuanli Liu, Xinping Zhang, Rainer Sauerborn

Response to Reviewer 1 (Weizheng Dong)

Comment 1:
Reviewer 1 writes that our article “does not classify different categories of the workers that are included in the sample, which includes employers who have 10 or less employees, self-employed professionals, temporary workers in formal/informal sectors, permanent workers in informal economy, and rural-urban migrants”. However, we do provide such information!

First, we provide information on the proportions of different categories of informal sector workers included in the sample. Table 1 (original version, page 32) shows that 21% of the informal sector workers in our sample are migrants, while 79% are residents in Wuhan, and that 80% of the informal sector workers included in our sample are in regular employment, while 20% are in irregular employment.
Second, our definition of people included in the sample (original version, page 9, para 2) – “own-account workers (excluding administrative workers and professionals), unpaid family workers, and employers and employees working in establishments with less than 10 persons engaged” – explicitly excludes “own account workers”, i.e. self-employed workers, who are “administrative workers and professionals” and excludes anybody working in the formal sector (whether in permanent or temporary employment). Reviewer 1 asks us to provide information on the proportions of “self-employed professionals” and workers in formal sectors. It is clear from the definition that these proportions must be zero.

We realize that it is easy to overlook the information contained in Table 1. We have thus added a description of the information contained in Table 1 in the text. We have further added information about the proportion of residents and migrants in our sample who are self-employed, employers and employees in enterprises with less than 10 people engaged:

Revised version, page 19, para 1

“79% of the 609 informal sector workers included in our final sample were residents in Wuhan, while 21% were migrants. 80% of the workers had permanent and 20% had temporary employment (Table 1). Among residents, 69% were self-employed, and 27% were employees and 4% were employers in enterprises with less than 10 people engaged. Among migrants, 97% were self-employed and 3% were employed in an enterprise with less than 10 people engaged.”

Further, in order to avoid misunderstanding, we have replaced the words “regular” and “irregular” with the words “permanent” and “temporary” when referring to the employment status of informal sector workers in our sample to make sure that it is clear that it is this distinction that we are referring to (as described in the methods section, (original version, page 15, last para)).

Reviewer 1 further states that “the study would make sense if it presented the responses of the different categories of the “informal workers””, implying that we do not present the responses of different categories of informal workers. However, at several places in the text, we do present and discuss the responses of different categories of informal workers! These places include original version, page 34, table 4; original version, page 15, last para; original version, page 22, para 2; original version, page 28, para 2. For instance, on page 22, para 2, original version, we write:

“Net of the other factors included in the regression models, … , migrants had lower WTP than residents (between 17.4% and 37.3% lower), and informal workers in regular employment had higher WTP than workers in irregular employment (between 19.1% and 30.0% higher).”

We have added one more descriptive table (revised version, page 37, table 3) that shows the willingness to pay separately by category of informal sector worker (migrants vs.
residents; workers in temporary vs. permanent employment) as well as by age group, sex, income group, educational attainment, and level of past health care spending, when other factors are not controlled for. Such univariate descriptions may indeed be useful for a number of purposes and had been missing from our manuscript.

Reviewer 1’s argument why it is important to distinguish between different types of informal sector workers is that their “economic situations” are different. It is precisely for this reason that we investigate the effect of belonging to a certain category of informal sector worker on willingness to pay for health insurance in multivariate analyses, i.e. after differences in income, education and other factors are taken into account! If differences in economic situation (and the other factors that we control for, such as age, and sex) were the only differences between different categories of informal workers, we would not need to include these categories as independent variables in our model. As we explain in the methods section (original version, page 15, last para), we distinguish between the different categories of informal sector workers because we hypothesize that the different categories of informal sector workers affect willingness to pay for BHI over and above other determinants:

“We hypothesized that migrants who currently work in Wuhan have a lower WTP for BHI than Wuhan residents, because they are more likely than residents to leave Wuhan in the following year and the BHI will reimburse health care expenditures only if they are accrued in Wuhan. We further expected that, after controlling for income, informal workers who are permanently employed in the informal sector have higher WTP for health insurance than informal workers who are in irregular employment. The BHI guarantees coverage only if all monthly contributions have been paid up to the point in time when health care expenditures accrue. Workers who are not regularly employed will be more likely to default on their payments for the BHI in the future and should thus have lower WTP for BHI in the present.”

The results of the multivariate analyses, showing the effect of being a migrant (vs. a resident) and being in regular (vs. in irregular) employment are summarized in table 4, (page 34, original version) and at several places in the text.

Comment 2:
Reviewer 1 writes “[s]ome cities in China provide informal workers with BHI, as long as they are willing to pay the employer’s proportion of premium as well. Whether Wuhan city has this policy is unknown, but a discussion of this policy to be included in the paper would be helpful.”

We agree with Reviewer 1 and have included the following discussion of and references to the policy to provide informal workers with BHI if they are willing to pay the employer’s proportion of the premium (revised version, page 28, para 2):

“A few cities in China currently allow informal sector workers to participate in the BHI if they contribute the same proportion of their incomes as formal sector workers or pay
premiums similar to the average premium paid by formal workers [1-3]. However, participation in these voluntary BHI schemes has been low [3]. Workers in the formal sector pay only a part of the total contribution directly from their salaries, while their employers pay the remainder. In contrast, informal sector workers usually have to pay the total contribution from their own incomes because they are either self-employed or employed in small-scale enterprises that do not contribute to their employees’ insurance coverage [4]. Our result that coverage declines steeply with increasing premium contributions at low contribution levels suggests that government subsidies would be an effective mechanism to increase coverage with BHI among informal sector workers.”

Comment 3:
We have added the following discussion about central (“universal”) and local health policy formulation and implementation in China, focusing on BHI.

Revised version, page 26, para 2 and 3, and page 27, para 1

“Health policy in China is formulated centrally, but decentralization has given lower level governments power to adapt policies from higher level government to local circumstances, leading to a situation where “governments at all levels are both policy-makers and policy-implementers” [5]. Discrepancies between central policy directives and local policy implementation have been observed for several health policies in China, such as disease control policies [6] and health care price setting [7].

The introduction of the BHI in Chinese cities is an example of the simultaneity of policy formulation and implementation at the local level. While the 1998 central government policy includes detailed directives about the attributes of the BHI (e.g. the proportions of a formal sector worker’s salary that employer and employee need to contribute to the BHI) [8], some municipal governments have implemented modified versions of the BHI, for instance in Shanghai and Beijing [9, 10]. Municipal governments have even more discretion in making decisions about expanding BHI to informal sector workers. The 1998 central government policy allows such an expansion, but does not require it. Recently, however, different levels of the Chinese government within and outside the health sector have called for improved social protection, including health insurance, for urban informal sector workers [2, 11-13].

This is the first study to investigate WTP to participate in social health insurance among informal sector workers in a major Chinese city. Many factors, such as political will and financial, managerial and technical resources, will influence municipal governments’ decisions whether or not to introduce the BHI for informal sector workers. Our study may support the decision making by providing evidence about the social desirability of the BHI, preferences for BHI attributes, and characteristics of informal sector workers that influence their valuation of the BHI.”

We have also added an example of a local implementation of the central BHI policy in the following paragraph.
Revised version, page 27, last para

“Whether the net benefits of the BHI will be positive or not depends on the validity of our cost estimates, which rests on a number of assumptions. For our first cost estimate, the average premium contribution of formal sector workers, to accurately represent the average cost of BHI, the contribution rates that are stipulated in the 1998 central government policy need to be sufficiently high, so that the total premium contributions to the BHI cover total costs. The fact that in their implementation of the BHI for formal sector workers some cities have chosen contribution rates that are higher than the rates stipulated by the central government suggests that this assumption may not hold true [14]. For instance, in Shanghai employers are required to contribute 10% of an employee’s annual wage to the BHI, while employees contribute 2% [9]. Even if the stipulated rates do lead to contributions that are sufficient to cover the costs of BHI for formal sector workers, they might not lead to contributions sufficient to cover the costs of BHI for informal sector worker, for instance because the latter face higher risks of work-related injuries and diseases than the former [3].”

Comment 4:
Reviewer 1 writes that “China has a number of cities have over 10 million residents, but Wuhan has less than 4 million. It is a typical medium sized city in China – which doesn’t undermine the importance of the study at all.”

Estimates of city population sizes depend on the definition of “city” that is used in counting the city’s population. However, Wuhan consistently ranks among the ten largest cities in China over the past 15 years across many different sources, including in


and in

http://www.citypopulation.de/China.html


Wuhan ranks among China’s five largest cities:

<table>
<thead>
<tr>
<th></th>
<th>City</th>
<th>City population estimate (2002)</th>
<th>Administrative region</th>
<th>Region</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Shanghai</td>
<td>9,031,200</td>
<td>Shanghai Municipality</td>
<td>East</td>
</tr>
<tr>
<td>2.</td>
<td>Beijing</td>
<td>7,129,500</td>
<td>Beijing Municipality</td>
<td>North</td>
</tr>
<tr>
<td>3.</td>
<td>Hong Kong</td>
<td>7,012,738</td>
<td>Hong Kong SAR</td>
<td>South</td>
</tr>
<tr>
<td>4.</td>
<td>Tianjin</td>
<td>4,344,500</td>
<td>Tianjin Municipality</td>
<td>North</td>
</tr>
<tr>
<td>5.</td>
<td><strong>Wuhan</strong></td>
<td><strong>3,957,500</strong></td>
<td><strong>Hubei Province</strong></td>
<td><strong>Central</strong></td>
</tr>
<tr>
<td>6.</td>
<td>Shenyang</td>
<td>3,452,900</td>
<td>Liaoning Province</td>
<td>Northeast</td>
</tr>
<tr>
<td>7.</td>
<td>Guangzhou</td>
<td>3,433,700</td>
<td>Guangdong Province</td>
<td>South</td>
</tr>
<tr>
<td>8.</td>
<td>Harbin</td>
<td>2,765,400</td>
<td>Heilongjiang Province</td>
<td>Northeast</td>
</tr>
<tr>
<td>9.</td>
<td>Xi'an</td>
<td>2,656,500</td>
<td>Shaanxi Province</td>
<td>Northwest</td>
</tr>
<tr>
<td>10.</td>
<td>Chongqing</td>
<td>2,311,600</td>
<td>Chongqing Municipality</td>
<td>Southwest</td>
</tr>
</tbody>
</table>

Given the above ranking of Chinese cities by population size, the only objection that one can validly have to our statement that China is “one of China’s largest cities” is that only the four largest cities in China (or any smaller number) should be counted among “the largest cities”. We have thus changed our statement that Wuhan “is one of China’s largest cities” to read “one of China’s ten largest cities” (revised version, page 8, para 1).

**Response to Reviewer 2 (Owen O’Donnell)**

**Comment 1**
We have aligned the numbering of equation 4.

**Comment 2**
We have replaced “WTP1”, “WTP2”, “WTP3” and “WTP4” with “baseline BHI”, “BHI without ceiling”, “BHI without deductible” and “BHI without coinsurance”, respectively, in tables, figures, and throughout the text.
Comment 3
We have changed the description of the results of the equity weighting.

Revised version, page 21, para 1

“The ranking of the point estimates of WTP for the different types of BHI is robust across all three equity weighting schemes (BHI without ceiling > BHI without coinsurance > BHI without deductible > baseline BHI) (Table 2). However, the only significant differences at the 5% confidence level between means of WTP for different types of BHI were found between WTP for baseline BHI and each of its three variations when either no equity weighting was applied or when the inequality aversion parameter $e$ was equal to 1.0.”

Comments 4a and 4b
We agree with Reviewer 1. We now acknowledge and discuss the limitations of our estimates of the cost of BHI.

Revised version, page 27, para 2-3, and page 28, para 1-3

“Whether the net benefits of the BHI will be positive or not depends on the validity of our cost estimates, which rests on a number of assumptions. For our first cost estimate, the average premium contribution of formal sector workers, to accurately represent the average cost of BHI the contribution rates that are stipulated in the 1998 central government policy need to be sufficiently high, so that the total premium contributions to the BHI cover total costs. The fact that in their implementation of the BHI for formal sector workers some cities have chosen contribution rates that are higher than the rates stipulated by the central government suggests that this assumption may not hold true [14]. For instance, in Shanghai employers are required to contribute 10% of an employee’s annual wage to the BHI, while employees contribute 2% [9]. Even if the stipulated rates did lead to contributions that are sufficient to cover the costs of BHI for formal sector workers, they might not lead to contributions sufficient to cover the costs of BHI for informal sector worker, for instance because the latter face higher risks of work-related injuries and diseases than the former [3].

For our second cost estimate, the informal sector workers’ past health expenditure, to approximate well the cost of BHI the demand for health care must not be affected by insurance. However, insurance is likely to change the demand for health care because it decreases the price of health care (as well as workers’ disposable incomes), and may lead to increased moral hazard behaviours.

While our cost estimates may be too low, the estimates of the benefits of BHI that do not take into account aversion to income inequality may underestimate the true size of the benefits from BHI. The equity weighted mean WTPs for BHI are much higher than non-equity weighted mean WTPs. If we assume, for instance, that the correct inequality aversion parameter for China is 1.5, the benefits of the BHI will be more than twice as
high as the unweighted benefit estimates, so that net social benefit will be positive, unless costs have been underestimated by more than a factor 2. One indication that Chinese society is indeed inequality averse is that Chinese policy makers have stipulated that formal sector workers should contribute an equal proportion of their incomes to the BHI, i.e. to receive BHI coverage workers with higher incomes are required to pay larger absolute amounts into the social risk pooling fund than workers with lower incomes.”

**Comment 5**

When referring to the numbered models in the text, we now point out that the models are labelled that way in Table 5. (We have added a table, so that Table 4 is now Table 5.)

**Revised version, page 23, para 1**

“The education variables were neither individually nor jointly significant in predicting WTP except for education level above high school, which significantly increased WTP in the models labelled 2.1, 3.1 and 3.2 in Table 5.”

**Revised version, page 23, last para, and page 23, last para**

“The age coefficients in the OLS regression models labelled 2.2 and 4.2 in Table 5 were respectively 14% and 20% lower than the age coefficients in the corresponding interval regressions (models 2.1 and 4.1 in Table 5).”

**Comment 6**

We agree with Reviewer 2 that “redistribution from rich to poor” can be understood as changes in income shares. We did indeed mean that there is “redistribution” because the rich contribute absolutely more than the poor. We have changed the paragraph to avoid any confusion as to our meaning:

**Revised version, page 28, para 3**

“One indication that Chinese society is indeed inequality averse is that Chinese policy makers have stipulated that formal sector workers should contribute an equal proportion of their incomes to the BHI, i.e. to receive BHI coverage workers with higher incomes are required to pay larger absolute amounts into the social risk pooling fund than workers with lower incomes.”
References

2. Li X: 40% migrant workers found with illness in Hubei [http://english.gov.cn/2005-12/30/content_179211.htm]