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Abstract

Following the 2010 protests in several Middle-Eastern and North African (MENA) countries, several reforms were initiated with the goal of moving towards universal health coverage (UHC). In their attempts to implement UHC, different developing countries encounter different types of obstacles. In Tunisia, major challenges include a widespread informal sector and protestors' general discontent with rising economic insecurity and inequality, the rollback of the state and public welfare. We apply a Contingent Valuation (CV) survey, often used to elicit preferences for non-market or non-existing health goods or services, to a non-healthcare-covered Tunisian sample vis-à-vis joining and paying for a health insurance scheme. We pay particular attention to the nature of the willingness-to-pay (WTP) values obtained, distinguishing genuine null from protest values. The latter may reflect not only protesters' beliefs regarding the survey, but also their lack of trust in government's commitment to ensuring the provision of quality healthcare. We use alternative econometric modeling strategies to account and correct for selection issues arising from protest answers. Our results support the presence of self-selection and, by predicting protesters' WTP, allow the "true" sample mean WTP to be computed. This appears to be about 14% higher than the elicited mean WTP. The WTP of the poorest non-covered respondents represents about one and a half times the current contributions of the poorest formal sector enrollees, suggesting that voluntary affiliation to the formal health insurance scheme could be a step towards achieving UHC in Tunisia. Overall, we highlight the importance of taking into account protest positions for the evaluation of progress towards UHC.

Key words: Willingness-to-pay; Contingent valuation; Universal health coverage; Self-selection; Protest attitude.

JEL codes: C34, C52, I13

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1. Introduction

Following the protests of the so-called "*Arab Spring*" in late 2010, several countries in the Middle East and North Africa (MENA) region put the goal of attaining universal health coverage (UHC) at the top of their political agenda and development plans (Saleh et al., 2014; Asbu et al., 2017). Efforts to achieve UHC are being further accelerated with the adoption of UHC in the 2015-2030 Sustainable Development Goals (Chapman, 2016). One of the key issues obviously concerns the health financing policies that should be implemented. Alami (2017) showed that reforms seeking to extend current health coverage on a contributory and formal employment basis are unlikely to succeed, leaving swathes of the active working population without any health coverage. Indeed, the widespread labor market informality, the rollback of the State and public welfare, and the protesters' discontent with increasing economic insecurity and inequality stand as major challenges (Wagstaff, 2010; Alami and Karshenas, 2012; Carrin and James, 2015; Kutzin et al., 2016). Yet the field lacks a systematic analysis of how protest positions may impact health financing policies based on voluntary affiliation, and hence, the implementation of UHC-oriented reforms.

We propose to fill this gap by using a Contingent Valuation (CV) survey to elicit preferences from the non-covered Tunisian population regarding *a voluntary health insurance scheme* (VHIS) (see Nosratnejad et al., 2016 for a recent review of willingness-to-pay (WTP) for health insurance in low- and middle-income countries (LMIC)). Stated preference methods help inform decision-makers on the hypothetical demand for not yet available or non-market goods or services. Analyses, however, generally focus on valid WTP and do not frequently pay enough attention to the impact of "*protest*" WTP. The latter may result from the respondent's protest beliefs or attitudes *via-à-vis* the survey or the proposed scenario (Jorgensen and Syme, 2000; Meyerhoff and Liebe, 2006), the payment vehicle *per se* (Strazzera et al., 2003), or, for UHC, the lack of faith in institutions (De Allegri et al., 2006; Cunha-e-Sá et al., 2012) and the capacity of governments to ensure the provision of good healthcare for all (Jehu-Appiah et al., 2011). These protest answers differ from stated "*genuine null WTP*" – indicating the respondent's unwillingness to join due to either a budget constraint or a null valuation of the expected utility – because they hide an unexpressed demand. We use appropriate econometric modeling strategies to properly disentangle genuine null values from protest answers and estimate the true demand for a VHIS.

We find evidence of self-selection issues reflecting protest behaviors against the survey / because of lack of confidence in the government. Our results suggest that the segments of the population not covered by any health insurance scheme would be willing to join the current formal scheme. In particular, using an ordered-probit-selection (OPS) model (Jimenez and Kugler, 1987), we find that the WTP of the poorest non-covered population represents about one and a half times the formal sector's poorest enrollees' contributions. This suggests that voluntary affiliation to a mandatory health insurance scheme could be a way towards achieving and financing UHC in Tunisia (Chahed and Arfa, 2014).

As in other countries in the MENA region, *de jure* entitlement to the Tunisian National Health Insurance Fund "*Caisse Nationale d'Assurance Maladie – CNAM*" – is mainly based on formal sector employment (Makhloufi et al., 2015; Alami, 2017). Despite the remarkable efforts made to extend *CNAM* coverage – through medical assistance plans, health card programs and the self-employed regime – the uptake in the informal sector (about 40% of the labor force) (Gatti et al., 2011) remains severely limited by *ad hoc* selection criteria and restrictions on entitlements (Arfa and Elgazzar, 2013). The continuing large-scale exclusions of the informal sector may also be due to a protest attitude towards the continuing prevalence of high out-of-pocket payments, which represented 38% of total health expenditure in 2014 (WHO, 2017), the rise of private healthcare providers, and lack of confidence in the government's capacity to deliver the healthcare needed (Abu-Zaineh et al., 2014). Testing for the presence and consequences of such protest attitudes on WTP for a VHIS may therefore contribute to the move towards UHC not only in Tunisia, but in LMIC.

The remainder of the paper is structured as follows. Section 2 presents the survey design and the data collection and describes the econometric methodology. Section 3 reports the results, which are then discussed in Section 4.

2. Materials and methods

2.1 Survey design and data collection

A CV study was conducted in Tunisia between August 1st and September 30th 2013 with the aim of eliciting the willingness-to-join, and willingness-to-pay for, on a voluntary basis, the current formal health insurance scheme run by CNAM. The inclusion criterion concerns all Tunisian citizens who are not covered by any health insurance schemes. Given that most of the non-covered segment of the Tunisian population belongs to the informal sector, the sampling points were

carefully chosen. We sampled from '*Al-Souk'*, marketplaces where most of the informal sector's activities take place, and '*Al-Mydan*', public spaces for youth demonstrations (since the popular revolt – known as the '*Jasmine Revolution'* - that began in late 2010). To take into account the huge differences in access to health facilities across Tunisia (Chahed and Arfa, 2014; Ministry of Public Health, 2016), eight governorates were sampled over the North, the Center and the South of Tunisia (see Figure 1).

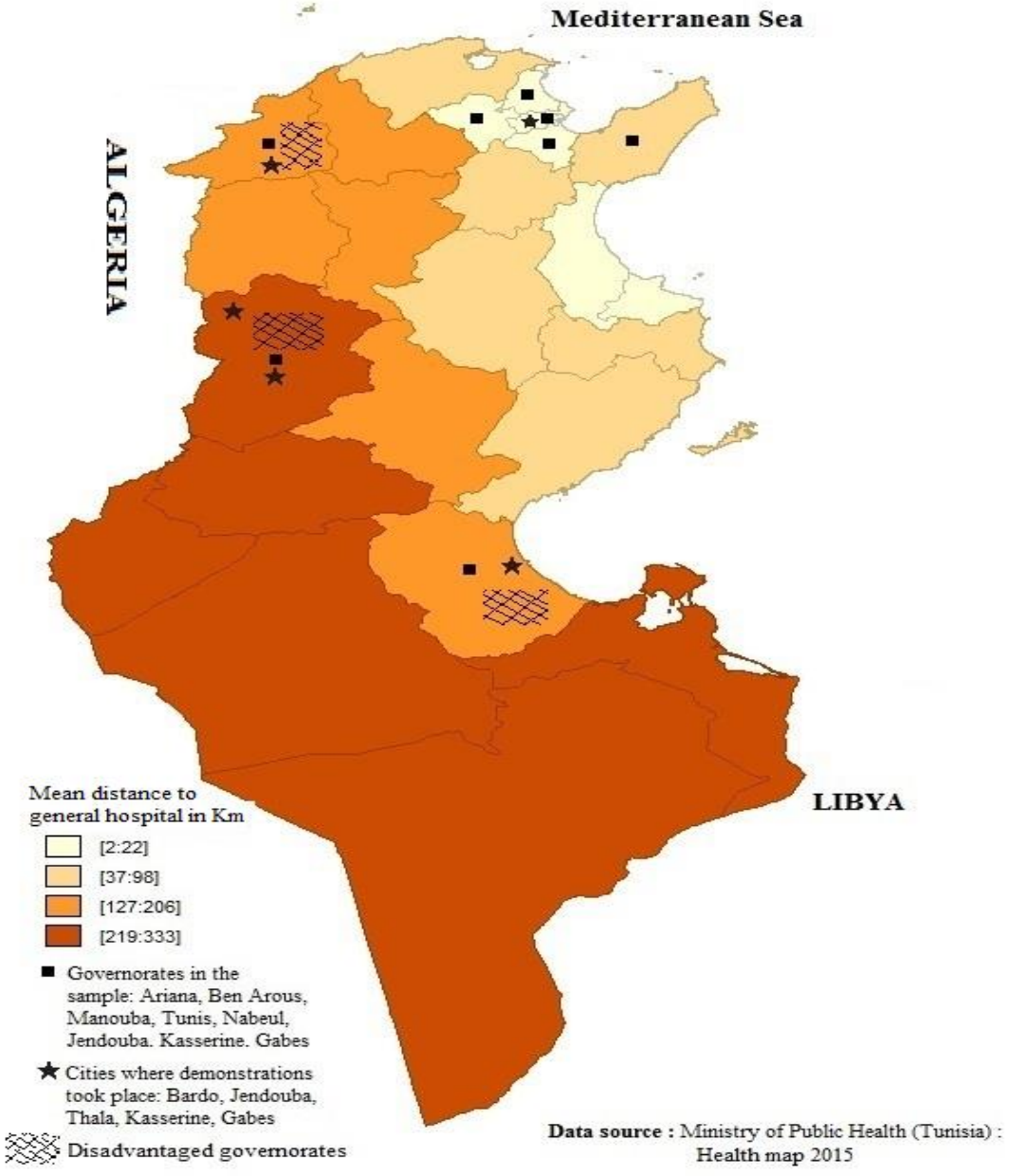

Figure 1 Map of Tunisia showing governorates in the sample

The survey instrument was developed by a group of researchers and refined using two pre-tests (pilots). The questionnaire was administered face-to-face by well-trained interviewers. After the main objectives of the CV study were introduced, respondents were asked to give the reason(s) why they are not covered by the current national health insurance scheme, *CNAM*. *CNAM* proposes coverage for public sector facilities, with a cap imposed on the annual amount of co-payments (Makhloufi et al., 2015). Respondents were asked to reveal their preferences *vis-à-vis* voluntary enrollment in an already existing health insurance scheme (VHIS) run by the *CNAM*. If respondents were not willing to join, they were asked to state the reason(s) and whether they would join the scheme if it was offered free or at a very low cost. This was intended to help distinguish between genuine null WTP values and protest answers. Non-protesters were asked to state their maximum WTP values.[1] Three different elicitation techniques were employed to gather information on respondents' WTP values: the well-known Open-Ended (OE) and Payment Card (PC) techniques (Donaldson et al., 1997; Ryan et al., 2001), and a newly introduced technique known as the Circular Payment Card (CPC).[2] The CPC uses a visual representation of a circular card with no pre-determined start or end points. Accordingly, the interviewer presents the CPC at a random position, and asks respondents to spin it until they find the bracket that best corresponds to their WTP values (details on the elicitation formats are given in Appendix 2). Finally, the questionnaire gathered information on the respondents' socio-economic, socio-demographic and health characteristics. In addition, respondents were asked to state their opinions on the proposed insurance scheme. All subjects were asked to give their full consent to participate in the study and no financial incentives were proposed.

The initial sample covered 456 subjects, of whom 30 refused to participate, resulting in a response rate of 93.42%. The overall sample was then randomly split into three equal and mutually exclusive sub-groups to respond to the above-mentioned three WTP elicitation formats. The range and centering of the bids on the PC and CPC were chosen based on the WTP values elicited through two pre-tests conducted in early July 2013.

[1] Note that the three willingness-to-join / to-join for free / to-join at low cost questions prevent us from observing null WTP responses that are in fact protest answers. Other studies may face the additional difficulty of identifying genuine null WTP from protest null WTP.

[2] The impact of using different elicitation formats to elicit these WTP has been addressed elsewhere (Anonymous, 2017).

2.2 Methods

The appropriate strategy for modeling WTP values hinges on the specific format chosen to elicit these values (Gyldmark and Morrison, 2001; Dong et al., 2003). In the context of our study, three formats were employed. While the OE format involves stating a point estimate of WTP, the PC and CPC state an interval with two specified thresholds. Thus, the actual elicited WTP value can be used in the case of OE, while with PC and CPC this value can be reliably approximated using the middle of the bid-range elicited (Cameron and Huppert, 1989; Bärnighausen et al., 2007; Alhassan et al., 2013).

2.2.1 Identifying genuine null and protest WTP

The willingness-to-pay stated by respondent *i*, WTP_i, corresponds to the amount that would equalize her/his *ex-ante* utility level (i.e., before joining the VHIS) and his/her *ex-post* utility level (i.e., after joining the VHIS), i.e. the Hicksian compensating measure. WTP_i can be positive, null or missing. The null values may simply reflect genuine values, indicating the respondent's unwillingness to join the scheme due to either a budget constraint or a null valuation of her expected utility. In this case, when the question is whether s/he would join a scheme offered free, or at a very low cost, a 'Yes' answer is expected (*genuine null WTP*). Missing WTP values may reflect a protest attitude *via-à-vis* the proposed scheme, the public provider or confidence in the government/CNAM. In this case, the respondent reveals her unwillingness to participate by refusing to join even at null (or low) cost (*protest answer*). Given their intrinsically different meanings reflecting two different behaviors (the first reflects a rational behavior while the second reflects a self-selection issue), the two types of response should be accounted for and distinguished in any econometric strategy. In what follows, we present econometric models that properly account for these two types.

2.2.2 Models not accounting for protest values

We first consider, as a benchmark, a simple linear regression model to estimate the WTP values. Accordingly,

$$WTP_i = X_i'\beta + \varepsilon_i;\ \varepsilon_i \sim N(0, \sigma_\varepsilon^2) \quad [1]$$

where X_i is a set of explanatory variables specific to respondent *i*, and ε_i is the error term. The

expected WTP is given as $E[WTP_i|X_i] = X_i'\beta$. Clearly, this model takes no particular account of null WTP values, which may lead to biased and inconsistent estimates (Amemiya, 1973).

One way to distinguish positive WTP from genuine zero WTP is the Tobit model (Tobin, 1958). Accordingly, the WTP is modeled as a latent variable WTP_i^*:

$$WTP_i^* = X_i'\beta + \varepsilon_i;\ \varepsilon_i \sim N(0, \sigma_\varepsilon^2) \quad [2]$$

where $WTP_i = WTP_i^*$ if $WTP_i^* > 0$, and $WTP_i = 0$, otherwise. The expected WTP is given by

$$E[WTP_i|X_i] = \Phi(x_i'\beta/\sigma)X_i'\beta + \sigma\phi(x_i'\beta/\sigma)$$

where ϕ is the density function of the standard normal distribution and Φ is the corresponding cumulative distribution function. The pair (WTP_i, X_i) is observed when respondent i chooses to join the VHIS. However, given that respondents with non-protest WTP may not be randomly drawn from the whole sample of respondents, we need to account for the probability of participating when computing $E[WTP_i|X_i]$, hence, the possible correlation between variables explaining the participation and the unobserved individuals' heterogeneity.

2.2.2 Sample selection model accounting for protest values

We consider the sample selection model that simultaneously specifies a probit-type equation for selection (predicting whether or not the respondent is willing to join the VHIS for free or at low cost, WTJ_i) and a linear-type equation for WTP conditional on the individual not being a protester (Heckman, 1976). The selection equation is:

$$WTJ_i^* = Z_i'\alpha + u_i;\ u_i \sim N(0, \sigma_u^2) \quad [3]$$

where WTJ_i=1 if $WTJ_i^* > 0$ and WTJ_i= 0 if $WTJ_i^* \leq 0$. Z_i is a set of variables explaining the decision of individual i to join the VHIS and u_i is the error term. The WTP given WTJ_i=1 can then be estimated as

$$WTP_i = X_i'\beta + \varepsilon_i;\ \varepsilon_i \sim N(0, \sigma_\varepsilon^2) \quad [4]$$

Equation [4] is estimated on the subsample of non-protest WTP. The joint distribution of error terms in equations [3] and [4] is assumed to be

$$(u, \varepsilon) \sim N[(0, 0, 1, \sigma_\varepsilon^2, \rho)$$

where σ_u^2 is normalized to 1, and ρ is the correlation coefficient between the two error terms. The expected WTP accounting for selection is given as:

$$E[WTP_i|X_i, Z_i, WTJ_i = 1] = X_i'\beta + \rho\sigma_\varepsilon\lambda(Z_i'\alpha) \quad [5]$$

where $\lambda(Z_i'\alpha) = \phi(Z_i'\alpha)/\Phi(Z_i'\alpha)$ is the inverse Mills ratio. If the estimated correlation coefficient, $\hat{\rho}$, is not statistically significantly different from zero, then the two error terms are independent. This suggests that selection bias resulting from the protest attitudes is not a problem; hence other modeling strategies estimating equations [3] and [4] separately (e.g., two-part model) may be relevant (Madden, 2008).

2.2.3 Sample selection model accounting for protest and null values

The ordered-probit-selection (OPS) model differs from the standard ordered probit with sample selection in that it allows continuous variables to be observed based on an ordered-probit selection rule. It was derived from Terza (1983)'s seminal work, first applied in Jimenez and Kugler (1987), and mainly used since then to account for selection based on performance indicators (see Green and Hensher, 2010; or Buch et al., 2014). The OPS model can however also account for selection induced by protest answers in CV surveys (cf. Cho et al., 2008; Brouwer and Martin-Ortega, 2012). We distinguish between genuine null WTP (those who are willing to join for free or at low cost) and protest answers with unobserved WTP. Consider the underlying latent model:

$$y_i^* = W_i'\alpha + u_i \quad [6]$$

where y_i is observed as per the following ordered-probit selection rule,

$$y_i = \begin{cases} 0\ (genuine\ null\ WTP)\ if\ c_0 \le y_i^* < c_1 \\ 1\ (protest\ WTP)\ if\ c_1 \le y_i^* < c_2 \\ 2\ \ (WTP > 0)\ if\ c_2 \le y_i^* < c_3 \end{cases}$$

where $c_0 \equiv -\infty$, $c_3 \equiv \infty$ and c_1 and c_2 are estimated simultaneously along with parameter α. The WTP_i is not observed if $y_i = 0, 1,$ while strictly positive WTP_i values (if $y_i = 2$) can be modeled using equation [1]. The error terms of the ordered-probit and the OLS equations are assumed to follow a bivariate normal distribution $(u, \varepsilon) \sim N[(0, 0, 1, \sigma_\varepsilon^2, \rho)$, where the variance of u is normalized to 1 to allow identification; ρ, is the linear correlation coefficient between ε and u and σ_ε^2 is the variance of ε. The expected WTP conditional on an observed strictly positive WTP is given as:

$$E[WTP_i|X_i, W_i, y_i = 2] = X_i'\beta + \left\{[1 - \Phi(c_2 - W_i'\alpha - \rho\sigma_\varepsilon)]/[1 - \Phi(c_2 - W_i'\alpha)]\right\} \quad [7]$$

The estimations present no particular difficulties when the log likelihood is maximized using standard unconstrained optimization methods (Chiburis and Lokshin, 2007). All statistical analyses are performed using STATA SE12 software.

3. Results

3.1 Descriptive Results

Table 1 provides descriptive statistics on respondents' socio-economic and demographic characteristics as well as their needs and preferences *via-à-vis* the proposed social insurance scheme. The majority of respondents are male (67%), living in urban areas (80%), employed (79%), and completed secondary education (52%). Average respondent age is 35.4 and average monthly household income is TND 558.11[3], about one and a half times the minimum monthly salary in Tunisia. The majority of respondents report good health (84%), although about 38% report at least one outpatient visit during the last 3 months. About 37% declare they are able to pay for healthcare services in the event of illness.

Interestingly, while 34% of the respondents declare that they do not have any insurance coverage due to the complexity of administrative procedures, about 49% state that their lack of insurance coverage is due to the fact that their professional activities are not officially declared. This is in line with previous studies (Gatti et al., 2011; CRES / BAD, 2016) suggesting that almost half of the young Tunisian population work in the informal sector. Lastly, it is worth noting that about 44% of the respondents live in disadvantaged governorates (see also Figure 1).

[INSERT TABLE **1** HERE]

About 58 respondents (13.5%) reveal a willingness-to-join the proposed VHIS if it was offered free or at very low cost, but give null WTP (*genuine null WTP*). 32 respondents (7.5%) show a protest attitude, refusing to join the proposed VHIS even for free *(protest WTP*), somewhat less than the 13.3% found in Ahmed et al. (2016)'s study on WTP for community-based health insurance among informal workers in urban Bangladesh. The quarterly mean WTP of the non-protest respondents is 36.32 TND, and 42.58 TND when computed on strictly positive WTP values. Finally, the median WTP (including the genuine null WTP) is 35 TND, which means that, on average, 50% of the respondents are willing to pay about 2.16% per quarter (35/(539*3)) of their

[3] At the time of the survey, 1 TND (Tunisian Dinar) = € 0.455 = $ 0.605.

income to join the VHIS. This is in line with previous findings reporting a WTP of 1.35% to join a health insurance plan in India (Dror et al., 2007).

3.2 Conditional analyses of WTP

3.2.1 Models not accounting for protest answers

Table 2 presents the results on WTP for VHIS estimated over the sub-sample of non-protest WTP using both the OLS and the Tobit models. In both cases, a parsimonious model was considered after variables were removed step by step by decreasing p-values. All significant variables in the complete model remain significant. The explanatory variables include: survey-specific variables (interviewer effect, survey point and format), respondents' socio-economic, socio-demographic and health characteristics (health status, use of healthcare and ability to pay for treatment for a given illness, risk aversion and reasons for not being covered by health insurance).

As shown in Table 2, the joint nullity of coefficients in the two models is strongly rejected. Expectedly, household equivalent income appears to be significantly correlated with WTP for VHIS. This provides evidence of the validity of the stated preference survey (see Bishop and Woodward, 1995). Similarly, WTP values appear to be significantly positively associated with individuals' employment status (*Work*), risk aversion attitude (*DumGamb*), ability to afford health services (*FinancialHealth)* in addition to the presence of one chronic condition in the family (*Chronic member)*. Unsurprisingly, individuals declaring no need for health insurance (*NoNeed)* appear be to less willing to pay for VHIS. Finally, a statistically significantly negative effect is also found for the two survey-specific variables, with interviewer 2 and OE and PC elicitation formats leading to lower WTP values compared to other interviewers and CPC format, respectively.

[INSERT TABLE 2 HERE]

3.2.2 Accounting for potential self-selection: Heckman model

Table 3 presents results on WTP estimated over the whole sample using a Heckman model. The latter can explicitly account for the potential effect of protest answers. It is worth noting, first, that the two equations predicting the WTJ and the WTP are significantly negatively correlated (p-value$= 0.029$). While this gives support to the self-selection hypothesis, it indicates that the selection-specific variables negatively affect the WTP through the correlation parameter ρ.

WTJ the VHIS appears to be significantly negatively associated with household equivalent income, living in a rural area and declaring no need for insurance. By contrast, both education level and living in a disadvantaged governorate are positively associated with WTJ the VHIS. As regards the survey-specific variables, WTJ is affected negatively by interviewer 3 and positively by the PC elicitation format.

For those willing to join the VHIS, we find a significantly positive effect of household equivalent income, employment status, and the presence of a chronic condition on WTP. WTP values tend, however, to decrease with smoking status and living in a rural area, and also with some survey-specific variables (Interviewer 2 and OE and PC formats).

[INSERT TABLE 3 HERE]

3.2.3 Sample selection model accounting for protest and null values

Results in Table 4 are obtained from estimating the OPS model over the whole sample. The OPS model independently accounts for the issues related to both genuine null WTP and protest answers. Average marginal effects (AME) are given for each of the three modalities of the ordered Probit: $Pr(genuine\ null\ WTP)$, $Pr(protest\ WTP)$ and $Pr(WTP > 0)$. Overall, results show similar patterns to those obtained from the Heckit and the Tobit models. In particular, the presence of a chronic condition significantly increases $Pr(WTP > 0)$ and decreases both $Pr(genuine\ null\ WTP)$ and $Pr(protest\ WTP)$, whereas living in a rural area and declaring no need for health insurance have the opposite effects. A new variable enters the selection equation - having at least one child under 5 years old at home – and is negatively associated with both $Pr(genuine\ null\ WTP)$ and $Pr(protest\ WTP)$ but positively associated with $Pr(WTP > 0)$ and WTP amount. Also of note, the correlation coefficient between the selection and WTP equations does not significantly differ from 0.

[INSERT TABLE 4 HERE]

Using the OPS model estimates makes it possible to compute the adjusted-WTP values that account for both genuine null WTP and selection issues in relation to protest WTP values. Table 5 shows that the predicted WTP for protesters is on average TND 51.82, leading to a sample mean WTP of TND 38.2 once null and protest answers are accounted for, 14% more than the observed

TND 33.59. It is worth noting that the mean predicted WTP for protesters is higher than for non-protesters.

[INSERT TABLE 5 HERE]

Finally, we compare existing social health insurance (SHI) contributions at the time of the survey and predicted WTP for the proposed VHIS, which sheds some light on the relevance of UHC in Tunisia. The SHI contribution rates differ depending on the individual's income and employment status (a rate of 2.5% for independent workers whose income is below TND 580.4 and a rate of 6.75% for those with income above TND 580.4). Table 6 shows that the 34 respondents with individual income lower than TND 193.47 per month are willing to pay more than the existing contribution (TND 24.11 vs. TND 14.51). The 392 respondents with higher income are willing to pay more than respondents with low income (TND 39.42 vs. TND 24.11), although less than the existing contribution (TND 39.42 vs. TND 58.76).

[INSERT TABLE 6 HERE]

4. Discussion

The post-revolution Tunisian government has accelerated its efforts to widen the existing social health insurance system (CNAM) with the aim of attaining UHC (2014 constitution). As elsewhere, efforts towards UHC in Tunisia have been challenged by several factors, mainly the presence of a large informal sector (about 40% of the workforce) and high unemployment (about 15.3% of the workforce in 2013) (Loayza and Wada, 2010; NIS, 2014). In addition, the wave of protests mainly led by Tunisian youth testify to a continuing lack of confidence in the government's capacity to fulfill its commitments, with claims that the current arrangements for financing and delivering healthcare may involve social exclusion and inequities.

Although similar problems exist elsewhere, social exclusion and inequities in the health sector are considered to be one of the triggering factors in the political turmoil and social unrest in the country (World Bank, 2013). Several calls have been made for participation in societal dialogue about UHC-oriented reforms and for increased research on its implementation (cf. Alami and Karshenas, 2012; WHO, 2013; Saleh et al., 2014). This paper attempted to shed light on one of the issues related to UHC implementation in Tunisia: whether and to what extent protest behaviors matter.

We assess the importance of protest answers when estimating the societal demand for a universally available health insurance scheme. Our results support the presence of self-selection issues concerning the elicitation formats or interviewers, which are standard survey-related effects. We also find that higher income, a higher level of education and poor health in the family increase WTP, as in Nosratnejad et al. (2016), who reviewed WTP for HIS in Asian and Sub-Saharan African countries. In addition, protest attitudes seem to be driven by the lack of adequate health care facilities in rural areas, as well as the view of some respondents that they don't need health insurance.

When expressed as a fraction of 2013 Tunisian gross national income per capita (World Bank, 2017), our sample showed an average WTP of 2.13%, higher than the meta-analytical 1.18% found by Nosratnejad et al. (2016) over ten countries. More specifically, our results on conditional non-zero WTP suggest that the non-covered segments of the population (79% of the respondents who were informal workers or unemployed) are willing to pay (on average 24.11 TND) to join the current formal health insurance scheme. This WTP represents about one and a half times the formal sector enrollee's contributions (14.51 TND under the low-income self-employed workers' regime of 2002). This indicates that the proposed voluntary affiliation to a mandatory health insurance scheme may be acceptable to the majority of the uninsured, with major implications for the achievement of UHC in Tunisia. The issue of whether or not informal workers should be subsidized to affiliate (Acharya et al., 2012; Kutzin et al., 2016) or tax-financed (Tangcharoensathien et al., 2011) remains open.

Our results corroborate existing evidence (WHO 2015; World Bank 2015, Alami, 2017) that enrolment in health insurance schemes does not solely depend on income, but on additional factors such as the adequacy and spatial distribution of healthcare services. Moreover, this investigation highlights the importance of taking into account *protest* positions for the evaluation of progress towards UHC. Indeed, it has been argued that SHI may act as a "*stabilizing institution*" particularly where there is political turmoil and an unstable environment (Obermann et al 2006; Chapman, 2016). While moving towards UHC requires removing restrictions on entitlement to a socially acceptable and financially feasible benefit package, there are other requisites. Among these is the need to combat the spatial and socio-economic inequality in access to quality care and to improve the delivery capacity of the overall healthcare system. This of course requires increasing government's commitment to health as a right to which all citizens are entitled.

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Tables

Table 1: **Descriptive statistics (n= 426)**

Variable definition	Mean (Std. dev.)
Dependent variables	
WTP for VHIS (quarterly, in TND) if WTP>0 (n=336)	42.58 (25.34)
WTP for VHIS (quarterly, in TND) if WTP≥0 (n=394)	36.32 (27.85)
Respondent characteristics	
Male = **1** if male, **0** if female	0.669 (0 .471)
Age = individual's age (in years)	35.384 (10.394)
Household size = number of household members	2.598 (2.011)
Child = **1** if at least one child under 5 years old in the household, **0** otherwise	0.133 (0.340)
Elderly = **1** if there is a person more than 65 years old in the household, **0** otherwise	0.051 (0.221)
Married = **1** if Married, **0** otherwise	0.417 (0.493)
NoSchool = **1** No schooling, **0** otherwise	0.023 (0.151)
Elementary = **1** primary school, **0** otherwise	0.213 (0.410)
Secondary = **1** secondary education, **0** otherwise	0.516 (0.500)
High School = **1** higher education, **0** otherwise	0.246 (0.431)
Household Income = Monthly household income (in TND)	558.11 (464.15)
Individual Income = Monthly respondent income (in TND)	539.14 (456.87)
Equivalized Income [a] = [Monthly income / (Household size)$^{0.5}$] (in TND)	425.80 (425.72)
Work = **1** if employed /self-employed, **0** otherwise	0.788 (0.408)
Rural = **1** living in rural area, **0** otherwise	0.197 (0.398)
DisadvantagedGov.[b] = **1** living in disadvantaged governorate, **0** otherwise	0.443 (0.497)
Other variables	
NonDeclared = **1** uninsured due to no declared work, **0** otherwise	0.490 (0.500)
Administration = **1** uninsured due to administrative procedures, **0** otherwise	0.340 (0.474)
NoNeed = **1** uninsured due to no need, **0** otherwise	0.663 (0.198)
RiskAverse = **1** if risk-averse, 0 otherwise [c]	0.885 (0.319)
Gamble [c] from **1** if risk lover to **6** if extremely risk averse	5.196 (1.411)
Respondent-specific health variables	
Self-reported health status = **1** if self-reported health status is good, **0** otherwise	0.835 (0.371)
Outpatient respondent = **1** if at least one outpatient care during the last 3 months, **0** otherwise	0.380 (0.486)
Inpatient respondent = **1** if at least one hospitalization during the last 8 months, **0** otherwise	0.093 (0.292)
Chronic condition = **1** if respondent reports a chronic condition, **0** otherwise	0.124 (0.330)
FinancialHealth = **1** if can afford health services, **0** otherwise	0.370 (0.483)
Smoking = **1** if consuming tobacco products, **0** otherwise	0.460 (0.498)
Health variables specific to the family members of the resp.	

Outpatient member = 1 if at least one outpatient care in household during the last 3 months, 0 otherwise	0.5 (0.500)
Inpatient member = 1 if at least one hospitalization in household during the last 8 months, 0 otherwise	0.140 (0.348)
Chronic member = 1 if one household member reports a chronic condition, 0 otherwise	0.185 (0.389)
Survey specific variables	
OE=**1** if open-ended elicitation format, **0** otherwise	0.331 (0.471)
PC=**1** if payment card elicitation format, **0** otherwise	0.322 (0.468)
CPC=**1** if circular payment card elicitation format, **0** otherwise	0.347 (0.477)
PublicSquare = **1** if sample point is a public square, **0** if informal market	0.420 (0.494)
Sample point = **1** in public squares, **0** informal market	0.420 (0.494)
Interviewer#1-5 = Dummy variables for each of the 5 interviewers	-

[a] Equivalized income is computed based on the OECD equivalence scale, by dividing household income by the square root of household size (see Atkinson et al., 1995).

[b] According to decree n° 2008-387 of February 11, 2008, see Figure 1.

[c] Based on six modalities generated according to the method of Barsky et al. (1997).

Table 2: **Regression results: OLS and Tobit models**

Variables	**OLS Model** Parameter (*p*-value)	**Tobit Model** Parameter (*p*-value)	Marginal effect
Constant	22.943**	22.144***	-
	(<0.0001)	(<0.0001)	-
OE format (=1)	-5.778***	-6.904**	-5.931**
	(0.050)	(0.039)	(0.039)
PC format (=1)	-7.062**	-7.769**	-6.673**
	(0.012)	(0.015)	(0.015)
Equiv. income (euros)	0.01879***	.01784***	.01533***
	(<0.0001)	(<0.0001)	(<0.0001)
Work (=1)	9.290***	10.574***	9.083***
	(0.001)	(0.001)	(0.001)
FinancialHealth (=1)	6.321**	7.237**	6.216**
	(0.028)	(0.025)	(0.023)
NoNeed (=1)	-13.575***	-17.780***	-15.273***
	(0.006)	(0.003)	(0.003
Chronic member (=1)	5.431*	6.365*	5.467*
	(0.096)	(0.070)	(0.070)
DumGamb (=1)	8.340**	8.037*	6.904*
	(0.039)	(0.063)	(0.061)
Interviewer 2 (=1)	-23.107***	-28.407***	-24.401***
	(<0.0001)	(<0.0001)	(<0.0001)
Sigma (σ)	-	26.084	-
No. obs.	394	394	
LRI / adjusted R^2	0.3155		
Joint nullity test	23.49***	18.03***	
(p-value)	(<0.0001)	(<0.0001)	
$\ln L_0$			
Log likelihood		-1629.94	

* if p<0.10, ** if p<0.05, *** if p<0.01.

Table 3: **Regression results: Heckman selection model**

Variables	Model 2			
	Selection equation (Probit)		WTP equation	
	Parameter (*p*-value)	Marginal effect	Parameter (*p*-value)	Marginal Effect
Constant	1.268	-	32.121***	-
		-	(<0.0001)	-
OE format (=1)			-5.129*	-5.129*
			(0.085)	(0.085)
PC format (=1)	-0.541**	-0.051**	-7.265**	-7.840***
	(0.023)	(0.017)	(0.011)	(0.005)
Equiv. income (TND)	-0.00047*	-0.000044*	0.01874***	.01824***
	(0.055)	(0.055)	(<0.0001)	(<0.0001)
Work (=1)			10.648***	10.648***
			(<0.0001)	(<0.0001)
Tobacco (=1)			-5.189**	-5.189**
			(0.029)	(0.029)
NoNeed (=1)	-1.113***	-.106***		-1.181*
	(<0.0001)	(<0.0001)		(0.072)
Chronic member (=1)			6.682**	6.682**
			(0.040)	(0.040)
Elementary	1.000**	0.095**		1.061**
	(0.029)	(0.018)		(0.036)
Secondary	.834***	.079***		0.885**
	(0.005)	(0.001)		(0.030)
Rural	-0.630**	-0.052**	-7.578**	-8.246***
	(0.019)	(0.012)	(0.013)	(0.007)
DisadvantagedGov.	0.978***	0.093***		1.038**
	(<0.0001)	(<0.0001)		(0.049)
Interviewer 2			-21.822***	-21.822***
			(<0.0001)	(<0.0001)
Interviewer 3	1.086**	0.103**		1.152
	(0.022)	(0.011)		(0.125)
Rho (ρ)	-	-	-0.276**	-
			(0.029)	
No. obs.	426			
Joint nullity test	160.14***			
(p-value)	(<0.0001)			
$\ln L_0$	-1885.846			
Log likelihood	-1876.262			

* if p<0.10, ** if p<0.05, *** if p<0.01,

Table 4: **Regression results: Ordered probit selection model**

	Model 2					
	Selection equation: Ordered Probit				WTP equation	
Variables	Parameter (*p*-value)	AME on Pr(WTP=0)	AME on Pr(protest)	AME on Pr(WTP>0)	Parameter (*p*-value)	AME on WTP
Noneed (=1)	-1.271***	.215***	0.070***	-0.285***		-2.817***
	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)		(<0.0001)
Chronic member (=1)	.495**	-0.084**	-0.027**	0.111**		1.096**
	(0.033)	(0.034)	(0.038)	(0.032)		(0.028)
Child (=1)	0.777***	-0.132***	-0.043***	0.174***		1.723***
	(0.006)	(0.006)	(0.009)	(0.005)		(0.004)
Rural (=1)	-0.594***	0.101***	0.033***	-0.133***		-1.317***
	(0.002)	(0.002)	(0.003)	(0.002)		(0.003)
Interviewer 2 (=1)	-1.111***	0.188***	0.061***	-0.249***		-19.776***
	(<0.0001)	(<0.0001)	(<0.0001)	(<0.0001)		(<0.0001)
Cut off 1	-1.744***					
	(<0.0001)					
Cut off 2	-1.373***					
	(<0.0001)					
Constant					22.937***	
					(<0.0001)	
OE format (=1)					-5.844**	-5.844**
					(0.035)	(0.035)
PC format (=1)					-6.892**	-6.892**
					(0.014)	(0.014)
Equiv. Revenue (euros)					0.0231***	0.0231***
					(<0.0001)	(<0.0001)
Work (=1)					9.618***	9.618***
					(0.001)	(0.001)
RiskAversion (=1)					9.636***	9.636***
					(0.008)	(0.008)
FinancialHealth (=1)					5.592**	5.592**
					(0.027)	(0.027)
Rho (ρ)					-0.156	-
					(0.422)	
No. obs.	426					
Joint nullity test (p-value)	227.45*** (<0.0001)					
$\ln L_0$						
Log likelihood	-1726.824					

AME = average marginal effects. * if p<0.10, ** if p<0.05, *** if p<0.01,

Table 5: **Observed and predicted WTP based on OPS model**

	WTP (in TND)	**Protest (n=32)**	**Null WTP (n=58)**	**Mean Positive WTP (n=336)**	**Mean WTP with null WTP (n=394)**	**Mean WTP with null and protest (n=426)**
Observed	Mean	-	0	42.58	36.32	33.59*
	Std. Dev.	-	0	25.34	27.85	28.44
Predicted	Mean	51.82	0**	43.49	37.09	38.20
	Std. Dev.	18.42	0	14.13	20.21	20.43

* Wrongly assuming that protest WTPs are equal to 0. ** Setting predicted values to 0.

Table 6: **Comparing predicted WTP with existing CNAM contributions**

	Existing SHI in Tunisia		**Sample predicted WTP for VHIS**	
SHI Regime	Monthly average reference income rate (in TND)[a]	Quarterly SHI contribution (in TND)	Monthly average income (in TND)	Quarterly WTP for VHIS (in TND)
Independent	290.20	58.77	574.20 [459.63] (392 resp. with income>193.47)	39.42 [20. 34]
Independent low income[b]	193.47	14.51	134.92 [46.03] (34 resp. with income<193.47)	24.11 [14. 25]

Standard deviation in square brackets. [a]Based on the official quarterly reference income rate of the CNAM for the third quarter of 2013 (TND 870.59 and TND 580.4 for Independent and Independent low income, respectively). [b]Formal sector enrollees affiliated under the special regime implemented in 2002.