

Author's response to reviews

Title: Corruption, inequality and population perception of health system quality in Europe

Authors:

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Author's response to reviews: see over

Responses to Reviewer 1

Minor Essential Revisions

- 1) Discussion section should be strengthened by using related references.

The authors welcome this comment. The discussion section was strengthened with a few of the related references.

Discretionary Revisions

- 2) Brief information about analysis could be given in methods section.

The authors welcome this comment. Couple of sentences on the analysis was given in the methods section.

Responses to reviewer 2.

The goal of the study is to analyze perceptions on quality of care (general assessment, main criteria, and risk of adverse events) in the general population. Based on the title of the manuscript, it seems that the authors are mostly interested in understanding whether "corruption" and "inequality" are major drivers of these perceptions. In the text, it is made clear that the authors mean general corruption and inequality, i.e., in the country at large, not specifically within the health care system. The question could be formulated as: are individuals living in a country where corruption (resp. income inequality) is more of a problem more likely to think that their health care system is of poor quality? The analysis uses a survey conducted in Europe (EU 27) in 2009, the sample being representative at the European and national levels (minimum sample size is 500, for smaller countries, regular sample size is 1000).

My comments are as follows:

1. Surprisingly, even though the title is about corruption and inequality, the analysis starts with an analysis of individual determinants of perceptions regarding the health care system, such as age, gender, marital status, or wealth and poverty. These are interesting questions in their own right but I could not really understand why they were addressed in a study on corruption, inequality and perceptions on health care quality. The only reason to include them would be to standardize across countries: if the UK and France have very different age distributions and age influences perceptions of quality of health care, any comparison between these two countries that does not standardize by age would be spurious (any difference attributed to variations in corruption among countries could be the result of their different age distributions). But, if that is the case, the manuscript should be presented very differently, starting with some theoretical suggestions that corruption and/or income inequality might influence perceptions of the quality of health care, and then (quietly, in the background) standardizing for possible socio-economic differences across countries. I would be very comfortable with such an analysis at the country (social) level and think it would be an original and thought-provoking study.

The authors welcome this comment. As the manuscript notes, the original weights of the sample were used in the analysis so as to minimize any difference in structure of the samples (in terms of socio-economic or demographic structure). Nevertheless, we have conducted an additional analysis where the age variable is included as a categorical dummy variable (the results reported

in Table B1 included at the end of this report). Broadly, our hypotheses for the non-linearity of age are broadly confirmed. In addition to the table included in this report to the reviewers, an endnote was added to the manuscript documenting the additional exercise that we have conducted in the context of reviewer's comments.

2. I am much less convinced by the econometric analysis of socio-demographic determinants of these perceptions: what can we conclude from the fact that both younger and older respondents are less happy with their national health care systems than those who are 40 years old? Is it purely a perception thing, does it have to do with personal exposure to the health care system (not enough or too much yields perceptions of lower quality), or is it the case that the health care system works better somehow for the middle aged? Again, I do not see what can be done with these analyses, but I agree with the need to control for such factors in a, much more interesting, analysis of social factors of national perceptions of the quality of the local health care system.

The authors also welcome this comment and agree with the reviewer. However and sadly for this analysis, the Eurobarometer does not include data/variables on the frequency of health visits over the course of the year (or the last few months). Indeed, this variable would be extremely important for controlling for possible effect of health status on perception of health quality (i.e. the authors are cognizant of the fact that sicker people would have a completely different perception of health quality than healthier people). Moreover, the Eurobarometer does not include a question on overall health status (which, as indicated above, is also important and could also sway the perception of quality of health system). As indicated in the manuscript, we tried to circumnavigate the problem by using age as a proxy for overall health status (even though, this could be a somewhat strong assumption). Finally, the authors are cognizant of the fact that this factor remains a limitation of the paper and have duly noted it under the limitation section of the paper.

3. I also have concerns with the way the econometric analysis is conducted. Firstly, the way the second type of analysis is conducted (what is presented in table 4 - determinants of quality, the criteria) is not clearly explained in the paper (or the table). My understanding is that responses to these questions on criteria were added as independent variables (but how exactly, I cannot tell) in the previous analysis of determinants of perceptions of quality of health care. I suggest adding one paragraph to make that clear.

The authors welcome this comment. Indeed, these variables were included as independent ones. A further explanation of the empirical strategy is explained in the main body of the paper.

4. More importantly, though, I am not convinced an ordered logit is warranted here. It imposes a demanding assumption on the data (proportional odds) that does not seem necessary (I agree that the OLS also imposes an unrealistic assumption and I do not recommend an OLS on the four item variables either).

The authors welcome this comment. As indicated in the manuscript, we borrowed the technique from the econometric modelling of life satisfaction/happiness studies that have been carried out in the last few years (see, for instance, the U Penn paper on this topic by Stevenson and Wolfers (2008)). Using ordered probit also keeps the richness of information available in the original form of the data. Nevertheless, as witnessed by the analysis (and everything that is reported in the tables) we use OLS as a robustness check but, moreover, we also dichotomise the variable

and run a regular probit analysis on this newly created dichotomous variable (we report these as appendix tables to the main paper).

5. The dependent variables can be naturally dichotomized – The analysis could focus first on the proportion in each country with a negative perception of the health care system (items "fairly bad" and "very bad") and simple correlations could be calculated (at the country level) between the proportion with a negative view of the health care system and various indicators at the macro-level (corruption, Gini index, income per capita, share of health care in GDP, physician density etc.). Running the analysis at the country level would also make clear how many degrees of freedom are truly available (27, no more, imposing a rather parsimonious theoretical model). Of course, the proportions could be first standardized on major socio-demographic characteristics at the individual level, using a probit analysis (but, again, in the background, and on characteristics that vary a lot across countries and are, therefore, susceptible of influencing differences in proportions with a negative opinion of the health care system). The same can be done with the likelihood of adverse events; it is a bit more complex since there are so many dependent variables (hospital or non-hospital related, plus by type of adverse event) but the logic is the same: there is a natural cut-off between "very likely" and "fairly likely" on one hand (negative perception) and "not very likely" and "not at all likely" on the other hand (positive perception). I would run a factor analysis of all these variables on adverse events and risks, to come up with a small number (hopefully one, possibly two) or variables summarizing the perception of risk in the system. I would then dichotomize (positive versus negative) and run the simple correlation analysis referred to above (as in the case of general assessment). This analysis could leave aside the questions on criteria so far, or these criteria could be used at the macro-level as well: calculate a score for each of these criteria at the national level and run a correlation analysis between general perception and scores of each dimension, to answer the question: Do countries with higher negative perceptions of their health care system also rank "free choice of doctor" higher?

The authors welcome this comment and include a separate section of additional analysis that includes the suggestions above. First we ran a probit model on the main individual determinants of the perception of healthcare quality. We then used the fitted values for the percentages of good perception for a simple correlation analysis. The correlation analysis is presented in Panel 1 below. We find consistent support for the main findings of our original analysis, i.e. perceptions of healthcare quality tend to be better in countries with lower inequality, higher transparency but also in richer countries. Panel 2 repeats the analysis conducted on a more lenient measure of quality of perceptions (very bad vs. all the other answers). The results that emerge from this analysis are broadly consistent with our main findings.

We then repeat the analysis above on our secondary variable of interest – likelihood of observing adverse events. We use two variables – likelihood of hospital and non-hospital harm. As in the case above we use two-step approach. First, we only take into account likely vs. non-likely possibility and then we use an approach where we separate the 'very likely' answers from all the rest. The results are reported in Panel 3, Panel 4, Panel 5 and Panel 6.

There are a few interesting results that emerge from our analysis. First, when the dichotomized variable is used, the simple correlation analysis reveals a strong link only between the income inequality and the fitted values for adverse events (both for hospital and for non-hospital harm). However, when we conduct the analysis with a different cut-off point ('very likely' vs. all the rest)

we find evidence that transparency and the overall macroeconomic standing of the country also bears a significant weight.

Moreover, we also conduct an analysis where we correlate the perception of healthcare quality and different attributes of care (Please see Panel 7). As evidenced by Panel 7, we find a strong correlation between well-trained doctors and cleanliness on the one hand and perception of healthcare quality on the other. This broadly confirms our logit analysis presented in the main body of the paper. In addition, we also find that preferences for short waiting lists and for a clean environment (in addition to the factors enumerated above) also have an impact when deciding on the overall perception of the healthcare quality.

We have also repeated the analysis above on a simple summary of respondents' questions (without obtaining fitted values) and our results broadly confirm the analysis. The additional seven panels are available upon request.

6. A sensitivity check could be to re-run the correlation analysis with a more lenient (for the health care system) cut-off, at "very bad" versus the other three categories for general assessment, and at "very likely" versus the other three categories for adverse events).

The authors welcome this point. As indicated above, it was addressed in the main part of the paper as a separate robustness check.

7. A rather interesting analysis would be that of correlation between general assessment of the health care system and assessment of risk of adverse events: do these two variables say the same thing or do they convey independent information on perceptions? The true question is: do we see respondents who think that the probability of adverse events is high but still rank their health care system positively (they may think such a probability is a natural thing and would not blame the system for it)? Similarly, do we see respondents who do not think adverse events are likely but still have a negative perception of their health care system (because something else, such as distance to the nearest hospital, is what really concerns them). An ambitious analysis would run correlations at the national level between three proportions (as the dependent variable:

negative perception of the system and thinks adverse events are likely

negative perception of the system but does not think adverse events are likely

positive perception of the system even though thinks adverse events are likely

Of course, the fourth category, being the reference, does not need to be analyzed.

The authors welcome this comment and the results of this analysis are presented in Charts 1, 2 and 3. It has to be noted that the analysis was conducted first by running probits on the individual data and then they were summarized at national level. The correlation charts reveal the main thrust of the analysis that both questions answer the same thing in a different way – there is a negative correlation between fitted values of respondents who think that it is likely to be affected by an adverse event and those who have good perception of healthcare quality; there is a positive link between fitted values of the percentage of respondents with bad views of healthcare quality and those who believe that it is likely to be affected by an adverse event; and

finally, there is a negative correlation between respondents who think that it is not likely to be affected by an adverse event and those with bad perceptions of healthcare quality.

8. Is there anything that can be done with individual characteristics beyond simply standardizing national proportions of negative perceptions of the health care system? I think so. Once the correlation analysis at the macro-level has selected promising societal characteristics (say, transparency and income inequality), it could be really interesting to see how these characteristics interact with individual ones: it seems reasonable to think that corruption could affect the poor more than the rich (the poor have a hard time finding doctors); similarly with income inequality: the rich should be happy in an unequal society, unless they care for their poorer fellow citizens. It would be fascinating to see who is affected by these societal determinants in the judgment they pass on their health care system. Again, I would run it simply, as a probit (or even a linear probability model) on a dichotomized dependent variable (negative general perception, perception of risk of adverse event).

The authors welcome this comment and we conducted additional analysis. However, the interaction variables between both socio-economic status and corruption and socio-economic status and inequality do not appear significant. The results are available upon request. This additional analysis has also been inserted as an endnote to the main manuscript.

9. Minor concerns:

I do not understand why income is not used at all. I agree that wealth, as measured by an asset indicator, captures something that income does not (permanent income, perhaps), but income can complement it nicely, and it could be entered in the standardization analysis beside wealth.

The authors welcome this comment. The Eurobarometer survey does not have a measure of income. Moreover, as indicated in the main body of the paper, the authors believe that due to various endogeneity issues, the asset index is the most superior measure of income and also quite widely used in this kind of analyses.

The studies conducted by the Commonwealth fund, comparing health care systems on the basis of national population surveys on wait times and quality of care through episodes of care, are not mentioned at all in the paper (or I could not find them) even though they seem topical. I would like to see how this study positions itself relative to the Commonwealth fund analyses.

The authors welcome this comment. The authors searched the studies by the Commonwealth fund but it appears that some of them are based on surveys of experts' opinions, rather than national representative surveys. Some of them are based on the views of doctors, while a handful of them are based on perceptions of people with specific illnesses or specific types of patients. While they are quite informative in their own right, the Commonwealth fund studies do not reflect the opinions of the wider public. Hence, we decided not to include them based on a few grounds: (i) this paper uses data that reflects the general population's perception of quality of healthcare and likelihood of occurrence of adverse events; (ii) surveys based on experts' opinions usually reflect different realities (for a critique of point (ii) please refer to Commander and Ninkovski (2011)).

On this same note, there is an interesting literature on the effect of societal characteristics such as corruption or inequality and some objective characteristics of health care or social protection - If you are

interested, I am happy to send you a working paper I wrote last year on this topic (I do not count that as being part of the "interesting literature" but it provides references to the literature that might be helpful).

The authors are very happy with this comment and welcome it wholeheartedly. We would welcome further reading materials on the topic.

Cited works:

1. Com m ander, Sin on and Z latko N ikolski (2011) "Institutions and growth: what can be explained" IZA W orking Paper N o. 5247.
2. Stevenson, B .and J.W olfers (2008) "E conom ic growth and subjective well being: reassessing the Easterlin Paradox", N BER W orking Paper N o. 14282.

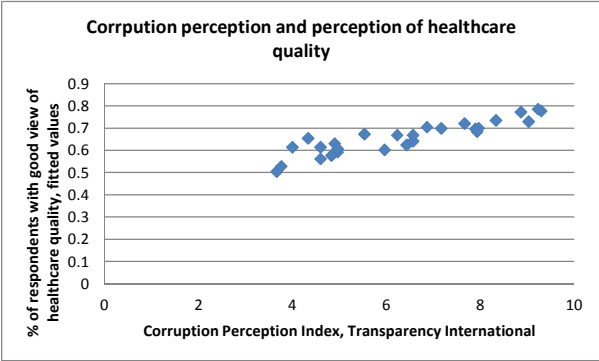
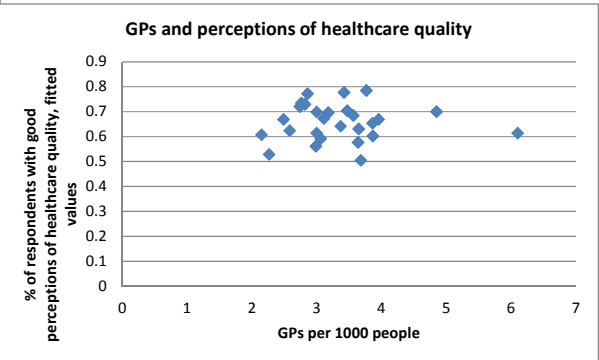
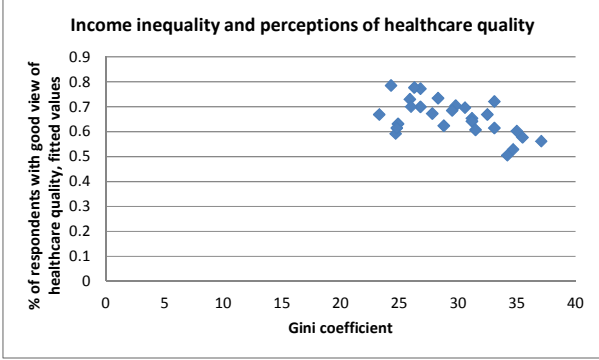
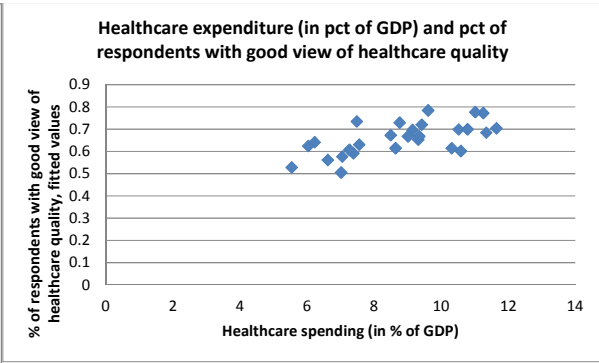
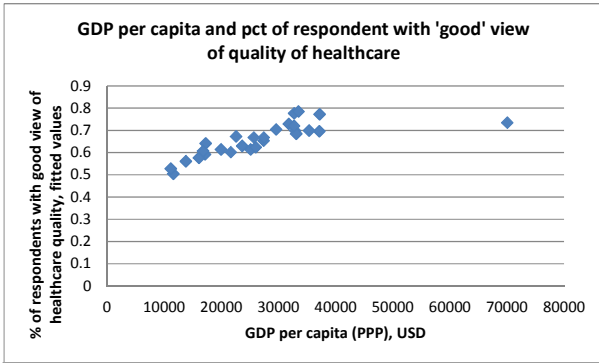
Table B1. Determinants of perception of quality of healthcare

	Ordered probit			OLS			Probit		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	health_qua	health_qua	health_qua	health_qua	health_qua	health_qua	quality	quality	quality
married	0.0953** (0.0375)	-0.0413 (0.0262)	-0.0377 (0.0310)	0.0687** (0.0269)	-0.0214 (0.0155)	-0.0203 (0.0203)	-0.123*** (0.0456)	0.0467 (0.0349)	0.0380 (0.0393)
divorced	0.0120 (0.0436)	-0.0233 (0.0380)	-0.0477 (0.0486)	0.0106 (0.0304)	-0.0111 (0.0222)	-0.0280 (0.0309)	-0.0780 (0.0520)	-0.0353 (0.0427)	-0.00859 (0.0574)
widow	0.0577 (0.0452)	-0.0784** (0.0377)	-0.0667 (0.0424)	0.0414 (0.0315)	-0.0419* (0.0224)	-0.0398 (0.0268)	-0.152*** (0.0509)	0.000747 (0.0432)	-0.00900 (0.0508)
primary_educ	0.00765 (0.0732)	0.0542 (0.0647)	0.0756 (0.0674)	0.00289 (0.0513)	0.0284 (0.0392)	0.0418 (0.0444)	0.0282 (0.0846)	-0.0259 (0.0718)	-0.0735 (0.0787)
secondary_educ	0.118* (0.0690)	0.114** (0.0492)	0.0668 (0.0662)	0.0799 (0.0492)	0.0646** (0.0299)	0.0366 (0.0432)	-0.0643 (0.0806)	-0.0665 (0.0546)	-0.0293 (0.0765)
university_educ	0.00531 (0.0652)	0.0237 (0.0539)	0.0237 (0.0568)	0.00390 (0.0463)	0.0136 (0.0327)	0.0137 (0.0364)	0.0476 (0.0726)	0.0157 (0.0615)	0.0194 (0.0679)
female	0.0113 (0.0192)	0.0431** (0.0193)	0.0380** (0.0178)	0.00389 (0.0132)	0.0220* (0.0110)	0.0200* (0.0109)	0.0293 (0.0198)	0.0000505 (0.0219)	0.00386 (0.0200)
urban	0.0426 (0.0414)	0.0113 (0.0205)	0.0468 (0.0327)	0.0279 (0.0293)	0.00648 (0.0123)	0.0281 (0.0202)	-0.0345 (0.0472)	-0.00875 (0.0274)	-0.0317 (0.0376)
hh_size	0.0363** (0.0158)	-0.00804 (0.00641)	-0.00504 (0.0113)	0.0250** (0.0110)	-0.00479 (0.00359)	-0.00393 (0.00695)	-0.0309* (0.0162)	0.0164** (0.00817)	0.0138 (0.0123)
poor	0.265*** (0.0417)	0.193*** (0.0446)	0.188*** (0.0457)	0.197*** (0.0305)	0.119*** (0.0268)	0.127*** (0.0303)	-0.292*** (0.0559)	-0.224*** (0.0597)	-0.215*** (0.0623)
age2534	0.0802* (0.0451)	0.100** (0.0440)	0.103** (0.0414)	0.0585* (0.0336)	0.0612** (0.0271)	0.0682** (0.0278)	-0.107* (0.0629)	-0.135** (0.0628)	-0.130** (0.0588)
age3544	0.0144 (0.0532)	0.0984** (0.0493)	0.113** (0.0447)	0.0152 (0.0387)	0.0627** (0.0303)	0.0772** (0.0293)	-0.0341 (0.0685)	-0.138** (0.0641)	-0.138** (0.0606)
age4554	-0.0847 (0.0546)	0.0736 (0.0483)	0.0655 (0.0462)	-0.0576 (0.0397)	0.0441 (0.0292)	0.0425 (0.0295)	0.111 (0.0704)	-0.0855 (0.0672)	-0.0592 (0.0644)
age5564	-0.209*** (0.0764)	0.0190 (0.0618)	0.00883 (0.0540)	-0.143** (0.0546)	0.0148 (0.0377)	0.00945 (0.0349)	0.270*** (0.0829)	-0.0107 (0.0786)	0.0280 (0.0636)
age65	-0.499*** (0.0847)	-0.103 (0.0706)	-0.134** (0.0588)	-0.344*** (0.0615)	-0.0538 (0.0418)	-0.0771** (0.0367)	0.597*** (0.105)	0.128 (0.0946)	0.188** (0.0747)
wealthindex	-0.317*** (0.0386)	-0.0162 (0.0135)	-0.0351** (0.0163)	-0.224*** (0.0301)	-0.00891 (0.00806)	-0.0223** (0.0107)	0.358*** (0.0497)	0.0162 (0.0194)	0.0387* (0.0214)
_cut1	-1.018*** (0.136)	-0.682*** (0.0537)	-6.055* (3.256)						
_cut2	0.587*** (0.149)	1.260*** (0.0591)	-4.250 (3.231)						
_cut3	1.593*** (0.128)	2.463*** (0.0895)	-3.129 (3.209)						
ln_pct3			-0.407 (0.300)			-0.277 (0.190)			0.410 (0.396)
health_exp3			-0.0102 (0.0483)			-0.00651 (0.0314)			0.0100 (0.0673)
gini_3			0.0274 (0.0236)			0.0175 (0.0154)			-0.0306 (0.0264)
ln_doc3			-0.116 (0.403)			-0.0643 (0.260)			0.0896 (0.423)
cpi_3			-0.207*** (0.0548)			-0.127*** (0.0357)			0.238*** (0.0582)
_cons				2.187*** (0.0928)	1.861*** (0.0285)	5.458** (2.051)	0.484*** (0.147)	1.122*** (0.0618)	-4.453 (4.083)
N	25661	25661	25661	25661	25661	25661	26025	26025	26025
R-sq				0.083	0.313	0.233			
adj. R-sq				0.082	0.312	0.233			
pseudo R-sq	0.037	0.160	0.114				0.060	0.242	0.179
Country dummies	NO	YES	NO	NO	YES	NO	NO	YES	NO

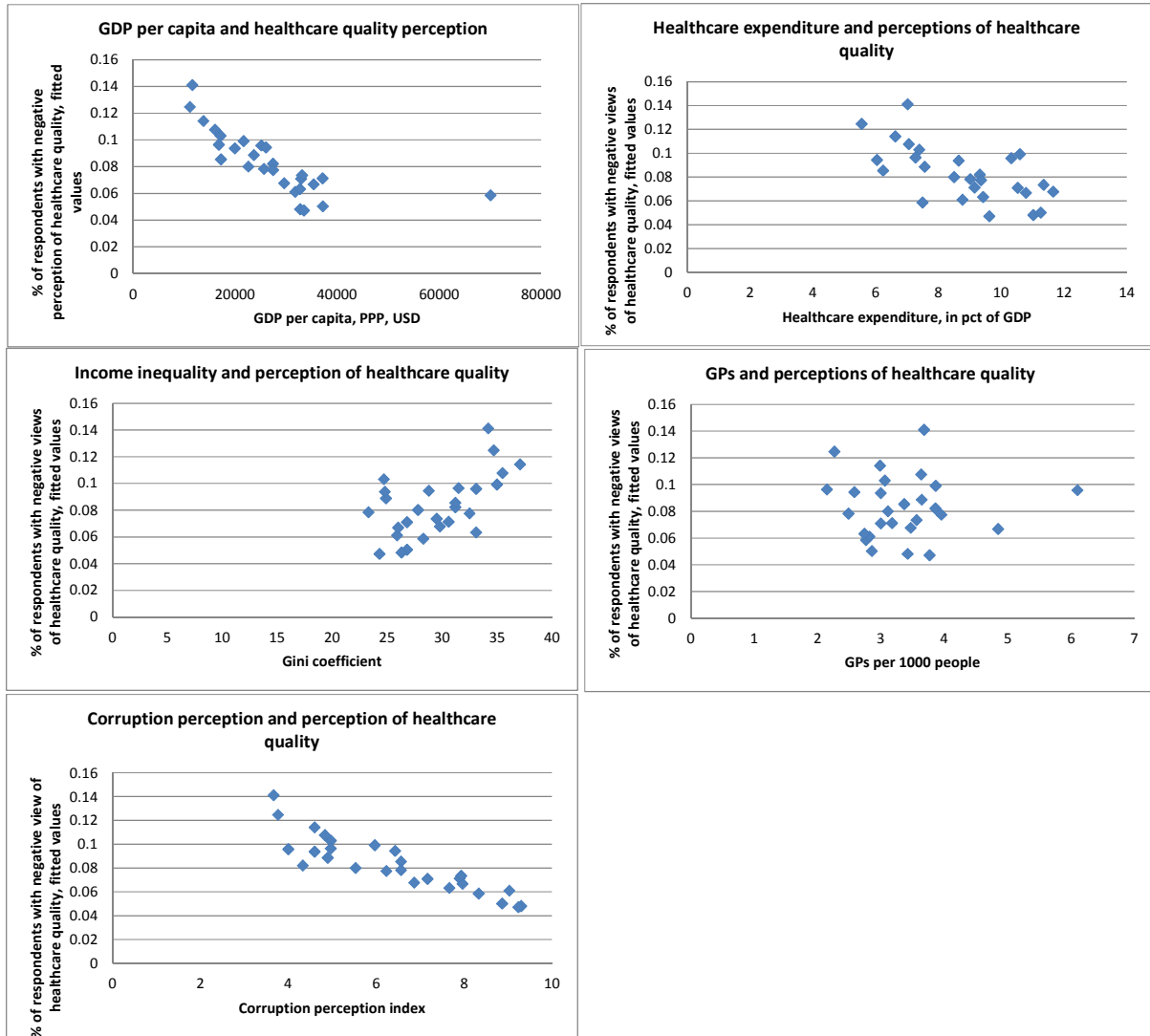
Standard errors in parentheses

=* p<0.1 ** p<0.05 *** p<0.01"

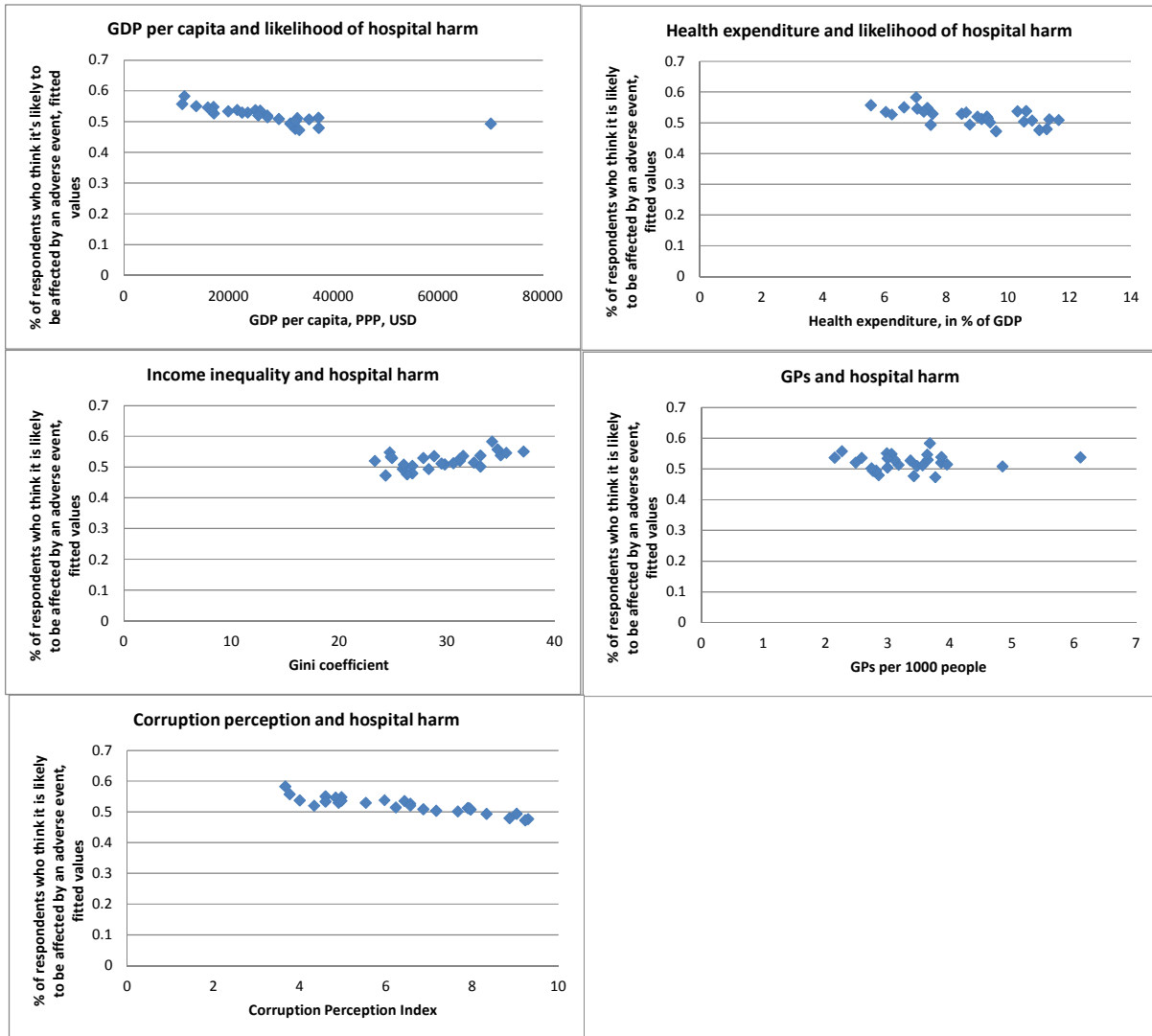
Panel 1. Perception of quality of healthcare and selected macro variables



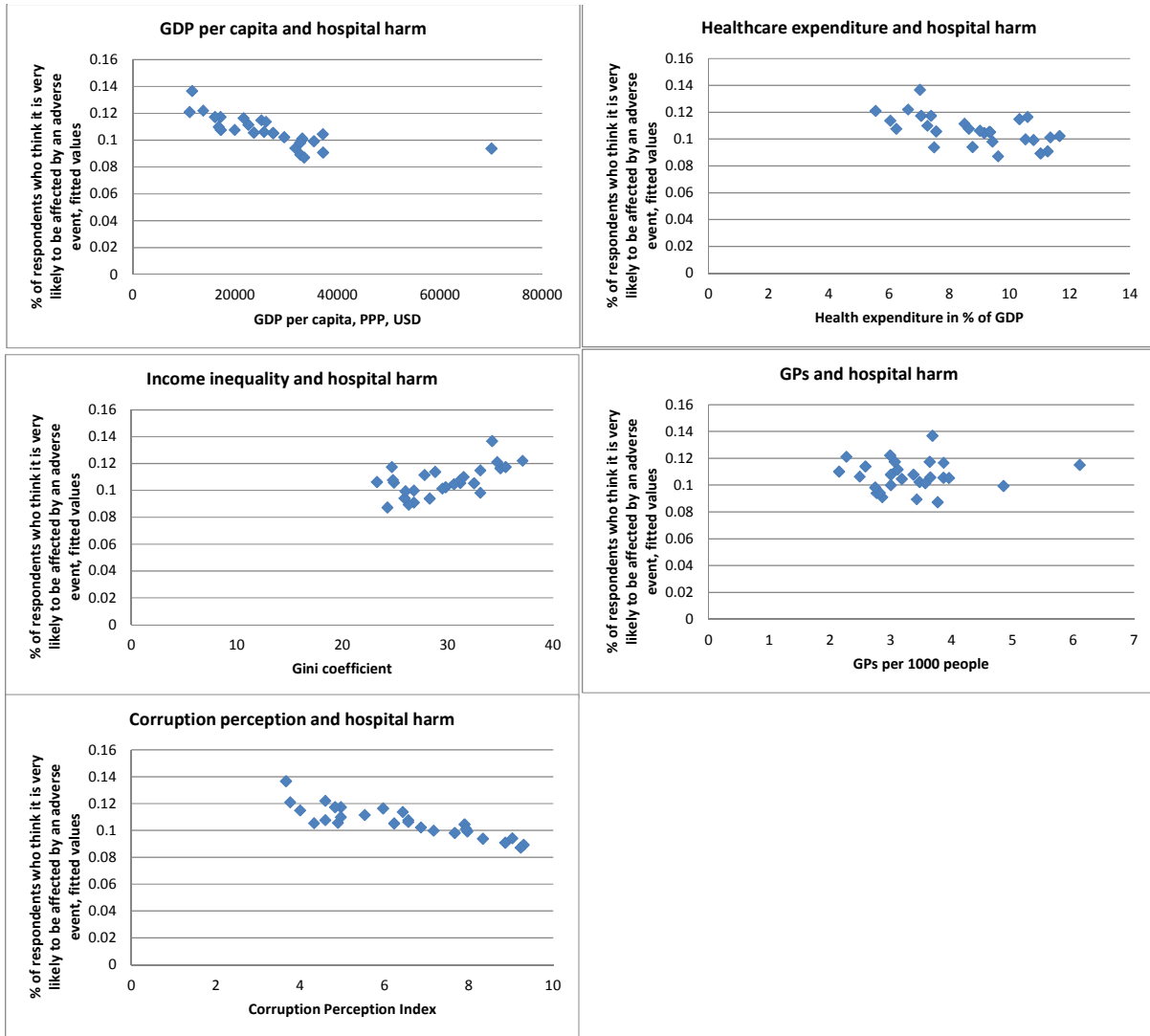
Panel 2. Perception of quality of healthcare and selected macro variables



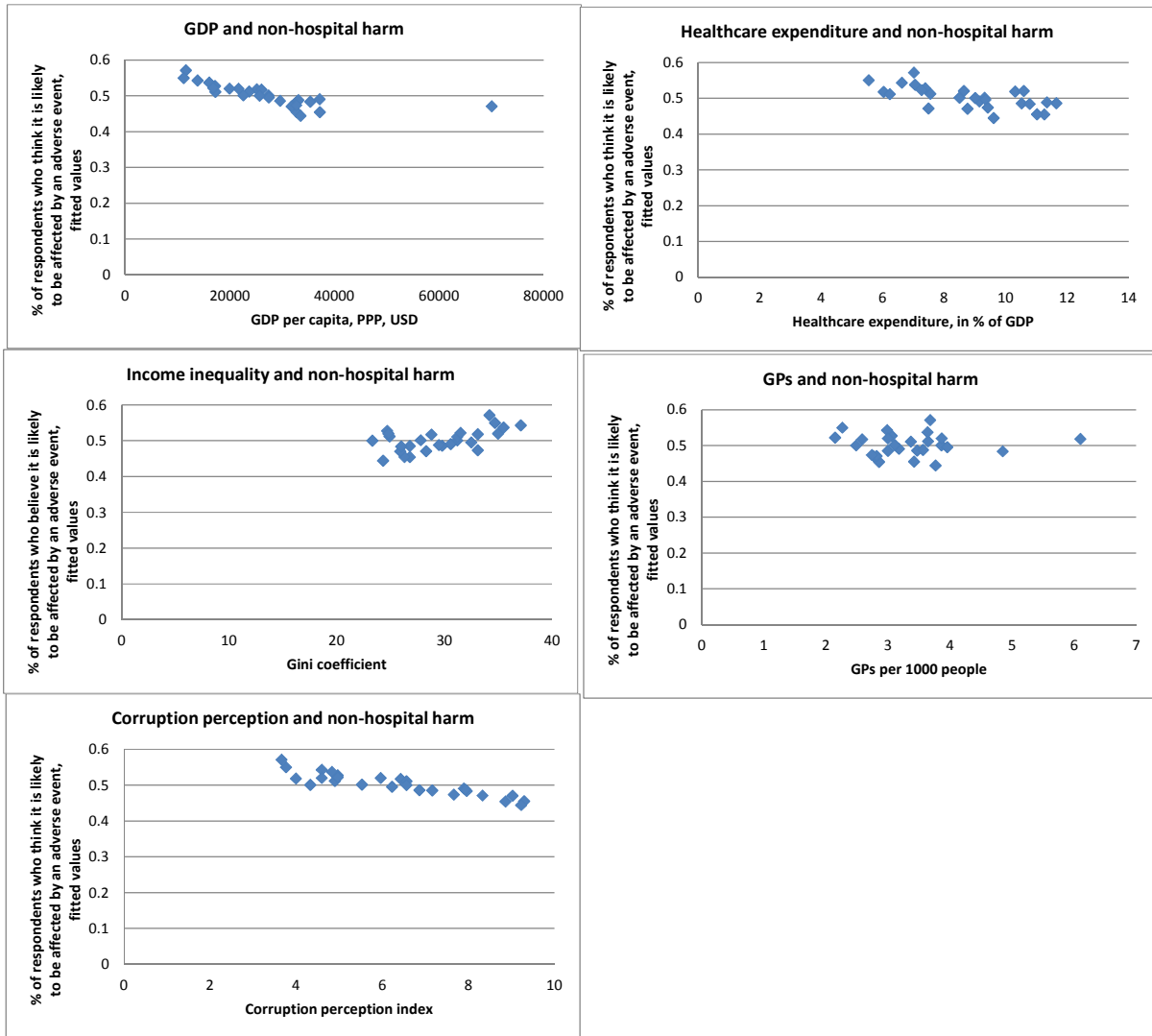
Panel 3. Likelihood of hospital harm and selected macro variables



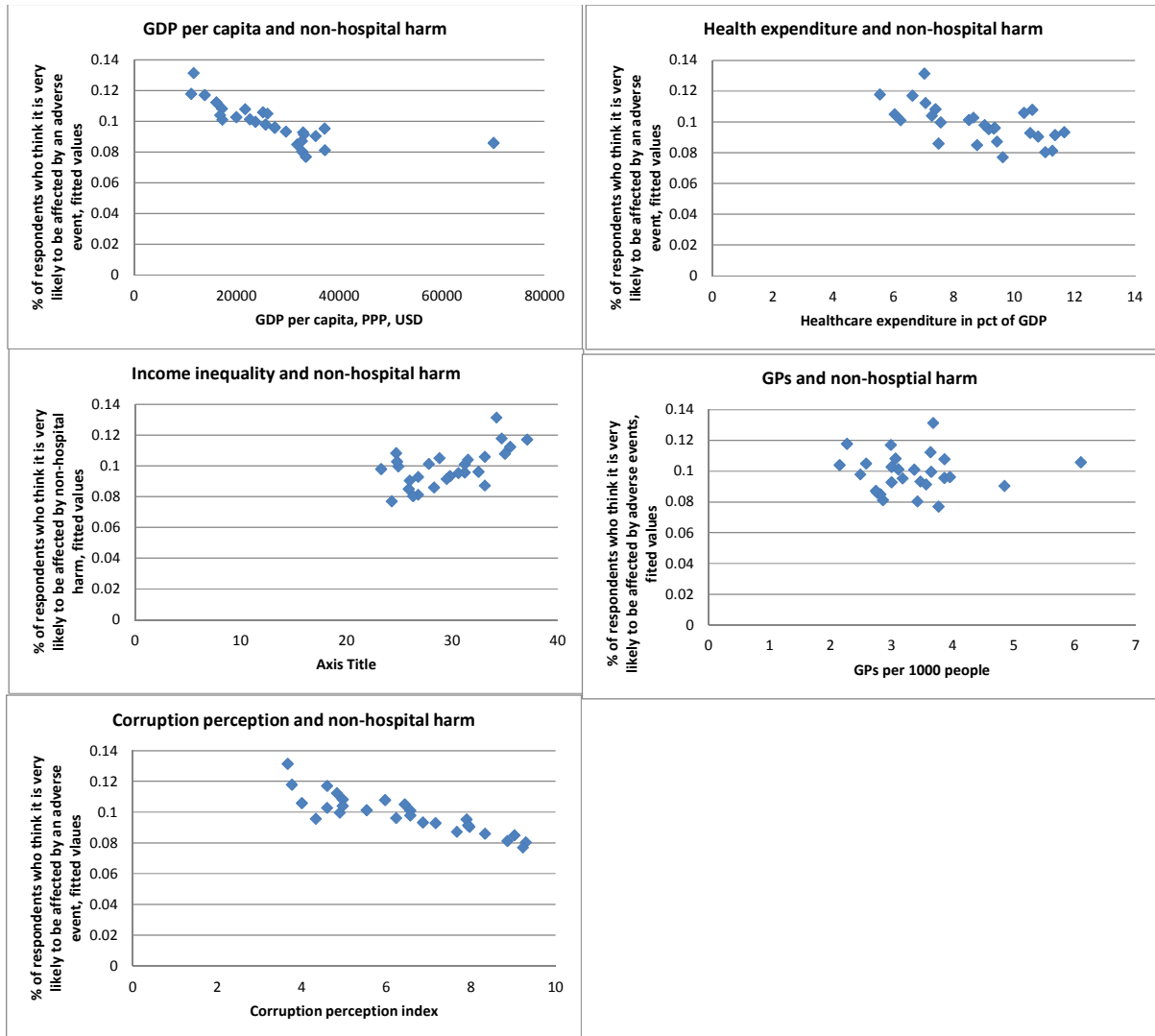
Panel 4. Likelihood of non-hospital harm and selected macro variables



Panel 5. Likelihood of hospital harm and selected macro variables



Panel 6. Likelihood of non-hospital harm and selected macro variables



Panel 7. Perception of quality of healthcare and attributes of healthcare

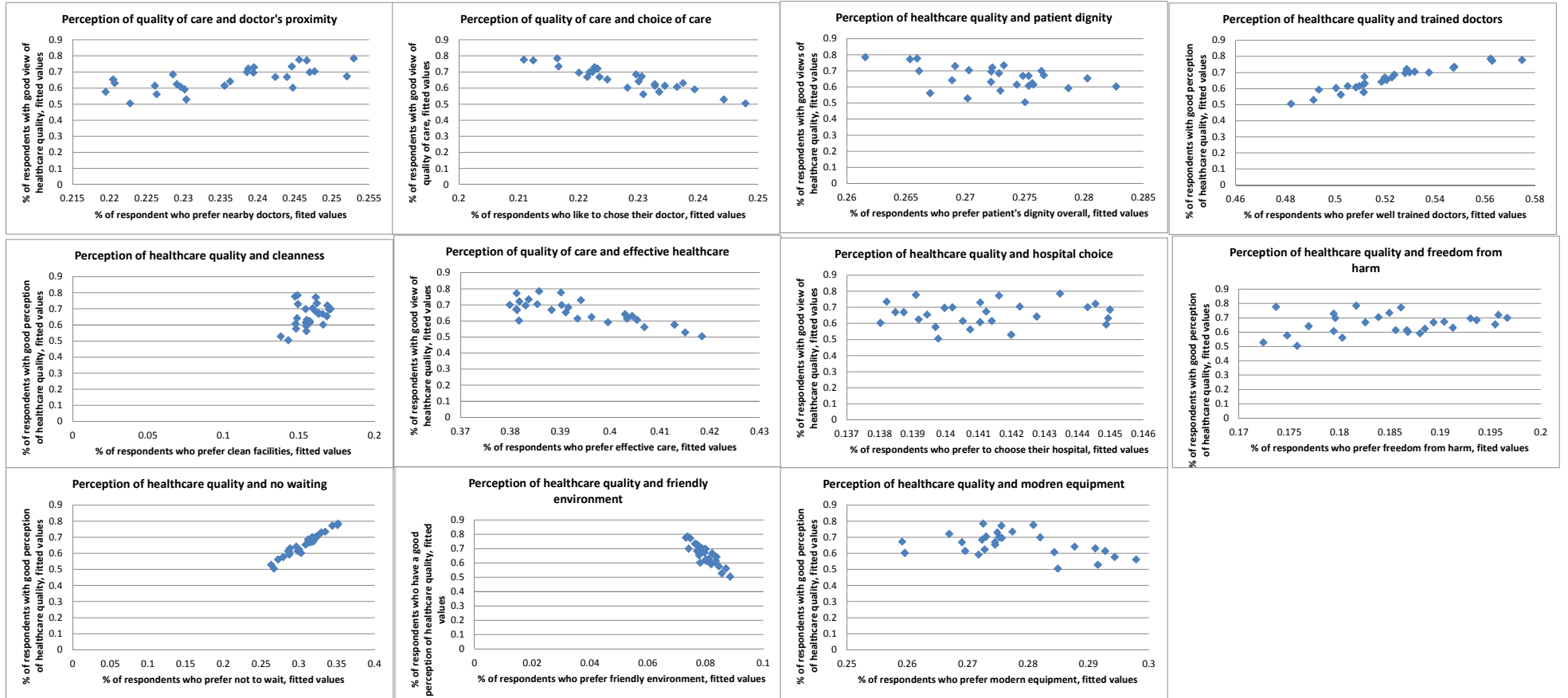


Chart 1. Perception of healthcare quality and adverse events

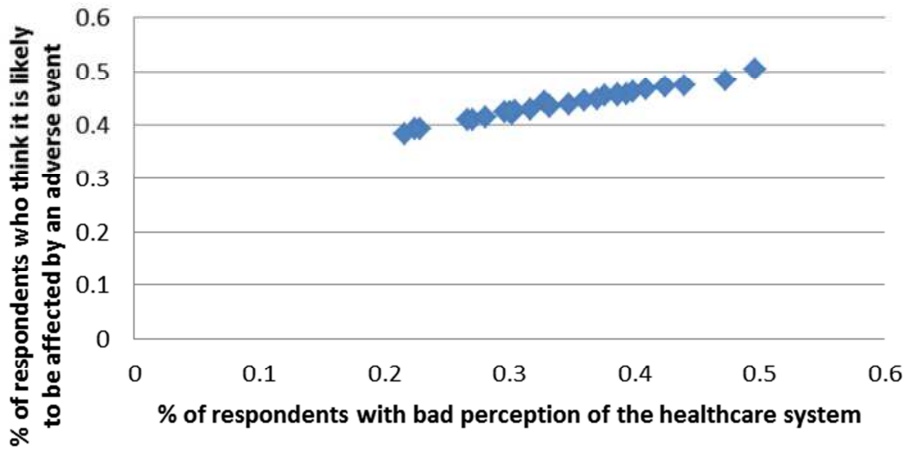


Chart 2. Perception of quality and healthcare system

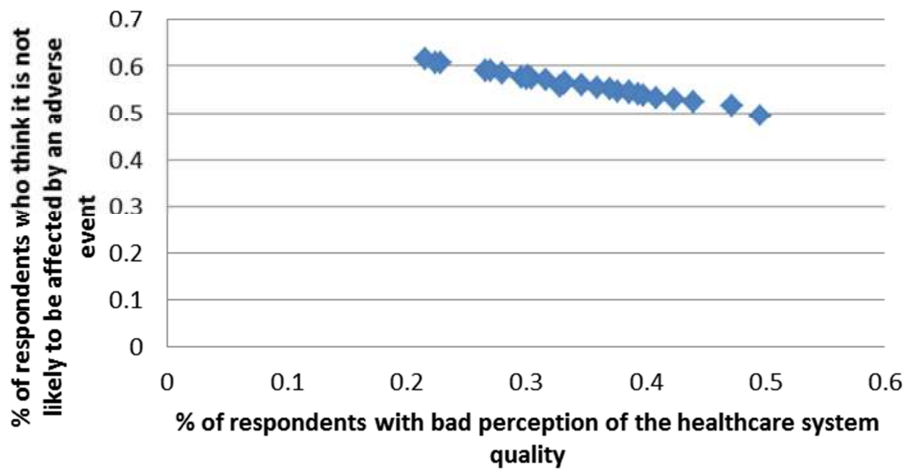


Chart 3. Quality of healthcare system and adverse events

