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Item Type (Accepted version) (Refereed)

Accepted Manuscript

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Highlights

- We examine variations in perceptions of access to health care across and within 29 European countries.

- Across Europe, the poor are over 5 times more likely than the wealthy to perceive access barriers.

- Probabilities of feeling unable to access care are often relatively similar among the rich and poor in countries with high overall perceived access barriers.

- Out-of-pocket spending as a share of total health expenditures is a weak proxy for access barriers.

An analysis of perceived access to health care in Europe: How universal is universal coverage?

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ABSTRACT

The objective of this paper is to examine variations in perceptions of access to health care across and within 29 European countries. Using data from the 2008 round of the European Social Survey, we investigate the likelihood of an individual perceiving that they will experience difficulties accessing health care in the next 12 months, should they need it (N=51,835). We find that despite most European countries having mandates for universal health coverage, individuals who are low income, in poor health, lack citizenship in the country where they reside, 20-30 years old, unemployed and/or female have systematically greater odds of feeling unable to access care. Focusing on the role of income, we find that while there is a strong association between low income and perceived access barriers across countries, within many countries, perceptions of difficulties accessing care are not concentrated uniquely among low-income groups. This implies that factors that affect all income groups, such as poor quality care and long waiting times may serve as important barriers to access in these countries. Despite commitments to move towards universal health coverage in Europe, our results suggest that there is still significant heterogeneity among individuals' perceptions of access and important barriers to accessing health care.

INTRODUCTION

Universal health coverage refers to the movement towards two objectives – access to high quality services and financial protection (Carrin et al., 2007; WHO, 2010). Europe has shown a strong commitment to this goal, with most countries in the region having legal mandates for universal health coverage (Stuckler et al., 2010). However, evidence suggests that some Europeans still feel as though they are unable to access care (Allin et al., 2008). In certain European countries, such as Bulgaria, Croatia, Latvia, Poland, Romania and Sweden, those without access to care comprise over 10% of the population (OECD, 2012). Levels of horizontal equity – or equal access for equal need - vary within developed countries for many types of care (van Doorslaer et al. 2006), with structural or design features of systems being key factors that determine which groups have access to care and which groups do not (Bolin et al., 2009; Jimenez-Martin et al., 2004).

While a number of studies use levels of coverage (USAID, 2012; Xu et al., 2010) and equity in utilization of health care services (Gulliford & Morgan, 2003; Koolman, 2007; Regidor, 2004) as proxy measures for access, it is difficult to accurately identify the individuals who are unable to access care, precisely because their lack of utilization is, by definition, unobserved. Likewise, it can be difficult to pinpoint the reasons people do not access health care services, particularly if they are legally entitled to health care services. Gaps in access to health care in countries with mandates for universal coverage may occur due to a number of reasons, such as

financial barriers like user charges or informal payments, or non-financial barriers such as waiting times, service exclusions, or poor quality care.

In order to identify access barriers among non-users of health care, indicators of 'unmet need' have been introduced (Allin, et al., 2008; OECD, 2012). These self-reported measures identify individuals who have encountered barriers that prevent access, and in some cases, include the reasons for lack of access. Most of these indicators capture past attempts to access care, but a few indicators assess the uncertainty health care users may feel regarding their ability to access care should they need it in the future. However as Saksena et al (2014) note, financial protection in health implicitly involves some notion of minimizing the uncertainty associated with future need for health services and the ability to pay for them. The goal of financial protection as a component of universal health coverage thus serves a dual role: (1) minimizing the level of uncertainty in access to health care – which can reduce wellbeing in its own right; and (2) ensuring that no member of the population faces the uncertainty of having to choose between saving for a future health care event and other necessities.

Our study seeks to better understand individual's perceptions of their ability to access health care in European countries. Using data on self-reported perceptions of access (within the next 12 months) we estimate how perceptions of access barriers differ across 29 European countries, and identify individual characteristics that are systematically associated with perceived access barriers. To explore disparities within-countries, we focus on variation in access perceptions among high and low-income groups in each country. In an effort to contextualize the results, we calculate

country-specific probabilities of perceived inability to access care based on our model

results. We then discuss potential linkages between our empirical findings and

selected country-specific features of health systems. While the results are intended to

be illustrative given the subjective nature of the data, our study allows policymakers

to better understand which of their constituents feel there are barriers to accessing

care, and provides some indication of the factors that may prohibit those individuals

from benefiting from progress towards universal health coverage.

METHODS

Data

Data used for this analysis come from the 2008 round of the European Social Survey

(ESS). The ESS is a cross-sectional multi-country survey designed to capture the

attitudes, beliefs, and behaviors of Europeans in 29 countries: Belgium, Bulgaria,

Switzerland, Cyprus, Czech Republic, Germany, Denmark, Estonia, Spain, Finland,

France, United Kingdom, Greece, Croatia, Hungary, Ireland, Israel, Latvia,

Netherlands, Norway, Poland, Portugal, Romania, Russian Federation, Sweden,

Slovenia, Slovakia, Turkey, and Ukraine. All but two of these countries (Cyprus and

Turkey) had legislation in place to ensure universal health coverage in 2008. Both

Cyprus and Turkey, however, had legislation to move towards universal coverage in

the near future (Theodorou et al., 2012; Tatar et al., 2011). Reports from a number of

countries with mandates for universal health coverage, such as Greece (Economou,

2010), Ukraine (Lekhan et al., 2010) and the Russian Federation (Popovitch et al.,

2011) acknowledge that there exists less than universal coverage in practice as

particular groups of the population find it difficult to access services due to barriers

such as waiting times, lack of service availability, quality concerns and costs (which often take the form of hidden or informal payments).

ESS data is collected via hour-long face-to-face interviews with randomly selected respondents (N=51,835). The 2008 version is the 4th round of the survey and the only round that includes a question on access to health care. The perceived health care accessibility question asks respondents to report their likelihood of accessing health care should they need it in the next 12 months (i.e. not at all likely, not likely, likely and very likely of being able to access care). This indicator allows us to capture the uncertainty individuals may feel regarding their ability to access health care in the future. Moreover, we feel that this may also be a good predictor of true access, since individual perceptions play an important role in how people construct their own social realities (Jussim, 1991). Thus, we assume that individuals who perceive that they are not able to access care in the next 12 months will be less likely to access care in the future – regardless of true accessibility or availability of health services. Other relevant individual level data in the ESS which we hypothesize may be associated with variations in access perceptions includes information on age, gender, education, marital status, employment status, citizenship, household size, self-reported health, income perceptions and income deciles.

Empirical Analysis

We use logistic regressions with country fixed-effects to estimate the odds that an individual perceives that they will be unable to access health care services in the next 12 months, conditional on a wide-spectrum of individual socio-demographic characteristics. The Model 1 logistic regression specification is:

$$\text{prob}(\textit{unable to access care} = 1)$$
$$= \alpha + \sum \beta_1 hlth_i + \sum \beta_2 inc_i + \beta_3 educ_i + \sum \beta_4 age_i + \beta_5 emp_i + \beta_6 gndr_i$$
$$+ \beta_7 mar_i + \beta_8 hhsize_i + \beta_9 citizen_i + \sum \beta_{10} curract_i + country_i$$

where the dependent variable is a binary indicator of whether an individual feels it is not at all likely or not likely that they would be able to access care. For each individual i, $hlth$ is a categorical variable of self-reported health (very good, good, fair, bad, very bad), inc is a categorical level of income perceptions (living comfortably, coping, difficult to get by, very difficult to get by), $educ$ is the number of full-time equivalent years of education, age is the respondent's age category (below 20, 20-29, 30-39, 40-49, 50-59, 60-69, 70-79, 80+), emp reflects employment volatility (a dummy variable signifying that the respondent has experienced 3 months or more of unemployment during some period of time), $gndr$ is equal to 1 for females, mar is whether the respondent is married, $hhsize$ is the household size, $citizen$ is whether the respondent is a citizen of the country where they reside, $curract$ is a categorical variable reflecting the respondent's primary activity in the past week (paid work, education, unemployed looking for job, unemployed not looking for job, permanently sick or disabled, retired, community or military service, housework or looking after children, other) and $country$ are the country fixed effects. Country fixed effects are relative to Switzerland, which was selected as the baseline country because it has the lowest absolute percentage of respondents who report high perceived inability to access care. As a robustness check, the model is replicated substituting income deciles for income perceptions, which are also expressed as categorical variables, to assess whether there are differences when using arguably more objective, albeit still self-reported income measures (Model 2).

Income may be an important determinant of access to health care, particularly in countries that have high levels of out-of-pocket spending. In order to understand whether and to what extent there is heterogeneity in perceptions of access across income groups *within* countries, we use the Model 1 specification and include an interaction between the income variable and the country fixed effects. This allows us to estimate the country-specific association between perceptions of income and perceptions of access. Model 3 includes all categories of income perceptions as interactions with the country dummies. Our final model specification (Model 4) collapses income perceptions into a dummy variable, where 1 indicates an individual having low income (i.e. reporting either of the two worse-off income categories); in Model 4 we interact this binary variable with the country dummies.

The approach in Models 3 and 4 allows for estimation country-specific effects of income inequalities on perceived access barriers. Using Model 4, we compare predicted probabilities of perceived access barriers among low income and higher income individuals to understand the gap in perceived access in each country among rich and poor individuals.

As a robustness check, we estimate ordinal logistic regressions using the same model specifications; these allow all four categories of perceptions of access to be modeled as the dependent variable (i.e. not at all likely, not likely, likely and very likely of being able to access care). All models are run for the entire population-weighted ESS pooled sample and cluster errors at the country level to allow for intragroup correlation.

RESULTS

Sample sizes for each country are included in Appendix Table 1. Based on the 2008 ESS data, 6.7% of individuals reported that it would be very unlikely that they would be able to access care if they should need it (Figure 1). The largest percentages of individuals reporting it unlikely that they could access care were in the Ukraine (24.8%), Russia (19.7%), and Turkey (15.6%), while the smallest percentages were in Switzerland (0.4%), Spain (1.2%), and Sweden (1.6%). A further 18.5% of all respondents reported that it would be unlikely that they could access care.

<insert Figure 1>

There is wide variation across countries regarding the percentage of individuals who report having low income. While overall 10.1% of individuals report that it is very difficult to get by on their income, this level varies from 0.7% in Denmark to 34.8% in Bulgaria. With regards to income deciles, across the entire sample, 6.4% of individuals reported being in the lowest decile and 8.3% reported being in the second lowest decile. 58.6% of individuals reporting that it was very difficult to get by on their current income were in these bottom two income deciles.

Model results

<insert Table 1>

We report all model results as odds ratios. Model 1 finds that low income, poor

health, lack of citizenship in the country where residing, 20-30 years old, unemployed

and/or female are associated with statistically greater likelihood of perceiving

difficulties accessing health care (Table 1). More years of education and currently

being in school are significantly associated with lower likelihood of perceived access

difficulties. Overall across all countries, some of the highest likelihoods of perceiving

access difficulties are found among the lowest income individuals. Those feeling it is

very difficult to get by on their current income are 5.77 times (according to Model 1)

more likely than those living comfortably on their current income to report difficulties

accessing health care; the corresponding odds ratio using ordinal logistic regressions

is 5.62 (Appendix Table 2). Results are consistent when using the more objective

income decile indicator (Model 2). In both logistic and ordinal logistic Models 1 and

2, there is a discernable gradient whereby poorer individuals are progressively more

likely to perceive barriers to accessing care.

We next calculate predicted probabilities for an individual in each country to report

that they feel unable to access care after controlling for the aforementioned

cofounders. Figure 2 contains the probability of perceived access barriers as predicted

by Model 1, holding all control variables at mean values, compared to a measure

commonly used to indicate barriers to access: out of pocket expenditures as a share of

total health expenditure (WHO, 2013). This comparison suggests a weak positive

association between out of pocket payments and the probability of perceived

difficulties accessing health care at the country level in 2008. Some countries, such as

the Ukraine, Latvia and Russia have both high shares of out of pocket payments as

well as high predicted probability of perceived inability to access care. However in

other countries with high out of pocket share of total health expenditure, such as

Cyprus and Greece there is relatively low predicted probability of perceived inability

to access care. Moreover, the predicted probabilities suggest that in other countries

such as Turkey, Romania, Ireland and Croatia, the probability of perceived inability to

access care is high, despite comparatively low reliance on out of pocket payments to

finance health care. We note that unsurprisingly, many of the countries with high

predicted probabilities of perceived access barriers after adjusting for individual

characteristics are also those which have high percentages of their populations

reporting difficulty accessing care in the descriptive statistics, including Ukraine,

Latvia, Russia, Romania and Turkey (Figures 1 and 2).

<insert Figure 2>

Models 3 and 4 allow for analysis of country-specific associations between

perceptions of access and income using interaction terms (Table 1 and Appendix

Table 3). Estimated relationships between explanatory variables and perceived access

are similar in magnitude and statistical significance in Models 3 and 4 to those found

in Model 1. Based on the estimates from Model 4, Figure 3 contains predicted

probabilities of perceived inability to access health care for low income individuals

compared to high income individuals in each country. This figure illustrates that in

many countries, particularly in Eastern Europe, despite legal mandates for universal

health coverage in most countries, there is a high overall probability of perceived

inability to access health care. However, in many countries such as Ukraine, Turkey

and Russia, the ratio of the predicted probability of perceived access barriers

estimated for high-income individuals relative to that estimated for low-income

individuals is not particularly large, so that both high and low-income individuals are

at relatively similar – and often considerable – risk of perceiving access barriers. For

example, low-income individuals in Ukraine as predicted to have a 66.1% probability

of feeling unable to access care, whereas high income individuals in Ukraine are

predicted to have a 53.7% probability of feeling unable to access care (a ratio of 1.23).

In many countries where there is a low overall likelihood of perceived inability to

access health care, the ratio of high to low income predicted probabilities is large,

such as in Belgium, France, Switzerland and Cyprus. For example, low-income

individuals are predicted to have a 20.4% probability of feeling unable to access care,

compared to high income individuals having only a 5.4% probability of feeling unable

to access care (a ratio of 3.79). This suggests that low-income populations in these

countries still are at much higher likelihood of feeling they do not have access to

health services relative to wealthier individuals. With the exception of Cyprus, all of

these countries had legal mandates for universal coverage in 2008.

<insert Figure 3>

DISCUSSION

In this paper we examine population perceptions of access to care in 29 European

health systems -- 27 of which had legal mandates for universal coverage in 2008– to

see how likely it is that individuals feel they are unable to access health care, and to

identify individual characteristics commonly associated with perceived access

barriers. We also investigate how perceptions of difficulty accessing care are

associated with income in each country. Our results confirm prior research

demonstrating that across European countries, there is wide variation in perceptions of

access to health care, as well as greater prevalence of perceived access barriers among the poor compared to the wealthy.

Our findings also indicate a weak relationship overall between out of pocket spending as a share of total expenditure and the probability of perceived inability to access health care at the country level (Figure 2). This may be because out of pocket spending only captures cases where the cost of care does not constitute a complete barrier to access that inhibits utilization. That is, out-of-pocket payments only reflect people who have used health care services, while the access indicator we use includes those that perceive they will not be able to access health services. This highlights that out of pocket spending may be a potentially inaccurate metric to identify countries that have barriers to access.

In the next section we review health system characteristics of selected countries in an attempt to try and explain some of our findings. We do not empirically test whether particular health system characteristics drive our results because of the wide variety of factors that make it difficult to create a useful typology of health system characteristics. Nevertheless, we believe a review of health system characteristics provides a plausible context underlying the model results, as well as a basis for further analysis.

Our models suggest that countries such as the Ukraine, Latvia and Russia have high levels of perceived inability to access care (Figure 2) but that the differences between low and high income individuals (based on the ratios of predicted probabilities) is relatively small, particularly in comparison to other countries (Figure 3). This is

consistent with recent reviews of these health systems which suggest that while these countries have mandates for universal health care, factors not directly linked to income, such as concerns about quality of care, poor accessibility (particularly for rural populations in Russia and the Ukraine) and long waiting times limit access to health care services (Lekhan et al, 2010; Popovitch et al., 2011; Tragakes et al., 2008).

Yet out of pocket payments are also high in these countries and often considered one of the key barriers to access, which would seem to contradict our findings. However, in these countries out of pocket spending provides a way for patients to overcome the aforementioned hurdles to access legally mandated health care. For example, as noted by Lekhan and colleagues (2010), in Latvia all non-urgent secondary care visits which are made without referral must be paid out-of-pocket; these types of visits occur quite often as patients wish to avoid extremely long waiting times (in June 2006 the waiting time for a knee replacement operation was 17 years). Similarly, in the Ukraine low public health care spending since the early 1990s has resulted in declines in quality of care, restrictions in the guaranteed package of free health care and increasing voluntary and informal payments for a large range of services (Tragakes et al., 2008). While population coverage has remained a priority, a lack of resources dedicated to the health system has likely created barriers to access through non-price related rationing. Therefore, out-of-pocket expenditure may serve less as a barrier to access, per say, and more as a means of bypassing the public system. Efforts to improve access to health care in these countries might be best focused on addressing barriers that affect all income groups, such as quality of care, rather than focusing directly on out of pocket expenditures.

Even in countries where there is relatively low perceived difficulty in accessing care, we find that there may be a high likelihood of perceived access barriers amongst the poorest population groups. In particular, in countries such as Spain, Cyprus and Greece, a high proportion of perceived inability to access health care is associated with low income. This group of countries represents a mix of health system designs suggesting that it is not a particular type of system that results in these perceptions, but rather, country-specific features.

For example, at the time of the survey Spain and Greece both had National Health Service (NHS) systems, with legal mandates for free access at the point of use. In Spain, the majority of out of pocket spending in 2008 came from pharmaceutical co-payments amounting to 40% of retail prices for people under the age of 65. As there was no exemption for low-income populations (other than those with certain chronic diseases) it is plausible that pharmaceutical co-payments contribute to low-income individuals feeling unable to access care, which is consistent with our findings. Moreover, in Spain there were concerns about access to non-urgent specialist care that had long waiting times; low income individuals were the least likely to be able to bypass long waiting times by purchasing care from private providers (Garcia-Armesto et al., 2010).

Greece, on the other hand, despite having had a mandate for universal coverage through the NHS system (as well as a social insurance system) also had one of the largest shares of private health expenditure in Europe in 2008 (nearly 40%). This high private expenditure is due to a number of different types of barriers to health care access. These include formal cost-sharing arrangements, as well as direct payments.

However people also often pay out of pocket to bypass long waiting times by seeking care in the private or informal sector. Indeed, the presence of a large informal sector along with concerns of low quality care and long waiting times in the public system may explain concerns among low income individuals regarding accessing health services in Greece (Economou, 2010). Since the economic crisis unfolded in Greece, unmet need has grown as people have had even fewer resources to bypass traditional access barriers (Kentikelenis and Papanicolas, 2012).

There are a number of limitations to the analysis. First, self-reported measures including access to health services, health status, and income may be subject to reporting biases. Reporting bias may arise from differences in how people respond to questions, the thresholds attached to different categorical scales, and other unobserved differences among individuals that we are unable to account for. Anchoring vignettes would allow us to adjust for some of this bias however they are not included in the ESS (King et al, 2004; Hernandez-Quevedo and Papanicolas, 2013). Our robustness check using income deciles, which are arguably a more objective measure, produces similar results. However, even objective measures of income would not necessarily be preferable, as income levels do not have the same purchasing power in households of different sizes and or across regions with varying prices (Deaton, 1997). Nevertheless, while our analysis is illustrative of the potential inequities in access within countries with legal mandates for universal coverage, it is important to verify these results using other, potentially more objective indicators.

Another limitation is that we are unable to investigate changes over time because the question on access to health care was only included in the 2008 round of the survey.

Lastly, using this dataset we are able to show associations between access perceptions and a set of explanatory variables, but we are unable to conclusively determine the reasons for perceived access barriers. While it is possible that poorer individuals are concerned about accessing care because of costs, it is also possible that there are other non-financial factors, such as fewer providers in impoverished areas, which are of equal if not greater importance.

CONCLUSION

Despite clear commitments to move towards universal health coverage in Europe, our results suggest that there remains significant heterogeneity among individuals in terms of their perceptions of access to care across and within countries. Overall, we find that the poorest groups are still the most likely to feel they will be unable to access care if they need it. In some countries however, differences in the probabilities of perceiving access barriers between low and high-income individuals are relatively small. This insinuates that rationing mechanisms that affect all income groups, such as low quality care and long waiting times may serve as important barriers. While non-price related rationing is difficult to measure, our exploratory study suggests that given the high probability of access barriers among wealthy individuals in some countries, it may be more important than previously acknowledged. Identifying the precise causes of barriers to accessing care is important for those designing health care policies to ensure that individuals enjoy universal access to health care services.

References

Allin, S. Gringon, M and Le Grand, J. (2008) 'Subjective unmet need and utilization of health care services in Canada: What are the equity implications?' *Social Science and Medicine* 70(3)465-472.

Bolin, K et al. (2009) 'Utilization of physician services in the 50+ population: the relative importance of individual versus institutional factors in 10 European Countries' *International Journal of Health Care Finance and Economics* 9(1)83-112.

Carrin, G. Evans, D and Xu, K (2007) 'Designing health financing policy towards universal coverage' *Bulletin of the World Health Organization* 85(9)652.

Deaton, A (1997) *The Analysis of Household Surveys: A Microeconometric Approach to Development Policy*. Johns Hopkins University Press, Baltimore, Maryland.

Economou, H (2010) Health Systems in Transition: Greece. European Observatory on Health Systems and Policies.

Garcia-Armesto, S., Abadia-Taira, MB., Duran, A., Hernandez-Quevedo, C., and Bernal-Delgado, E. (2010) *Health System in Transition: Spain*. European Observatory on Health Systems and Policies.

Gulliford, M., and Morgan, M. (2003) *Access to Health Care*. Psychology Press.

Hernandez-Quevedo, C. and Papanicolas, I. (2013) "Conceptualizing and Comparing Equity across Nations" in Papanicolas I. and Smith, PC. *Health System performance comparisons: An agenda for policy, information and research* (eds) Open University Press: Maidenhead.

Jimenez-Martin, S et al. (2004) 'An empirical analysis of the demand for physician services across the European Union'. *European Journal of Health Economics* 5(2): 150-165.

Jussim, L. (1991) Social perception and social reality: A reflection-construction model. *Psychological Review*. 98 (1): 54-73.

Kentikelenis, Alexander and Papanicolas, Irene (2012) Economic crisis, austerity and the Greek public health system. The European journal of public health, 22 (1): 4-5.

King G, Murray C, Salomon J, and Tandon A (2004) Enhancing the validity and cross-cultural comparability of measurement in survey research. American Political Science Review 98 (February): 191–205.

Koolman, X. (2007). Unmet need for health care in Europe. Comparative EU statistics on income and living conditions: issues and challenges. Proceedings of the EU-SILC conference. Helsinki: Eurostat.
http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-RA-07-007/EN/KS-RA-07-007-EN.PDF

Lekhan, V., Rudiy, V., and Richardson, E. (2010) Health Systems in Transition: Ukraine. European Observatory on Health Systems and Policies.

Organization for Economic Cooperation and Development (OECD) (2012) *Health at a Glance: Europe 2012,* OECD Paris.

Popvitch, L., Potapchik, E., Shishkin, S., Richardson, E., Vacroux, A., and Mathivet, B. (2011) *Health System in Transition: Russian Federation*. European Observatory on Health Systems and Policies.

Regidor, E. (2004). "Measures of health inequalities: part 1 " Journal of Epidemiology and Community Health 58: 858-861.

Saksena P, Hsu J, Evans DB (2014). Financial risk protection and universal health coverage: evidence and measurement challenges. PLoS Med 11(9): e1001701. doi:10.1371/journal.pmed.1001701

Stuckler, D., Feigl, AB., Basu, S. and McKee, M. (2010) *The political economy of universal coverage*. Background paper for the global symposium on health systems research. 16-19 November 2010. Monteux: Switzerland. http://www.pacifichealthsummit.org/downloads/UHC/the%20political%20economy%20of%20uhc.PDF

Tatar., M., Mollahaliglu, S., Sahin, B., Aydin, S., Maresso, A. and Hernandez-Quevedo, C. (2011) *Health System in Transition: Turkey*. European Observatory on Health Systems and Policies.

Theodorou, M., Charalambous, C., Petrou, C. and Cylus, J. (2012) *Health System in Transition: Cyprus*. European Observatory on Health Systems and Policies. http://www.commonwealthfund.org/~/media/Files/Publications/Fund%20Report/2012 /Nov/1645_Squires_intl_profiles_hlt_care_systems_2012.pdf

Thomson, S., Foubister, T., Figueras, J., Kutzin, J., Permanand, G. and Bryndova, L. (2009) *Addressing financial sustainability in health systems*. Policy Summary 1, World Health Organization Regional Office for Europe: Copenhagen.

Tragakes, E., Brigis, G., Karaskevica, J., Ruarnane, A., Stuburs, A., and Zusmane, E. (2008) *Health System in Transition: Latvia.* European Observatory on Health Systems and Policies.

USAID (2012) Indicators for measuring universal health care coverage: A five country analysis (draft). Maryland, USA. http://www.healthsystems2020.org/userfiles/Indicators%20for%20UHC%20Draft%2 0Report_Sept27.pdf (Accessed on 14/3/2013)

van Doorslaer E, Masseria C, Koolman X (2006) 'Inequalities in access to medical care by income in developed countries', *Canadian Medical Association Journal*, vol.174, no.2, pp. 177-183.

World Health Organization (WHO) (2010) *The World Health Report: Financing for universal Coverage.* World Health Organization

World Health Organization (WHO) (2013) *Health for all database (HFA).* World Health Organization Regional Office for Europe, Copenhagen.

Xu, K. Saksena, P., Jowett, M., Indikadahena, C., Kutzin, J and Evans, DB. (2010) *Exploring the thresholds of health expenditure for protection against financial risk.* WHO Health Report 2010 Background paper ,19.

http://www.who.int/healthsystems/topics/financing/healthreport/19THE-thresv2.pdf

Figures, and Tables

Figure 1. Percentages of respondents reporting levels of perceived access to care
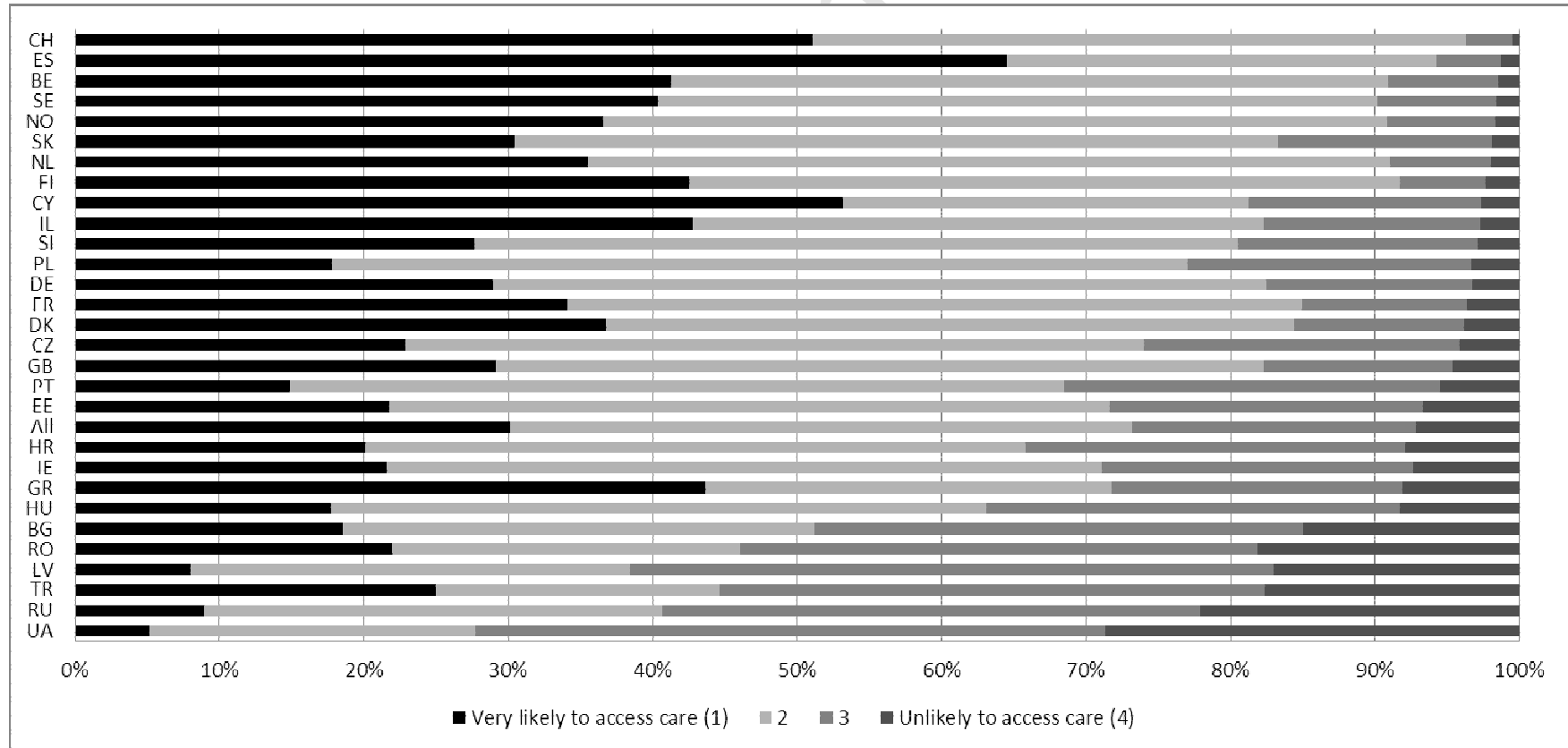
Country abbreviations: BE=Belgium; BG=Bulgaria; CH=Switzerland; CY=Cyprus; CZ=Czech Republic; DE=Germany; DK=Denmark;

EE=Estonia; ES=Spain; FI=Finland; FR=France; GB=Great Britain; GR=Greece; HR=Croatia; HU=Hungary; IE=Ireland; IL=Israel;

LV=Latvia; NL=Netherlands; NO=Norway; PL=Poland; PT=Portugal; RO=Romania; RU=Russia; SE=Sweden; SI=Slovenia; SK=Slovakia;

TR=Turkey; UA=Ukraine.

Figure 2. Model-adjusted predicted probabilities of perceived inability to access care in each country and out of pocket payments as a share of total health expenditure
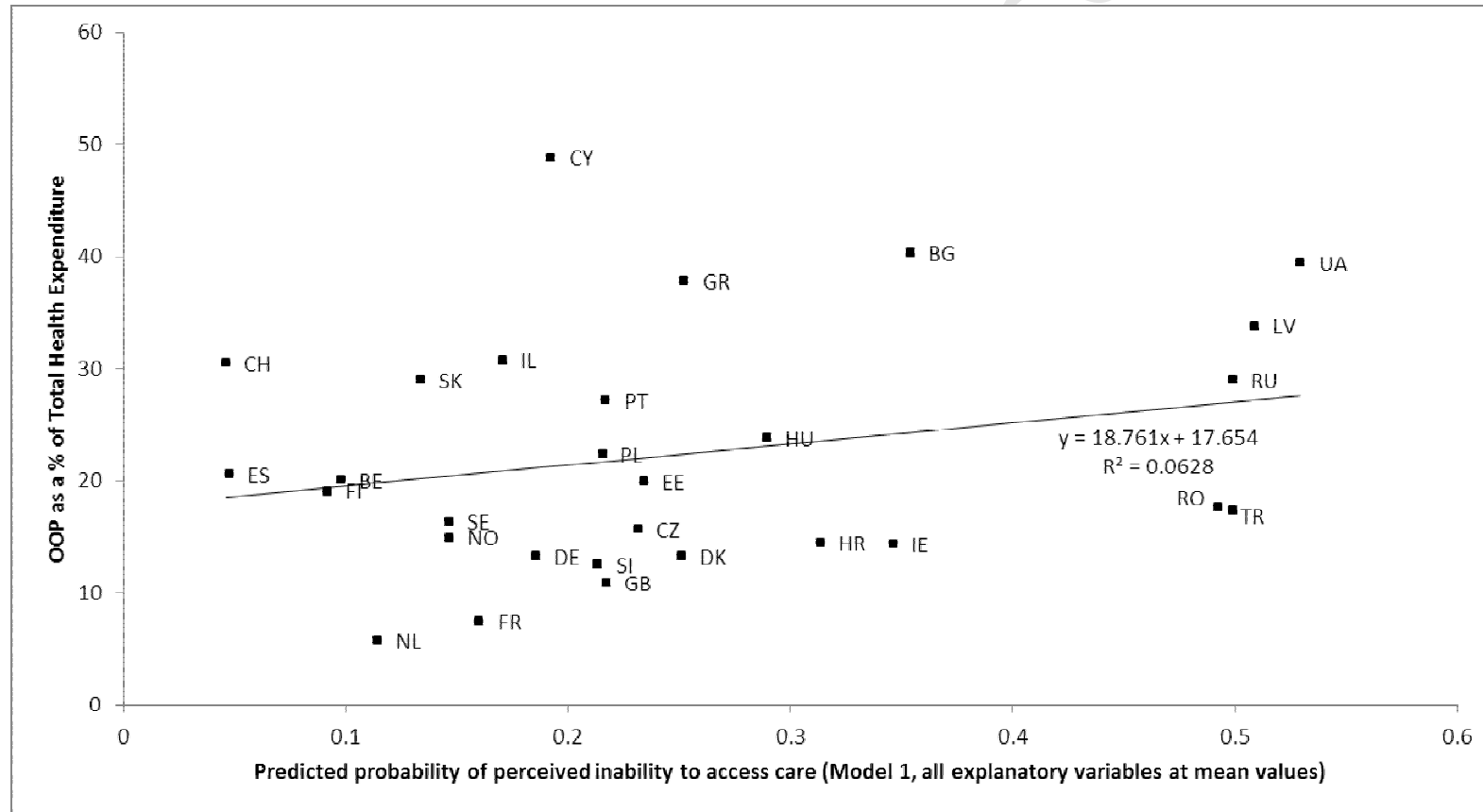
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TR=Turkey; UA=Ukraine.

Figure 3. Model-adjusted predicted probabilities of perceived inability to access care among low and high-income individuals in each country,

95% confidence intervals
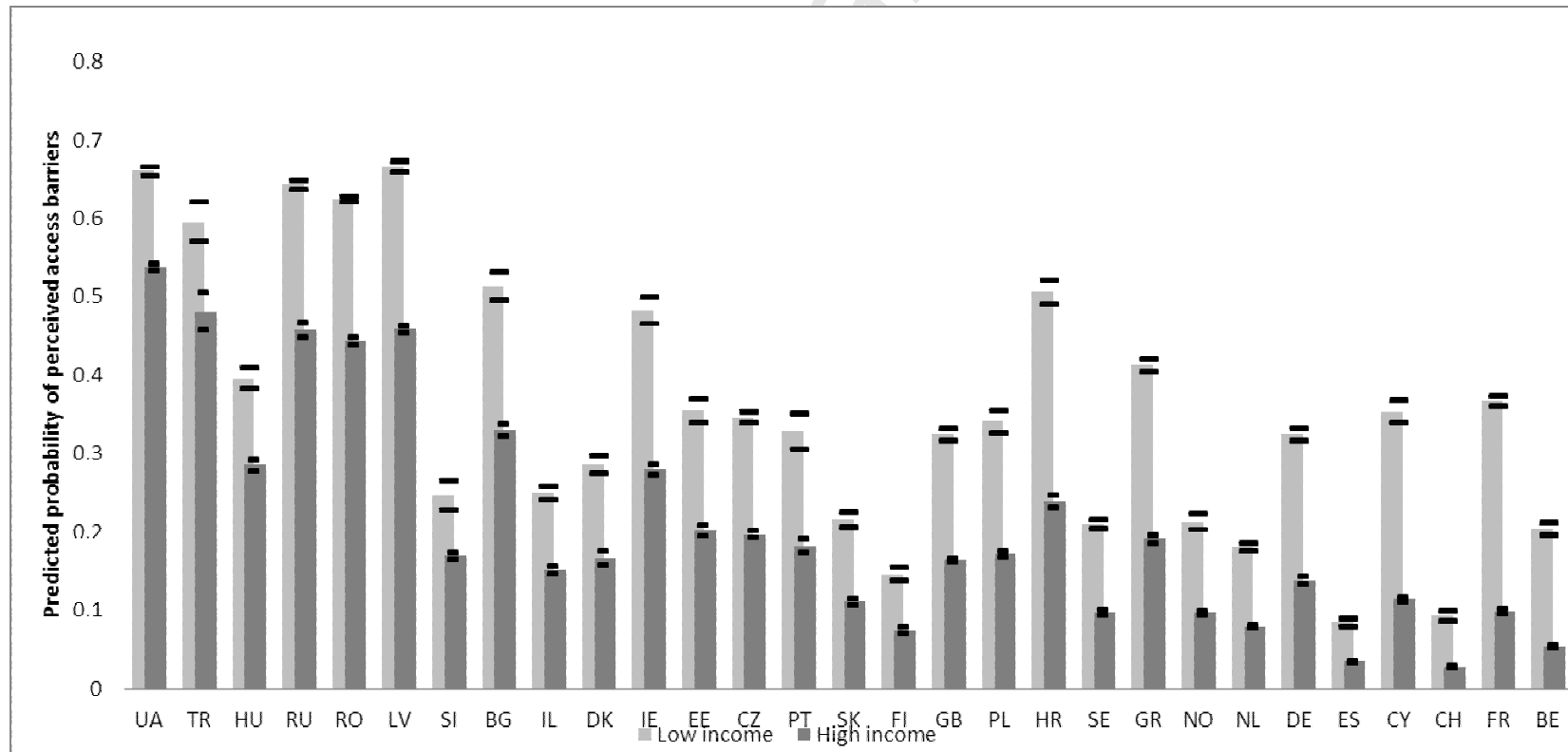
Notes: Countries are sorted from low to high based on the ratio of the probability of access barriers for individuals with low income relative to high income.

Country abbreviations: BE=Belgium; BG=Bulgaria; CH=Switzerland; CY=Cyprus; CZ=Czech Republic; DE=Germany; DK=Denmark; EE=Estonia; ES=Spain; FI=Finland; FR=France; GB=Great Britain; GR=Greece; HR=Croatia; HU=Hungary; IE=Ireland; IL=Israel; LV=Latvia; NL=Netherlands; NO=Norway; PL=Poland; PT=Portugal; RO=Romania; RU=Russia; SE=Sweden; SI=Slovenia; SK=Slovakia; TR=Turkey; UA=Ukraine.

Table 1. Model results for logistic regressions estimating perceived inability to access care, odds ratios

|		Model 1 (using income perceptions)	Model 2 (using income deciles)	Model 3 (income perception categories and country fixed effect interactions)	Model 4 (low income perceptions and country fixed effect interactions)
Subjective health (relative to very good)	Good	1.140	1.189**	1.134	1.171*
		(0.0905)	(0.0733)	(0.0887)	(0.0818)
	Fair	1.586***	1.627***	1.575***	1.659***
		(0.0873)	(0.0964)	(0.0894)	(0.0863)
	Bad	2.662***	3.040***	2.611***	2.763***
		(0.205)	(0.220)	(0.221)	(0.213)
	Very Bad	2.884***	3.606***	2.807***	3.106***
		(0.289)	(0.395)	(0.283)	(0.308)
Marital status (relative to unmarried)	Married	1.007	1.016	1.022	0.994
		(0.0598)	(0.0595)	(0.0547)	(0.0535)
Citizenship (relative to non-citizen residing in country)	Citizen of country	0.647***	0.592***	0.662***	0.654***
		(0.0519)	(0.0731)	(0.0585)	(0.0572)
Household size	Number of people in household	1.022	1.044***	1.028	1.028
		(0.0190)	(0.0106)	(0.0201)	(0.0183)
Education	Years of education	0.974***	0.968***	0.973***	0.965***
		(0.00497)	(0.00750)	(0.00433)	(0.00495)

	Education	0.776*	0.803	0.764**	0.775*
		(0.0770)	(0.124)	(0.0789)	(0.0808)
	Unemployed looking for job	1.381***	1.525***	1.364***	1.461***
		(0.108)	(0.139)	(0.115)	(0.116)
	Unemployed not looking for job	1.603***	1.924***	1.610***	1.703***
		(0.150)	(0.229)	(0.142)	(0.155)
	Permanently sick or disabled	1.132	1.305**	1.104	1.185
Activity last 7 days (relative to doing page work)		(0.102)	(0.109)	(0.106)	(0.105)
	Retired	1.160	1.180*	1.164	1.207*
		(0.0958)	(0.0972)	(0.0937)	(0.0914)
	Community or military service	1.618	0.495	1.623	1.672
		(0.786)	(0.313)	(0.797)	(0.871)
	Housework or looking after children	0.962	0.949	0.962	0.984
		(0.0802)	(0.0694)	(0.0802)	(0.0817)
	Other	1.011	0.843	0.997	0.999
		(0.0856)	(0.106)	(0.0827)	(0.0829)
Age (relative to below 20)	20-29	1.510*	1.498**	1.495*	1.550*
		(0.305)	(0.234)	(0.302)	(0.319)
	30-39	1.370	1.402	1.351	1.418
		(0.298)	(0.292)	(0.298)	(0.315)
	40-49	1.398	1.422	1.381	1.443
		(0.335)	(0.307)	(0.335)	(0.351)

	50-59	1.504	1.545	1.491	1.550
		(0.434)	(0.438)	(0.433)	(0.461)
	60-69	1.382	1.347	1.388	1.407
		(0.499)	(0.458)	(0.501)	(0.514)
	70-79	1.391	1.230	1.399	1.386
		(0.433)	(0.296)	(0.437)	(0.433)
	80+	1.474	1.160	1.475	1.445
		(0.441)	(0.260)	(0.436)	(0.433)
Employment volatility	Ever unemployed 3 months	1.295***	1.326***	1.288***	1.333***
		(0.0537)	(0.0372)	(0.0551)	(0.0522)
Gender (relative to male)	Female	1.101**	1.135***	1.104***	1.113***
		(0.0324)	(0.0324)	(0.0325)	(0.0326)
Income perceptions (relative to "Living comfortably on present income"	Coping with income	1.976***		2.996***	
		(0.221)		(0.0351)	
	Difficult to get by	3.632***		5.924***	
		(0.565)		(0.158)	
	Very difficult to get by	5.766***		15.59***	
		(0.992)		(0.530)	
Income deciles (relative to decile 1 - high income)	Decile 2		1.179		
			(0.183)		
	Decile 3		1.537**		
			(0.251)		
	Decile 4		1.823**		

			(0.404)		
	Decile 5		1.587		
			(0.388)		
	Decile 6		1.949**		
			(0.478)		
	Decile 7		2.105***		
			(0.428)		
	Decile 8		2.389***		
			(0.550)		
	Decile 9		2.415***		
			(0.403)		
	Decile 10		3.101***		
			(0.629)		
Income perceptions binary variable (relative to living comfortably or coping with present income)	Difficult or very difficult with present income				3.599***
					(0.0774)
Country fixed effects * income perception categories				YES	
Country fixed effects * low income binary variable					YES
Country fixed effects		YES	YES	YES	YES
Constant		0.0195***	0.0205***	0.0132***	0.0257***
		(0.00522)	(0.00404)	(0.00350)	(0.00696)
	Observations	51,835	38,585	51,835	51,835

| Pseudo R2 | 0.245 | 0.232 | 0.249 | 0.241 |

Robust standard errors clustered at country level

*** p<0.001, ** p<0.01, * p<0.05

Appendix.

Table 1. Sample sizes

Country	Frequency	Percent
BE	1,760	3.1
BG	2,230	3.93
CH	1,819	3.21
CY	1,215	2.14
CZ	2,018	3.56
DE	2,751	4.85
DK	1,610	2.84
EE	1,661	2.93
ES	2,576	4.54
FI	2,195	3.87
FR	2,073	3.65
GB	2,352	4.14
GR	2,072	3.65
HR	1,484	2.61
HU	1,544	2.72
IE	1,764	3.11
IL	2,490	4.39
LV	1,980	3.49
NL	1,778	3.13
NO	1,549	2.73

PL	1,619	2.85
PT	2,367	4.17
RO	2,146	3.78
RU	2,512	4.43
SE	1,830	3.22
SI	1,286	2.27
SK	1,810	3.19
TR	2,416	4.26
UA	1,845	3.25
Total	56,752	100

Country abbreviations: BE=Belgium; BG=Bulgaria; CH=Switzerland; CY=Cyprus; CZ=Czech Republic; DE=Germany; DK=Denmark;

EE=Estonia; ES=Spain; FI=Finland; FR=France; GB=Great Britain; GR=Greece; HR=Croatia; HU=Hungary; IE=Ireland; IL=Israel;

LV=Latvia; NL=Netherlands; NO=Norway; PL=Poland; PT=Portugal; RO=Romania; RU=Russia; SE=Sweden; SI=Slovenia; SK=Slovakia;

TR=Turkey; UA=Ukraine.

Appendix Table 2. Model results for ordinal logistic regressions estimating perceived inability to access care, odds ratios

		Model 1 (using income perceptions)	Model 2 (using income deciles)	Model 3 (income perception categories and country fixed effect interactions)	Model 4 (low income perceptions and country fixed effect interactions)
Subjective health (relative to very good)	Good	1.237***	1.256***	1.234***	1.281***
		(0.0593)	(0.0490)	(0.0605)	(0.0580)
	Fair	1.535***	1.551***	1.534***	1.630***
		(0.0681)	(0.0893)	(0.0689)	(0.0799)
	Bad	2.616***	3.027***	2.613***	2.802***
		(0.287)	(0.319)	(0.292)	(0.313)
	Very Bad	3.455***	4.577***	3.493***	4.107***
		(0.398)	(0.646)	(0.401)	(0.510)
Marital status	Married	0.964	0.960	0.961	0.934
		(0.0417)	(0.0437)	(0.0419)	(0.0381)
Citizenship	Citizen of country	0.772***	0.771**	0.763***	0.746***
		(0.0563)	(0.0703)	(0.0546)	(0.0528)
Household size	Number of people in household	1.037*	1.066***	1.038*	1.036*
		(0.0183)	(0.0134)	(0.0181)	(0.0162)
Education	Years of education	0.976***	0.972***	0.976***	0.966***
		(0.00486)	(0.00320)	(0.00451)	(0.00467)
Activity last 7 days (relative to	Education	0.691***	0.652**	0.691***	0.701***

doing page work)		(0.0626)	(0.0849)	(0.0620)	(0.0635)
	Unemployed looking for job	1.280**	1.412***	1.299**	1.410***
		(0.108)	(0.127)	(0.108)	(0.112)
	Unemployed not looking for job	1.557**	1.766**	1.593**	1.694***
		(0.245)	(0.319)	(0.243)	(0.264)
	Permanently sick or disabled	0.876	0.951	0.885	0.952
		(0.0754)	(0.0601)	(0.0813)	(0.0816)
	Retired	1.026	1.033	1.032	1.082
		(0.0675)	(0.0933)	(0.0697)	(0.0704)
	Community or military service	1.296	0.744	1.304	1.354
		(0.533)	(0.279)	(0.534)	(0.623)
	Housework or looking after children	0.884*	0.909	0.884	0.913
		(0.0550)	(0.0466)	(0.0555)	(0.0554)
	Other	0.980	0.902	0.994	0.992
		(0.107)	(0.0931)	(0.106)	(0.0997)
Age (relative to below 20)	20-29	1.326	1.386**	1.330	1.401*
		(0.196)	(0.162)	(0.198)	(0.198)
	30-39	1.315	1.410*	1.321	1.409
		(0.245)	(0.243)	(0.246)	(0.257)
	40-49	1.284	1.358	1.285	1.366
		(0.254)	(0.243)	(0.254)	(0.264)
	50-59	1.278	1.356	1.277	1.342
		(0.280)	(0.292)	(0.283)	(0.300)
	60-69	1.224	1.247	1.224	1.246
		(0.357)	(0.358)	(0.359)	(0.363)

	70-79	1.124	1.069	1.121	1.108
		(0.287)	(0.222)	(0.286)	(0.275)
	80+	1.064	0.931	1.060	1.038
		(0.306)	(0.218)	(0.304)	(0.293)
Employment volatility	Ever unemployed 3 months	1.240***	1.286***	1.243***	1.287***
		(0.0476)	(0.0416)	(0.0469)	(0.0507)
Gender	Female	1.111***	1.119***	1.115***	1.124***
		(0.0276)	(0.0278)	(0.0274)	(0.0308)
Income perceptions (relative to "Living comfortably on present income"	Coping with income	1.821***		1.680***	
		(0.117)		(0.0381)	
	Difficult with income	2.995***		2.160***	
		(0.289)		(0.101)	
	Very difficult with income	5.615***		1.740***	
		(0.674)		(0.121)	
Income deciles (relative to decile 1 - high income)	Decile 2		1.179		
			(0.100)		
	Decile 3		1.459***		
			(0.131)		
	Decile 4		1.663***		
			(0.178)		
	Decile 5		1.489***		
			(0.177)		
	Decile 6		1.787***		
			(0.256)		
	Decile 7		1.941***		

			(0.180)		
	Decile 8		2.184***		
			(0.247)		
	Decile 9		2.277***		
			(0.235)		
	Decile 10		2.886***		
			(0.415)		
Income perceptions binary variable (relative to living comfortably or coping with present income)	Difficult or very difficult with present income				1.596***
					(0.0566)
Country fixed effects * income perception categories				YES	
Country fixed effects * low income binary variable					YES
Country fixed effects		YES	YES	YES	YES
Constant	Constant (cut 1 ordinal)	1.731*	2.123***	1.585*	1.184
		(0.380)	(0.407)	(0.350)	(0.257)
	Constant (cut 2 ordinal)	17.52***	20.50***	16.17***	11.70***
		(4.217)	(5.217)	(3.799)	(2.750)
	Constant (cut 3 ordinal)	113.1***	127.3***	105.3***	74.45***
		(28.07)	(33.49)	(25.41)	(18.11)
	Observations	51,835	38,585	51,835	51,835
	Pseudo R2	0.140	0.127	0.142	0.134

Robust standard errors clustered at country level

*** $p<0.001$, ** $p<0.01$, * $p<0.05$

Appendix Table 3. Country fixed effects and country fixed effect * low income interaction, odds ratios (Model 4)

	Country fixed effects	Country*low income
BE	1.997***	1.253***
	(0.0432)	(0.0260)
BG	17.31***	0.596***
	(0.454)	(0.0210)
CY	4.530***	1.179***
	(0.0898)	(0.0445)
CZ	8.622***	0.600***
	(0.213)	(0.0138)
DE	5.660***	0.830***
	(0.163)	(0.0117)
DK	7.003***	0.559***
	(0.251)	(0.0108)
EE	8.893***	0.603***
	(0.174)	(0.00812)
ES	1.244***	0.725***
	(0.0289)	(0.0134)
FI	2.826***	0.592***
	(0.103)	(0.00834)
FR	3.862***	1.470***
	(0.0995)	(0.0274)
GB	6.938***	0.677***
	(0.126)	(0.0113)
GR	8.262***	0.832***

	(0.181)	(0.0189)
HR	11.07***	0.907***
	(0.367)	(0.0253)
HU	14.03***	0.457***
	(0.416)	(0.0123)
IE	13.66***	0.668***
	(0.364)	(0.0182)
IL	6.251***	0.521***
	(0.179)	(0.00978)
LV	29.87***	0.652***
	(0.472)	(0.0128)
NL	3.003***	0.716***
	(0.0703)	(0.0110)
NO	3.773***	0.702***
	(0.0701)	(0.00874)
PL	7.291***	0.693***
	(0.207)	(0.0265)
PT	7.838***	0.609***
	(0.234)	(0.0185)
RO	28.01***	0.581***
	(0.660)	(0.0160)
RU	29.77***	0.593***
	(0.732)	(0.0190)
SE	3.807***	0.684***
	(0.0977)	(0.0146)
SI	7.184***	0.446***

	(0.187)	(0.0193)
SK	4.392***	0.612***
	(0.144)	(0.0141)
TR	32.69***	0.441***
	(1.767)	(0.0136)
UA	40.95***	0.465***
	(0.936)	(0.0131)

*** $p<0.001$, ** $p<0.01$, * $p<0.05$

Country abbreviations: BE=Belgium; BG=Bulgaria; CH=Switzerland; CY=Cyprus; CZ=Czech Republic; DE=Germany; DK=Denmark;

EE=Estonia; ES=Spain; FI=Finland; FR=France; GB=Great Britain; GR=Greece; HR=Croatia; HU=Hungary; IE=Ireland; IL=Israel;

LV=Latvia; NL=Netherlands; NO=Norway; PL=Poland; PT=Portugal; RO=Romania; RU=Russia; SE=Sweden; SI=Slovenia; SK=Slovakia;

TR=Turkey; UA=Ukraine.