


Article

Exploring the Predictors of Co-Nationals' Preference over Immigrants in Accessing Jobs—Evidence from World Values Survey

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Abstract: This paper presents the results of an exploration of the most resilient influences determining the attitude regarding prioritizing co-nationals over immigrants for access to employment. The source data were from the World Values Survey. After many selection and testing steps, a set of the seven most significant determinants was produced (a fair-to-good model as prediction accuracy). These seven determinants (a hepta-core model) correspond to some features, beliefs, and attitudes regarding emancipative values, gender discrimination, immigrant policy, trust in people of another nationality, inverse devoutness or making parents proud as a life goal, attitude towards work, the post-materialist index, and job preferences as more inclined towards self rather than community benefits. Additional controls revealed the significant influence of some socio-demographic variables. They correspond to gender, the number of children, the highest education level attained, employment status, income scale positioning, settlement size, and the interview year. All selection and testing steps considered many principles, methods, and techniques (e.g., triangulation via adaptive boosting (in the Rattle library of R), and pairwise correlation-based data mining—PCDM, LASSO, OLS, binary and ordered logistic regressions (LOGIT, OLOGIT), prediction nomograms, together with tools for reporting default and custom model evaluation metrics, such as ESTOUT and MEM in Stata). Cross-validations relied on random subsamples (CVLASSO) and well-established ones (mixed-effects). In addition, overfitting removal (RLASSO), reverse causality, and collinearity checks succeeded under full conditions for replicating the results. The prediction nomogram corresponding to the most resistant predictors identified in this paper is also a powerful tool for identifying risks. Therefore, it can provide strong support for decision makers in matters related to immigration and access to employment. The paper's novelty also results from the many robust supporting techniques that allow randomly, and non-randomly cross-validated and fully reproducible results based on a large amount and variety of source data. The findings also represent a step forward in migration and access-to-job research.

Keywords: immigration; access to employment; regression and classification models; collinearity and reverse causality checks; performance comparisons and reporting; triangulation; cross-validations; full support for replication of results

MSC: 60-02

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1. Introduction

A well-known saying by Andrew Smith states: “People fear what they don't understand and hate what they can't conquer”. Migration is a generalized phenomenon as old as humanity [1]. Moreover, it seems to belong to all historical periods and all continents. Consequently, it became an issue of growing public concern [2]. In today's highly globalized and knowledge-based economies [3], migration is responsible for affecting individuals and societies multi-dimensionally [4]. According to Kanbur and Rapoport (2005) [5], its effects apply to both countries of origin and destination, and some of them relate to brain drain and widening income gaps [6].

In terms of migration motivations, the search for jobs [7,8] is one of them and the basis for the hope of a stable [9], if not better, life [10]. The latter seems natural to human beings [11]. Sensitivity to immigration, a process that affects both the immigrants and the native population [12], depends significantly on the country under consideration [13]. A well-known example of negative public perception is related to the concern that immigrants take the jobs of native-born workers [14–16]. Additionally, this will be translated into negative feelings of native residents towards immigrants and even less supportive attitudes towards pro-immigration policies [17], more as an expression of fear. These labor-market-related concerns [18] considered together with some other economic worries, such as the competition for economic and political power, social status, and the concern for crimes affecting individual security and material welfare form a large category known as realistic threats [19], the latter perhaps is even an expression of hatred.

In the same category of realistic threats (many of macroeconomic nature), we can find another explanation for negative perceptions of immigrants. This explanation seems to be related to the competition for limited resources [20–22] as a primary source of the conflict of interests between groups [23], mainly focused on cost–benefit reasons coupled with some other considerations such as geographical disproportions [24].

Other studies are more focused on socio-demographic and individual features. They show that women and those with higher education and income were more positive toward immigration, whereas older people and people with more seniority at work were considerably more negative [25]. The latter is confirmed in studies focused on comparing young people with adults in such specific terms [26]. Still, recent studies indicate that younger generations may, in fact, harbor more negative attitudes towards immigrants [27]. In addition, people who subscribe to conservative political ideologies are more likely to show negative attitudes toward immigrants [28]. Moreover, some personality traits, such as social domination orientation and right-wing authoritarianism, which reflect attitudes toward social hierarchy, equality, respect for authority, and traditional values, can condition individual perceptions of immigrants as inferior or even a threat [29,30].

Regarding another category of threats, namely the symbolic ones, Mangum and Block (2018) [31] consider that social identity affects public opinion on immigration and immigrants. In these terms, cultural differences coupled with the size of the minority group can act as threats to the values and identity of the majority [32]. Closely related to individual traits, other scholars [33] have shown that more educated people place a much higher value on the cultural diversity of society, believing that immigration generates benefits for society. The latter suggests that education is a transformative force capable of changing individual and collective values, and also encouraging people to be more confident, tolerant, and open [34].

Therefore, in addition to apparent reasons such as fear or hatred, attitudes towards immigrants and their access to jobs depend to a large extent on a whole range of more complex reasons related to individual and group characteristics, including personality traits, age, level of education, values and attitudes transmitted and developed, cultural diversity, and policies related to these phenomena. And this, of course, without claiming that this list is exhaustive.

The article further reviews the literature on the perceptions related to both migration and migrants as potential occupants of jobs. Then, it describes the data and methodology used, before presenting and discussing the main findings in a dedicated section. The latter captures the focus of the current study, namely the discovery of the determinants of the public perception's preference for citizens over immigrants regarding access to jobs. Additionally, this is achieved by insisting on emphasizing causal relations and eliminating redundancies after performing many robustness checks in advance.

2. Related Work

According to Ambrosini (2013) [35], at a certain point, many local governments developed a policy of excluding immigrants, motivated by reasons of security, the priority

of national citizens' access to various social benefits, and the defense of the cultural identity of the territory. Additionally, the opposite could work here, which means that such policies inevitably generate some perceptions [36] and indirectly change the public perception of immigrants. In some cases, they can destabilize the moral panics nurtured by it [37]. However, the relationship between the two exists and was a source of some debates and discussions in the literature [2,38,39]. Ivarsflaten (2005) [40] even compared the impact that some elites exert, which has the potential to impact change in the public perception that diversity poses a threat. This author concluded that the former would undoubtedly be less significant.

Regarding the Big Five personality traits and their potential impact on immigration acceptance, Rueda (2018) [41] stated that altruism is an important omitted variable in many political economy studies, which focuses on self-interest rather than on aversion to inequality. Stafford (2020) [42] examined the relationship between attitudes towards immigration and the Big Five personality traits. She found that personality traits, especially those related to altruism, are not just simple influences but essential determinants of attitudes toward immigrants, even with controls for political predispositions and socio-demographic characteristics.

Kunst et al. (2015) [43] discuss the common identity notion, which seems to be crucial for securing the altruistic efforts of the majority to integrate immigrants and, thus, for achieving functional multiculturalism. Still, some research on multicultural beliefs [44] has shown that multiculturalism can cause negative reactions against immigrants and minority groups. This is because the members of the majority sometimes perceive it as threatening their position and identity [45]. Moreover, other studies [46,47] suggest a strong relation between immigration acceptance and emancipative and democratic values. The latter is not necessarily incompatible with the idea of multiculturalism [48]. On the other hand, the perceived high discrimination and lack of acceptance hinder the positive impact of any integration guidelines [49].

In terms of interpersonal trust, according to Pellegrini et al. (2021) [50], this is a mediator between the experienced social exclusion and anti-immigrant attitudes. The experience of being socially excluded reduces feelings of generalized interpersonal trust that, in turn, promote hostile attitudes towards immigrants. Rustenbach (2010) [51] found this type of trust to be a strong predictor of anti-immigrant attitudes.

According to Ensign and Robinson (2011) [52], conventional thinking suggests that immigrants have no choice but to work as entrepreneurs or be self-employed, which is somehow to the detriment of the idea that entrepreneurial attitudes make them migrate. Moreover, it is worth mentioning that employers assign particular meanings to the migrant identity [53], which allows them to enjoy the benefits of cheap, exploitable, and hard-working employees. In some cases, migrants use this identity to obtain jobs, enduring exploitation, including the peculiar form of working below their skill level. Still, accepting hard work at lower wages [54] is explained by the dreams of future self-employment of the immigrant workers.

Therefore, considering the arguments presented here and in the Introduction section, the main hypotheses of this paper are:

H1. *The opinion on immigration policy is closely related to or even a determinant of the level of public acceptance of immigrants as potential job occupants [35,55].*

H2. *Those who subscribe to altruism [56], including working in the benefit of large communities, emancipative values [57], and against any discrimination no matter the type [58], ideologies including multiculturalism [59], and trust in people no matter their origins, are more inclined to accept immigrants when it comes to access to jobs.*

H3. *The ones being more attached to their cultural values and traditions [60] as part of their national identity [61–63] are more likely to be against immigrants as potential job occupants.*

H4. *The attitude towards work and entrepreneurship (as an expression of independence) could be a determinant for this specific type of immigrant acceptance [64–66].*

H5. *The respondent’s socio-demographic features are also significant predictors for this kind of acceptance [67,68].*

3. Materials and Methods

This article started from one of the most comprehensive datasets of the World Values Survey (WVS). The latter (version 1.6, WVS_TimeSeries_stata_v1_6.dta) includes 1045 variables and 426,452 observations. Its .csv export followed the simple binary derivation (C002bin) of the original variable to analyze (C002, Jobs scarce: Employers should prioritize nation people than immigrants). Additionally, this was achieved by considering the two extremes of its original three-point scale (Agree, Disagree, Neither—Tables A1 and A2, Appendix A). The option to generate numerical values for labeled variables was enabled when exporting.

The next step was to load this .csv export into the Rattle data mining interface (version 5.4.0) of R, then set C002bin as the target, ignore its source (C002) from the list of inputs and apply the adaptive boosting technique for the decision tree classifiers [69]. This step was performed [70,71] using default settings (Figure 1) to discover the most important related variables. The latter was the 1st data mining and selection round.

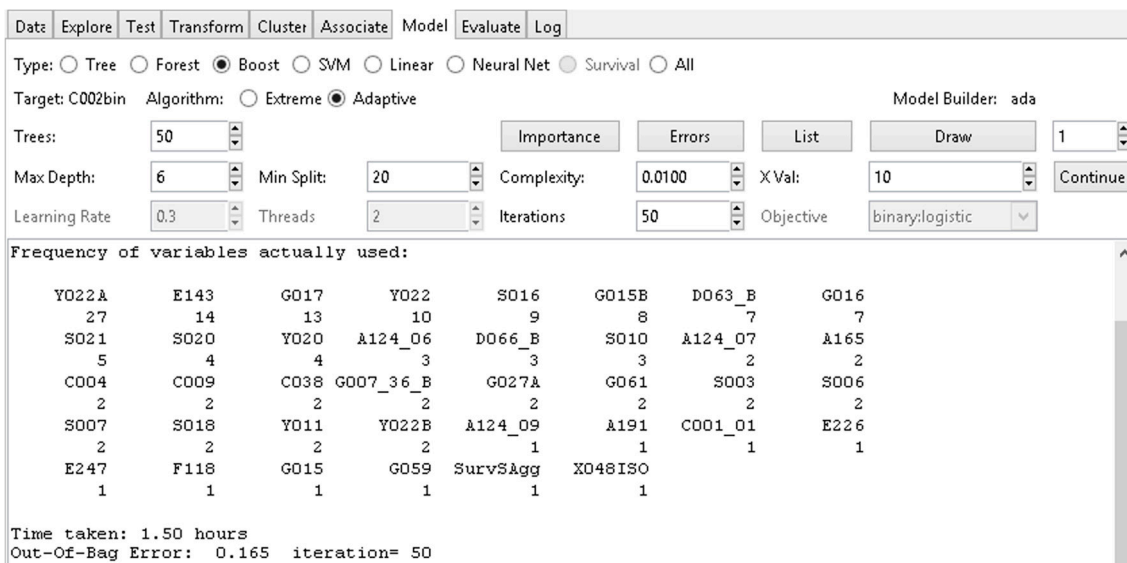


Figure 1. The results of the first selection round using adaptive (Ada) boosting in Rattle.

A consolidation of the set of variables used followed. It involved the ones remaining after the previous step. In some cases, such as with aggregate indexes, it included their sources.

The 2nd selection round stood on a set of filters applied. First, they met a minimum threshold of 0.1 [72] for the absolute values of pairwise correlation coefficients [73] between each recoded variable from the previous step and the one that was to be analyzed. In addition, there was a minimum value of the corresponding significance ($\min p = 0.001$) and a minimum support afferent to a minimum number of valid observations (at least a third of the total number) for each pair.

A processing/recoding phase followed. It involved all remaining variables (after the 2nd selection phase). Additionally, some socio-demographic ones for control and cross-validations purposes benefited this treatment. It mostly meant removing the missing and DK/NA (do not know/no answer) values [74] and reversing the scales in the case of larger values which do not reflect higher intensities, but vice versa.

Next, the 3rd selection phase occurred using mixed-effects modeling [75–77] in Stata 17 MP (64-bit version). The latter included both fixed-effects (the remaining variables after the 2nd selection phase and recoded at the previous step—top of Table A1, Appendix A) and random effects (clusters on gender, age, marital status, number of children, education level, income level, professional situation, region, settlement size, and survey year—bottom of Tables A1 and A2, Appendix A). Only those variables not losing significance no matter the clustering criteria and the mixed-effects regression type (both the melogit for the binary form of the response variable and the meologit for the one having values on a scale) resulted in this selection point.

Next, the 4th selection round took place also in Stata. It consisted of successive invocations (stages) of two powerful commands in the LASSO [78] package (CVLASSO to perform random cross-validations and RLASSO for controlling overfitting) until there was no loss in selections.

At the next step (5th round), reverse causality checks served the selection. The latter meant using pairs of individual models built by taking only each of the remaining influences and the variable to analyze (wished roles) and by reversing their roles (the response becomes an input and vice versa or reversed roles). Only some resulted after using ordered logit regressions. It is about the ones generating more explanatory power [79]/larger R-squared (or pseudo R-squared in the form of McFadden’s R-squared as reported by Stata for non-OLS regressions such as logit, ologit, meologit, etc.—explanations by Professor Richard Williams of the University of Notre Dame, <https://www3.nd.edu/~rwilliam/stats3/L05.pdf> (accessed on 25 January 2023) and more information gain/smaller values for both AIC and BIC [80] for the wished roles vs. the reversed ones. They acted as determinants (predictors).

The 6th selection phase focused on testing the existing collinearity between the remaining influences (those emerging after the 3rd phase) and the selected predictors (those resulting after the 4th). Ordinary least squares (OLS) regressions served, and the computed VIF (variance inflation factor) stood against (Equation (1)) the maximum accepted VIF threshold of the model [81,82]. In addition, the maximum absolute values from the matrices with correlation coefficients (maxAbsVPMCC) [83] corresponding to both influences and predictors were objects of evaluation [72,84].

$$\text{Model's maximum accepted VIF} = 1/(1 - \text{model's R-squared}) \quad (1)$$

Additionally, a prediction nomogram [85] resulted when using the *nomolog* command (after its previous installation using the following command: *net install st0391_1, replace from (http://www.stata-journal.com/software/sj15-3)*), and considering the most stalwart remaining predictors).

Finally, each socio-demographic variable previously used for cross-validations served controlling purposes (new models). The latter meant adding them one by one on top of the existing most robust model. They included the most resilient predictors emerging after the previous selection round.

All data processing and tests took place on a Windows Server Datacenter virtual machine (Intel Xeon Gold 6240 CascadeLake CPU and ~32 Gigabytes of memory) in a private cloud. The reporting of the results mainly benefited from the *estout* prerequisite package (*ssc install estout, replace*) with support for both the *eststo* and *esttab* commands [86,87], allowing the direct generation of tables (in the console and as external files, respectively) with default performance metrics, as well as some additional ones [83] of well-known statistical models.

As the reviewers of this manuscript have suggested (and I thank them very much for this observation), there are significant differences between data mining and statistics. Among others, they concern the approaches and techniques used, the propositions and hypothesis statement (loosely vs. well-defined), and the considered type and volume of data (all available vs. sample; several million to a few billion data points vs. hundreds to thousands). In addition, there are also consistent differences between exploratory approaches and those specific to empirical science. This paper benefits from the advantages

of all these categories. The letter is coupled with those emerging when comparing the results obtained this way with the ones from the existing scientific theory.

4. Results

After performing the first selection step using adaptive boosting (in the Rattle library—<https://rattle.togaware.com> of R, accessed on 22 October 2022), a set of 38 variables resulted (Figure 1).

As seen in Figure 1, one way to look at the importance of the resulting variables is by considering their corresponding frequencies of use in the tree construction.

The next concern before going to the second selection step, dedicated to filters on absolute values of pairwise correlation coefficients, was to find and keep (consolidation) only the sources of the following variables:

- (a) Y011 as DEFIANCE—Welzel defiance sub-index with three components (AUTHORITY or inverse respect for it, NATIONALISM or inverse national pride, and DEVOUT or Inverse Devoutness) derived from E018 (Future changes: Greater respect for the authority), G006 (How proud of nationality), and D054 (One of the main goals in life has been to make my parents proud);
- (b) Y020 as RESEMAVAL—Welzel emancipative values index (<https://www.worldvaluessurvey.org/WVSContents.jsp?CMSID=welzelidx&CMSID=welzelidx>, accessed on 22 October 2022) with four classes of components dedicated to AUTONOMY (A029 as Important child qualities: independence, A034 as Important child qualities: imagination, and A042 as Important child qualities: obedience), EQUALITY (C001_01 as Jobs scarce: Men should have more right to a job than women, D059 as Men make better political leaders than women do, and D060 as University is more important for a boy than for a girl), CHOICE (F118 as Justifiable: Homosexuality, F120 as Justifiable: Abortion, and F121 as Justifiable: Divorce), and VOICE (E001 as Aims of the country: first choice, E002 as Aims of the country: second choice, E003 as Aims of respondent: first choice, and E004 as Aims of respondent: second choice);
- (c) Y022 as EQUALITY—Welzel equality sub-index as C001, D059, and D060;
- (d) SurvSAgg that served to build the cultural map (<https://www.worldvaluessurvey.org/WVSContents.jsp?CMSID=tradrat&CMSID=tradrat>, accessed on 22 October 2022) starting from a set of source variables:
 - A008 (Feeling of happiness).
 - A165 (Can most people be trusted?).
 - E018 (Future changes such as greater respect for authority).
 - E025 (Political action such as signing a petition).
 - F063 (How important is God in your life?).
 - F118 (Is homosexuality justifiable?).
 - F120 (Is abortion justifiable?).
 - G006 (How proud of nationality?).
 - Y002 (Post-materialist index 4-item).
 - Y003 (Autonomy index).

After this consolidation point, 51 unique variables resulted: A008 (Section 4 (d) above), A029, A034, and A042 (Section 4 (b) above), A124_06 (Neighbors: Immigrants/foreign workers), A124_07 (Neighbors: People who have AIDS), A124_09 (Neighbors: Homosexuals), A165 (Section 4 (d) above), A191 (It is important to this person living in secure surroundings), C001_01 (Section 4 (b) above), C004 (Jobs scarce: older people should be forced to retire) C009 (First choice, if looking for a job), C038 (People who don't work turn lazy), D054 (Section 4 (a) above), D059, and D060 (Section 4 (b) above), D063_B (Job best way for women to be independent), D066_B (Problem if women have more income than husband), E001, E002, E003, and E004 (Section 4 (b) above), E018 (Section 4 (a) and above), E025 (Section 4 (d) above), E143 (Immigrant policy), E226 (Democracy: People choose their leaders in free elections), E247 (Priority: Global poverty versus National problems), F063, F118, and F120 (Section 4 (d) above), F121 (Section 4 (b) above), G006 (Section 4 (d) above), G007_36_B (Trust: People of another nationality), G015 and G015B (citizenship), G016

(Language at home), G017 (birth country), G027A (Respondent immigrant), G059 (Effects of immigrants on the development of own country), G061 (Measures taken by the government when people from other countries are coming here to work), S003 (ISO 3166-1 numeric country code), S006 (Original respondent number), S007 (Unified respondent number), S010 (Total length of interview), S016 (Language in which interview was conducted), S018 (weight), S020 (Year of survey), S021 (Country-wave-study-set-year), X048ISO (Counties and Country Macroregions ISO 3166-2), Y002, and Y003 (Section 4 (d) above).

After performing the second phase meant for filters starting from pairwise correlation coefficients as absolute values (≥ 0.1), together with their significance ($p < 0.001$) and support (at least a third of the data or $N > 142,150$), 19 variables resulted as indicated in Table 1. The same results were more easily achieved using the PCDM command (Stata script at <https://tinyurl.com/25pd6mx6>, accessed on 30 January 2023) in Stata [73] and three parameters (minacc (0.1) minn (142,150) maxp (0.001)) corresponding to those three filters above.

Table 1. Tabular view of the results of the second selection round based on magnitude of correlation coefficients, support, and significance.

Outcome(y)	Input(x)	Correl.Coeff.(CC)	Abs.Val.CC(ACC)	No.Obs.(Nobs)	Signif.(p)
C002bin	A124_06	0.107909689	0.107909689	319909	0
C002bin	A124_07	0.142095439	0.142095439	317298	0
C002bin	A124_09	0.149715072	0.149715072	311613	0
C002bin	A165	0.100856547	0.100856547	318679	0
C002bin	C001_01	-0.127478411	0.127478411	327400	0
C002bin	C009	-0.134529402	0.134529402	154481	0
C002bin	C038	-0.160784424	0.160784424	150894	0
C002bin	D054	-0.138970602	0.138970602	297639	0
C002bin	D059	-0.207249289	0.207249289	292549	0
C002bin	D060	-0.136010212	0.136010212	298000	0
C002bin	E025	0.142892051	0.142892051	298829	0
C002bin	E143	0.162277299	0.162277299	162113	0
C002bin	F063	0.138614001	0.138614001	314495	0
C002bin	F118	-0.215562546	0.215562546	298557	0
C002bin	F120	-0.158791514	0.158791514	309204	0
C002bin	F121	-0.132066862	0.132066862	316046	0
C002bin	G007_36_B	0.15077934	0.15077934	181140	0
C002bin	Y002	-0.133265316	0.133265316	316151	0
C002bin	Y003	-0.104665323	0.104665323	326701	0

The next concern before going to the third selection step (dedicated to cross-validations on specified criteria) was to recode (“nt” call sign meaning null treatment) the remaining variables (all 19 in Table 1). In addition to these, the ones to be used as clustering criteria in cross-validations or for further controls were recorded as well. The main concern here was to remove missing and DK/NA answers and adapt the scales to the original meaning of the source questions (Listing A1 and Tables A1 and A2, Appendix A).

The results after the third selection phase relied on mixed-effects modeling. They consisted of discovering and emphasizing the resisting influences (ten from 19, Table A3) no matter the chosen clustering criteria from the set of socio-demographic variables (bottom of Listing A1, lines 49–70, Appendix A section), including the year of the survey (S020, which did not require processing). Just ten influences from the previous list of 19 proved to be robust in this third selection round (Table A3), namely: A124_06nt, C001_01nt, C009nt, C038nt, D054nt, D059nt, E143nt, F118nt, G007_36_Bnt, and Y002nt. The remaining eight influences failed at least in one scenario (A124_07nt-models 6, 9, 11–22; A124_09nt-models 6, 7, 10, 11, and 22; A165nt-model 11; D060nt-models 2–11, 21, and 22; E025nt-models 1–8, 10–19, 21, and 22; F063nt-models 9, and 20; F120nt-models 9, 20, and 22; F121nt-models 9, 11, 20, and 22; Y003nt-models 1–11, 12–15, and 17–22).

The fourth selection round (Stata script at <https://tinyurl.com/4x3ez5y9>, accessed on 30 January 2023) used CVLASSO and RLASSO and the remaining ten variables. It encountered no loss in selection.

The fifth selection round dedicated itself to reversing causality checks. In addition, it removed one influence from the remaining ten (ordered logit—Table A4) when focusing on the predictors/determinants (the sense of the influences was counted). It gave up A124_06Cnt (Neighbors: Immigrants/foreign workers).

The sixth selection round, responsible for discovering evidence of collinearity (OLS max.Comput.VIF overpassing OLS max.Accept.VIF), further eliminated two variables (D059nt and F118nt—Table A5). Consequently, four matrices with correlation coefficients (only for the predictors in Models 1 and 2, 5 and 6, 9 and 10, and 15—Figure 2) additionally resulted. D054nt was temporarily removed (Models 9 and 10) because of being collinear with F118nt. The latter brought a higher accuracy and an R-squared value (Model 7 vs. Model 8 in Table A5). However, later, after removing F118nt (collinear with C001_01nt, Models 11 and 12), D054nt was added back (Logit Model 15 had the highest accuracy—AUCROC = 0.7852) and generated no collinearity (Table A5—Model 16).

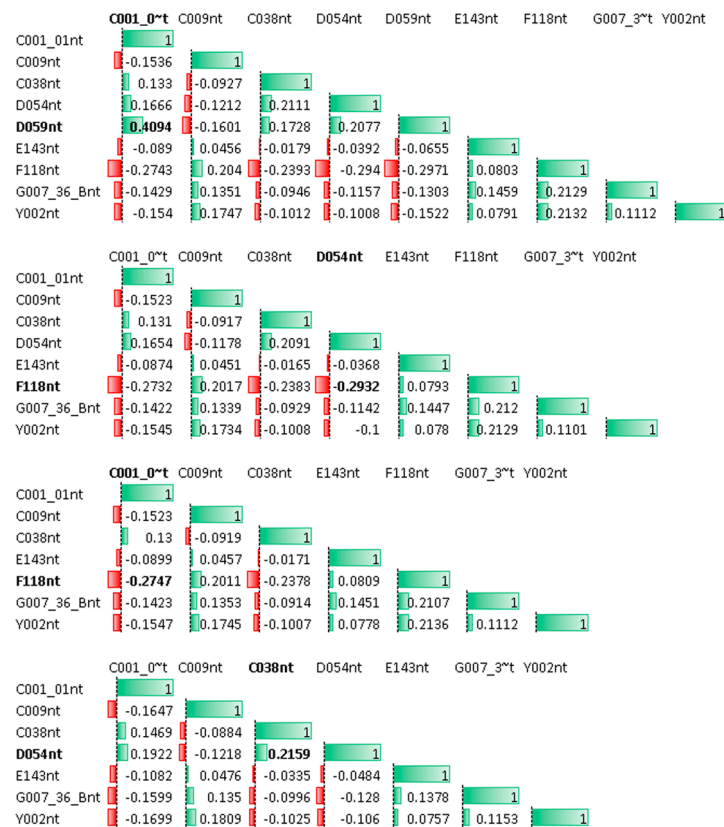


Figure 2. Assessing collinearity using consecutive matrices with correlation coefficients only for predictors (Stata script at <https://tinyurl.com/ueefxmd>, accessed on 30 January 2023).

When cross-validating again (second stage: Stata script at <https://tinyurl.com/mwb6nher>, accessed on 30 January 2023) starting from these seven remaining determinants and the same clustering criteria for cross-validations (including counties and country macroregions—X048WVSnt), no loss in selection occurred.

In terms of support (Stata script at <https://tinyurl.com/f868yab4>, accessed on 30 January 2023), more than 45,000 observations corresponding to a single wave served in most cases. Additionally, this is because all seven predictors and the response variable were considered simultaneously only in Wave 5 (2005–2009).

A prediction nomogram (Figure 3, *nomolog* command in Stata) starting from binary logistic regressions (Table A5—Model 15) served visual interpretations for all seven remaining determinants. This model, which has seven predictors, generated an R^2 of 0.1799 and a fair-to-good accuracy (AUCROC of 0.7852). The maximum theoretical probability for the most advantageous combination of variable values (Figure 3) is more than 0.99. The latter corresponds to a total score of 39.55 (second X-axis—bottom of Figure 3) as the top-down sum of 3.5, 6.75, 7.6, 4.6, 4.4, 2.7, and 10, values determined relatively easily after drawing perpendiculars to the first X-axis (Score). For other combinations of values (e.g., right edge of Figure 3), these seven predictors were identified as the most important ones; lower total scores emerged (e.g., 21.95). They indicated less critical cases and a lower corresponding probability (e.g., >0.8) of prioritizing the nation’s people to the detriment of immigrants regarding access to jobs. This nomogram also suggests the magnitude of the marginal effects (visually as segments corresponding to the unit difference on any scale—Figure 3 and Model 1, Table A7, Appendix A) for those seven robust determinants. In addition, it serves to understand the cumulated effect size by considering the amplitude of any scale visible in this representation.

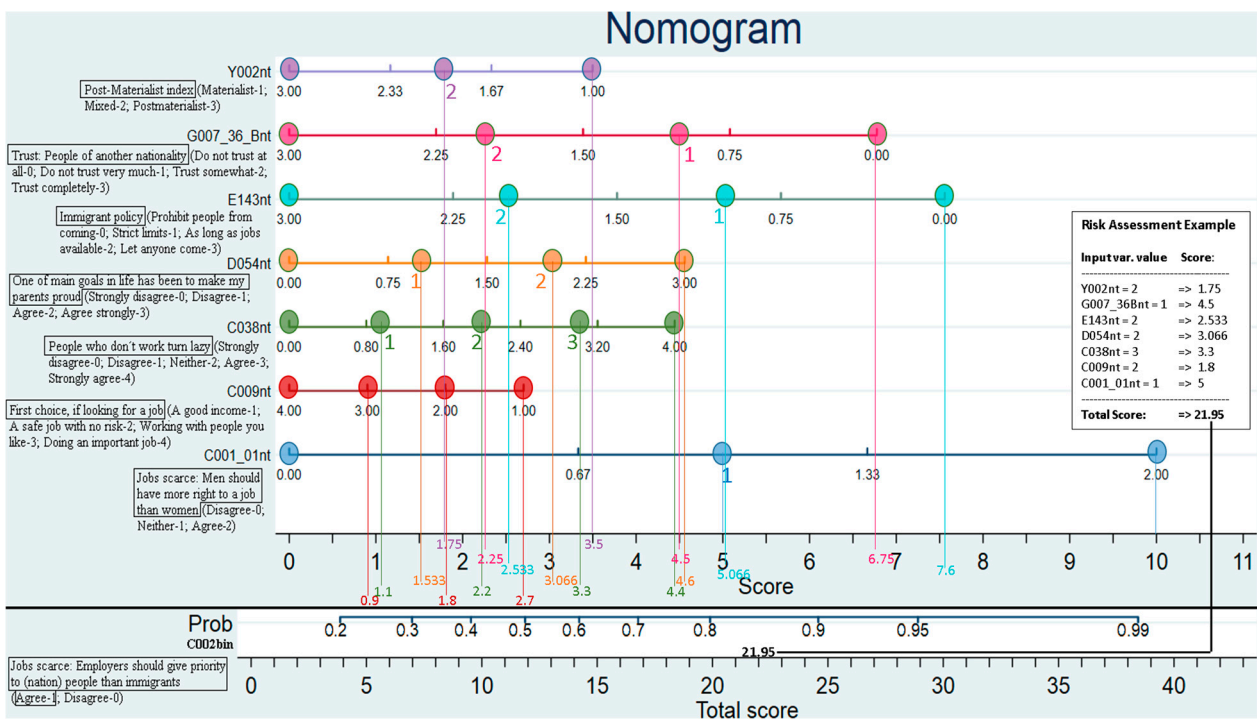


Figure 3. Risk prediction nomogram corresponding to the most resilient predictors (generated using the *nomolog* command in Stata).

Further controls (Table A6, Appendix A) are based on all seven most resilient predictors (Figure 3) and each of those eleven socio-demographic variables already used in cross-validations. All confirmed the robustness of the already identified hepta-core base model (Figure 3 and Models 1 and 13, Table A6, Appendix A), but only seven of them (Models 2, 6–9, 11, 12, 14, 18–21, 23, and 24, Table A6, Appendix A) proved to be significant. The best models here are those additionally emphasizing the role of the settlement size (X049nt, Model 11, based on a logit regression, and Model 23, based on an ologit one, Table A6, Appendix A). They have the highest McFadden’s pseudo R-squared (0.1937 for logit and 0.1108 for ologit), AUC-ROC (0.7946), and the lowest AIC (29162.5254 and 58024.8556) and BIC (29238.7119 and 58110.7761) if compared to the base ones (containing only those seven predictors—Models 1 and 13, Table A6, Appendix A).

Moreover, only for these seven additional confirmed influences were the corresponding models also reported using coefficients computed as average marginal effects (Table A7,

Appendix A) and containing direct references to the hypothesis codes. The performance metrics (e.g., pseudo R-squared, AUC-ROC, AIC, and BIC) are the same as in the case of Models 1, 2, 6–9, 11, and 12, Table A6, Appendix A). The interpretation of the coefficients in Table A7 (Appendix A, immediately above the errors reported between round parentheses) follows a simple rule. Each such value indicates the effect of an increase (for positive coefficients)/decrease (for negative ones) by one unit in the value of the corresponding variable (for a given model) on the target variable. This effect translates into the probability of finding it acceptable for employers to prioritize their employees over immigrants increasing by the same value (as the one of the coefficient) but in percentage points.

5. Discussion

The most important of these seven predictors is magnitude (the descending order of scale amplitudes as a visual representation can be found in Figure 3), which corresponds to the attitude towards gender inequality in terms of jobs. It indicates that people agreeing that men should have more rights to a job than women. It is a fact that they are also more likely to accept the idea that employers should prioritize co-nationals than immigrants in case of job scarcity (positive influence or the maximum value of 2 on the right—Figure 3). The latter means that the attitude to the first type of inequality regarding access to jobs (the gender-related one) is the best predictor of the one towards the second type (the immigration-related one). This finding is in line with the already documented relations between gender and migration when it comes to various kinds of discrimination, as mentioned in the scientific literature [88–90].

The second most important determinant when considering the same magnitude criterion seems to correspond to the permissiveness level of the immigration policy. As expected, the latter shows that the ones manifesting a lower level of this type of permissiveness are also more likely (negative influence or the minimum value of 0 on the right—Figure 3) to accept the idea of prioritizing citizens over immigrants in the event of job shortages (validation of H1). Although this finding seems almost obvious, the relationship between migration policy and job discrimination is a complex and well-studied one [91–93].

The third most potent predictor found (Figure 3 and Model 15 in Table A5) is related to the level of trust in people of another nationality. It means that the people with a lower level for this type of trust are also more likely (negative influence or the minimum value of 0 on the right—Figure 3) to accept that employers should prioritize citizens over immigrants in case of lack of jobs. The latter is in line with the findings of other scholars [94–96] and contributes to the validation of H2.

The fourth mightiest determinant corresponds to extrinsic motivations (one of the principal life goals of the respondents is to make their parents proud, also known as devoutness and partially related with traditions due to the interpretation of familism as one of their foundations [97]). That has a positive influence on the response variable. Its maximum value of 3 on the right is observable in Figure 3. It means that people more motivated this way (or devoted to parents in these terms) are also more likely to prioritize their co-nationals in case of job shortages. This finding also stands when considering the existing scientific literature [98,99]. Additionally, it applies if starting from the connection of both items with the notion of power distance. More specifically, the question specifying whether agreeing with making one's own parents proud is assumed to extend to the family. Moreover, it captures the obedience and hierarchy in the family concepts. The one as to whether nationals are privileged over immigrants when jobs are scarce is directly related to the definition of power distance. The particular way the devoutness works contributes to validating H3.

The next most important predictor (fifth) relates to the acceptance level regarding the idea that people who do not work turn lazy (also with a positive influence—the maximum value of 4 on the right, as seen in Figure 3). The latter shows that people more inclined to accept this attitude towards work are also more protective of the nation's people's access

to jobs. This finding complements other findings in the scientific literature, revealing the limitations of migrant working identity [53,100].

The sixth most potent determinant concerns the post-materialist index (the version with four items), which has a negative influence (the minimum of 1 on the right—Figure 3). The latter refers to people with a lower appetite for postmaterialist values or less need for independence and fulfillment of personal objectives in life [101]. They are also more likely to prioritize their co-nationals at the expense of immigrants as access to employment. This finding is in line with the ones of [102], through the concept of subjective well-being associated with endorsement of democracy, greater emphasis on postmaterialist values, and less intolerance (more tolerance) of immigrants and members of different racial and ethnic groups.

The specific way these two predictors function means a complete validation of H4.

The last most important predictor in terms of magnitude corresponds to the variable measuring the preference regarding a job with benefits for the community rather than individual ones (negative influence—the minimum value of 1 on the right—Figure 3). It indicates that people are less likely to prefer community-oriented jobs; on the contrary, they are more oriented towards individual benefits when it comes to a job or are simply more selfish [103]. They are more inclined to protect the nation's people in case of job shortages. The latter contributes to the full validation of H2.

Next, all seven resilient predictors previously found (Figure 3) stood as a strong base for further controls (Table A6, Appendix A). Those used all socio-demographic criteria involved in cross-validations. Only seven of those criteria indicated significance.

First, the gender influence (Models 2 and 14, Table A6, Appendix A) indicates that female respondents are more protective of citizens than immigrants regarding access to jobs. It means that women are more likely to consider it more justifiable for employers to prioritize the people of their nation than men. The latter is in line with some findings in the literature [104,105] and contradicts others [106].

An additional socio-demographic variable was found significant (income scale, Models 9 and 21, Table A6, Appendix A). By its sign (negative), the latter indicates that those who earn more are less inclined to consider it justifiable for employers to prioritize nationals than immigrants. This idea stands in the light of the findings of Chandler and Tsai (2001) [107], Tucci (2005) [108], Tavakoli and Chatterjee (2021) [109], and Ruhs (2018) [110]. For the last author, this is especially true for high-skilled migrants. The same applies to those with a higher education level (Models 7 and 19, Table A6, Appendix A). Additionally, this is also in line with the findings of Tavakoli and Chatterjee (2021) [109]. They concluded that an additional level of education on the earnings of an individual and his family income will bring better financial welfare and security. In turn, the latter will reduce the perception of the economic threat of immigrants. The same is true for those with an employment status more near a full-time job (Models 8 and 20, Table A6, Appendix A) and the opposite (positive coefficient sign) for the ones having more children (Models 6 and 18, Table A6, Appendix A). These last two findings are consistent with those on the income dependence of the response variable. The latter state that people in higher-income groups are more tolerant towards immigrants [111], more positive in their attitudes to them [112], and show significantly lower levels of welfare chauvinism [113].

Another significant control variable corresponds to the settlement size (Models 11 and 23, Table A6, Appendix A). The latter contributes to the best models (largest McFadden pseudo R-squared, AUC-ROC, and lowest AIC and BIC) with eight predictors (hepta-core plus each additional control), as already emphasized at the end of the Results section above. Due to its sign (negative), it shows that people from larger communities (bigger cities) are also less inclined to consider it acceptable for employers to prioritize nationals to the detriment of immigrants. In the case of Europe, this finding stands, and such respondents are more likely to have more tolerant attitudes towards immigrants [111]. Similarly, with direct reference to the case of Canada, other scholars [114] highlighted a particularity of large urban areas when compared with the small ones, namely, the existence of immigrant service providers and

language-training venues. By contrast, in Russia, for example, people living in the countryside are the least xenophobic, while the population of big cities is the most xenophobic [115]. All these mean the partial validation of H5, when considering that some socio-demographic variables were not found to be significant (e.g., age, marital status).

Due to its positive coefficient sign, the last significant control variable (the survey year, Models 12 and 24, Table A6, Appendix A) indicates a relevant finding. Despite the undeniable globalization and the rise of multiculturalism, over time, people have increasingly come to believe that it is more acceptable for employers to prioritize citizens over immigrants. The latter contradicts studies focused on general attitudes towards immigration [116] or integration of immigrants [117] based on considering specific regions and expanding for a shorter time.

As expected, due to its nature (nominal numerical codes originally unrelated to a specific intensity scale), the variable corresponding to the counties and country macroregions (X048WVS—in the given form) in which the interview took place did not prove to be statistically significant as a control variable. Still, it has proven to be extremely important [118,119] for cross-validations. The same argument (numerical codes originally unrelated to an intensity scale but useful for cross-validation) applies to the values of the variable corresponding to the country code (S003—ISO 3166-1 numeric country code). Still, the latter was identified in the first selection round (adaptive boosting—right side of Figure 1). Therefore, differences among countries are expected beyond these seven common predictors, referred to as a hepta-core model. However, the specific features of countries and particular regions (e.g., a dummy variable referring to whether a country is ex-communist or not [120], some country-dependent measures of economic activity such as GDP or the ratio between stock market capitalization and GDP defined in The World Bank Data Catalog or even the Worldwide Governance Indicators defined by Kaufmann et al. in 2010 [121] and used in many other studies, including recent ones [122,123]) will be the object of future research on the same topic but with more focus on certain local peculiarities.

6. Conclusions

An accurate model with seven strong influences emerged in this paper. These act more as determinants because of passing reverse causality checks. They indicate a specific type of world values survey respondents. It is about the ones less likely to consider it acceptable for employers to prioritize their people over immigrants. These are as follows: those who believe in emancipative values, namely, the ones of gender equality for jobs, those choosing a profession more relevant for the community than for themselves, those disagreeing that people who do not work will turn lazy, the ones with higher values if inverse devoutness (less inclined to make their own parents proud), the ones agreeing with a less prohibitive immigrant policy, those who trust more in people of another nationality, and the ones with a profile corresponding to a higher value for the post-materialist index. In addition, some controls generally emphasized the positive roles of three socio-demographic variables. There are the female gender, the number of children, and the survey year. It is also worth mentioning the negative ones, which are education level, employment status in terms of involvement in a full-time job, income scale, and settlement size (the most important control variable in terms of performance added to the basic hepta-core model), when considering whether it is justifiable for employers to prioritize the people of their nation rather than immigrants. By allowing visual interpretations corresponding to the seven most resilient determinants, the prediction nomogram presented in this paper serves both as a powerful probability identification instrument and as a decision support tool that serves management systems under conditions of uncertainty and risk. All conclusions related to the identified determinants stand on models with fair-to-good classification accuracy. They resulted after performing many selection rounds and robustness checks.

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Institutional Review Board Statement: The data used in this study belongs to the World Values Survey, which conducted surveys following the Declaration of Helsinki.

Informed Consent Statement: The World Values Survey obtained informed consent from all subjects involved in the study.

Data Availability Statement: The dataset used in this study belongs to the World Values Survey is the .dta file inside the “WVS TimeSeries 1981 2020 Stata v1 6.zip” archive (<https://www.worldvaluessurvey.org/WVSDocumentationWVL.jsp>, accessed on 22 October 2022, the “Data and Documentation” menu, the “Data Download” option, the “Timeseries (1981–2022)” entry).

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Appendix A

Listing A1. Recoding the remaining variables using a Stata script with numbered lines—numbers displayed separately, as when opened with the Stata editor (Stata script at: <https://tinyurl.com/5n6bdfss>, accessed on 30 January 2023).

```

1. use ‘‘F:\ WVS_TimeSeries_stata_v1_6.dta’’ //19x: A124_06
   A124_07 A124_09 A165 C001_01 C009 C038 D054 D059 D060 E025
   E143 F063 F118 F120 F121 G007_36_B Y002 Y003
2. generate C002nt=.
3. replace C002nt=2 if C002==1
4. replace C002nt=0 if C002==2
5. replace C002nt=1 if C002==3 // or Jobs scarce: Employers
   should give priority to (nation) people than immigrants
6. gen C002bin=.
7. replace C002bin=1 if C002==1
8. replace C002bin=0 if C002==2 // or Jobs scarce: Employers
   should give priority to (nation) people than immigrants
9. gen A124_06nt =.
10. replace A124_06nt=A124_06 if A124_06!=. & A124_06>=0 //or
   Neighbors: Immigrants/foreign workers
11. gen A124_07nt =.
12. replace A124_07nt=A124_07 if A124_07!=. & A124_07>=0 //or
   Neighbors: People who have AIDS
13. gen A124_09nt =.
14. replace A124_09nt=A124_09 if A124_09!=. & A124_09>=0 //or
   Neighbors: Homosexuals
15. generate A165nt=.
16. replace A165nt=2-A165 if A165!=. & A165>0 //or Most people
   can be trusted
17. generate C001_01nt=.
18. replace C001_01nt=2 if C001_01==1
19. replace C001_01nt=0 if C001_01==2
20. replace C001_01nt=1 if C001_01==3 //or Jobs scarce: Men
   should have more right to a job than women (source for
   Y022A=WOMJOB- Welzel equality -1: Gender equality: job)

```

```

21.generate C009nt=.
22.replace C009nt=C009 if C009!=. & C009>0 //or First choice ,
    if looking for a job:1.good income ,2. safe job ,3.wrk &people
    u like ,4.Do an import.job ,5.Do someth.for community
23.generate C038nt = .
24.replace C038nt=5-C038 if C038!=. & C038>0 //or People who
    don't work turn lazy
25.generate D054nt = .
26.replace D054nt=4-D054 if D054!=. & D054>0 //or One of main
    goals in life has been to make my parents proud (source for
    Y011C=DEVOUT- Welzel defiance -3: Inverse devoutness)
27.generate D059nt=.
28.replace D059nt=4-D059 if D059!=. & D059>0 //or Men make
    better political leaders than women do (source for Y022B=
    WOMPOL- Welzel equality -2: Gender equality: politics)
29.generate D060nt=.
30.replace D060nt=4-D060 if D060!=. & D060>0 //or University is
    more important for a boy than for a girl (source for Y022C=
    WOMEDU- Welzel equality -3: Gender equality: education)
31.generate E025nt=.
32.replace E025nt=3-E025 if E025!=. & E025>0 //or Political
    action: Signing a petition
33.generate E143nt = .
34.replace E143nt=4-E143 if E143!=. & E143>0 //or Immigrant
    policy: 1 Let anyone come . 4 Prohibit people from coming
35.generate F063nt=.
36.replace F063nt=F063 if F063!=. & F063>0 //or How important is
    God in your life
37.generate F118nt=.
38.replace F118nt=F118 if F118!=. & F118>0 //or Justifiable:
    Homosexuality
39.generate F120nt=.
40.replace F120nt=F120 if F120!=. & F120>0 //or Justifiable:
    Abortion
41.generate F121nt=.
42.replace F121nt=F121 if F121!=. & F121>0 //or Justifiable:
    Divorce
43.generate G007_36_Bnt=.
44.replace G007_36_Bnt=4-G007_36_B if G007_36_B!=. & G007_36_B>0
    //Trust: People of another nationality (B)
45.generate Y002nt=.
46.replace Y002nt=Y002 if Y002!=. & Y002>0 //or Post-Materialist
    index 4-item: 1 Materialist , 2 Mixed, 3 Postmaterialist
47.generate Y003nt=.
48.replace Y003nt=2+Y003 if Y003!=. & Y003>-5 //or Autonomy
    Index: -2 Obedience/Religious Faith .. 2 Determination ,
    perseverance/Independence
49.*FOR BUILDING CLUSTERS WHEN PERFORMING CROSS-VALIDATIONS:
50.generate X001nt = .
51.replace X001nt=X001 if X001!=. & X001>0 //Gender
52.generate X003nt = .
53.replace X003nt=X003 if X003!=. & X003>0 //Age
54.generate X007nt = .

```

```

55.replace X007nt=8-X007 if X007!=. & X007>0 //Marital status
56.generate X007bin=.
57.replace X007bin=1 if X007==1 | X007==2
58.replace X007bin=0 if X007!=. & X007>2 //Marital status as
  with someone or not
59.generate X011nt=.
60.replace X011nt=X011 if X011!=. & X011>=0 //How many children
  do you have
61.generate X025nt=.
62.replace X025nt=X025 if X025!=. & X025>0 //Highest educational
  level attained
63.generate X028nt=.
64.replace X028nt=8-X028 if X028!=. & X028>0 & X028<9 //
  Employment status
65.generate X047nt=.
66.replace X047nt=X047 if X047!=. & X047>0 //Scale of incomes
67.generate X048WVSnt=.
68.replace X048WVSnt=X048WVS if X048WVS!=. & X048WVS>0 //Regions
69.generate X049nt=.
70.replace X049nt=X049 if X049!=. & X049>0 //Settlement size
    
```

Table A1. The most relevant items of this study.

Variable	Short Description	Coding Details
C002	Jobs scarce: Employers should give priority to (nation) people than immigrants (original format)	<0 for Do not know/No Answer/Not applicable/Not Asked/Missing (DK/NA/M); 1-Agree; 2-Disagree; 3-Neither
C002nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 2-Agree; 1-Neither; 0-Disagree
C002bin	The same as above in its binary form and with null and DK/NA/M treatment	Null (.)-DK/NA/M or Neither; 1-Agree; 0-Disagree
A124_06	Neighbors: Immigrants/foreign workers (original format)	<0 for DK/NA/M; 1-Mentioned; 0-Not mentioned
A124_06nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Mentioned; 0-Not mentioned
A124_07	Neighbors: People who have AIDS (original format)	<0 for DK/NA/M; 1-Mentioned; 0-Not mentioned
A124_07nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Mentioned; 0-Not mentioned
A124_09	Neighbors: Homosexuals (original format)	<0 for DK/NA/M; 1-Mentioned; 0-Not mentioned
A124_09nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Mentioned; 0-Not mentioned
A165	Most people can be trusted (original format)	<0 for DK/NA/M; 1-You can trust most people; 2-Need to be very careful
A165nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-You can trust most people; 0-Need to be very careful
C001_01	Jobs scarce: Men should have more rights to a job than women (original format)	<0 for DK/NA/M; 1-Agree; 2-Disagree; 3-Neither
C001_01nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 2-Agree; 1-Neither; 0-Disagree

Table A1. Cont.

Variable	Short Description	Coding Details
C009	The first choice, if looking for a job (original format)	<0 for DK/NA/M; 1-A good income; 2-A safe job with no risk; 3-Working with people you like; 4-Doing important work; 5-Do something for the community
C009nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-A good income ... 5-Do something for the community
C038	People who do not work turn lazy (original format)	<0 for DK/NA/M; 1-Strongly agree; 2- Agree; 3-Neither agree nor disagree; 4-Disagree; 5-Strongly disagree
C038nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0-Strongly disagree ... 4-Strongly agree
D054	One of my main goals in life has been to make my parents proud (original format)	<0 for DK/NA/M; 1-Strongly agree; 2- Agree; 3-Disagree; 4-Strongly disagree
D054nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0-Strongly disagree ... 3-Strongly agree
D059	Men make better political leaders than women do (original format)	<0 for DK/NA/M; 1-Strongly agree; 2- Agree; 3-Disagree; 4-Strongly disagree
D059nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0-Strongly disagree .. 3-Strongly agree
D060	University is more important for a boy than for a girl (original format)	<0 for DK/NA/M; 1-Strongly agree; 2- Agree; 3-Disagree; 4-Strongly disagree
D060nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0-Strongly disagree ... 3-Strongly agree
E025	Political action: Signing a petition (original format)	<0 for DK/NA/M; 1-Have done; 2- Might do; 3-Would never do
E025nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0-Would never do; 1- Might do; 2-Have done
E143	Immigrant policy (original format)	<0 for DK/NA/M; 1-Let anyone come; 2- As long as jobs available; 3-Strict limits; 4-Prohibit people from coming
E143nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0-Prohibit people from coming ... 3-Let anyone come
F063	How important is God in your life (original format)	<0 for DK/NA/M; 1-Not at all important ... 10-Very important
F063nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Not at all important ... 10-Very important
F118	Justifiable: Homosexuality (original format)	<0 for DK/NA/M; 1-Never justifiable ... 10-Always justifiable
F118nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Never justifiable ... 10-Always justifiable
F120	Justifiable: Abortion (original format)	<0 for DK/NA/M; 1-Never justifiable ... 10-Always justifiable
F120nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Never justifiable ... 10-Always justifiable
F121	Justifiable: Divorce (original format)	<0 for DK/NA/M; 1-Never justifiable ... 10-Always justifiable
F121nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Never justifiable ... 10-Always justifiable

Table A1. Cont.

Variable	Short Description	Coding Details
G007_36_B	Trust: People of another nationality (original format)	<0 for DK/NA/M; 1-Trust completely; 2- Trust somewhat; 3-Not very much; 4-Not at all
G007_36_Bnt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0-Not at all .. 3-Trust completely
Y002	Post-Materialist index 4-item (original format)	<0 for DK/NA/M; 1-Materialist; 2- Mixed; 3-Postmaterialist
Y002nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Materialist; 2- Mixed; 3-Postmaterialist
Y003	Autonomy index (original format)	<0 for DK/NA/M; -2-Obedience/Religious Faith ... 2-Determination, perseverance/Independence
Y003nt	The same as above but with a positive (raised) scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0-Obedience/Religious Faith ... 4-Determination, perseverance/Independence
X001	Gender (original format)	<0 for DK/NA/M; 1-Male; 2-Female
X001nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Male; 2-Female
X003	Age (original format)	<0-DK/NA/M
X003nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M
X007	Marital status (original format)	<0-DK/NA/M; 1-Married; 2-Living together as married; 3-Divorced; 4-Separated; 5-Widowed; 6-Single/Never married; 7 and 8-other values considered the most distant from the status of a married person
X007nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0 and 1-other values considered the most distant from the status of a married person; 2-Single/Never married .. 7-Married
X007bin	The same as above in its binary form and with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Married/ Living together as married; 0-Otherwise
X011	How many children do you have (original format)	<0-DK/NA/M; 0-No child; 1-1 child; 2-2 children .. 5-5 children or more
X011nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 0-No child .. 5-5 children or more
X025	The highest educational level attained (original format)	<0-DK/NA/M; 1-Inadequately completed elementary education; 2-Completed (compulsory) elementary education; 3-Incomplete secondary school: technical/vocational type; 4-Complete secondary school: technical/vocational type; 5-Incomplete secondary: university-preparatory type; 6-Complete secondary: university-preparatory type; 7-Some university without degree/Higher education-lower-level; 8-University with degree/Higher education-upper-level tertiary
X025nt	The same as above with null and DK/NA/M treatment	Null (.)-DK/NA/M; 1-Inadequately completed elementary education .. 8-University with degree/Higher education-upper-level tertiary
X028	Employment status (original format)	<0-DK/NA/M; 1-Full time; 2-Part time; 3-Self employed; 4-Retired; 5-Housewife; 6-Students; 7-Unemployed; 8-Other

Table A1. *Cont.*

Variable	Short Description	Coding Details
X028nt	The same as above but with a reversed scale and with null and DK/NA/M treatment	Null (-)-DK/NA/M; 0-Other .. 7-Full time
X047	The scale of incomes (original format)	<0-DK/NA/M; 1-Lowest step; 2-Second step .. 10-Tenth step; 11-Highest step
X047nt	The same as above with null and DK/NA/M treatment	Null (-)-DK/NA/M; 1-Lowest step .. 11-Highest step
X048WVS	Counties and Country Macroregions (numeric code) where the interview was conducted (original format)	<0-DK/NA/M; 8001 Albania: Tirana .. 7360013 SD: River Nile
X048WVSnt	The same as above with null and DK/NA/M treatment	Null (-)-DK/NA/M; 8001 Albania: Tirana .. 7360013 SD: River Nile
X049	Settlement size (original format)	<0-DK/NA/M; 1—Under 2000; 2—2000—5000; 3—5000—10,000; 4—10,000—20,000; 5—20,000—50,000; 6—50,000—100,000; 7—100,000—500,000; 8—500,000 and more
X049nt	The same as above with null and DK/NA/M treatment	Null (-)-DK/NA/M; 1-Under 2000 .. 8-500,000 and more
S020	Year of survey (original format)	Years between 1981 and 2020 (limited to 2017-2020-non-NUL observations for the response variable)

Source: WVS data.

Table A2. Descriptive statistics for the most relevant WVS items used in this study.

Variable	n	Mean	Std.Dev.	Min	0.25	Median	0.75	Max
C002nt	377,345	1.55	0.75	0	1	2	2	2
C002bin	330,509	0.82	0.39	0	1	1	1	1
A124_06nt	396,205	0.21	0.41	0	0	0	1	1
A124_07nt	384,956	0.44	0.5	0	0	0	1	1
A124_09nt	376,865	0.5	0.5	0	0	1	1	1
A165nt	409,115	0.26	0.44	0	0	0	1	1
C001_01nt	395,652	0.97	0.91	0	0	1	2	2
C009nt	183,875	2.15	1.12	1	1	2	3	5
C038nt	175,111	2.86	1.09	0	2	3	4	4
D054nt	360,660	2.27	0.78	0	2	2	3	3
D059nt	357,860	1.53	0.98	0	1	1	2	3
D060nt	364,765	1.04	0.92	0	0	1	1	3
E025nt	379,840	0.83	0.81	0	0	1	2	2
E143nt	186,246	1.54	0.84	0	1	2	2	3
F063nt	402,066	7.7	3.02	1	6	10	10	10
F118nt	380,939	3.21	3.04	1	1	1	5	10
F120nt	398,878	3.37	2.85	1	1	2	5	10
F121nt	403,700	4.65	3.1	1	1	5	7	10
G007_36_Bnt	220,047	1.19	0.86	0	1	1	2	3
Y002nt	396,977	1.77	0.62	1	1	2	2	3
Y003nt	414,123	2.05	1.16	0	1	2	3	4
X001nt	421,634	1.52	0.5	1	1	2	2	2
X003nt	421,892	41.14	16.23	13	28	39	53	103
X007nt	421,264	5.34	2.18	0	3	7	7	7
X007bin	421,264	0.64	0.48	0	0	1	1	1
X011nt	410,849	1.89	1.81	0	0	2	3	24
X025nt	300,306	4.71	2.23	1	3	5	6	8
X028nt	413,665	4.69	2.16	0	3	5	7	7
X047nt	389,150	4.65	2.3	1	3	5	6	10
X048WVSnt	380,027	450,000	260,000	8,001	230,000	420,000	700,000	890,000
X049nt	303,252	4.95	2.51	1	3	5	7	8
S020	426,452	2005.05	9.57	1981	1998	2006	2012	2020

Source: own calculation in Stata (Stata script at <https://tinyurl.com/yt872hcs>, accessed on 31 January 2023).

Table A3. The results of cross-validations on some socio-demographic variables using mixed-effects binary (first 11 models) and ordered logit (last 11 ones).

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
Input/Response	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	
A124_06nt	0.3156 *** (0.0173)	0.3183 *** (0.0633)	0.3171 *** (0.0174)	0.3174 *** (0.0082)	0.2965 *** (0.0563)	0.3479 *** (0.0607)	0.2960 *** (0.0230)	0.3014 *** (0.0414)	0.3032 *** (0.0800)	0.3361 *** (0.0740)	0.3568 ** *** (0.1285)	0.2430 *** (0.0256)	0.2459 *** (0.0447)	0.2434 *** (0.0200)	0.2440 *** (0.0172)	0.2257 *** (0.0329)	0.2784 *** (0.0392)	0.2154 *** (0.0350)	0.2335 *** (0.0379)	0.2628 *** (0.0576)	0.2499 *** (0.0624)	0.2665 *** (0.0652)	
A124_07nt	0.1272 *** (0.0194)	0.1336 ** *** (0.0408)	0.1349 *** (0.0329)	0.1343 *** (0.0094)	0.1374 ** *** (0.0502)	0.1329 *** (0.0717)	0.1169 * *** (0.0544)	0.1444 *** (0.0296)	0.1287 *** (0.0673)	0.1065 * *** (0.0488)	0.0669 *** (0.1044)	0.0095 *** (0.0246)	0.0125 *** (0.0322)	0.0141 *** (0.0436)	0.0131 *** (0.0176)	0.0121 *** (0.0424)	0.0181 *** (0.0468)	-0.0013 *** (0.0422)	0.0254 *** (0.0255)	0.0652 *** (0.0527)	0.0021 *** (0.0389)	-0.0187 *** (0.0791)	
A124_09nt	0.1110 *** (0.0102)	0.1024 ** *** (0.0356)	0.1017 *** (0.0262)	0.1022 *** (0.0123)	0.1007 *** (0.0213)	0.1000 *** (0.0696)	0.0990 *** (0.0517)	0.1023 * *** (0.0498)	0.1201 * *** (0.0550)	0.0759 *** (0.0655)	0.1518 *** (0.1279)	0.1284 *** (0.0359)	0.1236 *** (0.0299)	0.1235 *** (0.0328)	0.1244 *** (0.0083)	0.1194 *** (0.0191)	0.1122 * *** (0.0526)	0.1170 * *** (0.0484)	0.1194 ** *** (0.0381)	0.1189 ** *** (0.0414)	0.1063 * *** (0.0469)	0.1534 *** (0.0942)	
A165nt	-0.2369 *** (0.0360)	-0.2373 *** (0.0356)	-0.2371 *** (0.0282)	-0.2376 *** (0.0174)	-0.2523 *** (0.0160)	-0.2469 *** (0.0662)	-0.2410 *** (0.0415)	-0.2394 *** (0.0406)	-0.1810 *** (0.0623)	-0.3095 *** (0.0586)	-0.2136 *** (0.1122)	-0.2429 *** (0.0237)	-0.2433 *** (0.0269)	-0.2422 *** (0.0095)	-0.2434 *** (0.0020)	-0.2568 *** (0.0199)	-0.2501 *** (0.0458)	-0.2496 *** (0.0341)	-0.2405 *** (0.0325)	-0.1825 *** (0.0469)	-0.3178 *** (0.0480)	-0.2331 *** (0.0894)	
C001_01nt	0.6993 *** (0.0797)	0.6935 *** (0.0208)	0.6920 *** (0.0325)	0.6916 *** (0.0209)	0.6833 *** (0.0216)	0.6821 *** (0.0257)	0.6755 *** (0.0378)	0.6897 *** (0.0265)	0.6808 *** (0.0397)	0.7529 *** (0.0619)	0.7011 *** (0.0731)	0.4944 *** (0.0933)	0.4910 *** (0.0159)	0.4913 *** (0.0287)	0.4905 *** (0.0201)	0.4882 *** (0.0136)	0.4832 *** (0.0222)	0.4726 *** (0.0272)	0.4870 *** (0.0107)	0.5007 *** (0.0307)	0.5017 *** (0.0318)	0.4946 *** (0.0363)	
C009nt	-0.1249 *** (0.0066)	-0.1225 *** (0.0117)	-0.1236 *** (0.0092)	-0.1236 *** (0.0032)	-0.1180 *** (0.0104)	-0.1258 *** (0.0106)	-0.1234 *** (0.0195)	-0.1134 *** (0.0155)	-0.0956 *** (0.0158)	-0.1034 *** (0.0209)	-0.1188 *** (0.0159)	-0.0809 *** (0.0002)	-0.0798 *** (0.0098)	-0.0800 *** (0.0086)	-0.0799 *** (0.0065)	-0.0757 *** (0.0126)	-0.0823 *** (0.0110)	-0.0801 *** (0.0128)	-0.0732 *** (0.0169)	-0.0667 *** (0.0135)	-0.0652 *** (0.0149)	-0.0779 *** (0.0140)	
C038nt	0.1510 *** (0.0143)	0.1494 *** (0.0147)	0.1483 *** (0.0210)	0.1482 *** (0.0300)	0.1496 *** (0.0197)	0.1508 *** (0.0177)	0.1538 *** (0.0188)	0.1456 *** (0.0129)	0.1249 *** (0.0177)	0.1343 *** (0.0196)	0.1555 *** (0.0121)	0.1383 *** (0.0129)	0.1377 *** (0.0140)	0.1372 *** (0.0123)	0.1369 *** (0.0151)	0.1384 *** (0.0169)	0.1378 *** (0.0136)	0.1386 *** (0.0172)	0.1354 *** (0.0093)	0.1100 *** (0.0162)	0.1217 *** (0.0137)	0.1420 *** (0.0225)	
D054nt	0.1113 *** (0.0158)	0.1102 *** (0.0206)	0.1095 *** (0.0053)	0.1095 *** (0.0022)	0.1069 *** (0.0211)	0.1060 *** (0.0321)	0.1079 *** (0.0285)	0.1079 *** (0.0208)	0.1177 *** (0.0318)	0.1079 *** (0.0314)	0.0730 * *** (0.0361)	0.1329 *** (0.0018)	0.1357 *** (0.0173)	0.1358 *** (0.0063)	0.1334 *** (0.0078)	0.1335 *** (0.0159)	0.1336 *** (0.0241)	0.1335 *** (0.0184)	0.1455 *** (0.0181)	0.0929 *** (0.0248)	0.1404 *** (0.0247)	0.1521 *** (0.0278)	
D059nt	0.2016 *** (0.0570)	0.1930 *** (0.0217)	0.1917 *** (0.0346)	0.1920 *** (0.0127)	0.1926 *** (0.0260)	0.1984 *** (0.0214)	0.1928 *** (0.0268)	0.2068 *** (0.0337)	0.1640 *** (0.0288)	0.2075 *** (0.0186)	0.1895 *** (0.0348)	0.1911 *** (0.0549)	0.1857 *** (0.0172)	0.1842 *** (0.0264)	0.1844 *** (0.0068)	0.1835 *** (0.0223)	0.1917 *** (0.0223)	0.1842 *** (0.0241)	0.1979 *** (0.0382)	0.1562 *** (0.0291)	0.1937 *** (0.0232)	0.1820 *** (0.0152)	0.1920 *** (0.0448)
D060nt	0.0347 ** *** (0.0134)	0.0250 *** (0.0232)	0.0242 *** (0.0272)	0.0240 *** (0.0421)	0.0215 *** (0.0241)	0.0195 *** (0.0362)	0.0342 *** (0.0272)	0.0243 *** (0.0292)	-0.0073 *** (0.0357)	-0.0144 *** (0.0383)	0.0268 *** (0.0278)	-0.0424 *** (0.0006)	-0.0474 *** (0.0161)	-0.0469 *** (0.0118)	-0.0472 *** (0.0173)	-0.0498 *** (0.0143)	-0.0612 *** (0.0258)	-0.0382 *** (0.0171)	-0.0488 *** (0.0231)	-0.0710 *** (0.0295)	-0.0737 *** (0.0376)	-0.0447 *** (0.0309)	
E025nt	0.0122 *** (0.0074)	0.0092 *** (0.0194)	0.0064 *** (0.0216)	0.0060 *** (0.0099)	-0.0109 *** (0.0239)	0.0035 *** (0.0239)	0.0127 *** (0.0160)	0.0165 *** (0.0197)	0.0894 ** *** (0.0344)	-0.0127 *** (0.0472)	0.0196 *** (0.0259)	0.0173 *** (0.0101)	0.0164 *** (0.0166)	0.0149 *** (0.0163)	0.0144 *** (0.0139)	0.0039 *** (0.0162)	0.0157 *** (0.0235)	0.0199 *** (0.0160)	0.0260 *** (0.0155)	0.0767 ** *** (0.0275)	0.0085 *** (0.0404)	0.0229 *** (0.0323)	
E143nt	-0.4764 *** (0.0416)	-0.4779 *** (0.0214)	-0.4783 *** (0.0307)	-0.4780 *** (0.0390)	-0.4587 *** (0.0241)	-0.4700 *** (0.0622)	-0.4748 *** (0.0550)	-0.4701 *** (0.0187)	-0.5082 *** (0.0440)	-0.4906 *** (0.0581)	-0.4423 *** (0.1056)	-0.4090 *** (0.0226)	-0.4098 *** (0.0165)	-0.4102 *** (0.0263)	-0.4097 *** (0.0248)	-0.3980 *** (0.0199)	-0.4104 *** (0.0453)	-0.4057 *** (0.0423)	-0.4007 *** (0.0178)	-0.4007 *** (0.0351)	-0.4263 *** (0.0450)	-0.4163 *** (0.0740)	-0.3819 *** (0.0280)
F063nt	0.0180 *** (0.0005)	0.0222 *** (0.0052)	0.0220 ** *** (0.0073)	0.0219 *** (0.0038)	0.0190 *** (0.0050)	0.0232 *** (0.0067)	0.0230 *** (0.0066)	0.0214 *** (0.0055)	0.0006 *** (0.0085)	0.0284 ** *** (0.0098)	0.0214 ** *** (0.0082)	0.0245 *** (0.0020)	0.0268 *** (0.0046)	0.0266 *** (0.0061)	0.0265 *** (0.0053)	0.0244 *** (0.0042)	0.0276 *** (0.0077)	0.0264 *** (0.0049)	0.0270 *** (0.0062)	0.0108 *** (0.0077)	0.0306 *** (0.0077)	0.0280 *** (0.0086)	
F118nt	-0.0482 *** (0.0119)	-0.0459 *** (0.0068)	-0.0461 *** (0.0043)	-0.0461 *** (0.0043)	-0.0455 *** (0.0036)	-0.0464 *** (0.0058)	-0.0456 *** (0.0086)	-0.0427 *** (0.0063)	-0.0340 *** (0.0090)	-0.0469 *** (0.0145)	-0.0427 *** (0.0038)	-0.0439 *** (0.0089)	-0.0428 *** (0.0057)	-0.0430 *** (0.0025)	-0.0428 *** (0.0007)	-0.0430 *** (0.0032)	-0.0436 *** (0.0065)	-0.0427 *** (0.0097)	-0.0436 *** (0.0097)	-0.0401 *** (0.0059)	-0.0348 *** (0.0079)	-0.0435 *** (0.0112)	-0.0398 *** (0.0022)
F120nt	-0.0404 *** (0.0062)	-0.0410 *** (0.0079)	-0.0411 *** (0.0044)	-0.0411 *** (0.0025)	-0.0432 *** (0.0038)	-0.0405 *** (0.0090)	-0.0404 *** (0.0075)	-0.0394 *** (0.0056)	-0.0149 *** (0.0090)	-0.0461 *** (0.0144)	-0.0391 *** (0.0194)	-0.0354 *** (0.0065)	-0.0356 *** (0.0061)	-0.0358 *** (0.0031)	-0.0359 *** (0.0024)	-0.0376 *** (0.0022)	-0.0360 *** (0.0081)	-0.0350 *** (0.0057)	-0.0336 *** (0.0060)	-0.0123 *** (0.0070)	-0.0418 *** (0.0115)	-0.0349 *** (0.0194)	
F121nt	0.0217 * *** (0.0104)	0.0216 *** (0.0063)	0.0214 *** (0.0044)	0.0214 *** (0.0007)	0.0211 ** *** (0.0078)	0.0184 * *** (0.0084)	0.0241 * *** (0.0099)	0.0206 * *** (0.0081)	0.0047 *** (0.0090)	0.0266 ** *** (0.0101)	0.0134 *** (0.0137)	0.0218 ** *** (0.0073)	0.0217 *** (0.0049)	0.0214 *** (0.0053)	0.0216 *** (0.0041)	0.0208 *** (0.0041)	0.0198 ** *** (0.0049)	0.0242 *** (0.0062)	0.0242 *** (0.0057)	0.0208 * *** (0.0060)	0.0070 *** (0.0070)	0.0239 *** (0.0115)	0.0162 *** (0.0194)
G007_36_Bnt	-0.2659 *** (0.0164)	-0.2695 *** (0.0233)	-0.2674 *** (0.0261)	-0.2676 *** (0.0228)	-0.2726 *** (0.0344)	-0.2865 *** (0.0168)	-0.2725 *** (0.0373)	-0.2713 *** (0.0290)	-0.2258 *** (0.0328)	-0.3023 *** (0.0305)	-0.2938 *** (0.0968)	-0.2595 *** (0.0085)	-0.2614 *** (0.0187)	-0.2598 *** (0.0222)	-0.2603 *** (0.0177)	-0.2599 *** (0.0239)	-0.2717 *** (0.0188)	-0.2656 *** (0.0281)	-0.2624 *** (0.0207)	-0.2344 *** (0.0251)	-0.2937 *** (0.0251)	-0.2764 *** (0.0667)	
Y002nt	-0.1737 *** (0.0185)	-0.1840 *** (0.0238)	-0.1800 *** (0.0202)	-0.1794 *** (0.0142)	-0.1828 *** (0.0127)	-0.1865 *** (0.0449)	-0.1835 *** (0.0370)	-0.1783 *** (0.0417)	-0.1491 *** (0.0353)	-0.1486 *** (0.0384)	-0.1664 *** (0.0317)	-0.1361 *** (0.0168)	-0.1414 *** (0.0187)	-0.1403 *** (0.0141)	-0.1394 *** (0.0023)	-0.1423 *** (0.0079)	-0.1383 *** (0.0310)	-0.1428 *** (0.0257)	-0.1327 *** (0.0333)	-0.1117 *** (0.0276)	-0.1216 *** (0.0347)	-0.1294 *** (0.0106)	
Y003nt	0.0018 *** (0.0138)	0.0003 *** (0.0140)	0.0019 *** (0.0151)	0.0019 *** (0.0157)	-0.0008 *** (0.0109)	0.0008 *** (0.0144)	0.0051 *** (0.0207)	0.0004 *** (0.0215)	0.0086 *** (0.0211)	-0.0159 *** (0.0148)	-0.0164 *** (0.0404)	-0.0126 *** (0.0045)	-0.0138 *** (0.0117)	-0.0128 *** (0.0106)	-0.0127 *** (0.0145)	-0.0101 *** (0.0073)	-0.0074 *** (0.0096)	-0.0083 *** (0.0119)	-0.0083 *** (0.0180)	0.0035 *** (0.0161)	-0.0224 *** (0.0118)	-0.0223 *** (0.0264)	

Table A3. Cont.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	
Input/Response	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	
_cons	1.7391 *** (0.3016)	1.7618 *** (0.1248)	1.7621 *** (0.1023)	1.7606 *** (0.1674)	1.7858 *** (0.0626)	1.8108 *** (0.1440)	1.7951 *** (0.2164)	1.6056 *** (0.2091)	2.1114 *** (0.2154)	1.8087 *** (0.1656)	1.9660 *** (0.5685)												
var(_cons[X001nt])	0.0068 ** (0.0025)											0.0024 (0.0019)											
var(_cons[X003nt])		0.0017 (0.0023)											0.0012 (0.0016)										
var(_cons[X007nt])			0.0003 (0.0010)											0.0004 (0.0005)									
var(_cons[X007bin])				0.0000 (0.0000)											0.0000 (0.0000)								
var(_cons[X011nt])					0.0000 (0.0000)											0.0000 (0.0000)							
var(_cons[X025nt])						0.0094 *** (0.0026)												0.0056 * (0.0022)					
var(_cons[X028nt])							0.0256 (0.0276)												0.0155 (0.0147)				
var(_cons[X047nt])								0.0407 * (0.0182)												0.0322 * (0.0134)			
var(_cons[X048WVSnt])									0.9769 *** (0.1090)												0.6856 *** (0.0706)		
var(_cons[X049nt])										0.0122 (0.0066)												0.0074 (0.0051)	
var(_cons[S020])											0.3847 (0.2663)												0.1051 (0.0699)
N	33,646	33,601	33,623	33,623	32,706	32,019	32,205	31,586	33,103	27,549	33,665	38,468	38,412	38,436	38,436	37,260	36,628	36,949	36,108	37,864	31,523	38,489	38,489
AIC	28,976.6072	28,980.5107	28,995.2304	28,985.3193	28,173.1051	27,603.3414	28,431.6436	27,065.5576	26,470.2628	23,639.7451	28,724.4783	57,631.2925	57,566.6483	57,593.4617	57,586.0935	55,508.4502	54,929.4457	56,506.1179	53,920.0443	54,288.1111	47,271.6480	57,459.9627	57,459.9627
BIC	28,993.4545	29,157.3793	29,045.7682	28,993.7422	28,240.2676	27,661.9600	28,490.3027	27,140.8018	26,646.8178	23,697.3112	28,758.1752	57,648.4076	57,754.8830	57,636.2454	57,594.6503	55,576.6556	54,997.5142	56,565.7390	54,004.9870	54,476.0298	47,338.5158	57,485.6371	57,485.6371

Source: own calculation in Stata (Stata script at <https://tinyurl.com/susvkppj>, accessed on 30 January 2023). Notes: var (_cons []) relates to the cross-validation criterion. Robust standard errors are between round parentheses. The raw coefficients emphasized using *, **, and *** are significant at 5%, 1%, and 1%. Red vs. green indicates a loss of significance (not selected variables) vs. the opposite (the selected ones).

Table A4. The results of the first stage of reverse causality checks using ordered logit.

Ologit Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	
Input/Response	C002nt	A124_06nt	C002nt	C001_01nt	C002nt	C009nt	C002nt	C038nt	C002nt	D054nt	C002nt	D059nt	C002nt	E143nt	C002nt	F118nt	C002nt	G007_36_Bnt	C002nt	Y002nt	
A124_06nt	0.6082 *** (0.0095)																				
C001_01nt			0.6370 *** (0.0042)																		
C009nt					-0.2307 *** (0.0048)																
C038nt							0.3211 *** (0.0048)														
D054nt									0.3915 *** (0.0047)												
D059nt											0.4651 *** (0.0042)										
E143nt														-0.4734 *** (0.0065)							
F118nt																-0.1426 *** (0.0012)					
G007_36_Bnt																					
Y002nt																					-0.4489 *** (0.0060)
C002nt		0.3864 *** (0.0061)		0.7017 *** (0.0045)		-0.2817 *** (0.0061)		0.3957 *** (0.0062)		0.3454 *** (0.0045)		0.5046 *** (0.0043)		-0.4273 *** (0.0058)		-0.4942 *** (0.0045)		-0.3817 *** (0.0056)			-0.3374 *** (0.0046)
N	364,886	364,886	373,890	373,890	173,676	173,676	171,085	171,085	339,416	339,416	333,481	333,481	181,744	181,744	341,555	341,555	209,101	209,101	359,823	359,823	
chi ²	4075.6756	4077.5373	22,654.9698	24,630.4358	2334.3676	2124.2002	4434.4490	4132.8212	6807.9723	5946.5022	12,262.6181	13,692.4046	5317.2469	5372.7167	14,504.4671	12,026.1077	4612.6482	4628.3237	5633.7297	5493.3756	
P	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Pseudo R ² (McFadden)	0.0074	0.0117	0.0402	0.0343	0.0090	0.0052	0.0169	0.0097	0.0129	0.0086	0.0252	0.0159	0.0199	0.0121	0.0272	0.0119	0.0145	0.0098	0.0103	0.0088	
AIC	575,488.7231	380,497.1679	569,329.7561	743,787.6208	266,870.8392	445,301.0113	265,052.6432	458,574.0556	529,550.7362	732,454.5935	514,174.3012	874,478.1394	271,678.0849	441,719.4397	532,491.6824	1,114,113.9416	335,383.6636	506,400.8567	561,172.6952	663,326.2812	
BIC	575,521.1451	380,518.7826	569,362.2513	743,820.1159	266,901.0341	445,341.2711	265,082.7930	458,624.3052	529,582.9411	732,497.5334	514,206.4533	874,521.0087	271,708.4159	441,759.8811	532,523.9062	1,114,221.3543	335,414.4153	506,441.8590	561,205.0753	663,358.6613	

Source: own calculation in Stata (Stata script at <https://tinyurl.com/4a278m42>, accessed on 30 January 2023). Notes: robust standard errors are between round parentheses. The raw coefficients emphasized using *** are significant at 1%. Colors are applied to emphasize better model scores and selected variables (green) and lower model scores and variables not selected (red).

Table A5. Identified collinearity issues.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
Regression Type	Logit	OLS	Logit	Logit	Logit	OLS	Logit	Logit	Logit	OLS	Logit	Logit	Logit	OLS	Logit	OLS	Logit	OLS
Filter condition	N/A	N/A	C001_01nt!=-	D059nt!=-	N/A	N/A	D054nt!=-	F118nt!=-	N/A	N/A	C001_01nt!=-	F118nt!=-	N/A	N/A	N/A	N/A	N/A	N/A
C001_01nt	0.7088 *** (0.0211)	0.0808 *** (0.0229)		0.7867 *** (0.0204)	0.7829 *** (0.0201)	0.0908 *** (0.0021)	0.7938 *** (0.0201)	0.8391 *** (0.0199)	0.7941 *** (0.0199)	0.0928 *** (0.0020)		0.8651 *** (0.0196)	0.8960 *** (0.0186)	0.1021 *** (0.0018)	0.8647 *** (0.0189)	0.0967 *** (0.0018)	0.7967 *** (0.0191)	0.0947 *** (0.0019)
C009nt	-0.1240 *** (0.0122)	-0.0229 *** (0.0019)	-0.1489 *** (0.0120)	-0.1320 *** (0.0121)	-0.1334 *** (0.0120)	-0.0243 *** (0.0019)	-0.1396 *** (0.0019)	-0.1619 *** (0.0118)	-0.1375 *** (0.0119)	-0.0248 *** (0.0018)	-0.1797 *** (0.0115)	-0.1735 *** (0.0117)	-0.1690 *** (0.0112)	-0.0291 *** (0.0017)	-0.1558 *** (0.0114)	-0.0275 *** (0.0017)	-0.1477 *** (0.0114)	-0.0270 *** (0.0018)
C038nt	0.1451 *** (0.0121)	0.0244 *** (0.0019)	0.1493 *** (0.0120)	0.1570 *** (0.0121)	0.1555 *** (0.0120)	0.0257 *** (0.0018)	0.1727 *** (0.0117)	0.1928 *** (0.0116)	0.1714 *** (0.0116)	0.0286 *** (0.0018)	0.1937 *** (0.0112)	0.2235 *** (0.0113)	0.2239 *** (0.0109)	0.0354 *** (0.0017)	0.1922 *** (0.0112)	0.0299 *** (0.0017)	0.1812 *** (0.0113)	0.0303 *** (0.0018)
D054nt	0.1594 *** (0.0174)	0.0276 *** (0.0027)	0.1824 *** (0.0171)	0.1791 *** (0.0172)	0.1771 *** (0.0170)	0.0304 *** (0.0026)		0.2532 *** (0.0165)							0.2629 *** (0.0160)	0.0429 *** (0.0024)	0.2474 *** (0.0160)	0.0429 *** (0.0025)
D059nt	0.2404 *** (0.0177)	0.0318 *** (0.0023)	0.4303 *** (0.0165)															
E143nt	-0.4715 *** (0.0183)	-0.0626 *** (0.0023)	-0.4764 *** (0.0178)	-0.4673 *** (0.0181)	-0.4607 *** (0.0179)	-0.0617 *** (0.0023)	-0.4593 *** (0.0178)	-0.4663 *** (0.0176)	-0.4604 *** (0.0177)	-0.0618 *** (0.0022)	-0.4631 *** (0.0169)	-0.4668 *** (0.0173)	-0.4381 *** (0.0163)	-0.0543 *** (0.0020)	-0.4358 *** (0.0167)	-0.0535 *** (0.0020)	-0.4099 *** (0.0169)	-0.0547 *** (0.0021)
F118nt	-0.0724 *** (0.0042)	-0.0148 *** (0.0007)	-0.0912 *** (0.0041)	-0.0825 *** (0.0041)	-0.0831 *** (0.0041)	-0.0162 *** (0.0007)	-0.0927 *** (0.0040)	-0.0928 *** (0.0040)	-0.0928 *** (0.0040)	-0.0178 *** (0.0007)	-0.1280 *** (0.0038)							
G007_36_Bnt	-0.3044 *** (0.0178)	-0.0441 *** (0.0023)	-0.3252 *** (0.0173)	-0.3111 *** (0.0173)	-0.3108 *** (0.0175)	-0.0447 *** (0.0023)	-0.3198 *** (0.0175)	-0.3600 *** (0.0173)	-0.3185 *** (0.0173)	-0.0457 *** (0.0023)	-0.3500 *** (0.0166)	-0.3796 *** (0.0171)	-0.4114 *** (0.0162)	-0.0554 *** (0.0020)	-0.3906 *** (0.0164)	-0.0526 *** (0.0020)	-0.3636 *** (0.0165)	-0.0529 *** (0.0022)
Y002nt	-0.2382 *** (0.0223)	-0.0394 *** (0.0032)	-0.2819 *** (0.0219)	-0.2543 *** (0.0222)	-0.2590 *** (0.0220)	-0.0419 *** (0.0031)	-0.2648 *** (0.0219)	-0.3170 *** (0.0215)	-0.2639 *** (0.0217)	-0.0423 *** (0.0031)	-0.3362 *** (0.0212)	-0.3348 *** (0.0213)	-0.3201 *** (0.0204)	-0.0494 *** (0.0028)	-0.3025 *** (0.0207)	-0.0473 *** (0.0028)	-0.2909 *** (0.0207)	-0.0479 *** (0.0030)
A124_06nt																	0.4291 *** (0.0397)	0.0420 *** (0.0039)
_cons	2.0665 *** (0.0832)	0.8702 *** (0.0118)	2.4117 *** (0.0812)	2.3386 *** (0.0805)	2.3603 *** (0.0798)	0.9100 *** (0.0114)	2.7547 *** (0.0718)	1.9727 *** (0.0760)	2.7500 *** (0.0712)	0.9752 *** (0.0099)	3.5529 *** (0.0681)	2.4915 *** (0.0689)	2.5001 *** (0.0662)	0.9129 *** (0.0089)	1.9563 *** (0.0733)	0.8268 *** (0.0100)	1.8357 *** (0.0741)	0.8206 *** (0.0106)
N	39,409	39,409	39,409	39,409	40,337	40,337	40,337f	40,337	41,042	41,042	41,042	41,042	47,618	47,618	46,794	46,794	43,679	43,679
chi ²	5397.0323		4878.7274	5263.4820	5340.8593		5284.0049	4874.1607	5358.1703		4410.4134	4788.2363	5579.7515		5685.7433		4994.4131	
P	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R ² (OLS) / McFadden's Pseudo R ² (logit)	0.1853	0.1816	0.1512	0.1806	0.1793	0.1759	0.1768	0.1701	0.1769	0.1729	0.1284	0.1648	0.1745	0.1574	0.1799	0.1637	0.1645	0.1549
RMSE		0.3759				0.3760				0.3765				0.3672		0.3659		0.3766
AIC	34,006.3629	34,733.5721	35,424.2274	34,199.1829	34,899.1207	35,578.0705	35,001.8603	35,285.0073	35,573.9850	36,293.2589	37,667.6077	36,093.7725	39,348.4448	39,717.3424	38,428.2481	38,705.2740	37,842.0569	38,648.3166
BIC	34,092.1804	34,819.3896	35,501.4632	34,276.4187	34,976.5659	35,655.5157	35,070.7005	35,353.8475	35,642.9638	36,362.2377	37,727.9642	36,154.1289	39,409.8416	39,778.7392	38,498.2762	38,775.3021	37,920.2185	38,726.4782
AUCROC	0.7844		0.7506	0.7808	0.7799		0.7789	0.7759	0.7791		0.7287	0.7736	0.7828		0.7852		0.7724	
chi ² GOF	24,317.90		18,676.12	16,884.76	17,091.77		11,106.98	7158.41	11,231.56		6291.07	3573.21	3592.05		7381.92		10,453.02	
p GOF	0.0000		0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000		0.0000	
Max.Abs.VPMCC	0.4094	0.4094	0.2971	0.2940	0.2932	0.2932	0.2732	0.2091	0.2747	0.2747	0.2378	0.1745	0.1819	0.1819	0.2159	0.2159	0.2022	0.2022
OLSmax.Accept.VIF		1.2219				1.2134				1.2090				1.1868		1.1957		1.1833
OLSmax.Comput.VIF		1.3027				1.2741				1.2181				1.0911		1.1121		1.1012

Source and notes: same as in Table A4 (Stata scripts at <https://tinyurl.com/yc26vjzd>, accessed on 30 January 2023).

Table A6. Cont.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	
Input/Response	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002bin	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	C002nt	
X028nt								−0.0510 *** (0.0059)												−0.0421 *** (0.0047)					
X047nt									−0.0563 *** (0.0060)												−0.0654 *** (0.0048)				
X048WVnt										0.0000 (0.0000)												0.0000 (0.0000)			
X049nt											−0.0399 *** (0.0061)												−0.0267 *** (0.0048)		
S020												0.1014 *** (0.0137)												0.1061 *** (0.0110)	
_cons	1.9563 *** (0.0733)	1.7297 *** (0.0854)	2.0320 *** (0.0825)	1.9899 *** (0.0803)	1.9609 *** (0.0753)	1.8580 *** (0.0755)	2.0661 *** (0.0802)	2.2076 *** (0.0798)	2.1746 *** (0.0807)	1.9210 *** (0.0765)	2.1135 *** (0.0891)	−201.5337 *** (27.4991)													
N	46,794	46,765	46,672	46,738	46,738	45,604	42,847	45,155	43,697	46,022	35,072	46,794	52,847	52,816	52,707	52,778	52,778	51,342	48,532	51,109	49,322	51,994	39,817	52,847	
chi ²	5685.7433	5688.5318	5672.4690	5683.4406	5683.3736	5611.6102	5230.4993	5466.7913	5423.3517	5646.8939	4503.3261	5724.3055	7305.0966	7299.7311	7289.6653	7302.4365	7302.4264	7118.7236	6700.7632	6939.7162	7022.7849	7254.3274	5812.2052	7360.6229	
P	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Pseudo R ² (McFadden)	0.1799	0.1806	0.1803	0.1801	0.1801	0.1806	0.1784	0.1776	0.1849	0.1809	0.1937	0.1810	0.1061	0.1064	0.1064	0.1063	0.1063	0.1069	0.1050	0.1037	0.1102	0.1068	0.1108	0.1072	
AIC	38,428,2481	38,373,9837	38,312,8451	38,371,4277	38,372,4109	37,379,4689	36,046,0042	37,637,9773	35,541,8175	37,919,9773	29,162,5254	38,382,4031	75,509,9590	75,446,2792	75,286,9253	75,381,7813	75,382,8895	72,856,9017	70,647,1644	73,988,3821	69,950,4322	74,471,0248	58,024,8556	75,423,8842	
BIC	38,498,2762	38,452,7997	38,391,6032	38,450,1985	38,451,1817	37,458,0187	36,123,9927	37,716,4380	35,619,9828	37,998,6092	29,238,7119	38,461,1847	75,589,8354	75,535,0249	75,375,6504	75,470,5198	75,471,6280	72,945,3644	70,735,0642	74,076,7993	70,038,4934	74,559,6137	58,110,7761	75,512,6358	
AUCROC	0.7852	0.7857	0.7855	0.7854	0.7853	0.7856	0.7827	0.7827	0.7880	0.7859	0.7946	0.7858													
chi ² GOF	7381.92	10,953.57	38,671.11	15,346.54	10,824.82	18,332.19	19,780.57	19,606.24	21,480.62	44,368.52	17,832.45	15,449.12													
p GOF	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000													
Max.Abs.VPMCC	0.2159	0.2160	0.2159	0.2157	0.2157	0.2158	0.2120	0.2111	0.2177	0.2164	0.2288	0.2160	0.2159	0.2160	0.2159	0.2157	0.2157	0.2158	0.2120	0.2111	0.2177	0.2164	0.2288	0.2160	

Source and notes: same as in Table A3 (Stata scripts at <https://tinyurl.com/puw7nd3n>, and <https://tinyurl.com/wcnwtvra>, both accessed on 30 January 2023).

Table A7. The average marginal effects identified after controlling using the most relevant seven predictors (hepta-core) and each of the other seven most significant socio-demographic control variables in logit models.

Model	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
C001_01nt (H2)	0.1132 *** (0.0024)	0.1145 *** (0.0024)	0.1113 *** (0.0024)	0.1131 *** (0.0026)	0.1124 *** (0.0024)	0.1122 *** (0.0024)	0.1264 *** (0.0029)	0.1112 *** (0.0024)
C009nt (H2)	−0.0204 *** (0.0015)	−0.0206 *** (0.0015)	−0.0199 *** (0.0015)	−0.0208 *** (0.0016)	−0.0200 *** (0.0015)	−0.0188 *** (0.0015)	−0.0185 *** (0.0017)	−0.0195 *** (0.0015)
C038nt (H4)	0.0252 *** (0.0015)	0.0254 *** (0.0015)	0.0250 *** (0.0015)	0.0266 *** (0.0015)	0.0257 *** (0.0015)	0.0244 *** (0.0015)	0.0237 *** (0.0017)	0.0248 *** (0.0015)
D054nt (H3)	0.0344 *** (0.0021)	0.0343 *** (0.0021)	0.0347 *** (0.0021)	0.0351 *** (0.0022)	0.0328 *** (0.0021)	0.0343 *** (0.0021)	0.0379 *** (0.0024)	0.0328 *** (0.0021)
E143nt (H1)	−0.0570 *** (0.0021)	−0.0567 *** (0.0021)	−0.0553 *** (0.0021)	−0.0605 *** (0.0023)	−0.0577 *** (0.0022)	−0.0554 *** (0.0022)	−0.0589 *** (0.0025)	−0.0569 *** (0.0021)
G007_36_Bnt (H2)	−0.0511 *** (0.0021)	−0.0508 *** (0.0021)	−0.0515 *** (0.0021)	−0.0541 *** (0.0023)	−0.0518 *** (0.0021)	−0.0497 *** (0.0022)	−0.0569 *** (0.0024)	−0.0516 *** (0.0021)
Y002nt (H2, H4)	−0.0396 *** (0.0027)	−0.0389 *** (0.0027)	−0.0393 *** (0.0027)	−0.0389 *** (0.0029)	−0.0399 *** (0.0028)	−0.0382 *** (0.0028)	−0.0397 *** (0.0032)	−0.0386 *** (0.0027)
X001nt (H5)		0.0175 *** (0.0034)						
X011nt (H5)			0.0049 *** (0.0010)					
X025nt (H5)				−0.0029 *** (0.0008)				
X028nt (H5)					−0.0068 *** (0.0008)			
X047nt (H5)						−0.0073 *** (0.0008)		
X049nt (H5)							−0.0053 *** (0.0008)	
S020 (H5)								0.0133 *** (0.0018)
N	46,794	46,765	45,604	42,847	45,155	43,697	35,072	46,794

Source: own calculation in Stata (Stata script at <https://tinyurl.com/yvc3py3u>, accessed on 30 January 2023)
 Notes: robust standard errors are between round parentheses. Coefficients computed as average marginal effects and emphasized using *** are significant at 1%. The H codes on the left indicate the hypotheses to which the variables next to them belong.

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