

Studies on Investment in Education and Labour Mobility

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Abstract. *In a globalized, knowledge-based economy, higher education is becoming a key factor in sustainable development. Romania is investing heavily in human capital development, but faces a constant exodus of highly skilled young people.*

This phenomenon generates economic and social costs that, over time, constrain development potential. This paper examines the return on public investment in higher education in the context of labor mobility. It focuses on the discrepancy between the resources allocated and the actual benefits reaped by Romanian society. By combining economic analysis with sociological research, our analysis explores young people's motivations to emigrate. These findings point to the need for active policies that support retention and valorization of graduates. This becomes even more apparent when professional reintegration and the stimulation of return to the country are considered as policy priorities. Strengthening human capital thus becomes a strategic priority.

Keywords: Investment in education, human capital, academic mobility, brain drain, social return.

Introduction

In an era marked by rapid globalization and increasingly knowledge-based economies, higher education serves not only as a tool for individual development but also as a strategic pillar of national competitiveness. Countries that succeed in training and retaining highly skilled human capital gain advantages in technological innovation, scientific research, public health, and efficient governance. Although Romania consistently invests in higher education, it faces a critical vulnerability regarding the retention of this human capital. The systematic emigration of young people with higher education, particularly in strategic fields such as medicine, IT, and engineering, creates substantial economic and social deficits, widening the gap between investments in education and the reality of national productivity.

A key point is that the benefits of academic education are, in fact, passed on to other economies. We argue that the cost-benefit ratio of public education policy cannot be assessed in isolation from labour mobility and its distributional effects. In the absence of a coherent framework for retaining human capital, Romania is placed in the position of a net provider of intelligence for

other EU member states or in the OECD area, without obtaining an adequate return on investment. The implication is clear: analysing this issue is not only opportune, but essential for substantiating fairer and more efficient public policies

The paper pursues several complementary objectives. First, it quantifies public investment in higher education in relation to different fields of study. Second, it examines the level of job mobility among graduates and the factors that influence it. Third, it analyses young people's perceptions of the quality of academic training and its correlation with the labour market. Fourth, it identifies the real beneficiaries of the Romanian educational system. Finally, it proposes concrete measures aimed at maximising educational performance in the national context.

From a methodological standpoint, the study adopts an interdisciplinary approach, combining an economic analysis of budget allocations and per-student costs with tools from applied sociological research. A structured questionnaire was developed and distributed to a nationally representative sample of 670 respondents, with a margin of error of $\pm 3.99\%$. The collected data were analyzed using statistical methods, including the χ^2 test and the Mann-Whitney U test, to validate the formulated hypotheses. In addition, a comparative analysis was conducted between the profiles of those who chose to remain in the country and those who left, along with an estimate of long-term budgetary and economic losses.

This paper therefore contributes to understanding the relationship between investment in education and human capital mobility. The findings provide a solid basis for developing public policies oriented towards performance, equity and strategic retention.

Investment in education is a central theme in labour economics and the social sciences. It is examined repeatedly through its links to productivity, economic growth, the reduction of inequalities and labour mobility. The literature emphasizes that education is not merely a mechanism for accumulating human capital, but also a key determinant of occupational, geographic, and social mobility. This makes a difference because it shapes individual migration decisions and it influences labour market dynamics at both national and international level.

G. Becker defines human capital as a stock of knowledge, skills and health, formed through rational investment decisions made by the individual or the state. Consequently, education is viewed as an asset that generates a stream of future income, and investments in education are evaluated in terms of their cost-benefit ratio. In particular, the general education provided by the public education system can generate network effects and positive externalities, such as social integration and civic participation, which support the need for government intervention.

In the article *Evolution of Interdependencies between Education and the Labor Market in the View of Sustainable Development and Investment in the Educational System*, the authors examine types of influences between education and the labour market. Their approach relies on cluster analysis, built on different levels of investments in the educational system.

The article *International student mobility, Covid-19, and the labour market: a scoping review* (Mihuț G. et al.) provides a systematic review and documents research published between 2020 and 2024 on the effects of international student mobility on labour market outcomes, particularly in the context of the Covid-19 pandemic. The authors identify significant negative impacts on access to work during mobility, skills acquisition and post-mobility employment opportunities. Somewhat surprisingly, they also highlight the widening of socio-economic inequalities among international students.

The paper by Papri Das (*Unlocking potentials: The impact of human capital investment in youth informal employment in emerging markets and developing economies*) reveals that an increase in the enrolment ratio in tertiary education five years ago negatively impacts current youth

informal employment. The results suggest that higher education helps reduce informal employment among young people. The study also indicates that the increase in education spending recorded eight years ago has led to an actual reduction in the current rate of informal employment among young people. These findings underscore the importance of sustained investment in education for the development of a skilled and well-trained workforce

Crăciun, Orosz and Preoteasa, analyses the impact of credit mobility on insertion in the labour market, income levels and occupational prestige.

Another study examining student mobility is “International Student Mobility and Labor Market Outcomes: An Analysis of the Role of Educational Level, Type of Mobility, and International Prestige Hierarchies” (Christof et al.). The authors analyze the relationship between participation in international student mobility (ISM) at the bachelor’s and master’s levels and two outcomes: graduate wages and the duration of the transition from education to the labor market.

A complementary institutional perspective is provided by the World Bank Group study “Human Capital for More Jobs: Connecting People to Work and Creating Entrepreneurs.” It highlights high levels of youth unemployment and the NEET rate (young people not in education, employment, or training), pointing to gaps between education and labor market integration within a specific national context. Complicating matters further is the report’s broader message: more strategic investments in education and training are needed. The report by the World Bank and other international institutions argues that investments in education and health are essential for creating decent jobs and reducing inequalities, highlighting the role of human capital in economic and social development.

From the literature on investment in education and labour mobility, several central ideas emerge for analysis in this study. Public investment in higher education is a strategic economic policy decision. It is justified by direct effects on the accumulation of human capital and, indirectly, on sustainable development. In Th. Schultz's view, education is one of the main forms of investment that influences the quality of the workforce, alongside health infrastructure, individual mobility and vocational training. Schultz argues that these investments cannot be treated in the same way as those in physical capital primarily because such investments generate long-term effects that are difficult to quantify immediately, yet they do remain essential for long-term economic growth.

The migration of highly educated individuals can be understood as a natural extension of human capital theory in the context of globalization. People decide to emigrate based on an economic calculation: the return on education is higher in other countries, where labor market structures, wages, living conditions, and opportunities for professional development are superior. In this logic, migration becomes a mechanism for maximizing utility within the neoclassical model. The cost of education borne by the state of origin is then recovered by the country of destination, in the form of the migrant's taxable contributions.

In the case of Romania, the phenomenon is particularly accentuated among young people with higher education, especially in medicine, IT, research and engineering. This has structural effects on the domestic labour market. This is reshaping the domestic labor market, exacerbating the shortage of essential skills and undermining public institutions, as they can no longer compete on wages with the globalized private sector.

From an economic perspective, this mobility of human capital affects the balance between educational training and domestic labor absorption. The effects are uneven. Remittances sent by emigrants, which exceeded \$650 billion globally in 2023, contribute to consumption and investment, but cannot replace the actual loss of human resources. The data also reveal a second

constraint: the transfer of knowledge and technology remains limited when the diaspora is not actively integrated into the development projects of the country of origin.

Some countries in Northern Europe, such as Sweden and Estonia, have succeeded in turning educational mobility into a strategic advantage. They attract young people from other countries, integrate them professionally and fiscally, and involve them in innovation ecosystems. Romania and other Eastern European countries, however, remain at risk, largely due to the lack of coherent policies for retaining or repatriating skilled human capital. This discrepancy constitutes a critical vulnerability for the national economy.

The state has a fundamental obligation to protect and capitalize on the human capital in which it invests. This social responsibility is expressed not only through equitable access to higher education, but also through active policies that retain and integrate graduates into the domestic labor market. This does not mean that remittances are irrelevant, but rather that, in the absence of systemic measures, investments in education risk becoming an indirect subsidy for developed economies.

Education policy must align with national strategic priorities: regional development, innovation, digitalization, and public health. The funding system must encourage academic performance, community engagement, and a focus on underserved sectors. The conclusions drawn from these findings are practical in nature: mechanisms such as post-graduation employment contracts, conditional scholarships, or tax incentives for employers can help retain human resources.

The theoretical discussion above suggests that decisions regarding migration are closely linked to how individuals assess the return on their investment in education and the opportunities available in the domestic labor market. When graduates perceive limited career prospects or significant income disparities, working abroad becomes a rational alternative rather than an emotional reaction. At the same time, the disconnect between academic training and actual employment opportunities can generate frustration and reinforce intentions to migrate. From this perspective, migration reflects structural gaps in opportunities rather than dissatisfaction with education itself. Based on this reasoning, the following hypotheses are formulated.

Methodology

As a study methodology, we used various statistical tools able to highlight the central trend and the defining elements of the collected data. We begin with a documentary study of the situation in Romania. This step is necessary to define the working assumptions and the target population, based on the data available to us.

Between 2015 and 2022, annual allocations for education in Romania fluctuated between 2.7% and 3.6% of GDP, often influenced by union demands or structural changes. Despite these temporary peaks, the budget for higher education has grown modestly and remains consistently below the EU average, both in terms of the share of GDP and funding per student.

For comparison, in 2021, Romania allocated 2.8% of GDP to education, of which higher education received approximately 0.45% of GDP. In 2022, amid rising inflation and falling real incomes, the budget for higher education stagnated in real terms, even though it increased slightly in nominal terms. This means that real purchasing power ultimately determines what institutions can offer.

In 2023, the Ministry of Education received a 9% budget increase compared to the previous year, reaching approximately 55 billion lei for the entire education system. The portion allocated

to higher education was estimated at approximately 7 billion lei. However, per-student funding remained significantly below the EU average.

A notable change occurred in 2025. According to the Ministry of Education and Research, the total budget allocated to education, including all funding sources, reached 4.5% of GDP. This represented 10.7% of the Consolidated General Budget. Of this total, 0.17% of GDP was dedicated to research, development, and innovation (R&D). This is the largest budget allocation in the last 15 years.

The budget directly allocated to the Ministry of Education in 2025 was 60,249,451 thousand lei, up 9.58% compared to the budget execution in 2024. Within this amount, the education component received 58,062,930 thousand lei, an increase of 9.78%. The R&D component received 2,148,957 thousand lei, marking a 4.42% increase. This indicates that the upward trend is evident in nominal terms and can be observed across all components.

From a strategic perspective, Romania aims to allocate 6% of GDP to education and 1% of GDP to research, in line with the objectives set out in the National Education Strategy and the recommendations of the European Commission. These targets are formulated as an alignment with broader European expectations rather than as isolated national ambitions.

International comparisons show that Romania remains below the OECD and EU averages in terms of higher education funding. In Western European countries, average government spending on tertiary education exceeds 1% of GDP, while the average allocation per student is over 8,000 euros. Romania is closer to around €2,000 to €2,300 per student. This gap remains substantial.

Against this background, we used a questionnaire whose main purpose was to investigate young people's perceptions of the relevance of higher education in Romania in relation to the labour market, as well as its influence on labour mobility. Our analysis suggests that the main mechanism is simple: the Romanian government's investments in higher education can generate benefits beyond the country's borders through the migration of skilled human capital.

The objectives of the case study are:

1. To identify the current perceptions of students and graduates regarding the quality and relevance of university education to the demands of the Romanian labor market.
2. To analyze the factors influencing the decision to emigrate among young people with higher education, with a focus on economic, social, and professional motivations.
3. To assess the perceived impact of the Romanian education system on respondents' professional careers, including in relation to opportunities abroad.
4. To determine young people's perception regarding the real beneficiaries of university training carried out in Romania.
5. To investigate respondents' views on the role of the state in retaining human capital, including possible public policies that could encourage them to stay or to return to the country.
6. To propose directions of action and educational policies in order to optimize public investment in higher education and to reduce losses caused by the intellectual exodus.

Based on these points, we have formulated the following working hypotheses:

The research hypotheses

If migration is influenced by perceived differences in opportunities, then differences in available employment prospects should be reflected in differing mobility intentions.

Main hypothesis (H1): The intention to work abroad after completing one's studies varies significantly depending on the availability of job opportunities in the field for which respondents

have trained. A stark contrast emerges between Romania and the lack of opportunities or the lack of alignment with the labor market.

If individuals view education as an investment, then dissatisfaction with its perceived return should be associated with a stronger intention to emigrate.

Secondary hypothesis (H2): Perceptions of the relationship between personal investment in education (time/money) and subsequent benefits (salary/stability) differ significantly between respondents who intend to work abroad and those who do not.

If wage differences play a key role in decisions regarding economic mobility, their perceived importance should significantly influence migration plans.

Secondary hypothesis (H3): Respondents who intend to work abroad place significantly greater importance on the influence of wage levels in Romania on their decision to emigrate, compared to respondents who do not intend to leave. This difference is expected to be significant, not marginal.

If public investment in education is considered socially valuable, a significant proportion of respondents should support government intervention aimed at retaining graduates.

Secondary hypothesis (H4): A significantly higher proportion of 50% of respondents believe that the state should intervene through measures and policies. This includes, where relevant, conditioning public support in order to encourage the retention of graduates in Romania.

Null hypothesis (H0): There are no statistically significant differences in the assessment of the efficiency of the higher education system between respondents who intend to work abroad and those who do not.

To test these research hypotheses, a questionnaire was distributed to 670 people. The centralised results are summarised in the following graphs

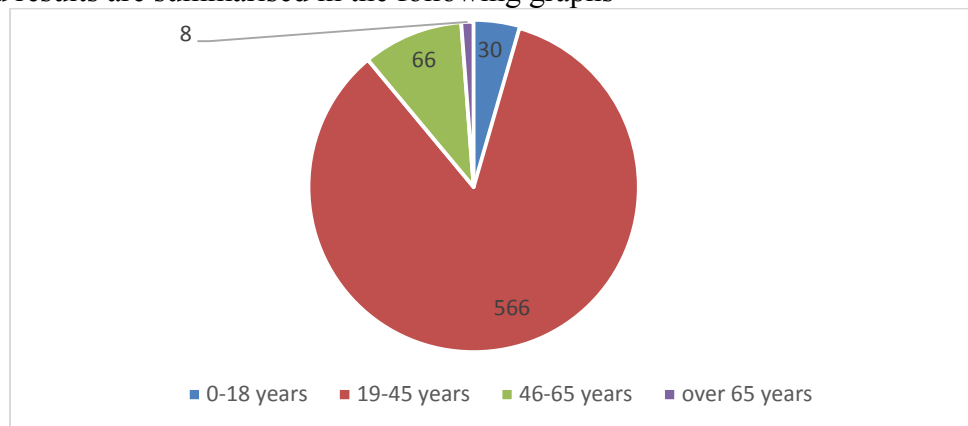


Figure 1. Analysis of representativeness by age groups

The age distribution of the sample shows a strong concentration in the 19–45 age group (84.2%), suggesting that the results primarily reflect the perceptions of the active and potentially mobile segment of the population. This aspect is particularly relevant, given that migration intentions and labor market integration are most pronounced in this age group. In contrast, respondents aged 46–65 (9.9%) and those over 65 (1.2%) are underrepresented, which limits the extent to which the results capture perspectives shaped by longer career trajectories or retirement-related considerations. The low proportion of respondents under the age of 18 (4.8%) also confirms that the analysis primarily concerns individuals who are pursuing higher education or who are already integrated into the labor market.

Most respondents are undergraduate students (67.2%), which means that the results largely reflect the views of individuals who are still in the midst of their academic careers. This is significant because expectations regarding employment opportunities and potential migration often take shape at this stage. Another 10.1% have already completed their studies, and 5.7% are enrolled in master's programs, which adds a perspective from those who are close to graduation or who have already made the transition to the labor market. The other categories represent relatively small shares (each under 5%), suggesting that the results are primarily influenced by respondents at the beginning of their professional careers.

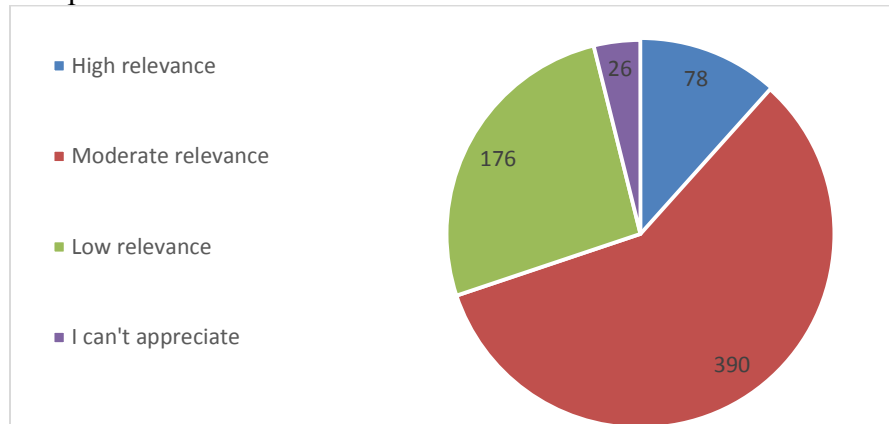


Figure 2. Relevance of the training provided

The majority of respondents (58%) believe that the training provided by the education system is only moderately aligned with the demands of the labor market. This suggests a perception of partial adequacy rather than strong confidence in the system's ability to meet market needs. At the same time, over a quarter (26.6%) consider the relevance to be low, indicating a noticeable level of dissatisfaction regarding the alignment between academic training and professional opportunities. Only 11.6% consider the training to be highly relevant, while 3.9% cannot form a clear opinion. Overall, these responses indicate that, although the system is not perceived as being completely disconnected from the labor market, there remains a significant gap between educational outcomes and employment expectations.

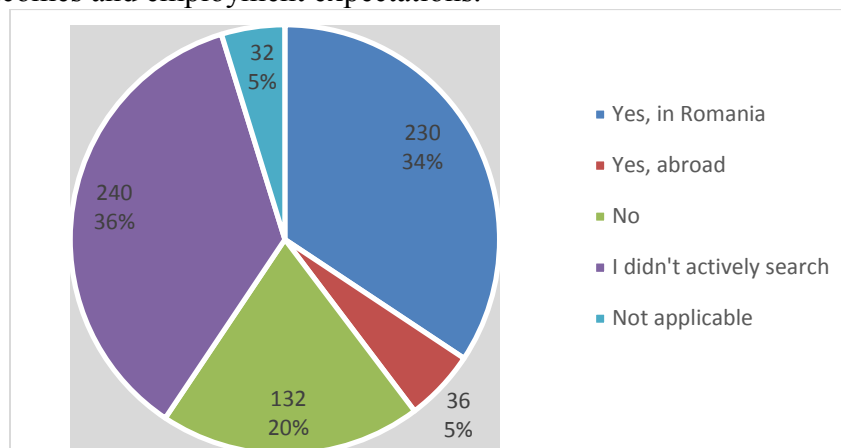


Figure 3. Employment Opportunities

Only about one-third of respondents (33.1%) report having employment opportunities in Romania in the field in which they were trained, suggesting that access to relevant jobs is far from universal. A very small proportion (5%) identify opportunities abroad, indicating that options outside the country are not necessarily immediately accessible, at least at the time of the survey. However, the overall distribution also reflects a certain degree of uncertainty and constraint: 36.2% have not actively sought employment in their field, while 19.4% state that no relevant opportunities are available to them. An additional 4.8% consider the question not applicable. Together, these responses indicate a mixed landscape in which limited opportunities, a lack of active engagement, and structural barriers can influence perceptions of labor market integration.

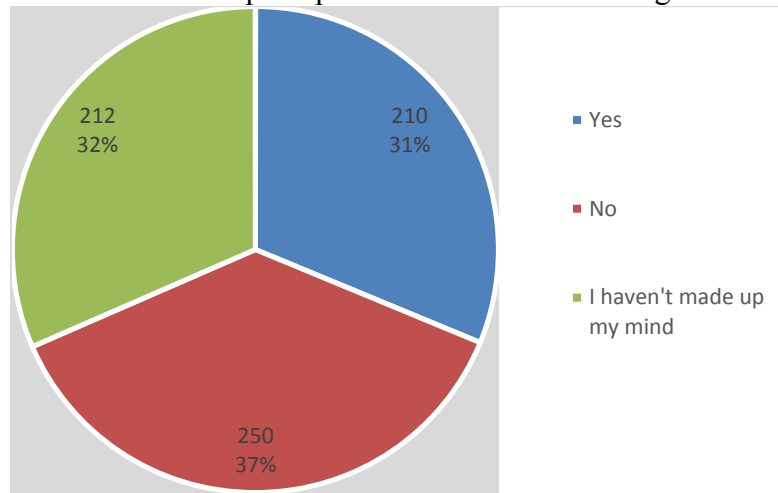


Figure 4. Intention to work abroad after completing studies

Nearly one-third of respondents (31.3%) say they intend to work abroad after completing their studies, while a similar proportion (32%) remain undecided. Just over one-third (37.3%) do not express any intention of leaving the country. This distribution suggests that the potential for migration remains significant, as the combined share of those intending to leave and those still undecided exceeds two-thirds of the sample.

Wage levels emerge as a decisive factor in shaping migration intentions. A clear majority of respondents believe that wages in Romania have a strong influence on the decision to work abroad: 51.3% describe this influence as very strong, and 30.2% as strong. Only a marginal proportion (3.3%) believe that wage differences are of little or no relevance. These results highlight the central role of economic incentives in the mobility decisions of young graduates.

Perceptions regarding the balance between personal investment in education and the subsequent benefits are more nuanced. Many respondents view this relationship as either balanced (33.4%) or slightly unfavorable (35.0%), suggesting a certain ambivalence regarding the return on the effort invested in education. Clearly positive assessments are relatively rare, with only 7.2% describing the ratio as very favorable and 11.1% as favorable. At the other end of the spectrum, 9.3% consider it very unfavorable, while 4.2% are unable to provide a clear assessment. Overall, these findings indicate moderate dissatisfaction rather than strong confidence in the benefits of higher education.

When asked about the overall effectiveness of Romania's higher education system in preparing a skilled workforce, just over half of respondents (54.5%) offer a generally positive assessment, and 4.8% consider it very effective. However, this view is not shared by everyone.

Nearly one-third (30%) perceive the system as ineffective, and 3.6% consider it very ineffective. Another 7.2% are unable to form a clear opinion. This mixed assessment suggests that, although the system is not widely rejected, it does not inspire unanimous confidence either.

Closely linked to these perceptions is the question of what kind of support would encourage graduates to return to Romania. Given its relevance to public policy, this aspect was examined using a multiple-choice question, the results of which are presented in the table below.

Table 1. Level of Support

Category	Number of replies	Notes
Financial / Salaries / Material benefits	460	Higher salaries, financial support, tax benefits, tax exemptions, competitive salary conditions, salary packages, decent income, business aid, scholarships.
Working conditions / Professional infrastructure	160	Better working conditions, respect in the workplace, stability, career opportunities, well-paid jobs, healthy working environments, recognition of diplomas and professional experience.
Support for reintegration / entrepreneurship / public policy	80	Professional reintegration programs, support for entrepreneurs, public policies targeting the diaspora, and incentives for returning to the country.
Family / Community	40	Support for families, access to preschools/schools, quality of life, sense of belonging, emotional support.
Public System	50	Political stability, the fight against corruption, systemic reforms, improved public services, and an efficient healthcare system.
Don't know / Other opinions	30	"I don't think there are solutions", "I don't know", "No support would work", philosophical/pessimistic/generalist answers.

Source: The authors' own research.

Financial considerations clearly dominate respondents' expectations regarding potential support for returning to Romania. Competitive salaries, material incentives, and direct financial support are by far the most frequently mentioned measures (68.7%), indicating that economic stability is considered the primary condition for staying or returning to the country. In comparison, improving working conditions and strengthening professional infrastructure are mentioned less frequently (23.9%), though they remain an important secondary concern. Support for professional reintegration and entrepreneurship also appears relevant (12.0%), suggesting that some respondents value structural opportunities for career development, not just income levels.

In contrast, social and family-related issues (6.0%) and broader political or systemic reforms (7.5%) are mentioned less frequently, even though they are still part of the bigger picture. A small proportion of respondents (approximately 5%) express skepticism, either by questioning the existence of effective solutions or by being unsure about the type of support that would make a difference. Overall, the responses highlight a clear hierarchy of priorities, with financial security standing out as the primary factor.

Table 2. Motivation for going abroad

Category	Number of replies	Notes
Salary/Financial Reasons	482	Higher salaries, money, income, remuneration, decent living, salary package
Working conditions	224	Pleasant/stable work environment, respect, stress, overwork, toxicity, nepotism

Category	Number of replies	Notes
Professional opportunities	192	Jobs, professional development, career, lack of jobs in the field, promotion
Standard of living / Quality of life	176	Infrastructure, public services, economic/political stability, cost of living, safety
Socio-political system / Corruption / Nepotism	76	Corruption, instability, clientelism, bureaucratic system, lack of meritocracy, inequity
Cultural/personal aspects	54	Desire for autonomy, multiculturalism, international experiences, openness, better personal life

Source: The authors' own research.

Above, we summarized the main reasons why graduates from Romania choose to work abroad after completing their studies. The data reveal a clear hierarchy of motivations.

The most common reasons cited are higher wages and other financial considerations (71.9%). These are followed by better working conditions (33.5%) and career opportunities (28.7%). Standard of living and quality of life also play a significant role (26.2%) in the decision to work abroad. A smaller number of respondents mention factors related to the sociopolitical system (11.3%) or personal and cultural reasons (8.1%).

Turning to the issue of whether support granted by the Romanian state should be conditioned on staying in the country, the main ideas resulting from the study are summarized in Table 3.

Table 3. Conditioning of staying in Romania

Category	Number of replies	Notes
Yes – with clear arguments (pro conditioning)	314	Most of them argue that the state should benefit from investment in education.
No – with clear arguments (against conditioning)	184	Individual freedom, equal rights, the lack of real incentives are invoked.
Balanced stance / partial conditioning / “Yes and no”	98	I support conditional assistance through social benefits, not through obligations. I emphasize balance and freedom.
Don't know / no clear opinion / neutral answers	36	Undecided, general or absent answers.
Other suggestions (alternative solutions without direct positioning)	38	Emphasis should be placed on indirect support policies (scholarships, jobs, living conditions, etc.).

Source: The authors' own research.

A significant proportion of respondents (46.9%) believe that the Romanian government should make its support for higher education contingent on graduates' intention to remain and work in Romania. The reason given is practical: such a condition could help ensure a return on investment in education. In contrast, 27.5% oppose this approach, citing individual freedom and the equal rights of graduates. Another 14.6% take a middle ground, suggesting that support could be partially conditional but not mandatory. Nearly 11% either do not have a clear opinion or propose alternative solutions, such as indirect support through scholarship policies, job opportunities, and living conditions.

When asked who benefits most from higher education in Romania, the majority of respondents cited students and graduates (35.8%), highlighting the direct impact on skills, professional development, and personal growth. The state and Romanian society are also considered major beneficiaries (26.9%), largely due to the skilled workforce and resulting tax contributions. Employers are mentioned by 17.9% of respondents, reflecting access to a skilled workforce, albeit one that is sometimes poorly paid. Other countries are also identified as beneficiaries (7.5%), through the training of graduates who choose to emigrate. A smaller proportion (6%) believes that universities and professors benefit from tuition fees and the maintenance of funding.

Not all respondents consider the distribution of benefits to be significant. Skeptical responses account for 3%, indicating that some do not believe there is a clear or significant benefit. A small percentage (1.5%) identify politicians as beneficiaries of the system.

Table 4. Main beneficiaries

Category	Number of replies	Notes
Students/Graduates	240	The most frequently mentioned as the main beneficiaries – through skills, career, personal development.
The State / Romanian Society	180	It benefits from an educated workforce, taxes, socio-economic development.
Employers (in Romania or abroad)	120	They have access to skilled, often underpaid, flexible work.
Other countries (by emigrating graduates)	50	Benefit from free training for graduates who choose to work abroad.
Universities / Faculty / Management	40	Earn through the number of students, fees, salaries, maintenance of funding.
No one / Critics / Negative opinions	20	Skeptical views regarding the actual benefits; lack of a visible positive impact.
Politicians / The political system	10	Mentioned in the context of political opportunism and manipulation of the system.
Other categories (parents, doctors, etc.)	10	Sporadic mentions, with limited or specific impact on certain areas.

Source: The authors' own research.

The migration of higher education graduates reveals a marked divide between two broad groups: those who leave Romania shortly after completing their studies and those who decide to stay. Graduates who leave tend to have a clear orientation toward international careers. They are often better integrated into Western educational and professional networks, have stronger language skills, and frequently report high academic performance. Many have benefited from Erasmus+ internships or participated in international competitions, thereby building transnational social capital that facilitates their integration into more developed economies. The decision to leave appears to be driven by both substantial wage differences and a lack of trust in the transparency and efficiency of Romania's public system.

Graduates who remain typically demonstrate a stronger attachment to family, community, and local values. Some come from rural or semi-urban areas and consider international mobility too risky or too costly. Professionally, they often gravitate toward education, public administration, or small-scale entrepreneurship. However, staying does not automatically imply satisfaction. Even among those who remain, job satisfaction is affected by stagnant wages, limited infrastructure and unequal access to development opportunities.

Another distinguishing factor relates to perceptions of meritocracy. Those who emigrate often cite the lack of a fair and transparent assessment of skills in Romania. Those who remain, on the other hand, may be willing to accept compromises regarding the recognition of their professional value in exchange for stability and proximity to family. Geographically, emigration occurs among graduates from major university centers (Bucharest, Cluj, Iași) as well as those from poorer counties, where limited opportunities can hasten the decision to leave.

Romania allocates significant funds annually for the education of students in higher education, but high emigration rates limit the extent to which this investment yields economic returns. For 2025, the cost of educating a student ranges from approximately 3,850 euros in the social sciences to over 17,200 euros in medicine. In fields such as the visual arts, the cost can exceed €28,000 per full degree program. If we estimate an annual number of approximately 30,000 graduates leaving Romania, the direct financial impact on the state is estimated at a minimum of €300–400 million per year, based solely on unrecovered training costs.

In addition, losses in direct taxes must also be taken into account. These are estimated at approximately €3,000–4,000 per person per year, which amounts to an annual loss of over €100 million in uncollected taxes and social contributions. There are also opportunity costs: lost revenue from consumption, local investment, and entrepreneurial activity that these graduates would have generated in the national economy. Over a ten-year period, the cumulative effect is substantial, amounting to a potential budget deficit of over 3 billion euros.

Let's consider a group of 30,000 graduates who emigrate in a single year. Let's assume a balanced distribution across the humanities, technical, and medical fields. With an estimated average cost of 10,000 euros per graduate, the resulting annual gross loss is 300 million euros.

Added to this amount are the unrealized tax contributions. Assuming an average annual contribution of 3,500 euros and a 30-year working life, the tax loss per person amounts to 105,000 euros. At the cohort level, this amounts to 3.15 billion euros. The total loss (education plus taxation) thus amounts to €3.45 billion for a single generation of emigrating graduates. These calculations are intended to illustrate the possible magnitude of cumulative losses rather than to provide precise macroeconomic forecasts. They are based on available averages and simplified assumptions and should be interpreted as indicative estimates. This points to more than just a budgetary imbalance. It signals a structural imbalance that can undermine the long-term sustainability of the public investment model. Expenditures already made from the education budget become investments with no domestic economic return, while the benefits are transferred to the destination countries.

The exodus of young people with higher education profoundly affects Romania's ability to build an economy based on knowledge and innovation. Without this essential segment of the active and qualified population, the health, education, research and public administration systems face skills shortages that reduce the quality of services offered. The impact is direct. Mass emigration also accelerates population aging. This puts pressure on the pension system and contributes to deepening social and economic inequalities between generations. At the same time, a smaller base of young taxpayers weakens the budget balance and limits the state's ability to support public investment and redistribution policies.

From an institutional perspective, Romania is facing a decline in the human capital available for strategic roles and innovation in the public sector. The brain drain also limits universities' ability to maintain a critical mass of researchers and doctoral students, which, in turn, affects participation in international projects and the ability to attract external funding. The risk is cumulative: without a coordinated response, prolonged stagnation in technological and educational progress becomes a plausible scenario. Emigration contributes to identity fractures by

disconnecting graduates from Romania's institutional, civic, and economic networks. Many of those who leave do not return, either temporarily or through investment and knowledge transfer. More importantly, the brain drain phenomenon, in which Romanian specialists hold positions abroad below their level of qualification, reduces the overall efficiency with which educational resources are utilized.

In the absence of clear public policies designed to retain graduates and engage the diaspora, Romania risks losing its long-term competitive advantage in strategic sectors and facing a systemic bottleneck in the broader process of sustainable development.

Results and discussions

The cost of training a student in state higher education in Romania is mainly determined by the basic funding allocated to universities by the Ministry of Education. Funding is differentiated. It is based on a mechanism that takes into account the cycle of studies (bachelor's, master's, doctorate), field and branch of science, language of instruction, as well as the form of education. To this financing are added any additional funds (e.g. institutional development), as well as extra-budgetary resources.

For the year 2025, the per-student allocation has been set at 6,346 lei. The coefficients determine the variations. This allocation is multiplied by equivalence and cost coefficients, which vary significantly depending on the field. For example:

- Social Sciences, Economics, Philology (coefficient: 1.00): 6,346 lei/year
- Computer Science and Engineering (coefficient: 1.65–1.75): 10,471–11,105 lei/year
- General Medicine, Pharmacy (coefficient: 2.25): 14,278 lei/year
- Arts and Architecture (coefficient: 2.5–7.5): between 15,865 and 47,595 lei/year

Based on these values, the estimated total cost of educating a student over the duration of a full cycle of study is as follows. The totals are indicative. They are derived directly from the equivalent per-student funding and the relevant coefficients and vary substantially across fields and cycles of study.

Bachelor's degree programs (3 years, 180 ECTS):

- Social Sciences and Humanities: $6,346 \text{ lei/year} \times 3 \text{ years} = 19,038 \text{ lei}$ (~3,850 EUR)
- Engineering/Computer Science (4 years):
- $10,900 \text{ lei/year} \times 4 \text{ years} = 43,600 \text{ lei}$ (~8,800 EUR)
- Visual Arts (e.g., music, theater):
- up to $47,595 \text{ lei/year} \times 3 \text{ years} = 142,785 \text{ lei}$ (~28,800 EUR)

Master's Degree (2 years, 120 ECTS):

- Social Sciences: $6,346 \text{ lei/year} \times 2 \text{ years} = 12,692 \text{ lei}$ (~2,570 EUR)
- Engineering/Computer Science: $\sim 11,000 \text{ lei/year} \times 2 \text{ years} = 22,000 \text{ lei}$ (~4,500 EUR)

Long-term integrated studies – Medicine (6 years):

- General medicine, dentistry, pharmacy: $14,278 \text{ lei/year} \times 6 \text{ years} = 85,668 \text{ lei}$ (~17,200 EUR)

Doctoral studies (3 years, on average):

- Estimated total funding (including scholarships and research, development, and innovation projects): 66,000 – 84,000 lei (~13,300 – 17,000 EUR), varying by field.

These indicators represent the gross cost of education, expressed per student equivalent. Indirect components are excluded. They do not include investments in infrastructure, advanced research, international mobilities or other indirect components. In reality, the actual cost may be higher for universities that offer intensive practical training (e.g. university hospitals, specialized laboratories, research equipment).

International Comparison

The gap is consistent.

- France: €11,800/year
- Germany: 13.300 EUR/an
- Netherlands: 14.200 EUR/year
- EU Average: 8.100 EUR/an

Therefore, even if the cost/benefit ratio in Romania is one of the most efficient in Europe in budgetary terms, underfunding affects institutional performance, research capacity and internationalization of the higher education system.

Romania is facing one of the highest rates of emigration of graduates with higher education in the European Union. According to data provided by the OECD and Eurostat, in 2023, approximately 35% of Romanians aged 25 to 34 who had higher education lived and worked outside the country's borders. This proportion places Romania in the top 3 at European level regarding the emigration of highly qualified young people, along with Bulgaria and Lithuania.

According to the OECD (International Migration Database), between 2010 and 2022, Romania lost, on average, 25,000–30,000 higher education graduates/year, with a peak reached after joining the European Union (2007–2012). In total, over 400,000 people with tertiary education trained in Romania lived in 2022 in other OECD member countries, the most frequent destinations being:

- Germany: 100,000
- Italy: 80,000
- United Kingdom: 55,000
- France: 40,000
- Spain, the Netherlands, Belgium, Austria: between 15,000–30,000 each

Data from the National Institute of Statistics (INS) confirm that emigration is more pronounced among graduates in medicine, engineering, and IT. The effects are uneven. These are sectors with high demand in Western markets. For example, in 2022:

- over 20% of doctors trained in Romania were working abroad;
- in the IT sector, approximately 30,000 Romanian specialists were working in companies in Western Europe and North America;
- engineers and technicians specializing in niche industries (e.g., oil and gas, mechatronics, aeronautics) had an estimated emigration rate of 15–20%.

According to a report by the IZA Institute of Labor Economics (Anghel et al., 2016), over 54% of highly qualified Romanians in the diaspora lived in the US and Canada, and 29% in EU countries. This study reveals a policy dimension. Those countries have programmes in place to actively attract talent, either through special visas for graduates or through automatic diploma recognition schemes.

The main factors driving emigration The rise in emigration rates is driven by a combination of structural and contextual factors. In particular, several of these factors work in synergy:

The rise in emigration rates is driven by a combination of structural and contextual factors. Significant wage gaps between Romania and Western European countries remain the most visible determining factor, particularly in fields such as medicine and engineering. These financial disparities are exacerbated by perceived shortcomings in working conditions and professional infrastructure, as well as by the instability of public policies affecting education and research.

Limited career opportunities in research, innovation, and technology entrepreneurship further reinforce intentions to move abroad. At the same time, strong pull factors exist abroad, including

access to dynamic labor markets, well-funded research centers, and internationally recognized institutions. In addition, young Romanian graduates frequently develop international networks during their studies (through Erasmus+ programs and internships at international companies), which facilitates their professional mobility after graduation. This does not mean that networks alone drive emigration, but rather that they reduce the practical barriers to mobility.

The situation of Romanian students in the diaspora An important segment is represented by Romanian students who go to study abroad and choose to stay there after completing the university cycle. The pattern is visible. According to data from the French Ministry of Education, in 2022 there were about 5,000 Romanian students in French universities, of which only a third returned to the country after graduation. The same phenomenon is also observed in Germany, the United Kingdom, the Netherlands and Italy.

To verify whether the sample is representative, we calculated the margin of error and the confidence interval. The margin of error is a measure of uncertainty in a statistical survey. It indicates how much the results obtained from a sample can vary from the true value of the general population.

The confidence interval is a range of values that indicates the extent to which a result obtained from a sample reflects the true value of a general population. In other words, this indicates how confident we can be that the actual percentage of the population falls within a certain range, given that we collected data from only a sample.

For the calculation of the sample, we considered the adult population of Romania of 19 million people using the formula:

$$\text{Margin of error (ME)} = Z \times \sqrt{\frac{p(1-p)}{n}} \times \sqrt{\frac{N-n}{N-1}}$$

where

Z = 1.96 (for a 95% confidence interval)

P = 0.5 (conservative value for maximizing the margin of error)

n = sample size

N = total adult population of Romania (19 million)

Starting from the margin of error formula, we make the calculations for the representativeness of the sample of 670 responses received to the questionnaire applied.

Total population (N): 19,000,000 (estimated adult population of Romania)

Sample size (n): 670 respondents (number of responses received)

Confidence level (Z): 1.96 (corresponds to a 95% confidence interval)

Estimated proportion (p): 0.5 (conservative value to maximize the margin of error)

Margin of error (ME): 3.99% ($\pm 3.99\%$)

Confidence interval: [46.01%, 53.99%].

The results suggest that the sample provides a reliable picture of perceptions among the working-age adult population. However, given the structural imbalances related to age and gender, the findings should be interpreted with caution when extrapolating conclusions to the entire national population. This supports the reliability of the estimate. At the national level, the questionnaire can be considered statistically reliable for identifying general trends, but only partially representative due to structural imbalances related to age and gender. A margin of error below 4% is generally favorable for sociological or educational studies. Next, we conducted a more detailed analysis of the sample to assess the extent to which its structure reflects the structure of the population, for example in terms of sex, age, and place of residence.

Table 5. Distribution by age group

Age group category	Number	Percentage
0–18 years	32	4.78%
19–45 years	566	85.58%
46–65 years	66	9.85%
Peste 65 years	8	1.19%

Source: The authors' own research.

The ratio of the sample size to the total population is extremely low (less than 0.01%). However, this factor is not decisive in and of itself. In opinion polls, representativeness is not determined solely by numerical proportion, but by the internal structure of the sample and the distribution of relevant sociodemographic characteristics.

Analysis by age group reveals a marked overrepresentation of the 19–45 age group, which accounts for 85.58% of respondents. This suggests that the sample is primarily oriented toward the working-age population, with the capacity to work and a higher level of digital tool usage—a pattern frequently observed in research conducted via online surveys. In this context, the sample can be considered functionally representative for analyzing the perceptions and behaviors specific to the working-age adult population, but it is less suitable for generalizations regarding the entire national population.

The 46–65 age group is relatively underrepresented (9.85%). The extremes are limited. The extreme categories (0–18 years and over 65 years) together account for less than 6% of all respondents. This distribution indicates an underrepresentation of minors and the elderly, which limits the sample's ability to accurately reflect the opinions of these groups, particularly regarding issues related to limited access to technology or differing administrative experiences.

From the perspective of sampling error, for a sample of 670 respondents and a 95% confidence level, the maximum theoretical error is approximately $\pm 3.8\%$, a value generally considered acceptable in quantitative social research. However, this error estimate applies under the conditions of a simple random sample. In this case, this condition is likely met only partially, given the data collection method.

In conclusion, the sample can be considered partially representative of the Romanian population and is particularly suitable for analyzing the segment of working-age adults (19–45 years old). The results are relevant for identifying general trends, dominant perceptions, and relationships between variables. Generalizations to the entire national population should be made with caution, explicitly acknowledging the limits of representativeness and the structural imbalances of the sample.

Table 6. Distribution by gender

Genders	Number of respondents	Percentage
Women	478	71.30%
Male	192	28.70%

Source: The authors' own research.

The distribution by age group is as follows:

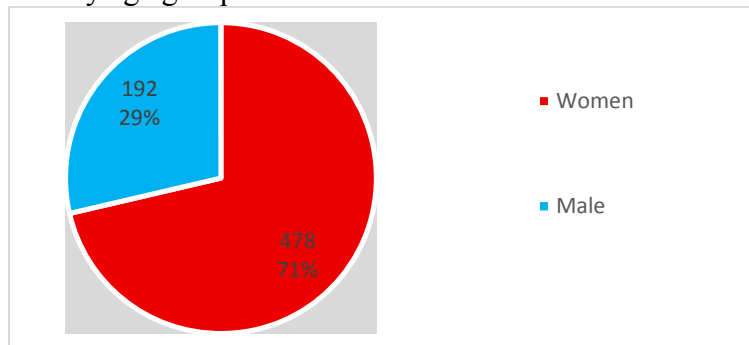


Figure 5. Gender distribution

Thus, 478 respondents (71.34%) are women, while 192 respondents (28.66%) are men. The imbalance is clear. This distribution highlights a marked overrepresentation of women in the sample.

Compared to the real structure of the Romanian population, where the gender distribution is relatively balanced with a slight predominance of women, the analysed sample does not reflect the real demographic proportions. The observed imbalance can plausibly be attributed to the data collection method. Questionnaires completed independently by respondents and distributed online typically yield higher response rates among women, particularly younger women and those with a high school education or higher.

For the analysis of the research hypotheses, we used several methods of validating these hypotheses. A combination of non-parametric and inferential statistical tests was employed to verify the hypotheses formulated, selected according to the level of measurement of the variables and the sample structure. Most questionnaire items are ordinal or nominal. Normality assumptions are therefore not met. Accordingly, the Mann-Whitney U test, the Chi-square test and the proportion test were applied, at a significance level of 5%.

With regard to the main hypothesis, the analysis focused on the relationship between the availability of employment opportunities in the field of vocational training in Romania and young graduates' intention to work abroad after completing their studies. The chi-square test revealed a statistically significant association between the two variables ($p < 0.001$). Respondents who declare the lack of professional opportunities corresponding to the level and field of training manifest a significantly higher intention to emigrate. This result confirms the existence of a perceived discrepancy between academic training and the capacity of the Romanian labor market to absorb the highly qualified workforce.

The secondary hypothesis regarding the benefits of investing in education was examined by comparing the perceived relationship between personal investment in university training and the benefits obtained later, depending on the intention to emigrate. The Mann-Whitney U test indicated statistically significant differences between the two groups of respondents ($p < 0.01$). Those who intend to work abroad evaluate this ratio significantly more negatively than those who intend to stay in Romania. These results indicate that the perception of insufficient capitalization of educational investment is an important factor in the external career orientation of young graduates.

Regarding the role of wages and the economic context, the analysis aimed to assess the influence of the level of wages on the decision to emigrate. The Mann-Whitney U test revealed statistically significant differences between respondents with intent to emigrate and those without

this intention ($p < 0.05$). The former attribute a significantly higher importance to the salary factor. This result indicates that the level of remuneration and economic stability are perceived as major determinants of the international mobility of the young and skilled workforce.

Finally, the hypothesis regarding the need for state intervention was analysed through a test of proportions, with the objective of verifying the existence of a clear majority of respondents in favour of the involvement of public authorities in the retention and return of graduates. The results indicate that a significantly higher proportion than 50% of respondents support the need for active public policies in this regard, the difference being statistically significant. This finding reflects a consistent social expectation regarding the state's role in managing the migration of highly skilled workers.

In contrast, the analysis of the relationship between the overall assessment of the higher education system's effectiveness and the intention to emigrate did not reveal statistically significant differences between groups, according to the Mann-Whitney U test ($p > 0.05$). This suggests that the decision to emigrate is not directly determined by perceptions of the quality of academic training, but rather by how it is subsequently valued in the labor market.

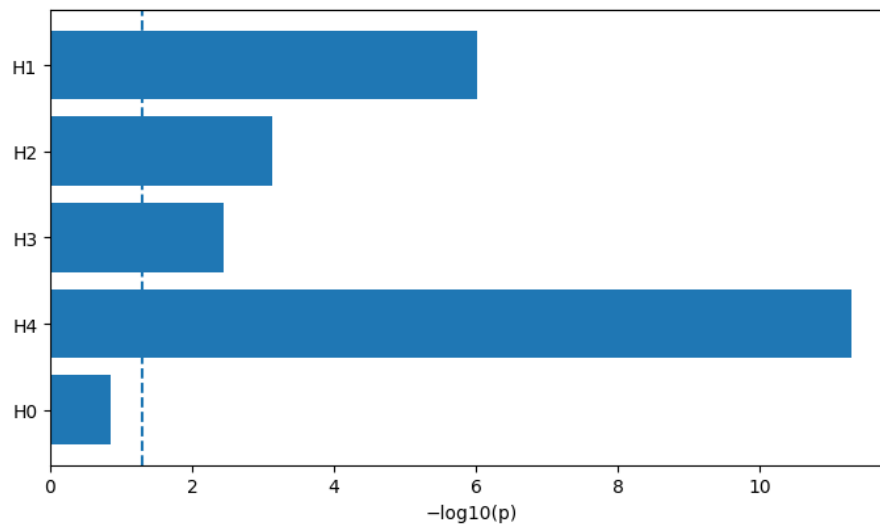


Figure 6. Summary of statistical tests (p-values on a $-\log_{10}$ scale; $\alpha = 0.05$)

Figure 6 presents the statistical significance of the tests applied to verify the research hypotheses, by plotting the p-values on a $-\log_{10}(p)$ scale relative to the significance threshold $\alpha = 0.05$. This study highlights a trend and acknowledges certain limitations. The chi-square test evaluating the relationship between employment opportunities and the intention to emigrate, the Mann-Whitney U tests applied to the perceived investment-benefit ratio and the influence of wages, as well as the proportion test regarding state intervention all exceed the threshold of statistical significance. In comparison, the Mann-Whitney U test applied to the overall assessment of the higher education system's efficiency falls below this threshold, confirming the absence of a statistically significant relationship for this dimension

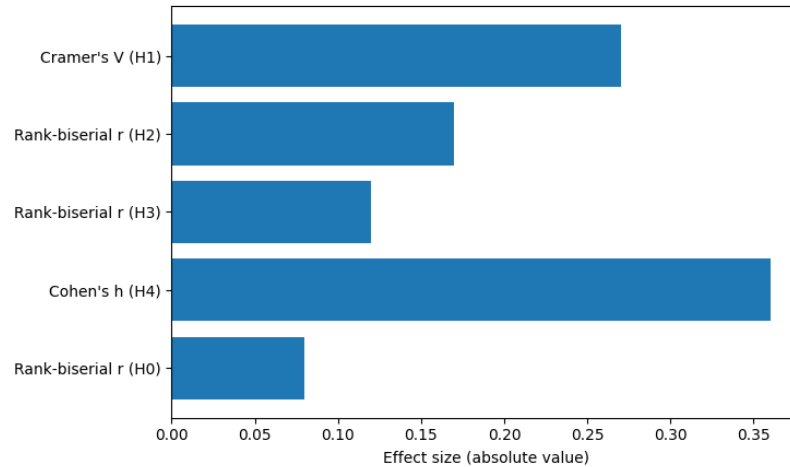


Figure 7. Effect sizes associated with the statistical tests applied

Figure 7 presents the magnitude of the effects associated with each statistical test used, offering a perspective that complements the p-values regarding the strength of the identified relationships. The effect sizes provide additional context for interpreting statistical significance. The results indicate a moderate-sized effect for the association between employment opportunities and emigration intention (Cramer's V), as well as small- to moderate-sized effects for the Mann-Whitney U tests regarding the investment-benefit ratio and the influence of wages. The proportion test reveals a relatively high effect (Cohen's h), suggesting a substantial deviation from the null hypothesis of equal distribution. At the same time, the effect associated with assessing the efficiency of the education system is reduced, reinforcing the conclusion that no practically relevant relationship is present for this dimension.

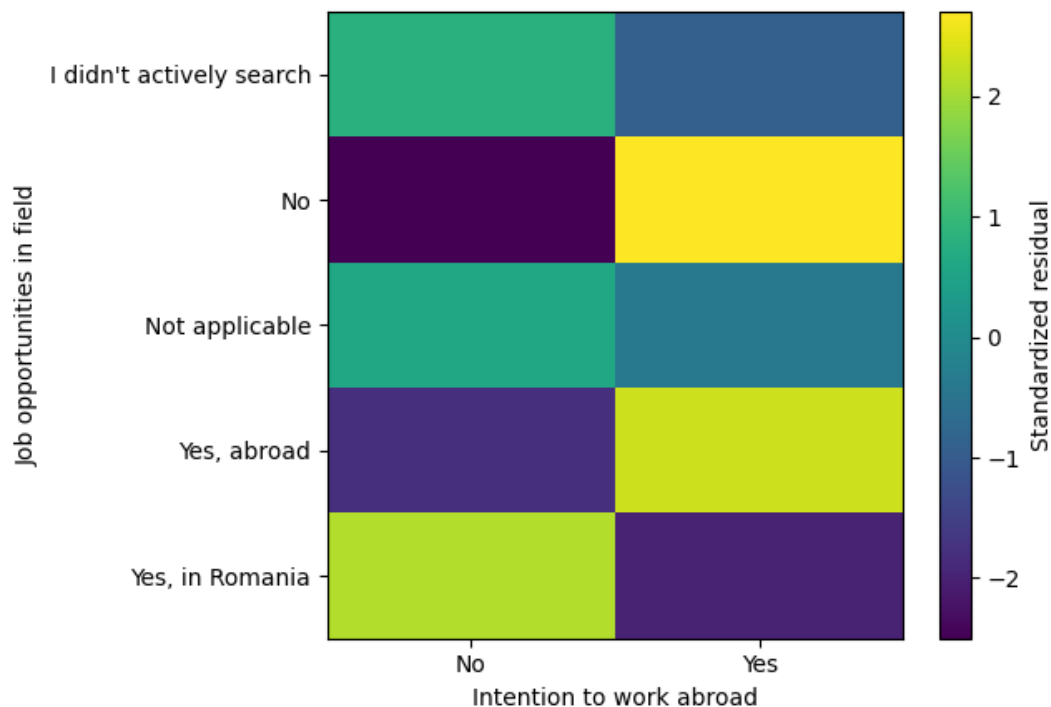


Figure 8. Chi-square test diagnostics: standardized residuals (Opportunities × Intention)

Figure 8 illustrates the structure of the standardized residues resulting from the application of the Chi-square test for the association between job opportunities in the field of training and the intention to work abroad. High residual values, positive or negative, indicate those combinations of categories that contribute most to the overall statistical significance of the test. It is observed that the lack of professional opportunities or their identification exclusively outside Romania is disproportionately associated with the intention to emigrate, confirming the role of the labor market as a major differentiating factor.

To analyze the differences between the groups in greater detail, we examined the results of the Mann–Whitney U tests using the scaled U statistic, expressed relative to the size of the two groups being compared. A value close to 0.5 indicates that there are no significant differences between them. The analysis shows that, in the case of the perceived balance between investment in education and subsequent benefits, as well as the influence of wages on migration intentions, the scaled U values clearly deviate from this neutral point, with p-values below the chosen significance threshold. In contrast, when respondents assessed the overall efficiency of the higher education system, the scaled U value remained close to 0.5, and the associated p-value did not indicate statistical significance. This suggests that migration intentions are determined more by perceived returns and wage considerations than by general assessments of the system's performance.

The proportion test was used to assess the level of support for government intervention aimed at retaining and encouraging the return of highly qualified graduates. The results indicate that the estimated proportion of respondents who support government involvement clearly exceeds the 50% threshold set by the null hypothesis. Furthermore, the confidence interval lies entirely above this threshold, and the associated p-value is extremely low. Taken together, these results indicate the existence of a clear and statistically significant majority that supports an active role for the state in addressing the issue of skilled labor migration.

The analysis of employment opportunities by migration intention highlights clear structural differences between groups. By examining the proportional distribution within each intention category (No, Undecided, Yes), it becomes possible to compare how respondents perceive opportunities in their field of study, regardless of group size. This approach allows for a clearer understanding of how perceived labor market conditions relate to different levels of migration intention.

A consolidated overview of the results of the hypothesis testing, expressed on a $-\log_{10}(p)$ scale, allows for a direct comparison of statistical significance across all examined relationships. The results show that hypotheses H1–H4 are consistently supported by the empirical evidence, as the results associated with them meet the conventional significance threshold ($\alpha = 0.05$). In contrast, the null hypothesis (H0) is not rejected, indicating that no statistically significant differences were identified for that specific dimension.

The results demonstrate a strong association between the availability of employment opportunities in the field of study and the intention to emigrate (H1). Two findings stand out. Statistically significant group differences are also observed regarding the perceived balance between investment and return in higher education (H2) and the influence of salary considerations on migration decisions (H3), while the very low p-value associated with H4 provides strong evidence of a prevailing consensus in favor of state intervention aimed at retaining and re-attracting highly qualified graduates.

Conversely, the lack of statistical significance for the null hypothesis (H0) suggests that migration intentions are not primarily driven by general assessments of the higher education system's effectiveness, but rather by structural disparities in the labor market and economic

incentives. Overall, these results support an interpretation of graduate migration in which post-educational opportunity structures and wage dynamics take precedence over perceptions of the quality of education itself.

Conclusion

The results of the study show that Romania faces a structural imbalance between the formation of human capital and the capacity of the national system to absorb and capitalise on it. The imbalance is persistent. Despite a progressive increase in the budget allocated to education, the Romanian university system is perceived as only partially adapted to the demands of the labour market.

The international mobility of educated young people is not only a symptom of globalisation, but also the expression of internal dysfunctions: uncompetitive salaries, limited professional opportunities, the absence of meritocracy, bureaucracy and institutional instability. Approximately one-third of respondents say they intend to leave the country after completing their studies, and a similar proportion is undecided, indicating a high potential for emigration.

Public investment in higher education in Romania is disproportionately reaped by other countries, particularly those in Western Europe and North America. The distribution of benefits remains unequal among stakeholders. They benefit from a well-trained workforce without bearing the costs of training. On the other hand, graduates gain access to competitive markets, and international employers benefit by attracting talent at a low cost. Romania faces fiscal pressures, a skills shortage, and increasing strain on its educational and institutional capacity.

For Romania to transform education into a tool for real development, a coherent and carefully calibrated review of retention policies is needed to preserve and capitalize on human capital. A policy shift is required. Key recommendations include:

- Introduction of graduation-based contracts, particularly for state-funded positions;
- Tax incentives for employers who hire graduates in fields facing labor shortages;
- Competitive salary packages in the public sector for strategic fields (healthcare, education, IT);
- Creation of reintegration programs for the diaspora with higher education;
- Development of university partnerships with research centers and industry;
- Investments in academic infrastructure and the internationalization of Romanian universities.

This research is limited by its static nature and the self-reported nature of the sociological data, which present obvious limitations. In the future, a longitudinal approach that tracks graduates' actual trajectories over a longer period would be useful, as this would allow for a more precise assessment of how intentions translate into outcomes across different cohorts and contexts. It is also advisable to expand the analysis by including qualitative indicators regarding employability, innovation, and impact on local communities. Finally, a detailed international comparison could contribute to the formulation of adaptable models for Romania's educational and migration policies.

Beyond its national perspective, this study contributes to the broader discussion on human capital mobility, showing that migration intentions are driven less by general dissatisfaction with the quality of education and more by perceived structural gaps in opportunities and expected economic returns. In this regard, the findings provide a nuanced understanding of how public investment in education interacts with labor market absorption capacity in emerging European economies.

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