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Europeans' willingness to pay for ending homelessness: A contingent valuation study

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ABSTRACT

The purpose of this study is to assess the utility value European citizens put on an innovative social program aimed at reducing homelessness. The Housing First (HF) model involves access to regular, scattered, independent and integrated housing in the community with the support of a multidisciplinary team. Currently, HF is not implemented by most European countries or funded by healthcare or social plans, but randomised controlled trials have stressed significant results for improved housing stability, recovery and healthcare services use. The broader implementation of HF across Europe would benefit from a better understanding of citizens' preferences and "willingness to pay" (WTP) for medico-social interventions like HF. We conducted a representative telephone survey between March and December 2017 in eight European countries (France, Ireland, Italy, the Netherlands, Poland, Portugal, Spain, and Sweden). Respondent's WTP for HF (N = 5631) was assessed through a contingent valuation method with a bidding algorithm. 42.3% of respondents were willing to pay more taxes to reduce homelessness through the HF model, and significant differences were found between countries ($p < 0.001$); 30.4% of respondents who did not value the HF model were protest zeros (either contested the payment vehicle-taxes- or the survey instrument). Respondents were willing to pay €28.2 (± 11) through annual taxation for the HF model. Respondents with higher educational attainment, who paid national taxes, reported positive attitudes about homelessness, or reported practices to reduce homelessness (donations, volunteering) were more likely to value the HF model, with some countries' differences also related to factors at the environmental level. These findings inform key stakeholders that European citizens are aware of the issue of homelessness in their countries and that scaling up the HF model across Europe is both feasible and likely to have public support.

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1. Introduction

Europe is one of the richest and most developed regions of the world, but pervasive social inequalities ensure that homelessness is a persistent and growing issue. More than 4 million people were estimated to be homeless in 2012 in Europe (Feantsa and The Foundation Abbé Pierre, 2018). This situation is alarming as the experience of homelessness has serious effects on life expectancy, mental and physical health, and limits access to healthcare or social services as well as impairing integration in the community (Martens, 2001).

Research on the causes of homelessness has shifted focus from individual determinants to a greater acknowledgement of the role of broader structural factors, like the availability of social housing (Anderson, 2010; Geddes and Fazel, 2011). This shift in emphasis has highlighted the need for innovative health and social policy solutions that better address the complex interaction of personal and structural pathways to homelessness (Toro and Warren, 1999). In Europe, common measures to address homelessness are based on a staircase model in which people who experience homelessness progressively move through various stages of support, through temporary shelters, to congregate accommodation and eventual access to housing, which is predicated on accepting treatment for behavioural disorders and abstinence from alcohol and other drugs (Kertesz et al., 2009). This approach tends to fail the most severely ill and marginalized individuals who are either excluded from or endlessly cycle through the staircase model (Kyle and Dunn, 2008; Tsemberis et al., 2004).

In response to this, the United States, then Canada, and more recently some European countries have trialled a medical and social innovation known as “Housing First” (HF) (Goering et al., 2011; Tinland et al., 2013; Tsemberis et al., 2004). HF operates on the assumption that access to independent and permanent housing (as a basic human right) offers a secure foundation from which to address other social and health related problems. Under the HF model, people with long-term psychiatric illnesses are offered direct access to independent and permanent housing with concurrent support from a dedicated medical and social team, which is not dependent on accepting treatment – for either psychiatric disorders or substance abuse. The HF model includes multidisciplinary accompaniment teams (social worker, nurse, doctor, psychiatrist, and peer worker) which follow an Assertive Community Treatment (ACT) model (Goering et al., 2016). ACT offers higher intensive psychosocial rehabilitation support than Case Management, with a low participant/staff ratio, participants being provided 24-h coverage for psychiatric or other crises, several contacts per week with the team at home or in the city, housing and employment services, and support with legal and social issues, at times convenient to them. Results from studies of HF carried out in the US and Canada were positive compared to the existing staircase model, with greater housing stability for homeless people with severe mental disorders, and significant reduction in the use of the emergency departments, psychiatric hospitals, and other homeless services (Aubry et al., 2016; Palepu et al., 2013; Stergiopoulos et al., 2015). High fidelity HF programs tested in European countries achieved similar outcomes (Aubry et al., 2015; Woodhall-Melnik and Dunn, 2015).

Despite these positive signs, large scale adoption of the HF model requires a reallocation of resources between services, and policy makers may fear public discontent resulting from these changes. This concern could be mitigated by a better understanding of existing public support for social programs like HF. From an economic perspective, effectively measuring public stated preferences makes it possible to demonstrate the positive impact of a shift in resource allocation, if the well-being of a few is increased without changing the well-being of others (Sen, 1993), as well as offering a means of quantifying the value a population places on certain public actions or services (Myles, 2006). The Contingent Valuation (CV) method is a common technique used to assess the distribution of individual preferences to inform budgetary decisions for publicly financed systems, enabling a cost-benefit analysis of alternative programs (Carson and Hanemann, 2005; Hausman, 2012). Previous literature on willingness to pay valuation has been applied within the areas of the environment (Graham et al., 2019; Longo et al., 2012; Meyerhoff and Liebe, 2006), transport (Carlsson et al., 2012; Istamto et al., 2014; MacKerron et al., 2009; Nordlund and Garvill, 2003), and healthcare (Blouin-Bougie et al., 2018; Burt et al., 2017; Chatterjee et al., 2017; Fischer et al., 2016; Gerves-Pinquie et al., 2014; Kanya et al., 2019; Marshall et al., 2017; Settumba et al., 2019).

However, there is little research, if any, which has used CV methods to address citizen's preferences in broader areas of social policy and particularly in the field of public services for homeless people. Despite the lack of directly comparable studies, it is possible to use recent examples of contingent valuations for environmental public goods such as renewable energy, and preventative health measures like screening for susceptibility to breast cancer, to inform our expectations about the sociodemographic profile of different WTP valuations. This literature suggests that both personal opinions and socioeconomic profile can serve as relevant predictors of valuation (Blouin-Bougie et al., 2018; Burt et al., 2017; Chatterjee et al., 2017). In particular, earlier studies suggest that WTP and valuation increase with socio-economic profile (higher income and education levels). We expected similar tendencies with our results, but set out to investigate a broad range of sociodemographic and environmental variables.

Overall the present study has two objectives: 1) to assess European citizens’ WTP for the HF model by carrying out a CV via a telephone survey, and 2) to analyse the determinants of this valuation by conducting a multilevel modelling approach.

2. Methods

2.1. Sampling strategy

A quota telephone survey was conducted between March and September 2017 with participants from eight European countries, namely France, Ireland, Italy, the Netherlands, Poland, Portugal, Spain, and Sweden. Adult participants (18 years and older) were randomly selected from online research panels of operational landline and mobile phone numbers so as to be representative of the general population in each country with respect to gender and age. Interviews were conducted using Computer Assisted Telephone Interviews (CATI) software tailored for telephone surveys. All interviews were conducted by bilingual interviewers, recruited and trained to conduct the survey. Respondents were informed of the purpose of the study, the intended use of the data, and assured of anonymity.

A pilot study was conducted with a sample of 30 individuals in France to assess the length of the questionnaire and its intelligibility (face validity). Then, the survey questionnaire was translated into the targeted native languages using best standardized practice (Beaton et al., 2000). Data collection was part of a larger study on homelessness (Petit et al., 2018).

Ethics approval for this study has been received from the research ethics committee of Aix-Marseille University (reference number: 2016-01-02-01).

2.2. Sample size

In the environmental literature, when assessing willingness to pay in the general population, a sample size of 300 per country is considered appropriate (Vaughan and Darling, 2000). Statistical tables present the different sizes of a simple random sample according to the target population's size, the desired level of precision, and heterogeneity or variability within the target population (default = 0.5). In the case of large target populations (N > 100 000) and for an accuracy of ± 5%, the sample size should be a minimum of 400 individuals actually surveyed (Bartlett et al., 2001). Given possible drop-outs during interviews, we extended the sample size to a total of 700 individuals

surveyed in each country, representing a total of 5600 European citizens across the eight countries.

2.3. Survey design, outcomes measurement and elicitation format

A contingent valuation (CV) method was used to design the survey and to estimate the value respondents placed on the innovative program. The CV scenario was divided into four parts: 1) Some information on homelessness consisting of national prevalence estimates, current services to accommodate homeless people and associated living conditions; 2) A description of the Housing First program was then provided, along with data on proven efficacy in several European countries (Greenwood et al., 2013); 3) The elicitation procedure was introduced and explained. We proposed a realistic and fair way of paying for the program, i.e. the payment vehicle being annual general taxation. The iterative bidding process was adopted for estimating the WTP for the HF program. This requires respondents to respond with either a 'Yes' or 'No' to the starting point, as in the closed-ended method. In the iterative bidding process, if the respondent answers 'yes', a higher bid is proposed and so on. Respondents were presented with increasing bids until they reached an amount they would be unwilling to pay. 4) Finally, the WTP question was asked as follows: "*I will propose amounts in euros. Please tell me what you would be willing to pay each year through taxes for this program. Would you be willing to pay €10?*". Possible answers were "*yes*", "*no*", "*do not know*" and "*refusal to answer*" (eFig. 1 [INSERT LINK TO ONLINE FILE]). Bids ranged from 10 euros to a maximum of 400 euros, with iterations and ranges based on a pilot study. Bids were subsequently translated into local currency using the European Commission's official monthly accounting rates for the euro (European Commission, 2019). To avoid truncated data, a follow-up open-ended question assessed respondents' maximum WTP-value by asking them to specify the maximum amount they would be willing to pay, between the previously accepted bid and the refused bid (Carson and Hanemann, 2005).

In our scenario, we decided to assign zero WTP values to respondents who refused to take part in the valuation process, alongside participants who spontaneously answered "0" to the willingness to pay question. Differentiation between these zero values as 'protest' and 'non-protest' was based on responses to a follow-up question requesting the selection of reason(s) for the stated WTP (Frey and Pirscher, 2019; Pennington et al., 2017; Strazzera et al., 2003). The reasoning behind this categorization is that, whilst some participants deny participating in government funded social programs, the government's ability or responsibility to address homelessness, or refuse to pay more taxes, they might nevertheless actually value the HF program. As a result their value of zero can be differentiated from respondents who specifically value the HF intervention with a zero WTP. In line with this, participants who answered "The program won't work", "Other programs are more important/of higher priority", "I cannot afford to pay more taxes" were categorized as non-protest responses (i.e. genuine zeros), as they either did not value the proposed program or would spend available funds elsewhere. Participants who answered "I do not want to pay more taxes" or "Other (please specify)" and in this case, for example, those who contested the survey instrument (i.e. objected to the principle of placing a monetary value on the studied program) or who contested the role of the Government to address this issue were categorized as protest responses. For responses in the "Other" category, two authors independently assessed each response and labelled them as protest or non-protest answers. These categorisations were then compared and any discrepancies were resolved in discussion. To conclude the CV scenario, respondents were asked to weight the certainty of their answers on a four-point scale ranging from 1 "absolutely sure" to 4 "absolutely unsure".

2.4. Covariates at the individual level

We investigated the influence of gender, age, education level, marital and child status, living area, employment status, and either individual income or being taxable (yes/no). Individual incomes were compared to the mean income in each country at the time of collection and percentage of the mean income was considered for the analysis (2017 mean incomes were: Netherlands €52,900; France €43,800; Sweden €42,400; Spain: €38,500; Ireland €37,700; Italy €36,700; Poland €27,000 and Portugal €25,400). However, due to a large amount of missing data for this variable (30%) a proxy variable was used in the final model, which was whether participants paid national taxes.

Furthermore, we investigated the role of two additional variables as potential predictors of WTP: respondents' exposure to homelessness and their general attitudes about homelessness. We included five variables that indicated the level of exposure: two based on personal experience of homelessness among respondents or among their relatives or acquaintances, and three variables from reported practices towards homelessness (having given money, food or clothing to a homeless person, to non-profit organisations, or done any volunteer work). Respondents' attitudes were based on a composite indicator, developed and described in a previous analysis on Knowledge, Attitudes and Practices related to homelessness (Petit et al., 2019). The composite indicator was constructed using multiple correspondence analysis and a hierarchical cluster approach, and based on different measures assessing the respondent's perception of the capabilities of people who are homeless, their empowerment and integration within the community, as well as questions aimed to elicit attitudes towards public policy. The attitudes variable was then summarized as three classes: 1) positive attitudes, 2) negative attitudes, and 3) without any opinion (eMethods1 and eTable1 [INSERT LINK TO ONLINE FILE]).

2.5. Covariates at the environmental level

To account for unobserved country-level characteristics, such as the design of the healthcare system or broader social services, we added dummy variables. The sample of countries covered in our survey includes a mix of Beveridge and Bismarck healthcare models. Beveridge models are wholly financed by the government through tax payments, whereas Bismarck models tend to be financed by joint contributions from employers and employees with a larger proportion of private suppliers (although with tight regulation and without operating to make a profit). In reality these systems are not so distinct and most countries operate something between these categories. However for the purposes of our study and in line with recent European data, three surveyed countries with shared characteristics were characterized as 'Bismarck' (France, Poland and the Netherlands), and the rest were classed as 'Beveridge' (Ministry of health, 2017).

Other variables describing the broader environmental context in each surveyed country were as follows: 1) the share of social protection expenditures on family benefits: this indicator explains how much is spent on family benefits in each European country - the expression 'family benefits' refers to 'family/children benefits' and includes support (except healthcare) in connection with the costs of pregnancy, childbirth and adoption, childcare and caring for other family members; 2) employment rates of recent graduates: namely persons aged 20 to 34 fulfilling the following conditions: having attained at least upper secondary education as the highest level of education, not having received any education or training in the four weeks preceding the European Commission survey and having successfully completed their highest educational attainment within three years of the survey; 3) share of lone parent families: being the proportion of single adults with children in each country; 4) at-risk-of-poverty rate: this indicator corresponds to persons with an equalized disposable income below the risk-of-poverty threshold, which is set at 60% of the national median equalized

disposable income (after social transfers); 5) old-age-dependency ratio: this indicator is the ratio between the number of persons aged 65 and over and the number of persons aged between 15 and 64. The value is expressed per 100 persons of working age (15–64); and 6) housing cost overburden rate: this indicator is defined as the percentage of the population living in a household where the total housing costs (net of housing allowances) represent more than 40% of the total disposable household income (net of housing allowances). These dummy variables were estimated from official data from Eurostat databases (European Commission, 2019) (eMethods2 [INSERT LINK TO ONLINE FILE]).

2.6. Statistical analysis

Since discrepancies were found between the distribution of socio-demographic variables (i.e. gender, age, and education) and the 2017 census data obtained through the World Bank (World Bank, 2019) and Eurostat (European Commission, 2017), weights were applied. The survey sample was weighted by strata, which were defined by official national population strata on age, gender and education level. Data analyses were conducted using R 3.6.0, 'Survey' package that allowed us to incorporate a complex sampling design (clustered and weighted data). Descriptive analyses were carried out, presenting the results as percentages (N (%)) for the qualitative variables or of mean and standard deviations (m ± standard deviation) for the quantitative variables.

Distributions of participants across the binary WTP variables (WTP yes/no) were cross-tabulated and tested using chi2 ($\chi 2$). Analyses of variances (ANOVA) were used for the continuous variables (WTP valuation revealed through the bidding process).

A series of diagnostic tests were performed, such as tests on the presence of heteroscedasticity using the Breusch-Pagan test (bptest() in R) and correlation in explanatory variables using the Pearson's correlation. The 'Survey' package in R produces the sandwich estimator and provides standard errors robust to heteroscedasticity, and possibly clustering. We addressed the issue of protest responses by two approaches: 1) assignment of a zero value prior to estimating mean and median WTP; 2) exclusion of individuals with protest answers, in order to analyse the specific impact of the protest responses on the estimated mean WTP value. Five outcome variables were considered in the following analysis (Table 1).

Then, multivariate analyses were carried out. A two-part model with two generalized linear models for complex sampling design was used to analyse the binary variables and the continuous variables (Fox and Weisberg, 2018). Using a quasi-binomial distribution, a binary choice model was fit for the probability of observing a positive-versus-zero outcome. Then, using a quasi-poisson distribution, we modelled the positive outcome. We assessed the role of different potential covariates of the willingness to pay at two distinct levels: individual and environmental. Performance of the models was addressed by implementing the Hosmer-Lemeshow goodness of fit test (Hosmer et al., 1980).

3. Results

3.1. Sample description

Response rates to the survey ranged from 30.4% to 33.5%, for a total number of respondents of 5631 which resulted in 5295 valid questionnaires (Fig. 1). The majority of respondents were women (52% for the overall sample). Across all countries, at least 31% completed higher education, except in Poland and in Italy. Respondents were mainly employed either full-time or part-time, except in France, Italy and most notably in Spain (eTable 2 [INSERT LINK TO ONLINE FILE]). Income distribution was sparse with the 1st and 3rd interquartile range between 36% and 92% of the mean income.

3.2. Stated WTP values

Overall pooled willingness to pay for HF was 42.3%, although there were significant variations between countries (Fig. 2). Sweden reported the highest proportion with 62.1%, and Netherlands with the lowest at 24.0%. Among those who refused to value the HF model, 30.4% were considered as "protest zeros" and 56% as "genuine" valuations (Fig. 3a & Fig. 3b).

We did not find any significant differences in characteristics between respondents with protest valuations and their counterparts (eTable 2 [INSERT LINK TO ONLINE FILE]). If we withdraw the protest zeros in the valuation process of the HF program, 51% of all respondents reported that they were willing to pay more taxes for the HF program (Fig 2); in Portugal, this percentage reaches 73%.

The mean value respondents were willing to pay, including those who were not willing to pay (WTP $\geq$ 0), was €23 (± 4.8) per year through taxes, varying from €16 (in Poland) to €57 (in Sweden) across countries ($p < 0.001$) (Fig. 4). Excluding those respondents providing protest answers (n = 921), the mean value for the HF program was much higher (mean €28.2 ± 11) (Fig. 4). Considering those who were willing to pay (WTP > 0), the mean value respondents were willing to pay for the HF program was €56.9 (± 9.1) varying from €33 (in Italy) to €93 (in Sweden) across countries ($p < 0.001$).

3.3. Regression results

The results of the binary independent variable multilevel model are reported in Table 2 (with eTable 3 showing the correlation matrix

Table 1
Definition of measures of willingness-to-pay outcomes.

Name of variables	Variable Type	Style definition	Definition
WTP_1:	Binary;	Long	WTP qualitative variable WITH protest answers included as protest zeros: 1 = Yes, for having given a positive value for the Housing First model 0 = No, for having given a "zero" value for the Housing First model
		Short	WTP (0,1) with protest
WTP_2:	Binary;	Long	WTP qualitative variable WITHOUT protest answers: 1 = Yes, for having given a positive value for the Housing First model 0 = No, for having given a "zero" value for the Housing First model
		Short	WTP (0,1) without protest
WTP_3:	Continuous;	Long	WTP quantitative variable WITH protest answers included as protest zeros
		Short	WTP ≥ 0 with protest
WTP_4:	Continuous;	Long	WTP quantitative variable WITHOUT protest answers
		Short	WTP ≥ 0 without protest
WTP_5:	Continuous;	Long	WTP quantitative variable WITHOUT Zero answers
		Short	WTP > 0

Abbreviations: WTP: willingness to pay.

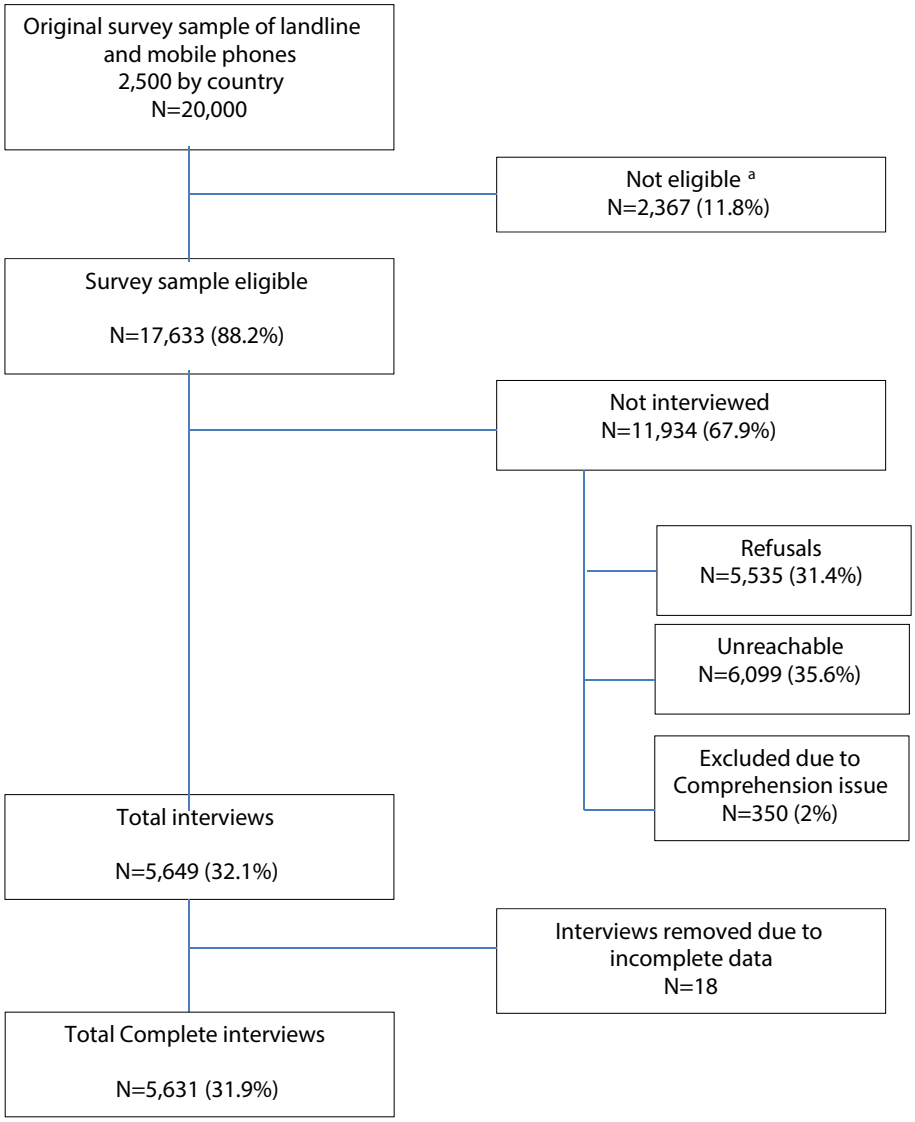


Fig. 1. Flow chart of response rates for telephone survey. a: Not eligible due to the following reasons: business number, fax/modem, not in service.

between exploratory variables [INSERT LINK TO ONLINE FILE]). Looking at each covariate, we found that having secondary education ($p = 0.02$) or higher ($p < 0.0001$), paying taxes on income ($p < 0.0001$), reporting positive attitudes about homelessness ($p < 0.0001$), having given help to people who are homeless ($p = 0.025$) or to homeless services ($p = 0.013$), as well as residing in a country with a Bismarck model ($p < 0.0001$), higher share of social protection expenditures on family benefits ($p < 0.0001$), higher at-risk-of-poverty rate ($p < 0.0001$) or higher old-age-dependency ratio ($p < 0.0001$) were all associated with a higher probability of being willing to pay taxes for the HF model. In contrast, residing in a country with a higher proportion of single adults with children or housing costs over-burden rate were associated with a lower probability of being willing to pay taxes for the HF model ($p < 0.0001$).

The second column of Table 2 shows the potential predictors of being willing to pay for the HF model after excluding respondents reporting a protest answer. Similar significant relations between individual covariates and the dependent variable were observed while an additional significant environmental covariate was found: a higher rate of graduate employment was associated with a higher probability of being willing to pay taxes for the HF model ($p < 0.0001$).

The results of the count independent variable multilevel model are reported in the third to fifth columns of Table 2. Reporting positive attitudes about homelessness ($p < 0.0001$), paying taxes on income ($p = 0.0002$), having relatives or acquaintances who have experienced homelessness ($p < 0.0001$), having been in contact with dedicated structures for homelessness ($p = 0.023$), as well as residing in a country with a higher share of social protection expenditures on family benefits ($p < 0.0001$) or a higher housing over burden rate ($p = 0.013$) were all associated with higher valuations of the HF model. In contrast, residing in a country with a higher proportion of single adults with children or a higher old-age-dependency ratio were associated with lower valuations of the HF model ($p < 0.0001$).

4. Discussion

This study set out to assess European citizens' willingness to pay for, and valuation of the Housing First model for addressing homelessness, and to investigate the covariates of these variables. For the eight European countries included in our survey, 51% of the respondents reported they were willing to pay for the HF model. Of those respondents willing to pay, the mean value was €57. These are extremely positive figures from the perspective of health economics.

Comparable results for specific health products based on WTP studies found, for example, that the proportion of women being willing to pay for breast cancer susceptibility testing is similar, at around 50%

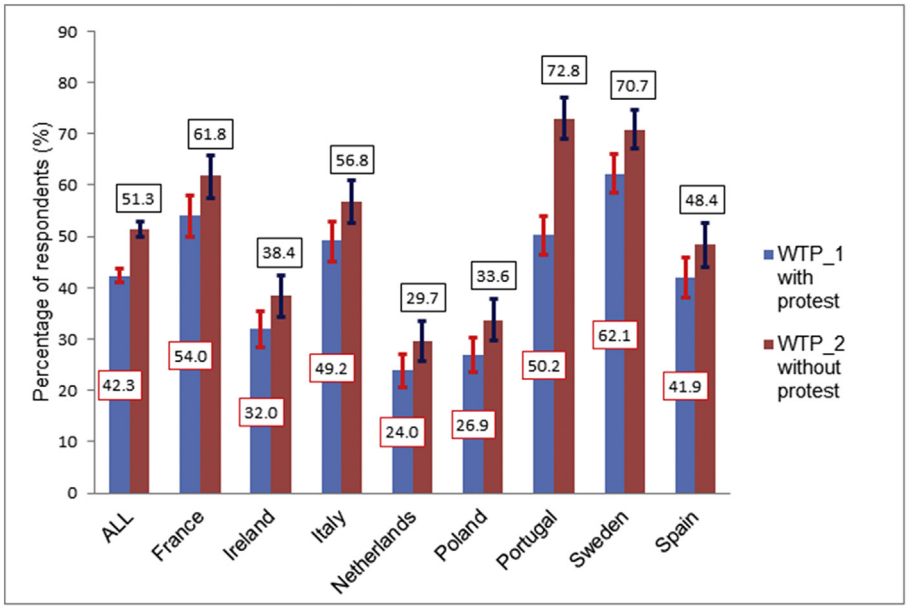


Fig. 2. Percentage of respondents which were willing to pay for the Housing First program. Distinct histograms were built by including or excluding protest answers; 95% Confidence intervals were reported. X-axis lists surveyed nations. Y-axis shows the percentage of respondents.

(Blouin-Bougie et al., 2018). A study in Iceland found citizens were willing to pay an average €29.7 though annual taxation for the preservation of a recreational urban area (Cook et al., 2018). WTP studies conducted in the environmental field have reported much lower values for public goods such as renewable energy (Ntanos et al., 2018) or wind farms (Gibbons, 2015).

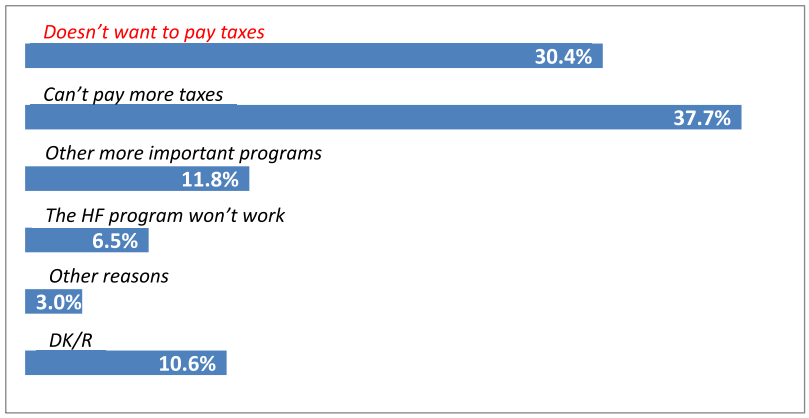
In practice, public expenditures associated with homelessness are substantial, including the cost of housing alongside additional costs attributed to emergency departments, psychiatric care, criminal justice services, and social assistance. In North America, cost estimates per homeless person, with moderate needs or high needs, varied between €18,000 and €30,000 per year, respectively (Aubry et al., 2016; Ly and Latimer, 2015). In Europe, data on the cost of homelessness are limited but suggest similar expenditures trends. For example, in France, a recent study quantified the overall cost of caring for a homeless individual with high needs at €35,000/year, including 60% for healthcare costs, 18% for social assistance, 12% for accommodation and 10% for justice services (Tinland et al., 2020). To date, most of HF programs are financed by government (France, Netherlands, Spain), whilst some receive funding from local authorities, non-profit, and faith-based organisations (Italy, Ireland, Portugal, Sweden). There were no robust data on the costs of the HF program in our surveyed countries at the time of the survey, with the exception of France and Ireland. In France a pilot program called “Un Chez-Soi d'abord” was implemented in four cities (Lille, Marseille, Paris, and Toulouse) including 353 homeless people with severe mental illness receiving the Housing First programme. The mean cost of the French HF program was estimated at €14,000 per year, half for the accompaniment and half for housing subsidies (€18/day housed compared to €16/day housed in the standard social sector) (DIHAL, 2019). In Ireland, the government funded around 220 HF accommodations in 2018, for an average cost of €13,500 per person per year (Kelly, 2018). Using the data for France we can make an initial comparison between the implementation costs of HF and the WTP estimates provided by our study (cost-benefit analysis approach). Based on the cost of the French HF program per year and a prevalence of homelessness in France of 0.2% (Mordier, 2016), the average cost of implementing such a program across the entire homeless community would be around €28 per citizen. Our study implies that the average amount French citizens are willing to pay (€49) for the HF model far exceeds the mean annual costs of the HF program in France (even if such a programme was costed for every person experiencing homelessness). Such cost-benefit analyses could be conducted in each surveyed country to specifically address the efficiency of the HF programme and inform policy on the implementation of HF.

This overall picture covers some difference in WTP between countries. Participants from the Netherlands, France and Poland (i.e. from nations with a Bismarck healthcare model) were more likely to report willingness to pay for the HF model compared to their counterparts (under a Beveridge model), but reported lower WTP values. This may relate to national community values and a perceived right for all citizens to have access to an effective healthcare system, with lower values perhaps expressing concern for the provision of such health and housing services for those who cannot contribute financially to the system (with most people who are homeless not having access to work, or in very low paid employment).

Additionally, nations with higher social protection expenditures on family benefits were more likely to value HF, implying that greater social redistribution at the governmental level increases general willingness to contribute to social programs. In contrast, respondents in countries with higher rates of households overburdened by housing costs (the Netherlands, 15.4%, Spain, 10.9%, Poland, 9.6%; Portugal, 9.2%) were less likely to value HF, suggesting that exposure to greater housing strains increases caution about interventions that might limit the capacity of the housing market. It is notable that in these countries, when respondents expressed a willingness to pay, they reported higher WTP values, perhaps suggesting sensitivity to housing costs and the problem of homelessness. In eTable 4 [INSERT LINK TO ONLINE FILE] we provide the rates of homelessness and mean WTP values in each country to enable some tentative comparisons between the level of the homelessness in each country and the valuation of the HF model. In the surveyed countries, the rate of homelessness varied from 0.04% in Portugal to 0.36% in Sweden (FEANTSA, 2018; Feantsa and The Foundation Abbé Pierre, 2018). However, there is a wide heterogeneity in both counting methodologies and utilised time-frames behind this prevalence data which warns against any possible comparisons.

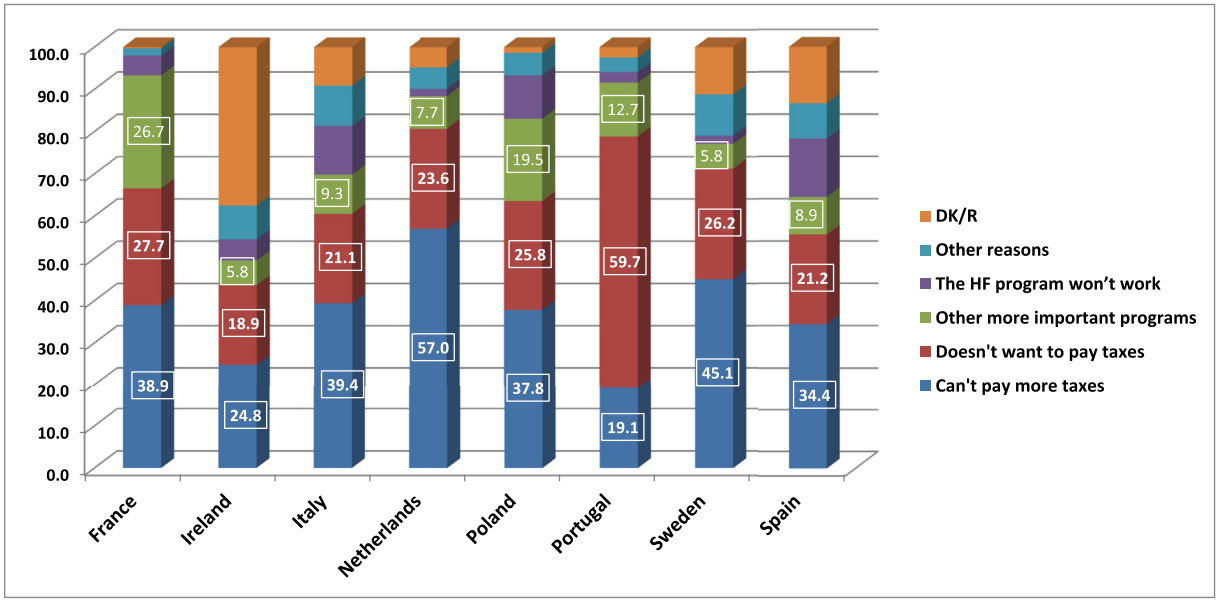
Our study found no effect for graduate employment on WTP. A possible explanation is the inverse correlation (−0.67) between graduate-employment and risk-of-poverty rates. Risk-of-poverty rate has a consistently positive and significant effect across all of our models, and this variable may be acting as a proxy for graduate-employment rate.

a



Abbreviations: HF: Housing First; DK/R: Don't Know or Refusal.

b



Abbreviations: HF: Housing First; DK/R: Don't Know or Refusal.

Fig. 3. Reasons reported by respondents for not being willing to pay for the HF program. Abbreviations: HF: Housing First; DK/R: Don't know or refusal. In red: respondents who reported they don't want to pay taxes, and represented all protest zeros. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

However, while both variables are significant in the WTP_3 model, risk-of-poverty rate retained its statistical significance and relative magnitude in the WTP_4 model, which emphasizes the correlation between poverty and utility valuation for public goods addressing precariousness of population and altruism (Andreoni, 1989).

As expected, participants with higher socio-economic status (higher educational level, and those who pay income taxes) were more likely to value and give higher values for the HF model. Similar correlations between WTP values and economic status have been reported previously (Olsen and Smith, 2001). Such findings support the robustness of the CV scenario in this study.

The high number of zero WTP values in our study warrant discussion. Firstly, with a program addressing homeless people's healthcare and social needs, most respondents were valuing a program they were unlikely to benefit from personally, which tends toward higher numbers of zero values (Bosworth et al., 2015). Additionally, in the light of ongoing economic strains in many of the surveyed countries, coupled with reduced government spending, it seems likely that the payment vehicle, national taxation, may well elicit greater zero valuations or refusals to participate. In a recent study conducted in Ireland using annual taxation, zero bids represented half of the total bids (Callan and O'Shea, 2015). Nevertheless this payment vehicle remains appropriate as the healthcare systems in the targeted European countries are mostly funded through general taxation.

Although the assumption behind the category of 'protest zeros' is that the respondents' opposition obscures the actual value they might place on the program, including this zero value can be considered a 'worst-case' scenario in sensitivity analysis. Inversely, excluding these protest answers relies on an assumption that they did not differ from those who stated a value for the HF program. To test this hypothesis, we compared both protesters' and non-protesters' characteristics. Results showed no significant differences in characteristics between respondents with protest answers and their counterparts on observed characteristics. There are alternative approaches that have been developed to address the issue of protest responses, such as multiple imputation or the Heckman model. Studies have reported that although the Heckman selection model has been commonly used to adjust for protesters, its underlying distribution assumptions (i.e. normal

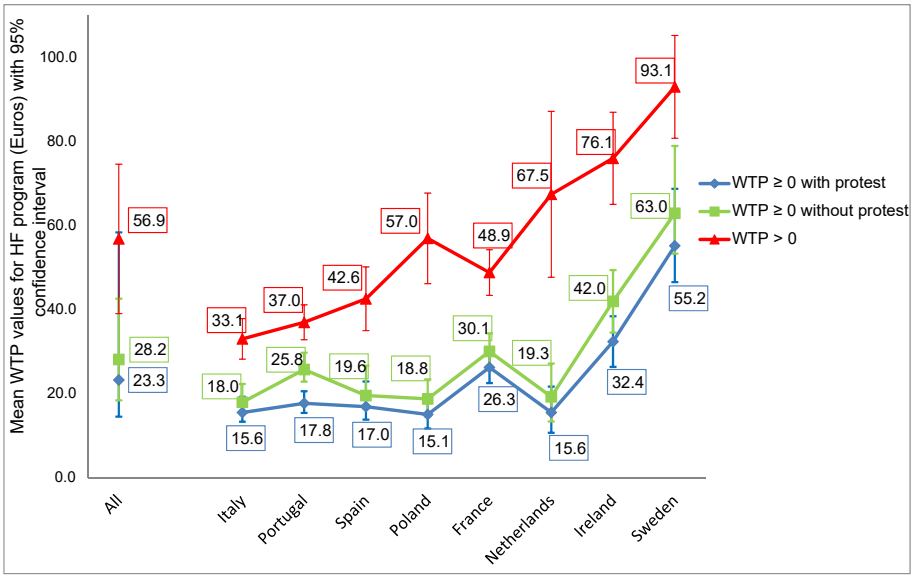


Fig. 4. Willingness to pay values by country. Abbreviations: WTP: willingness to pay; HF: Housing First. X-Axis shows each targeted country. Y-axis shows the mean value for the Housing First program in Euros and the 95% confidence interval.

distribution) may be implausible in our context (Puhani, 2000; Strazzera et al., 2003). Considering multiple imputation, this approach is relevant in cases where protest responses are missing at random (Pennington et al., 2017). In cases where protesters differed from non-protesters on un-observed characteristics, protest responses would be characterized as missing not at random (MNAR), and the multiple imputation approach is not relevant (van Buuren, 2007). In our study, lower mean WTP values were estimated when including protesters (producing similar results to multiple imputation) (Pennington et al., 2017) and marginal changes in potential predictors of WTP were

Table 2
Multivariate analyses using a two-part model to analyse the qualitative WTP variables and the quantitative WTP variables.

Type of variable Protest: Yes/no	WTP_1	WTP_2	WTP_3	WTP_4	WTP_5
	Qualitative	Qualitative	Quantitative	Quantitative	Quantitative
	Yes	No	Yes	No	No
	Coeff.	Coeff.	Coeff.	Coeff.	Coeff.
INDIVIDUAL-LEVEL					
Gender – Woman[a]	−0.076	−0.146	−0.063104	−0.128	−0.063
Age	0.001	−0.004	−0.002	−0.003	−0.001
Education - Upper secondary/vocational[b]	0.589***	0.503**	0,.52**	0.366**	0.121
Education - University degree	0.785***	0.738***	0.627***	0.541***	0.247
Paying taxes	0.582***	0.873***	0.638***	0.703***	0.287***
Living area – semi-urban[c]	−0.289	−0.285	−0.115	−0.112*	−0.044
Living area – urban	−0.223	−0.216	0.017	0.008	0.064
Interact with HML people – Yes	0.337*	0.434***	−0.161	0.151	−0.011
Interact with HMLN services - Yes	0.414*	0.367**	0.356***	0.281***	0.129*
Have been HML - Yes	0.498	0.284	0.473	0.382	0.324
Relatives/Friends have been HML – Yes	0.043	−0.016	0.273***	0.265**	0.281***
Reporting negative attitudes - Yes	−1.092***	−1.068***	−0.805***	−0.680***	−0.265***
ENVIRONMENTAL-LEVEL					
Bismark_model[d]	0.894***	0.687***	0.119	−0.026	−0.079
At-risk-poverty_rate	0.256***	0.227***	0.081***	0.054***	0.001
Employ-graduate _rate	0.003	0.028***	−0.008***	−0.003	−0.003
Old-age-dependency_rate	0.052***	0.139***	−0.064***	−0.043***	−0.062***
Share_lone-parent-families	−0.172***	−0.042**	−0.192***	−0.142***	−0.115***
Share_benefits	0.173***	0.045***	0.189***	0.135***	0.129***
Housing-over-burden_rate	−0.143***	−0.175*	−0.054***	−0.056***	0.016*
Intercept	−4.851***	−9.154***	5.405***	4.576***	6.272***
Sample size:	4668	3855	4668	3855	2489
R-squared:			0.230	0.229	0.201
Hosmer-Lemeshow (p-value):	0.395	0.499			

Abbreviations: WTP: willingness to pay; Coeff: coefficient of the model; HMLN: homelessness; HML: Homeless
***: $p < 0.001$; **: $p < 0.01$; *: $p < 0.05$.
[a] Reference = Man.
[b] Reference = Lower secondary education level.
[c] Reference = Rural area.
[d] Reference = Beveridge model.

observed when we compared the two approaches of excluding and including these zero values. Given the above, we felt our approach was the most appropriate.

There are some limitations to the current study. The CV method has been criticized for obtaining results through stated preferences that might differ from revealed preferences (Carson and Hanemann, 2005). Against such criticisms, studies have shown CV results that compare favourably with subsequent valuation behaviour (Cameron et al., 2002; Vossler et al., 2003). The survey was also designed to mitigate the effects of data inaccuracy or of hypothetical bias (overvaluation of a hypothetical scenario – the respondent is not going to have to actually pay their reported valuations), through the use of the bidding game format, careful writing of the CV scenario, and a cheap talk discussion with the respondent in which hypothetical bias was discussed (Lusk, 2003). In addition, the survey was designed to avoid the use of technical terms so as to avoid misunderstanding by the general public, and to avoid the use of ambiguous, complex, long and double-barrelled questions. We also conducted a pilot study to assess the intelligibility and the length of the questionnaire. Other commonly reported biases in the literature on contingent valuation conducted alongside a general population telephone survey are the issues of the representativeness of the study sample, nonresponse bias, as well as acquiescence and anchoring bias (Bhattacharya and Isen, 2009). Representativeness bias may arise in our telephone study due to an underrepresentation of people difficult to contact or interview. However, to properly represent this group, interviewers were instructed to call back fifteen times before discarding a landline or mobile number and offer alternative time appointments to either start or complete an interview. At the end, we observed a high response rate among the random sample with a relatively few incomplete responses to the CV scenario. Moreover, decreasing willingness to participate in telephone surveys may give rise to nonresponse bias. Against this, statistical methods such as weighting or regression-based models can be used to correct for the lack of representativity (Dal Grande et al., 2015), which we used in this study with our weighted samples. Surveys in general can suffer from acquiescence bias, which occurs when respondents may have felt uncomfortable to voice their true preferences and answer 'yes' to questions that they think will please the interviewer or reflect well on the respondent. However, anonymous telephone surveys usually allow more self-expression than face-to-face interviews in this regard. In addition, interviewers for this study were trained not to skew answers.

As a further caution, the bidding game technique used in this study for preference elicitation has been linked to starting point bias and the risk of anchoring bias (i.e. WTP values sensitive to the initial bid). The usual practice to mitigate this effect is to allocate different starting points at random, however the efficacy of this approach remains uncertain (Frew et al., 2004). Consequently our study did not attempt to evaluate the effect of different starting bids on WTP estimates, and it is possible that this has had some effect on the results of our study. The starting value was chosen based on the available costs of standard accommodation for homeless people. We collected this information for each surveyed country and chose the smallest one to reduce the risk of a high proportion of zero values in the countries with the lower cost for standard homeless services (i.e. the cost of one night in emergency shelter). We did not start with a different price depending on the country to address the heterogeneity of the countries. However, our surveyed countries differ in several aspects: availability of homeless services, existence of alternatives to emergency shelters, mean income, gross domestic product, unemployment rates, etc. and therefore the issue of the relevant criteria for addressing such heterogeneity would be difficult to solve. Keeping in mind that the main objective of this study was to estimate the mean utility value European citizens reported on the HF model and not really to address the specific WTP value in each European country, the main consequence of having no different starting point by country is the potential underestimation of the mean WTP across Europe. Previous studies have shown that "a well-balanced, symmetric bid design may result in very modest biases even when the anchoring mechanism is very strong" (Veronesi et al., 2011). In other words, a good specification of the WTP distribution may help to reduce the possible influence of starting-point bias (Soeteman et al., 2017). Because we used an appropriate bid design as well as specifying a quasi-distribution for WTP valuation, those efforts may have helped to reduce the possible influence of starting-point bias.

We adopted the bidding game format to elicit WTP values in this study over other possible CV methods, such as trade-offs, for the following reason: as our contingent valuation formed part of telephone survey that also investigated the experience and opinions of European Citizens about homelessness, it was necessary that the WTP section of the survey be reasonably brief and distinct. The bidding game is relatively quick and simple to introduce to a respondent, in comparison to the trade-offs approach which involves asking respondents how they would make trade-offs between multiple goods by allocating a budget and can be both time intensive and complex for respondents (Frew et al., 2004). It also provides the most appropriate method for valuing an innovation like HF, which, as it requires many integrated components to qualify as HF in line with the HF fidelity scale, is less amenable to being compartmentalized for trade-off approaches.

It is entirely possible that the existence of other programs addressing the issue of homelessness in any of those surveyed countries might have an influence on the study findings, and as such this offers a possible limitation to our results. It is worth noting that, where such alternative programs exist in most of the surveyed countries, their existence is the product of isolated actors (NGOs, local associations, etc.) making it difficult to take them into account. It is also unlikely that the average respondent had comprehensive knowledge of existing programs to address homelessness. A previous study on citizens' opinions about homelessness had underlined a poor knowledge of European citizens in that field (Petit et al., 2019). Nonetheless, this issue does present a possible limitation of our study.

The above caveats taken into account, the stated WTP for the HF model is extremely positive, indicating that much can be done, now and relatively quickly, to promote inclusive health policies for vulnerable and precarious populations by providing to them with access to the HF program (Luchenski et al., 2018). Our work informs stakeholders and policies makers that European citizens are aware of the issue of homelessness in their countries and that scaling up HF model across Europe is both feasible and likely to have public support (Marmot, 2018).

Authors' contributions

PA, the principal investigator designed the study with major contributions from SL and AT. SL, AT and PA provided the first drafts of the questionnaire. Each research partner within the HOME-EU consortium study group reviewed the target country questionnaire and participated on the elaboration of a consensual version. SL and OT analyzed the data. SL, OT and PA wrote the manuscript with significant contributions from each partner. All authors read and approved the final manuscript.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.socscimed.2020.112802.

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