

DETERMINANTS OF EMPLOYABILITY IN THE EU: THE ROLE OF MAJORITY ATTITUDES AND PERCEPTIONS TOWARD ROMA COMMUNITIES

Adina Teodora STOICA-UNGUREANU^{a*}

^aThe Bucharest University of Economic Studies, Romania

Abstract

This study explores the factors affecting employability among the general population within the European Union by analysing how socio-demographic traits, household situations, and mainstream attitudes towards Roma communities influence labour market outcomes. Using microdata from Eurobarometer 91.4 (2019), the analysis incorporates descriptive statistics, non-parametric tests, and binary logistic regression, complemented by probit regression and linear discriminant analysis as robustness checks. Findings show that older individuals, married respondents, and those in larger households are more likely to be employed, while financial hardships, rural living, and early career changes decrease these chances. Gender disparities still favour men. Attitudinal factors also play a significant role: limited contact with Roma people, low awareness of Roma in schools, and uncertainty about discrimination are linked to poorer employment prospects, whereas integrated labour market participants exhibit higher social distance regarding minority political representation, suggesting a complex socio-political cleavage. The study concludes that labour-market integration depends not only on structural elements but also on social visibility and intergroup familiarity, highlighting the need for policies that address both economic barriers and societal perceptions within the majority population.

Keywords: Employability determinants, Majority perceptions, Labour market inclusion, Logistic regression, Eurobarometer 91.4 microdata

JEL Classification: J15, J21, J71, C25

1. Introduction

Persistent inequalities affecting ethnic minority groups across Europe continue to create significant disparities in labour market participation, educational opportunities, and economic security. Among these communities, the Roma population remains one of the most marginalised, experiencing cumulative and intergenerational forms of exclusion widely documented in empirical research (European Union Agency for Fundamental Rights, 2016, 2018). Evidence indicates that early educational segregation, residential marginalisation, and persistent negative stereotypes contribute to unequal labour market outcomes and

* Corresponding author, Adina Teodora Stoica-Ungureanu – adina.ungureanu@csie.ase.ro

limited economic mobility (O'Higgins & Brüggemann, 2014; Kahanec, 2014; Czaderny, 2022). These disadvantages are further exacerbated by structural and institutional barriers that continue to restrict opportunities throughout adulthood (Heath & Cheung, 2007).

Simultaneously, the concept of employability has expanded beyond traditional human capital models. Recent studies view employability as a multidimensional concept where education and skills interact with labour market structures, household circumstances, and social perceptions (Fugate et al., 2004; McQuaid & Lindsay, 2005; Berntson et al., 2006). For groups perceived as socially distant or not well understood by most people, attitudes and perceptions can indirectly affect labour market outcomes, including through discriminatory practices or reduced intergroup trust (Pager & Shepherd, 2008; Balaneasa, 2015; Berat, 2018). The theoretical motivation for linking majority perceptions to individual outcomes lies in the role of social capital; exclusionary attitudes or low awareness often signal restricted social networks and lower institutional trust, which act as critical barriers to navigating modern labour markets. Evidence from comparisons shows that negative attitudes towards Roma communities remain widespread across several EU member states, linked to limited social contact, low institutional visibility, and restricted political representation (European Commission, 2019a; Černič, 2025).

In this context, grasping how the traits and perceptions of the majority group relate to employment outcomes is essential. It must be explicitly stated that the Roma-related indicators used here reflect the subjective awareness and attitudes of the general population, serving as proxies for their civic openness and social integration.

Eurobarometer 91.4 (2019) provides a particularly fitting empirical basis for this, as it includes extensive indicators on attitudes and awareness regarding Roma people without disclosing the identities of Roma respondents. This framework allows for the examination of how socio-demographic features, household conditions, and Roma-related perceptions among the general population correlate with employability across the EU-28.

The study emphasises two main areas of investigation, supported by existing literature and empirically confirmed through the methodological procedures described in the Data and Methodology section.

Hypothesis 1 – Structural determinants of employability: socio-demographic characteristics and household context (age, marital status, education, household size, economic vulnerability, area of residence) significantly influence the likelihood of being employed. Nonparametric comparisons reveal apparent differences across subgroups, while the logistic regression confirms the substantial predictive value of these structural factors.

Hypothesis 2 – The role of perceptions and intergroup contact: perceptions of discrimination against Roma, familiarity with Roma individuals, awareness of Roma presence in schools, and attitudes towards Roma political representation influence employability among the majority population. The underlying mechanism suggests that individuals with higher intergroup contact and lower prejudice possess greater intercultural competencies and social adaptability – traits valued in diverse work environments. The logistic model reveals significant links between these attitudinal variables and the likelihood of employment, aligning with intergroup contact theory (Pettigrew & Tropp, 2006) and research on how perceived discrimination affects economic participation (Chowdhury, 2019; Heisig et al., 2018).

Furthermore, the structural stability of these findings is ensured by employing probit regression and linear discriminant analysis (LDA) as robustness checks.

By examining these complementary dimensions, the study provides an integrated view of how structural and attitudinal factors interact to impact employability in contemporary Europe. Its primary contribution

lies in the systematic analysis of variables reflecting majority-group perceptions and awareness of Roma communities. This area remains underexplored but is crucial for understanding the social mechanisms, such as social trust and network diversity, that facilitate or obstruct labour-market inclusion.

2. Literature review

Employment outcomes among ethnic minority groups in Europe remain uneven, impacted by structural inequalities, discriminatory attitudes, and limited access to essential social and economic resources. The Roma population, in particular, is widely recognised as facing ongoing exclusion across multiple areas of life, including employment, education, and political participation (European Union Agency for Fundamental Rights, 2016, 2018).

Previous research highlights that Roma communities face cumulative barriers—such as residential segregation, poor schooling conditions, and limited social visibility—that lead to long-term disadvantages in the labour market (O’Higgins & Brüggemann, 2014; Kahanec, 2014). These challenges are further intensified by ongoing inequalities in access to education and inclusion, as emphasised in comparative studies across the EU and North America (Kirova & Thorlakson, 2016).

The academic literature presents various frameworks for understanding employability. Early research emphasised human capital and individual resources (Berntson et al., 2006). More recent studies view employability as shaped by personal qualities, labour market structures, institutional factors, and social attitudes (Fugate et al., 2004; McQuaid & Lindsay, 2005). Within this multidimensional framework, social attitudes do not merely reflect personal bias but act as indicators of an individual’s social capital and openness to diverse professional environments. Such multidimensional perspectives are especially relevant to the Roma context, where both national environments and interpersonal relationships influence employment prospects (Czaderny, 2022; Heath & Cheung, 2007).

Recent studies also emphasise that socioeconomic vulnerability among Roma populations—particularly those with chronic health conditions—further limits their participation in the labour market (Abudari et al., 2025).

A substantial amount of evidence highlights the broad impact of discrimination. Ethnic minorities face disadvantages not only because of objective traits but also due to negative stereotypes and unfair treatment that influence employers’ decisions and institutional practices (Pager & Shepherd, 2008). Additionally, for the majority population, internalising these stereotypes can indicate a dependence on restrictive social networks, which may limit their own access to the diverse ‘bridging’ capital needed in modern, mixed societies. For Roma citizens, discriminatory attitudes remain common across EU Member States, affecting areas such as school placement, housing segregation, and employment decisions (Berat, 2018; Balaneasa, 2015; Chowdhury, 2019; European Commission, 2019a). Comparative studies show that ethnic penalties persist even in advanced welfare states, influencing long-term income trajectories and labour market participation (Heisig et al., 2018).

Intergroup contact theory offers further insights. Increased interaction between majority groups and minority communities generally reduces prejudice and boosts social trust (Pettigrew & Tropp, 2006). From an employability perspective, high levels of intergroup contact function as a proxy for social adaptability and intercultural competence – traits that facilitate professional mobility. However, for many Europeans, Roma communities remain socially distant and little understood, with few opportunities for personal contact (European Union Agency for Fundamental Rights, 2018). Awareness of the Roma in

schools or workplaces, as well as familiarity with Roma individuals, is therefore a vital factor influencing attitudes and potentially behaviour.

Another emerging area of research explores political representation and institutional visibility. Studies show that including minority voices in political and administrative structures can improve perceptions, trust, and social participation (Černič, 2025; Berat, 2018). These findings align with the attitudinal variables used in Eurobarometer 91.4, which assess comfort with Roma political representatives, perceived discrimination at a national level, and school awareness of Roma culture.

Although a substantial body of literature documents Roma marginalisation, relatively few studies examine perceptions among the majority population and their connection to broader labour market outcomes. Most empirical analyses focus directly on Roma individuals, often through targeted surveys, but do not explore how societal attitudes and visibility relate to employment patterns within the general population (European Commission, 2011; European Union Agency for Fundamental Rights, 2018).

This highlights a significant research gap, as majority beliefs, awareness, and prejudices often lead to discrimination. The current study adds to this body of work by analysing EU-28 majority-population microdata from Eurobarometer 91.4 (2019), which does not identify Roma respondents but includes detailed questions about attitudes towards Roma people. By linking these attitudes to employability, the research explores how social distance from minority groups serves as a mechanism for understanding individual economic engagement. By combining nonparametric subgroup comparisons with a robust econometric framework comprising logistic regression, probit models, and linear discriminant analysis, the analysis examines how socio-demographic characteristics, household context, economic vulnerability, and perceptions of Roma influence the likelihood of employment. This approach enables a detailed understanding of how both structural and attitudinal factors interact to affect employability outcomes among the general population, thereby complementing previous research that has mainly focused on Roma respondents.

3. Data and methodology

The analysis utilises individual-level microdata from Eurobarometer 91.4 (2019), a cross-sectional survey conducted using stratified multistage probability sampling across all EU-28 Member States. The dataset, obtained from the GESIS Data Archive (European Commission, 2019b), comprises 27,438 face-to-face interviews conducted between 9 and 25 May 2019 with residents aged 15 and above. All estimations utilise the official Eurobarometer design weights to ensure representativeness by gender, age, region, and level of urbanisation.

The study uses variables from the Discrimination Module, linked to Special Eurobarometer 493: Discrimination in the European Union. Since Eurobarometer 91.4 does not identify Roma respondents and all variables are self-reported, Roma-related indicators reflect the subjective perceptions and attitudes of the majority population rather than the characteristics of Roma communities.

Given this structure, the logistic regression is estimated using the full weighted EU-28 sample, analysing how socio-demographic, household-level, and attitudinal factors influence employability across the population. The dependent variable is a binary indicator equal to 1 for respondents who report employment and 0 for those who report unemployment. To ensure a focused examination of market participation, inactive respondents (e.g., retirees, students not seeking work) were excluded. While this isolates the determinants of employability within the active labour force, it is acknowledged that this exclusion may introduce selection bias, particularly for the 55+ age group. Furthermore, while the dataset

does not include specific occupational categories, the model incorporates educational levels and economic vulnerability (difficulty paying utility bills) as proxies for individual labour market positioning.

Explanatory variables (Table no. 1) cover three conceptual domains: socio-demographic characteristics, household and spatial context, and Roma-related perceptions.

All variables are classified as either categorical or dichotomous, and multi-level predictors are incorporated into the regression model through dummy coding relative to a specified reference category.

Table no. 1: Independent variables and coding used in the logistic regression model

Variables	Variable categories and coding
Gender	Dichotomous variable: 1 = men, 2 = women
Age	Categorical (4 categories): 1 = 15-24, 2 = 25-39, 3 = 40-54, 4 = 55+ years
Marital status	Categorical (5 categories): 1 = unmarried, 2 = married, 3 = divorced, 4 = widowed, 5 = other
Education level	Categorical (5 categories): 1 = 12-15 years of education, 2 = 16-19 years, 3 = 20 years and over, 4 = student (working students), 5 = refusal and don't know
Household size	Categorical (4 categories): 1 = 1 person, 2 = 2 persons, 3 = 3 persons, 4 = 4 or more persons
Type of community	Categorical (3 categories): 1 = urban, 2 = rural area or village, 3 = don't know
Difficulty paying utility bills	Categorical (4 categories): 1 = most of the time, 2 = sometimes, 3 = almost never, 4 = refusal
Discrimination against Roma people	Dichotomous variable: 1 = being Roma, 2 = other reason
The school should inform about diversity: the Roma culture and history	Categorical (3 categories): 1 = yes, 2 = no, 3 = don't know
Employment disadvantage due to Roma origin	Dichotomous variable: 1 = yes, 2 = no
Acquaintances of Roma	Categorical (3 categories): 1 = yes, 2 = no, 3 = don't know
Perceived national-level discrimination against Roma	Categorical (3 categories): 1 = yes, 2 = no, 3 = don't know
Elected politician: Roma	Categorical (3 categories): 1 = uncomfortable, 2 = comfortable, 3 = don't know
Workplace promotion of Roma	Categorical (3 categories): 1 = yes, 2 = no, 3 = don't know

Source: Author's own calculations

3.1. Nonparametric tests

Before estimating the regression model, heterogeneity across socio-demographic subgroups was examined using rank-based nonparametric tests appropriate for ordinal and non-normally distributed variables.

The Mann–Whitney U test was utilised to assess gender differences.

Variables with more than two categories were examined using the Kruskal-Wallis H statistic, defined as:

$$H = \frac{12}{N(N+1)} \sum_{i=1}^k \frac{T_i^2}{n_i} - 3(N+1) \quad (1)$$

where k denotes the number of groups, n_i the sample size of group i , T_i the rank sum for group i , and N the total sample size. The null hypothesis of equal population distributions was tested at the 5% significance level.

Roma-related attitudinal variables were excluded from this step because they do not lend themselves to comparisons across socio-demographic subgroups.

3.2. Econometric models and robustness checks

Employability determinants were analysed using binary logistic regression. The probability that respondent i is employed, conditional on the covariates X_i , is:

$$P(Y_i = 1 | X_i) = \frac{\exp(\alpha + \beta X_i)}{1 + \exp(\alpha + \beta X_i)} \quad (2)$$

Parameters were estimated by Maximum Likelihood, ensuring consistency and asymptotic efficiency.

In the absence of explanatory variables, the baseline odds of being employed reduce to:

$$Odds_0 = \frac{P(Y_i = 1 | X_i = 0)}{1 - P(Y_i = 1 | X_i = 0)} = \exp(\alpha) \quad (3)$$

For each predictor X_i , its contribution to employability is summarised through the odds ratio:

$$OR_i = \exp(\beta_i) \quad (4)$$

Overall model fit was assessed using pseudo-R² indices defined as:

$$R^2 = 1 - \left(\frac{L_0}{L_1} \right)^{2/N} \quad (5)$$

where L_0 and L_1 represent the log-likelihoods of the null and fitted models, respectively.

The study also acknowledges potential endogeneity; attitudes and employment status may be mutually reinforcing or shaped by unobserved individual value orientations. To ensure the structural stability of the findings, the analysis incorporates two alternative econometric specifications as robustness checks. First, a probit model is estimated, assuming a standard normal distribution of the errors.

$$P(Y_i = 1 | X_i) = \Phi(\beta_0 + \sum_{j=1}^k \beta_j X_{ij}) \quad (6)$$

Second, linear discriminant analysis (LDA) is applied to maximize the separation between the employed and unemployed groups through a linear discriminant function (D):

$$D = w_0 + \sum_{j=1}^k w_j X_{ij} \quad (7)$$

3.3. Model diagnosis and goodness-of-fit

Model adequacy was evaluated using several diagnostic statistics. The Hosmer–Lemeshow goodness-of-fit test indicated satisfactory calibration between the predicted and observed probabilities ($p = 0.126$). The Cox & Snell pseudo-R² (0.647) and the Nagelkerke pseudo-R² (0.863) showed substantial explanatory power. The model correctly classified 93.2% of cases, and the global fit was further supported by the -2 Log-Likelihood ($-2LL$) value of 8610.282. All estimations were performed in IBM SPSS Statistics 26, using a significance threshold of $\alpha = 0.05$.

The consistency of results across the logistic, probit, and LDA specifications confirms the structural stability of the model, despite the inherent limitations of cross-sectional data regarding causal inference.

4. Results and discussion

This section presents the descriptive, comparative, and multivariate results that support the analysis. All findings refer to EU-28 respondents because Eurobarometer 91.4 does not identify Roma individuals, and all Roma-related variables therefore capture perceptions, attitudes, and awareness towards Roma populations rather than characteristics of a self-identified Roma sample. Consequently, the results

describe: (i) the socio-demographic profile of the respondents included in the analysis, (ii) differences across socio-demographic groups, and (iii) determinants of employability in the EU-28 population, including the role of perceptions and attitudes related to Roma people.

4.1. Socio-demographic profile of EU-28 respondents

The descriptive statistics provide a broad overview of the EU-28 adult population included in the study, establishing the contextual basis for analysing perceptions of the Roma and employability outcomes. Figures 1-4 highlight key socio-demographic patterns, including gender, age, education, household size, financial vulnerability, and interpersonal contact.

Figure no. 1 illustrates a balanced gender distribution (54.5% women; 45.5% men) and an ageing profile, with 47.1% aged 55 years or older and only 8.8% in the 15-24 age group. Educational attainment is mainly medium-to-high, with 43.6% reporting 16-19 years of education and 34.8% reporting 20 or more years of education. Most respondents are married (65.6%).

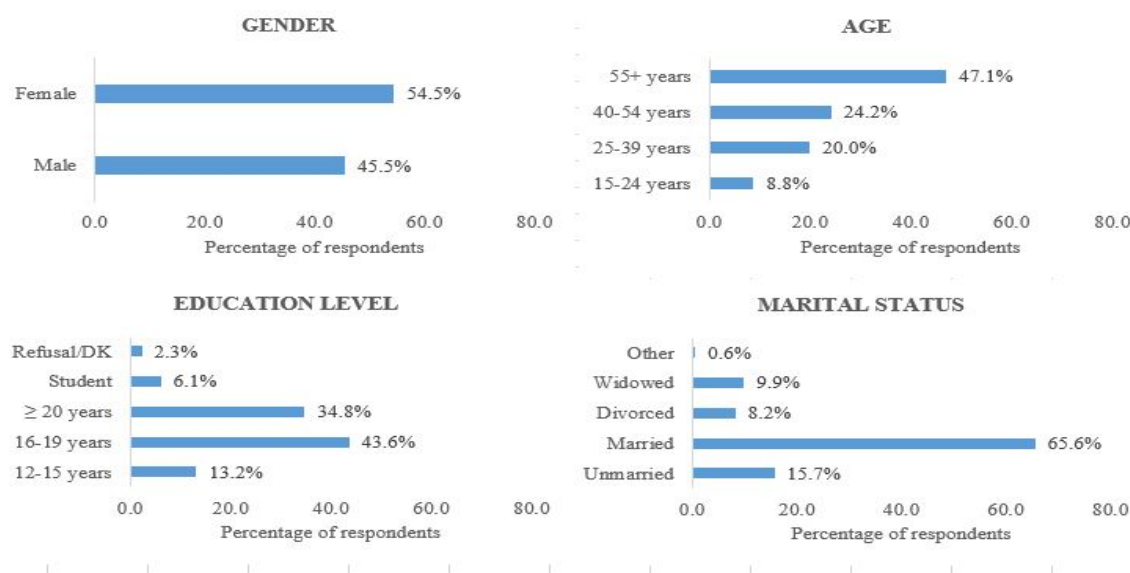


Figure no. 1: Demographic Characteristics of EU-28 Respondents

Source: Author's own calculations

Figure no. 2 illustrates different household types: 37.3% live in two-person households, followed by 24.1% in larger households and 21.6% living alone. Urban areas account for 39.3% of the sample, with 32.0% residing in rural communities. A notable proportion (28.7%) responded “Don’t know” to the community-type question, probably indicating uncertainty about localities' classification.

Figure no. 3 highlights financial and digital aspects: 67.3% report almost never struggling to pay utility bills, reflecting limited financial strain, while 15.7% never use the internet, and 9.7% use it only occasionally, indicating persistent digital divides across the EU-28 population.

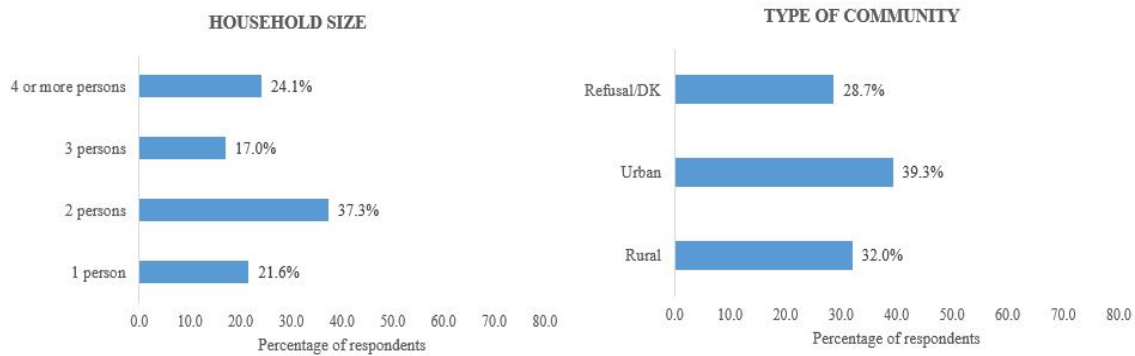


Figure no. 2: Household Size and Spatial Context

Source: Author's own calculations

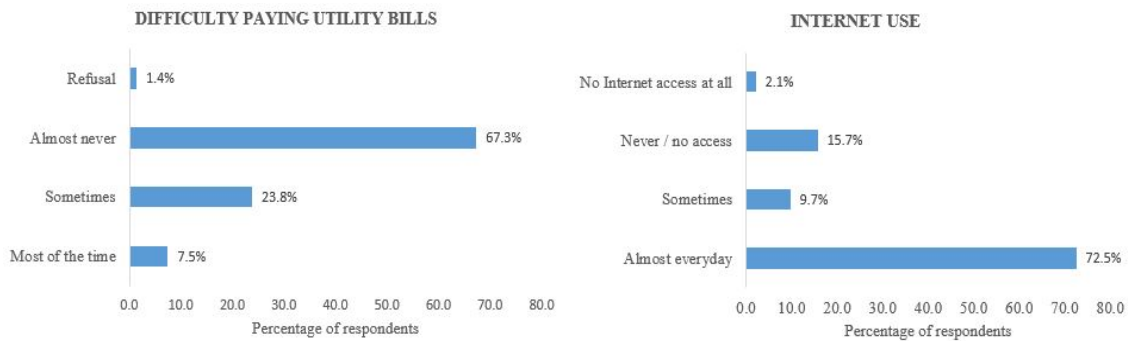


Figure no. 3: Economic Vulnerability and Digital Divide

Source: Author's own calculations

Figure no. 4 shows indicators directly related to perceptions of Roma. A large majority (76.0%) report having no friends who are Roma. Awareness of Roma presence in schools is everyday (70.5%), while opinions on Roma political representation are nearly evenly split between approval and disapproval. Additionally, 61.8% perceive discrimination against Roma at the national level. Only 0.9% identify “being Roma” as the main reason for discrimination, indicating that respondents mainly see discrimination affecting other social groups rather than Roma. Choosing “other reason” suggests that respondents believe other groups (not Roma) face discrimination.

Overall, these descriptive patterns reveal that the EU-28 population displays significant internal diversity in socio-economic conditions, the social visibility of Roma communities, and attitudes towards discrimination. These findings lay the groundwork for the comparative and regression analysis that follows.

Overall, the descriptive profile shows limited social interaction, moderate education levels, diverse household structures, and a strong awareness of broader inequality. Building on these patterns, Section 4.2 investigates whether the observed differences are statistically significant across socio-demographic groups using nonparametric methods.

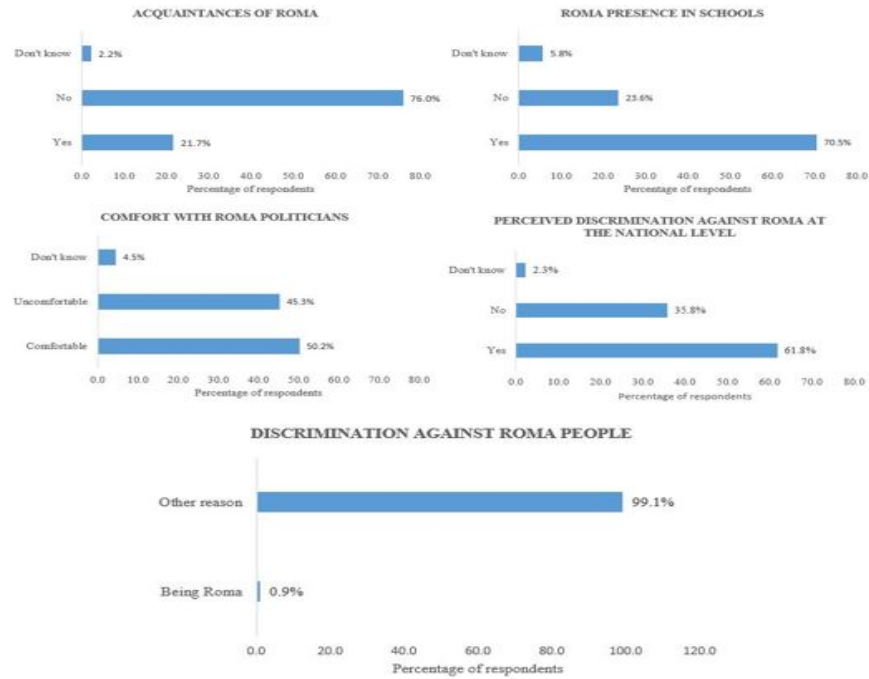


Figure no. 4: Social Contact and Perceptions of Inequality

Source: Author's own calculations

4.2. Non-parametric tests of socio-demographic differences among respondents in the EU-28 population

Before estimating the logistic regression model, nonparametric tests were used to determine whether socio-demographic groups differ systematically across variables relevant to employability.

Since several predictors are ordinal and not normally distributed, the Mann-Whitney U test was used to compare the dichotomous variable gender. Conversely, the Kruskal-Wallis H test was used for all variables with more than two categories – age, education level, marital status, household size, type of community, difficulty paying utility bills, and internet use.

Table no. 2: Statistical differences across socio-demographic indicators (Kruskal-Wallis test results)

Variables	Kruskal-Wallis H	df	Asymp. Sig.
Age	291.116	3	.000
Education level	185.803	2	.000
Marital status	212.683	5	.000
Household size	119.479	3	.000
Type of community	81.881	2	.000
Difficulty paying utility bills	75.042	3	.000
Internet use	545.898	3	.000

Source: Author's own calculations

The Mann-Whitney U test ($U = 92,553,276.6$; $Z = -1.266$; $p = 0.205$) shows no statistically significant gender differences in the distribution of the analysed variables. Therefore, men and women exhibit broadly similar socio-demographic and attitudinal characteristics.

By contrast, the Kruskal-Wallis test indicates significant differences among the remaining predictors (Table no. 2). Age ($H = 291.116$, $p < 0.001$) and education level ($H = 185.803$, $p < 0.001$) exhibit the most significant variation, highlighting substantial inequalities in human capital. Significant differences

are also observed in marital status ($H = 212.683$), household size ($H = 119.479$), type of community ($H = 75.042$), and internet use ($H = 545.898$), with the latter indicating a considerable digital divide across the EU-28 population.

These results confirm that the EU-28 adult population is diverse across key socio-economic dimensions. The observed differences justify including these predictors in the logistic regression model used to evaluate employability.

4.3. Logistic regression analysis of employability determinants

The model investigates how socio-demographic, household, economic, and Roma-related attitudinal factors within the EU-28 majority population are associated with employability. The binary logistic regression model (Table no. 3) demonstrates an excellent overall fit (Nagelkerke $R^2 = 0.863$; Cox & Snell $R^2 = 0.647$) and satisfactory calibration between predicted and observed values (Hosmer–Lemeshow $p = 0.126$). The predictive accuracy is high, with 93.2% of cases correctly classified. Diagnostic checks revealed no problematic multicollinearity. Marital status appears to be linked to employability: married respondents exhibit higher odds of being employed than unmarried individuals ($OR = 1.409$, $p = 0.030$). Gender also plays an important role—men show a higher likelihood of being employed than women ($OR = 1.513$, $p < 0.001$). Age is the strongest predictor. Compared to the 15–24 age group, respondents aged 25–39 show 4.5 times higher odds of being employed ($p < 0.001$), those aged 40–54 show 7.7 times higher odds of employment ($p < 0.001$), and respondents aged 55+ exhibit the highest odds ($OR = 10.213$, $p < 0.001$). This peak among the older age group reflects our focus on the active population, excluding those who have already transitioned into retirement.

Educational attainment exhibits a non-linear pattern. Respondents with 16–19 years of education are associated with lower odds of employment ($OR = 0.487$, $p = 0.007$). Higher education (20+ years) shows a marginally positive but not statistically significant trend toward improved employability ($OR = 1.009$, $p = 0.070$). Larger households increase the probability of employment ($OR = 1.270$, $p = 0.007$), while residing in rural or uncertain community settings ($OR = 0.807$, $p = 0.002$) significantly reduces it. Difficulty paying utility bills is strongly linked to employability. Compared to those who struggle “most of the time”, respondents reporting “almost never” struggling show markedly different outcomes ($OR = 0.405$, $p < 0.001$). Interestingly, the category of respondents who struggle only “sometimes” also exhibits a significant negative association with the likelihood of being employed ($p < 0.001$). These results emphasise the persistent connection between financial strain and labour-market positioning, where any level of financial vulnerability remains a strong indicator of employment status.

Apart from structural and economic factors, different perceptions and attitudes towards Roma populations also show notable associations with employability. Respondents who attribute discrimination to reasons other than Roma identity (category “Other reason”) exhibit lower odds of employment ($OR = 0.462$, $p = 0.034$). A lack of awareness about the presence of Roma in schools is linked to reduced employability ($OR = 0.612$ for “No”; $OR = 0.595$ for “Don’t know”; both $p < 0.001$). Respondents with no Roma acquaintances have lower odds of being employed ($OR = 0.512$, $p = 0.001$).

Regarding political attitudes, expressing comfort with Roma politicians is associated with significantly lower odds of being employed compared to the 'Uncomfortable' reference category ($OR = 0.438$, $p < 0.001$). This negative association, consistent across both Logit and Probit models, indicates that in this specific EU-28 sample, individuals who are currently integrated into the labour market tend to maintain a

higher social distance regarding minority political representation. This suggests that employment status does not automatically correlate with broader social openness in the political sphere.

Finally, the variable “Workplace promotion of Roma” is not statistically significant ($p > 0.95$), suggesting that general perceptions of workplace inclusion efforts are unrelated to individual employability status of the respondents.

Table no. 3: Results of the logistic regression model estimating employability in the EU-28 population

Variables	β	Sig.	Exp (β)
Marital status (ref. category = Unmarried)			
Married	.343	.030	1.409
Divorced	.517	.339	1.677
Widowed	.804	.143	2.235
Other	-.191	.731	.826
Gender (ref. category = Women)			
Man	.414	.000	1.513
Age (ref. category = 15-24 years)			
25-39 years	1.514	.000	4.545
40-54 years	2.045	.000	7.728
55 years and more	2.324	.000	10.213
Education level (ref. category 12-15 years)			
16-19 years	-.720	.007	.487
20+ years	.009	.070	1.009
Student	.398	.115	1.489
Refusal	-.202	.589	.817
Type of community (ref. category = Urban area)			
Rural area	-.193	.007	.825
Don't know	-.214	.002	.807
Household size (ref. category = 1 person)			
2	.024	.838	1.024
3	.012	.886	1.012
4+	.239	.007	1.270
Difficulty paying utility bills (ref. category = Most of the time)			
Sometimes	-.488	.000	.226
Almost never	-.904	.000	.405
Refusal	-.420	.075	.657
Discrimination against Roma people (ref. category = Being Roma)			
Other reason	-.772	.034	.462
Disadvantage in employment due to Roma identity (ref. category = Yes)			
No	.066	.262	1.068
Awareness of Roma presence in schools (ref. category = Yes)			
No	-.490	.000	.612
Don't know	-.520	.000	.595
Acquaintances of Roma (ref. category = Yes)			
No	-.669	.001	.512
Don't know	-.332	.081	.717
Perceived national-level discrimination against Roma (ref. category = Yes)			
No	-.394	.013	.674
Don't know	-.334	.037	.716
Perception of Roma politicians (ref. category = Uncomfortable)			
Comfortable	-.827	.000	.438
Don't know	-.786	.000	.455
Workplace promotion of Roma (ref. category = Yes)			
No	.641	.967	.278
Don't know	.655	.960	.106
Constant	-.570	.393	.565
-2 Log likelihood	8610.282		
Cox & Snell R^2	.647		
Nagelkerke R^2	.863		

Variables	β	Sig.	Exp (β)
Sig. (Hosmer and Lemeshow Test)		.126	
Correctly classified percentage		93.2	

Source: Author's own calculations

Overall, employability in the EU-28 arises from a complex interaction among structural factors, socio-economic conditions, and Roma-related perceptions. These findings demonstrate that employment determinants extend beyond individual human capital, reflecting broader societal attitudes and the visibility of minority groups. Taken together, the results confirm the study's main hypotheses: structural factors remain key predictors, while intergroup awareness and social perceptions also play a measurable role. The fact that attitudinal variables remain significant even after controlling for socio-demographic characteristics indicates that majority attitudes are a vital component of labor-market dynamics, warranting further attention in European inclusion policies.

4.4. Comparative performance of the Probit, Logistic, and Discriminant models

The Probit model results (Table no. 4) confirm the robustness of the initial findings, showing consistent signs and significance levels across most predictors. While gender and age remain highly significant, the core Roma-related attitudinal variables—awareness, acquaintances, and political perception—maintain their direction of influence and remain statistically significant ($p < 0.05$). The smaller numerical values of the probit coefficients are expected due to the scaling between the standard and logistic distributions. This consistency across different functional forms validates that the observed links between social attitudes and labour market outcomes are structurally stable and not model-dependent.

Table no. 4: Probit regression model results for estimating employability (significant predictors)

Variables	Category	Estimated Coefficient	Std. Error	P
Gender (ref. category = Woman)	Man	.201	0.031	.000
Age (ref. category = 15-24 years)	25-39 years	1.123	.049	.000
	40-54 years	1.288	.043	.000
	55 years and more	.800	0.092	.000
Marital status (ref. category = Unmarried)	Married	.456	.311	.143
	Divorced	.286	.307	.352
Education level (ref. category = 12-15 years)	20+ years	.006	.148	.070
Household size (ref. category = 1 person)	3 persons	.136	.051	.008
Type of community (ref. category = Urban area)	Rural area	-.094	0.039	.018
	Don't know	-.112	.037	.003
Difficulty paying utility bills (ref. category = Most of the time)	Sometimes	-.505	.139	.000
	Almost never	-.799	.148	.000
Awareness of Roma presence in schools (ref. category = Yes)	No	-0.260	.061	.000
Acquaintances of Roma (ref. category = Yes)	No	-.374	.112	.001
Perception of Roma politicians (ref. category = Uncomfortable)	Comfortable	-0.454	0.071	.000
Perceived national-level discrimination against Roma (ref. category = Yes)	No	-0.226	0.086	.009
Discrimination against Roma people (ref. category = Being Roma)	Other reason	-0.476	0.198	.016

Source: Author's own calculations

The high discriminative power of the estimated models further confirms the robustness of these predictors. While the logistic and probit frameworks identify the individual impact of each variable, the

combined predictive capacity of these socio-demographic and attitudinal factors allows for a highly accurate classification of individuals within the labor market.

To evaluate and compare the performance of the three econometric methods, the indices for sensitivity, specificity, the area under the ROC curve (AUC), and the overall accuracy rate are summarised in Table no. 5. The results indicate that the logistic regression model achieved an AUC of 0.972 and a correct prediction rate of 93.2%. While all analysed frameworks demonstrated high analytical precision, the logistic regression model proved to be the most effective at classifying and predicting employability status within the EU-28 population. This superior predictive capability, combined with its high sensitivity (93.1%) and specificity (93.3%), justifies its selection as the primary analytical tool for identifying the socio-demographic and attitudinal determinants of employment.

Table no. 5: The values of sensitivity, specificity, the area under the ROC curve, and the percentage of correct predictions of the logistic regression, probit regression, and linear discriminant analysis models in the prediction of employability among the EU-28 population

Method	AUC (Area Under Curve)	Sensitivity (%)	Specificity (%)	Correct prediction (%)
Logistic regression	0.972	93.1	93.3	93.2
Probit regression	0.970	87.5	97.6	92.3
Linear discriminant analysis	0.946	85.0	100.0	92.0

Source: Author's own calculations

The determinants of employability within the EU-28 population are analysed by combining traditional structural factors with majority-group perceptions of Roma communities. Using three different statistical methods – logistic regression, probit regression, and linear discriminant analysis (LDA) – the stability and robustness of the results are confirmed. The high explanatory power of the logistic model (Nagelkerke $R^2 = 0.863$) indicates that labour market outcomes result from a complex interaction between accumulated life-course advantages and wider societal attitudes.

Hypothesis 1 is supported by evidence indicating that structural factors such as age, marital status, and financial stability are key predictors of employment. The peak of employability among older age groups reflects the combined influence of professional experience and financial security. Conversely, the significant negative link between financial strain (difficulty paying bills) and employability emphasises a reciprocal relationship between economic vulnerability and labour-market exclusion. Methodologically, logistic regression proved more effective for such interpretations because it provides odds ratios via a closed-form model. While the probit model produced nearly identical results in terms of sign and significance, confirming the findings across different link functions, LDA performed less well. This lower predictive accuracy of LDA is due to its sensitivity to categorical variables and the violation of multivariate normality assumptions common in socio-demographic datasets.

Beyond individual human capital, another aspect uncovered is that perceptions of Roma are significantly associated with employability outcomes. Limited intergroup contact, low awareness of Roma presence in schools, and uncertainty about discrimination are all linked to reduced chances of employment. While Hypothesis 2 is partially supported by the significant role of social contact and awareness, the link between political representation and employability revealed an unexpected pattern. Contrary to expectations, the results indicate that comfort with Roma political representation is associated with lower odds of employment ($OR = 0.438$). This finding suggests a socio-political cleavage where the employed majority population may hold more traditional or cautious views regarding minority inclusion in high-level political leadership. This misalignment with intergroup contact theory in the political dimension warrants further investigation into how regional political cultures influence the professional elite's

attitudes. Ultimately, the observed alignment with intergroup contact theory in terms of school awareness and personal acquaintances implies that reducing “social distance” correlates with increased institutional trust and better labor-market positioning.

This alignment with intergroup contact theory implies that reducing “social distance” correlates with increased institutional trust.

Despite the model’s 93.2% accuracy, some limitations still exist. Excluding inactive respondents was necessary to focus on market participants, but it may introduce selection bias. Furthermore, since specific occupational categories were not available in the dataset, we utilised education level and financial vulnerability as proxies for market position. As this is a cross-sectional analysis, results show associations rather than definitive causality.

Reverse causality remains a possibility (endogeneity), as economic hardship might lead to exclusionary attitudes. However, the consistency across three models indicates a stable association that warrants policy attention.

5. Conclusions

The analysis provides evidence that employability in the EU-28 is significantly associated with the combined influence of structural conditions and social perceptions. Structural determinants such as age, marital status, household size, and financial stability consistently distinguish individuals’ likelihood of employment. These patterns suggest that labour-market participation is deeply rooted in broader life-course trajectories, where social and economic stability tend to enhance employment opportunities. At the same time, the findings show that Roma-related attitudes and perceptions exhibit an independent association with employability status. Limited familiarity with Roma, uncertainty about discrimination, and weaker school-level awareness correlate with lower employment probabilities, indicating that social distance and reduced intergroup visibility are associated with reduced engagement in economic activities.

The structural stability of these findings is further supported by the robustness checks performed. The consistency in sign and significance across the logistic regression and probit models confirms that the identified associations are not artifacts of a specific statistical method. The high classification accuracy (93.2%) and the alignment of results across different econometric specifications enhance the reliability of the observed patterns within the active EU-28 population, demonstrating that the model’s insights remain valid across different functional forms. However, the association between political attitudes and employment reveals a more complex dynamic; the finding that comfort with Roma political representation is associated with lower odds of employment suggests that labor market integration does not follow a linear path with social openness in this specific sample, reflecting complex socio-political cleavages.

Certain limitations must be recognized, as emphasized by the empirical design. The cross-sectional nature of Eurobarometer data precludes definitive causal inference, meaning the relationship between attitudes and employment status should be viewed through the lens of mutual association rather than direct causality. Furthermore, all attitudinal variables depend on self-reported measures that may reflect subjective or context-specific perspectives. Moreover, the analysis cannot fully differentiate between contextual differences across EU Member States, which might affect perceptions and employability in diverse ways.

From a policy perspective, the findings point toward the potential importance of promoting social contact and enhancing the visibility of minority groups. Addressing misperceptions and strengthening educational awareness may serve as complementary strategies in advancing labour-market inclusion, alongside traditional socio-economic support. From an academic viewpoint, the study adds to the existing literature by showing that perceptions held by the majority population—rather than solely the experiences of minority groups—provide valuable insights into understanding employment inequalities across Europe. Overall, the study highlights that enhancing labour-market inclusion requires a multi-faceted approach that considers not only socio-economic factors but also the potential role of social awareness, intergroup understanding, and civic openness across European societies.

References

- Abudari, M., Razeq, N., Al-Hussami, M., Algunmeeyn, A., & Abu-Abbas, M. (2025). Food insecurity among Romani adults with chronic illness in Jordan: Prevalence, predictors, and public health implications. *Frontiers in Public Health*, 13, 1639325. <https://doi.org/10.3389/fpubh.2025.1639325>
- Balaneasa, M. (2015). Observance of the principle of nondiscrimination on grounds of ethnicity on the labour market. *European Journal of Law and Public Administration*, 2(3), 5–16. <https://doi.org/10.18662/eljpa/2015.0203.01>
- Berat, D. (2018). Roma rights and discrimination based on ethnicity in Sweden (Göteborg, Vänersborg, Stockholm and Trollhättan)', *SEEU Review*, 13(1), 15–29. <https://doi.org/10.2478/seeur-2018-0003>
- Berntson, E., Sverke, M., & Marklund, S. (2006). Predicting perceived employability: Human capital or labour market opportunities?', *Economic and Industrial Democracy*, 27(2), 223–244. <https://doi.org/10.1177/0143831X06063098>
- Chowdhury, S. (2019). Equal access for the Roma minority: A question of “political will” or “competence” of EU institutions – A focus on Hungary', *International Journal on Minority and Group Rights*, 26(3), 409–435. <https://doi.org/10.1163/15718115-02602003>
- Černič, J. L. (2025). Discrimination against non-majorities, Roma, Ashkali and Egyptian communities in Kosovo: Insights from practice', *Access to Justice in Eastern Europe*, 8(3), 448–477. <https://doi.org/10.33327/AJEE-18-8.3-a000106>
- Czaderny, K. (2022). Segregation, education, and inclusion of European Roma: A demographic analysis', *Migration Letters*, 19(6), 737–753. <https://doi.org/10.33182/ml.v19i6.1555>
- European Commission (2011). An EU framework for national Roma integration strategies up to 2020 (COM(2011) 173 final). Luxembourg: Publications Office of the European Union. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52011DC0173> (Accessed: 1 December 2025).
- European Commission (2019a). Special Eurobarometer 493: Discrimination in the European Union. Publications Office of the European Union. Available at: https://www.cartapariopportunita.it/wp-content/uploads/2020/09/Eurobarometer_focus-on-Discrimination_2019.pdf (Accessed: 1 December 2025).
- European Commission (2019b). Eurobarometer 91.4 (2019): Attitudes of Europeans towards discrimination [Data set]. GESIS Data Archive. Available at: <https://doi.org/10.4232/1.14576> (Accessed: 1 December 2025).
- European Union Agency for Fundamental Rights (2016). Second European Union Minorities and Discrimination Survey (EU-MIDIS II): Roma – Selected findings. Publications Office of the European Union. Available at: https://fra.europa.eu/sites/default/files/fra_uploads/fra-2016-eu-minorities-survey-roma-selected-findings_en.pdf (Accessed: 1 December 2025).
- European Union Agency for Fundamental Rights (2018). Transition from education to employment of young Roma in nine EU Member States. Publications Office of the European Union. Available

- at:<https://fra.europa.eu/en/publication/2018/transition-education-employment-young-roma-nine-eu-member-states>(Accessed: 1 December 2025).
- Fugate, M., Kinicki, A. J., & Ashforth, B. E. (2004). Employability: A psycho-social construct, its dimensions, and applications. *Journal of Vocational Behavior*, 65(1), 14–38. <https://doi.org/10.1016/j.jvb.2003.10.005>
- Heath, A. & Cheung, S. Y. (eds.) (2007). *Unequal chances: Ethnic minorities in Western labour markets*. Oxford: Oxford University Press.
- Heisig, J. P., Lancee, B., & Radl, J. (2018). Ethnic inequality in retirement income: A comparative analysis of immigrant–native gaps in Western Europe. *Ageing & Society*, 38(10), 1963–1994. <https://doi.org/10.1017/S0144686X17000332>
- Kahanec, M. (2014). Roma integration in European labour markets. *IZA World of Labor*, 39. <https://doi.org/10.15185/izawol.39>
- Kirova, A., & Thorlakson, L. (2016). Introduction: Policy, inclusion, and education rights of Roma children: Challenges and successes in the EU and North America. *Alberta Journal of Educational Research*, 61(4), 371–380. <https://doi.org/10.11575/ajer.v61i4.56196>
- McQuaid, R. W., & Lindsay, C. (2005). The concept of employability. *Urban Studies*, 42(2), 197–219. <https://doi.org/10.1080/0042098042000316100>
- O’Higgins, N., & Brüggemann, C. (2014). The consequences of cumulative discrimination: How special schooling influences employment and wages of Roma in the Czech Republic. *European Educational Research Journal*, 13(3), 282–294. <https://doi.org/10.2304/eerj.2014.13.3.282>
- Pager, D., & Shepherd, H. (2008). The sociology of discrimination: Racial discrimination in employment, housing, credit, and consumer markets. *Annual Review of Sociology*, 34, 181–209. <https://doi.org/10.1146/annurev.soc.33.040406.131740>
- Pettigrew, T. F., & Tropp, L. R. (2006). A meta-analytic test of intergroup contact theory. *Journal of Personality and Social Psychology*, 90(5), 751–783. <https://doi.org/10.1037/0022-3514.90.5.751>