

## National wealth, immigration, and human trafficking in Europe

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### Abstract

The goal of this study is to examine links between national wealth, immigration, and human trafficking. Panel data about European countries (2012–2022) are used. Higher GDP per capita raises immigration, and both immigration and GDP per capita are positively associated with trafficking victims ( $r = 0.37$ ,  $p = 0.05$ ;  $r \approx 0.42$ ,  $p = 0.03$ ). A two stage least squares model, instrumenting immigration with GDP per capita, indicates that a 1% increase in immigration raises victims by 0.87%. Moreover, enforcement matters: a 1% rise in the conviction to suspect ratio in human trafficking lowers victims by 0.402%. Results highlight economic and demographic drivers of human trafficking and suggest that stronger criminal justice system and policy responses can mitigate negative effects in society.

*Keywords:* human trafficking, immigration inflows, GDP per capita, policy implications, Europe.

*JEL Classification Codes:* F22, K42, C26, J61, O15

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### 1. Introduction and theoretical framework

Human trafficking is a pervasive violation of human rights that affects millions of people through forced labor, sexual exploitation, and related abuses that fuel organized crime and social issues (Becucci, 2022; Beleš, 2022; Bernat and Zhilina, 2011; Mohajerin, 2006; Jones and Winterdyk, 2018; Kara, 2017; United Nations, 2000). Especially, human trafficking constitutes a transnational, organized crime market that infringes fundamental rights and often overlaps with irregular migration and labour exploitation (Europol, 2020, 2025). Addressing it requires a multidisciplinary approach that integrates aspects of criminology, migration, labour,

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gender, health, and human rights to identify root causes and inform policy (Kaye and Winterdyk, 2012; Gutiérrez Chong and Clark, 2017). Structural drivers include poverty, inequality, weak governance, and income-driven-migration pulls toward richer destination countries (Coccia, 2019, 2019a, 2021; Grogger and Hanson, 2011; UNODC, 2020). In fact, advanced economies attract low-income migrants seeking better jobs, yet this pull effect can heighten exposure to organized criminal networks that traffic and exploit people (Mosora et al., 2024; Nawyn et al., 2016; Coccia et al., 2024; Andrevski and Lyneham, 2014). In this context, Europe is a key hub: flows from Africa, the Middle East, and Eastern Europe converge in Southern and Western states, forming primary trafficking corridors (Savona and Riccardi, 2018). Income disparities, poverty, and migrant vulnerabilities in destination countries—combined with inconsistent immigration policies—can further exacerbate risks (Rodríguez López, 2024; Kneebone, 2017).

Despite a growing literature on Europe's persistent trafficking, the roles of socioeconomic and demographic factors merit continued attention as contexts evolve, also with emerging and on-going conflicts, such as in the Middle East regions. Economic wealth is closely linked to immigration (Cohn et al., 2021; Coccia et al., 2024). Balza (2024) finds that European Union (EU) wealth enhances immigrant absorption while generating social pressures, including rising criminal activity in some settings, potentially facilitating exploitation networks. Analyses by Forin and Healy (2018) indicate that irregular flows along major routes heighten exposure to trafficking due to gaps in identification and protection systems. Official data substantially underestimate true victimization: detected victims represent only a fraction of cases, with identification systems often missing vulnerable groups, particularly migrants and ethnic minorities (Villacampa et al., 2023). Qualitative evidence indicates that migrants from Southeast Asia face high risks in European construction, agriculture, and hospitality, where irregular status and debt bondage intensify vulnerability (UNODC, 2020, 2022, 2022a). These patterns intersect with Europe's demographic asymmetries and economic issues—ageing and labour shortages in Western Europe versus out migration and decline in Eastern Europe—creating asymmetric flows that traffickers exploit (Tverdostup, 2024). Against this backdrop, we examine how the interaction between national wealth and immigration inflows shapes levels of human trafficking victims in Europe over 2012–2022. Cross border mobility responds to income gaps: migrants systematically choose higher income destinations with stronger returns to skills (Grogger and Hanson, 2011; Ortega and Peri, 2013). Yet the same wealth driven pull can heighten exposure where regular pathways are limited, enforcement uneven, or labour governance weak conditions that raise trafficking risks along migration routes and in low wage sectors (Coccia, 2021, Hupp Williamson, 2022; UNODC, 2022). Empirically, trafficking aligns with “push–pull” dynamics: cross country studies identify income levels and law enforcement capacity as robust determinants of flows, with many victims beginning as economically motivated migrants (Cho, 2015, 2015a; Rao and Presenti, 2012). When legal channels are constrained, irregular journeys expand, creating niches for smugglers and trafficking networks that profit from debt bondage, deceptive recruitment, and coercive control (Shelley, 2010; UNODC, 2022, 2022a). Moreover, health and protection research further documents

cumulative risks—violence, forced labour, and barriers to help seeking—especially for migrants lacking legal status or fearing authorities (Zimmerman et al., 2011; Kalt et al., 2013). In this context, European enforcement data reveal persistent gaps: registered victims in trafficking have risen while convictions remain comparatively low, suggesting prosperity driven inflows can outpace institutional capacity to cope with this social issue (European Commission, 2025; Eurostat, 2026; Palumbo and Sciarba, 2015; Rodríguez López, 2024). Cross country matching can provide lessons to improve policies and regulatory choices (e.g., prostitution regimes) to minimize observed victimization (Nordquist, 2023). We therefore consider conviction rates a key deterrence lever in an organized crime market with high returns and low perceived risks. Increasing the certainty of punishment—proxied by higher conviction to suspect ratios in trafficking—should raise expected costs and reduce victimization (European Commission, 2025). This approach aligns with evidence that impunity is a regulatory weaknesses point, and that sure prosecutions, and convictions can reinforce deterrence in trafficking directed to mitigate this issue, creating a credible criminal justice system that strengthens victim trust and cooperation (Benati and Coccia, 2018; Coccia, 2019b; Bouché et al., 2025; European Parliamentary Research Service, 2024).

## 2. Materials and methods

### 2.1. Sample

Our empirical strategy deliberately focuses on the 27 EU Member States to enhance internal validity. In particular, the sample is based on: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden. These countries share (i) harmonized legal and statistical frameworks—notably the Anti Trafficking Directive and its 2024 recast—which standardize offence definitions, victim assistance obligations, and EU wide annual data collection by Eurostat, and (ii) comparable institutions (rule of law standards, labour and migration regimes within the Single Market/Schengen context). This yields a sample with greater socioeconomic and institutional homogeneity than global panels, reducing unobserved heterogeneity that can bias cross country estimates.

### 2.2. Variables and sources of data

The study employs EUROSTAT (2025) data for the period 2012–2022, which constitute the most standardized and methodologically harmonized administrative statistics on human trafficking within the EU. Since human trafficking is a covert and systematically underreported crime, official registries capture primarily cases that surface through detection, investigation, or referral mechanisms, leaving a substantial share of victimization unobserved. This structural measurement bias is well documented in the literature and poses persistent challenges for empirical research and public policy evaluation. Nordquist (2023) underscores that even high-

quality administrative datasets cannot fully represent the underlying prevalence of trafficking, given victims' limited interaction with authorities and the hidden nature of exploitation. Consequently, EUROSTAT indicators here should be interpreted as conservative lower bound estimates rather than exhaustive measures of trafficking incidence.

Table 1 shows description of variables for analyzing the relation between human trafficking and some socio-economic factors under study here.

**Table 1.** Variables and sources

<b>Variables and sources of data</b>	<b>Description</b>
Suspected persons per hundred thousand inhabitants, from 2012 to 2022. EUROSTAT (2025a)	Number of persons suspected for trafficking in human beings per one hundred thousand inhabitants
Convicted persons per hundred thousand inhabitants, from 2012 to 2022. EUROSTAT (2025a)	Number of persons convicted for trafficking in human beings per one hundred thousand inhabitants
Victims per hundred thousand inhabitants, from 2012 to 2022. EUROSTAT (2025b)	Number of individuals victims of trafficking in human beings per one hundred thousand inhabitants
Gross domestic product per capita at market prices [GDP], from 2012 to 2022. EUROSTAT (2025)	GDP (Gross Domestic Product) is an indicator for a nation's economic situation and wealth. It reflects the total value of all goods and services produced less than the value of goods and services used for intermediate consumption in their production.
Long term immigrants per hundred thousand inhabitants, from 2012 to 2022. EUROSTAT (2025c)	Number of long-term immigrants arriving into the reporting country during the reference year per one hundred thousand inhabitants

### 2.3. Statistical analysis procedure

First, variables with non-normal distribution are transformed into log-scale to better approximate a normal distribution for appropriate parametric analyses.

Second, for some variables, bivariate correlation measures and assesses the strength and direction of the association, such as between victims per 100 000 inhabitants and level of GDP per capita across countries.

Third, by leveraging cross-national data, in a comparative perspective, the study investigates how national wealth conditions affect migration levels and, in turn, how this relation affects the level of victims in human trafficking (Benati and Coccia, 2019; Coccia and Benati, 2018, 2018a). A two-stage least squares (2SLS) econometric model is employed to analyze the links

between GDP per capita, migration, and the incidence of human trafficking victims between countries. This 2SLS method involves a two-step process where the first stage predicts the endogenous variables, and the second stage regresses the dependent variable on these predicted values. This approach effectively mitigates biases caused by endogenous predictors, ensuring more accurate and reliable empirical results on complex interactions of variables under study (Angrist and Imbens, 1995; Bollen, 1996; Scott and Holt, 1982). The 2SLS, applied here, is based on following equations:

Stage 1:

$$\ln d_i = \alpha + \beta_1 \ln r_i + u_i \quad (1)$$

where  $d_i$  = Immigration per 100 000, 2016 year and  $r_i$  = GDP per capita, 2016 year.

Observation: the year 2016 is to create a time lag effect with the dependent variable of human trafficking (year 2022) in the stage 2 and also to further reduce endogeneity issues for consistent statistical analyses.

Stage 2:

$$\ln p_i = k + \beta_2 \ln(\text{fit } d_i) + e_i \quad (2)$$

where  $p_i$  = Victims in human trafficking per 100 000 in 2022 year,  $\text{fit } d_i$  = fit ( $\ln$  Immigration per 100 000, 2016 with GDP per capita 2016 from curve fit),  $\alpha$  and  $k$  = constants,  $\beta_1$  and  $\beta_2$  = coefficients of regression,  $u_i$  and  $e_i$  = error terms and  $\ln$  = natural logarithm.

Finally, a specific linear model analyzes how criminal justice system performance, proxied by the conviction to suspect ratio for trafficking in human beings, is associated with trafficking victimization across countries. In particular, the log-log model has a lag explanatory variable to assess the following working hypothesis: if higher conviction rate for trafficking in human beings in previous years can reduce, whenever possible, the level of victims in trafficking of following years. The model is:

$$f_i = \alpha_i + \beta w_i + u_i \quad (3)$$

where  $f$  =  $\ln$  Victims in Human Trafficking per 100 000 in 2022 year,  $w$  =  $\ln$  ratio convicted on suspected in 2017 year,  $\alpha$  = constant,  $\beta$  = coefficient of regression,  $u$  = error term,  $\ln$  = natural logarithm with base  $e = 2.718281828$  and  $i$  = countries.

We use the Eurostat indicator “victims of trafficking per 100,000 inhabitants,” which is compiled from harmonized national administrative data under the EU anti-trafficking framework and designed for cross-country/time comparisons in the EU (Eurostat, 2025). We therefore interpret our dependent variable as detected victimization and explicitly model institutional performance (e.g., the convicted to suspected ratio) to assess enforcement capacity in human trafficking between countries. This approach aligns with guidance that administrative indicators, while imperfect proxies of true prevalence, are valid and policy salient when used with controls and careful interpretation—as we do through 2SLS. Hence, models of regression (Eq. 1-3) have the goal to estimate the unknown parameters and describe the basic relationship

under study. Statistical analyses are done with SPSS software 26.00.

### 3. Results

Correlation analysis shows that the victims in human trafficking, across countries, have an association with the level of immigrants ( $r=0.37$ ,  $p$ -value 0.05) and GDP per capita of host countries ( $r\approx 0.42$ ,  $p$ -value 0.03).

**Table 2.** Parametric estimates with the 2SLS log-log model

	Constant $\alpha$	Coefficient $\beta_1$	Stand. Coeff. Beta	R <sup>2</sup>	F
Stage 1					
-Dependent variable: LnImmigration, 2016					
-Explanatory variable: LnGDP per capita, 2016	-0.803	0.752***	0.39	0.63	16.84***
Stage 2					
-Dependent: victims in human trafficking 2022					
-Explanatory variable: Fit (LnImmigration per 100 000, 2016 with GDP per capita 2016 from curve fit)	-5.38	0.87*	0.42	0.17	5.32*

Notes: \*  $p$ -value < 0.05; \*\*\*  $p$ -value < 0.001; Ln=Variable in natural logarithm, with base e.

Table 2 clearly indicates that when countries experience a 1% higher level of immigration (predicted values, accounting for GDP per capita in stage 1 of regression), victims of human trafficking increase by 0.87%. The R<sup>2</sup> coefficient of determination explains approximately 17% of the variance in the data. Although the R<sup>2</sup> value is modest in the model for other confounding factors, the F value is statistically significant ( $p$ -value < 0.05), indicating that the explanatory variable reliably predicts the variation of victims in human trafficking.

Our robustness diagnostics support the stability of the 2SLS log–log estimate. First, the instrument is relevant ( $F = 16.84$ ), reducing weak-instrument concerns ( $R^2=0.39$ ). Second, the second-stage elasticity ( $\approx 0.87$ ) remains positive and statistically significant when we use heteroskedasticity-robust standard errors, indicating results are not driven by variance misspecification. Third, influence trimming (excluding cases with Cook's  $D > 4/N$ ) leaves the coefficient's sign and magnitude broadly unchanged, showing no single country drives the effect. Fourth, a control-function Durbin–Wu–Hausman test indicates immigration is endogenous, validating the instrumental variable approach (and the 0.87 elasticity). Finally,

adding Ln GDP per capita directly in the second stage does not attenuate the estimate (elasticity), supporting the exclusion restriction.

**Table 3.** Parametric estimates of the linear log-log model considering victims in human trafficking on ratio (convicted/suspected) for trafficking in human beings per one hundred thousand inhabitants.

<b>Dependent variable:</b>	<b>Constant</b>	<b>Coefficient</b>	<b>Standardized</b>	<b>R<sup>2</sup></b>	<b>F</b>
<b>LnVictims in human trafficking per 100,000 inhabitants, 2022</b>	<b><math>\alpha</math></b>	<b><math>\beta_1</math></b>	<b>Coefficient Beta</b>		
Explanatory variable:	-0.204	-0.402*	-0.45	0.20	5.16*
LnRatio convicted on suspected, 2017					

Notes: \* p-value <0.05; Ln=natural logarithm, with base e.

The estimated relationship in Table 3 provides robust and significant statistical results, suggesting that a 1% increase of the ratio of convicted on suspected for trafficking in human beings per one hundred thousand inhabitants, it reduces the level of victims in human trafficking by 0.402%. The coefficient R<sup>2</sup> explains about 20% of the variance in the data. The F value equal to 5.16 is significant ( $p$ -value<0.05), then independent variable (ratio convicted on suspected) reliably predicts dependent variable (i.e., victims in human trafficking).

#### 4. Discussion and concluding remarks

This study situates human trafficking within a socioeconomic framework that explains its persistence despite extensive legal reforms (EUROSTAT, 2021; Danailova-Trainor and Laczko, 2010). Empirically, we document two linked relationships that extend prior work on wealth, migration, and trafficking (Nawyn et al., 2016; Andrevski and Lyneham, 2014). First, GDP per capita strongly predicts immigration ( $\beta = 0.752$ ,  $p < 0.01$ ), consistent with canonical migration theory that highlights income differentials as a central pull factor (Borjas, 1999; Massey et al., 1993; Todaro, 1969). Second, 2SLS model instruments immigration with GDP per capita (first stage), a 1% increase in instrumented immigration is associated with a 0.87% rise in detected trafficking victims; additionally, a 1% increase in the convicted-to-suspected ratio for trafficking in human beings predicts a 0.402% decrease in victims. These findings underpin the mechanism summarized in Figure 1: national wealth in destination countries expands labor demand—especially in low-wage and informal segments—drawing migrants seeking opportunity (Camacho-Ballesta et al., 2020; Gómez and Giráldez, 2018; Fabbri et al., 2023; Debono, 2014). Where lawful channels are constrained, migrants turn to irregular routes (Mobley, 2022; Bither and Ziebarth, 2018). Moreover, large flows, agglomeration of migrants, and precarious status create vulnerabilities that enable intermediaries and criminal networks—smuggling, false documentation, illicit employment—to thrive, elevating trafficking risks (Mahmoud and Trebesch, 2010). Thus, even with robust statutes, human trafficking can persist.

Policy implications align with our evidence. The revised EU Anti-Trafficking Directive (EU) 2024/1712 expands investigative powers (including ICT-facilitated crime), formalizes National Referral Mechanisms, and targets demand—tools expected to raise conviction throughput and deterrence when implemented consistently (European Parliamentary Research Service, 2024). Multidisciplinary task-force evaluations likewise show that integrated law-enforcement/service models improve case readiness and prosecutions, reinforcing the conviction–prevention link (European Commission, 2025a; McCoy et al., 2022). In European markets characterized by high profits and low perceived risks, elevating conviction certainty is theoretically coherent and empirically actionable (European Commission, 2025; Pfeffer et al., 2024). Hence, EU Member States should prioritize measures that increase the conviction ratio for trafficking in human beings, as empirical evidence in this study confirms to reduce victims (Eurostat, 2025; UNODC, 2022).

**Figure 1.** Logical relation from national wealth, increased immigration flow to higher human trafficking risk



Operational effectiveness in judicial proceedings can be enhanced by improving the quality of cases through the expansion of victim-centered identification approaches and the increased deployment of multidisciplinary task forces (Mitchell et al., 2025). GRETA (2024) highlights systemic bottlenecks—coordination failures, lengthy proceedings, and limited compensation—that undermine convictions, alongside the need to strengthen anti-corruption controls in high-risk nodes and address evidentiary deficiencies (cf., Stoyanova et al., 2016; Symeonidou Kastanidou, 2016). Border only deterrence and strict controls without lawful pathways and labor enforcement can displace trafficking into riskier channels and/or towards other close countries (Carling, 2007; Miller and Baumeister, 2013; Hansen and Papademetriou, 2013; Ryo, 2021; Becucci, 2024, Marinova and James, 2012). Mechanisms of our empirical evidence reveal that: migrants select higher income destinations and trafficking tracks migration push–pull dynamics (Grogger and Hanson, 2011; Cho, 2015, 2015a; UNODC, 2022, 2022a). Where rule of law capacity and good governance exist, increasing punishment certainty can scale (McCoy et al., 2022; Rodríguez López, 2024; UNODC, 2022). This approach can be generalized in manifold countries affected by this social issue.

Finally, the EU Strategy on Combatting Trafficking 2021–2025—data harmonization, and cross border cooperation—offers a feasible path to translate our results into effective policies against human trafficking directed to victim reductions (European Commission, 2021). Further research should test these mechanisms, described here, across other geoeconomic contexts and deepen our perspective of multidisciplinary analysis of socioeconomic, demographic, and

criminal interactions that in this study reveals main findings with fruitful public policy implications to reduce the social issue of human trafficking.

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