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EDUCATIONAL MIGRATION AND DEMOGRAPHIC RESILIENCE: THE ROLE OF STUDENT MOBILITY IN LOCAL DEVELOPMENT

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ABSTRACT: Contemporary non-metropolitan regions of Central and Eastern Europe face significant demographic challenges, characterised by depopulation trends and accelerating population aging. This research addresses two primary objectives: first, to examine the significance of higher education-related migration inflows for demographic resilience (conceptualised as a locality's capacity to regenerate its population following structural demographic shifts) and second, to identify how flows' impact on graduate retention and human capital accumulation, using Opole – a Polish non-metropolitan city – as a case study. The methodology combines empirical research among students in Opole with statistical analysis to evaluate the long-term demographic and structural implications of educational migration for both city and region. Initial findings suggest that educational migration – specifically, the influx of students to the specific non-metropolitan area – may serve as a crucial mechanism for building demographic resilience through the attraction and retention of young cohorts. Our analysis indicates that such educational migration patterns may contribute to both mitigating adverse demographic trends and enhancing regional human capital stocks. Particularly significant in fostering demographic resilience is the retention of female graduates by academic centers. These findings carry substantial implications for regional policy formulation and higher education development strategies in other non-metropolitan regions confronting demographic challenges.

KEYWORDS: educational migration, demographic resilience, student mobility, human capital, local development

Introduction

The ongoing demographic transformations, characterised by simultaneous rapid population growth in certain regions and significant depopulation in others, present unprecedented challenges to stability and development across local, regional, and global scales. Particularly noteworthy is the situation in Central and Eastern European countries experiencing substantial population decline, most prominently evidenced in Romania, Bulgaria, and the Baltic States (Daugirdas & Pociūtė-Sereikienė, 2018; Otovescu & Otovescu, 2019; Koyama, 2024; Truskolaski & Bugowski, 2024). Research indicates that depopulation processes manifest themselves most intensely in areas peripheral to major urban centers. These regions, lacking robust economic nuclei, face not only population exodus but also deteriorating economic conditions, including eroding tax bases and diminishing public service provision (Koyama, 2024). Moreover, these adverse demographic trends significantly impact production volumes, economic growth trajectories, and labor market dynamics (Hollbach-Grömig & Trapp, 2006). Given these challenges, understanding and developing the concept of demographic resilience becomes imperative (De Souza, 2015; Shkuropadska et al., 2024).

The concept of resilience encompasses multiple theoretical frameworks, varying according to specific research contexts. In its conceptualisation, Holling defines resilience as "a measure of the persistence of systems and their ability to absorb change and disturbance and still maintain the same relationships between populations or state variables" (Holling, 1973). This framework describes systems' capacity – whether physical, biological, or social – to withstand external negative perturbations (Serfilippi & Ramnath, 2018; Agnani et al., 2024). In medical and psychological contexts, resilience denotes positive adaptation or the ability to maintain or regain health, including mental well-being, despite adversity (Truffino, 2010; Herrman et al., 2011). From an economic perspective, resilience represents the capacity of households, institutions, regions, and nations to withstand shocks while adapting positively to short or long-term stress, change, and uncertainty (Mitchell, 2013; UNFPA EECA, 2023). The demographic conceptualisation of resilience draws from social ecology and demographic theory, with Capdevila et al. (2020) defining it as a population's capacity to recover from alterations in demographic structure, typically accompanied by changes in population size. When examining resilience in the context of urban areas, it is essential to consider the concept of urban resilience. This can be defined as the sustainable capacity of urban systems to absorb, adapt, transform, and prepare for shocks and stresses across economic, social, institutional, and environmental dimensions, ensuring the continuity of urban functions while enhancing the ability to respond to future disturbances (Figueiredo et al., 2018). One manifestation of urban areas' demographic resilience is suburbanisation, which refers to the process by which populations, housing, industries, trade, and retail activities expand beyond traditional urban cores, forming dispersed settlements that remain functionally connected to the city through commuting networks. The suburbanisation process drives the spatial expansion of individual agglomerations and rapid population growth in municipalities adjacent to large and medium-sized cities. It encourages the influx of populations from outside the region and simultaneously transforms selected urban areas into specialised economic, business, industrial, or educational zones, effectively relegating residential functions to suburban "bedroom communities" (Gregory et al., 2009).

Our analysis focused on the concept of demographic resilience within the context of non-metropolitan areas in Poland. These territories confront multiple challenges: demographic decline and aging, economic stagnation and labor market constraints (Weingarden, 2017; ESPON, 2020; Flamant et al., 2021). We interpret demographic resilience as the capacity of a population to adapt, recover, and sustain its structural and functional integrity in response to significant disturbances or changes. However, it needs to be emphasised that an increase in the demographic resilience of, e.g., urban areas, may trade-off with such resilience in its surrounding areas. Furthermore, besides adaptation of the demographic structure, other factors such as economic and cultural adaptation are important (Suchacek, 2019). In this paper, the focus is on the relevance of the academic function of urban areas.

Given the demographic and socioeconomic challenges characterising these areas (Colantoni et al., 2020), we posit that some of them – particularly those with strong academic functions – can enhance their demographic resilience through developing and strengthening their higher education infrastructure. The presence of universities and their associated academic functions (teaching, research, and knowledge transfer) generates sustainable economic and social growth, even amid

DOI: 10.34659/eis.2024.91.4.1016

adverse demographic conditions. Within this context, academic functions serve multiple roles: they not only attract young people through educational opportunities but also create conditions conducive to their post-graduation retention through research commercialisation, academic entrepreneurship, and university-business collaboration. Educational migration, defined as internal population mobility driven by higher education pursuit (Rokita-Poskart, 2021), emerges as a key mechanism for enhancing demographic resilience in university cities within depopulating regions. These centers can serve as anchors for regional development by not only attracting students but also creating an ecosystem of knowledge-based activities that encourages graduate retention, thereby contributing to human capital formation and economic vitality. Recent research indicates that cities successfully leveraging their academic functions to retain educational migrants can enhance their demographic resilience and development potential, even in otherwise depopulating regions (Bjerke & Mellander, 2017; Suchacek, 2019).

Our study examines the case of the Opole Voivodeship in Poland and its capital city, which exemplifies the dynamics of a university city in a demographically challenging region. Despite being classified as a depopulation area (Solga & Heffner, 2024) and experiencing significant youth outflow to other university cities and international destinations, Opole maintains its position as a vibrant academic hub with four universities and approximately 20,000 students. This makes it an ideal case study for examining the relationship between educational migration and demographic resilience.

Drawing on mixed-methods research, including a survey of [N=730] students at universities in Opole and comprehensive analysis of demographic and social indicators, this study advances two objectives:

1) To evaluate how educational migration flows and gender-specific graduate retention patterns contribute to demographic resilience in the university city.
2) To examine the transformation of educational migration into sustained human capital accumulation in the university city.

To address these objectives, we explore three research questions:

1) What are settlement intentions among educational migrants in Opole as the depopulation university city?
2) How do settlement intentions manifest gender-specific patterns among the studied population of educational migrants?
3) To what extent do declared settlement intentions correspond to gender structure and educational attainment in the region challenging depopulation?

This study makes three significant contributions to the literature. First, it offers a novel perspective on demographic resilience by incorporating educational migration as a factor that can promote population sustainability in non-metropolitan areas. Second, it provides empirical evidence on the relationship between university-town inflows and demographic resilience, addressing a critical gap in the existing literature. Third, by integrating empirical research with statistical data, it establishes a framework for assessing how gendered patterns of intentions influence regions facing demographic challenges.

The findings have important implications for both theory and practice. Theoretically, the study aims to connect demographic and human capital indicators with tertiary education migration. Practically, it demonstrates that policymakers seeking to leverage the academic functions of a region or city can benefit from the presence of universities in their area.

An overview of the literature

Educational migration, specifically that associated with tertiary education enrollment, constitutes a significant research domain within the intersecting contexts of local and regional development and demographic resilience. Contemporary analyses demonstrate that this phenomenon manifests complex implications across multiple societal dimensions, which can be systematically examined through macro, meso, and micro analytical frameworks.

From a macroeconomic perspective, empirical studies across developed economies, including the United States, United Kingdom, Sweden, Australia, and Canada (Cavanagh & Glennie, 2012; Bjerke & Mellander, 2017; Guichon, 2019; Marshall, 2019), demonstrate substantial positive externalities of

DOI: 10.34659/eis.2024.91.4.1016

higher education migration flows on national economies, labor markets, and demographic compositions. Of particular significance are empirical investigations quantifying the economic contributions of international students, which reveal considerable benefits for host economies (Sachrajda & Pennington, 2013; Roslyn Kunin and Associates, 2023; NAFSA, 2024).

Within the context of accelerating educational internationalisation, Tremblay (2005) emphasises that academic mobility functions as a crucial source of skilled human capital for host nations. This phenomenon is particularly evident in Asian economies, where Findlay and Tierney (2010) demonstrate that internationalisation strategies have effectively expanded skilled workforce capacity through international student integration. Alberts and Hazen (2005) identify three primary domains of impact regarding international students in the United States: enhancement of human capital through knowledge transfer and skill diversification, labor market enrichment through increased skilled workforce availability and demographic restructuring affecting population composition and educational attainment levels in host countries.

The Australian case exemplifies the long-term implications of educational migration patterns. Research by Guo (2010) and Zhai et al. (2019) demonstrates that the sustained increase in Chinese student enrollment in Australian institutions – with a significant proportion transitioning to permanent residency – has substantively enhanced both cultural diversity and skilled labor market dynamics. Similar patterns emerge in the Canadian context, where policy frameworks actively facilitate post-graduation employment opportunities for international students (Lu et al., 2009). These findings align with Balaz et al.'s (2004) theoretical framework suggesting that temporary migration facilitates permanent settlement through three distinct mechanisms: as a pathway to long-term migration, as a facilitator of residency through adaptive experiences, and as a strategic option for future planning.

Analysis at the meso level reveals substantial evidence regarding educational migration's role in fostering local and regional development. Empirical investigations in regions experiencing demographic decline (OECD, 1999; Jones & Rushall, 2013) indicate that higher education institutions serve as critical mechanisms for human capital retention and attraction. Furthermore, research examining student populations' influence on local labor markets (Munro et al., 2009; Beblavý & Fabo, 2015) and real estate dynamics (Rugg et al., 2002) demonstrates significant multiplier effects. Bernard and Bell (2018) underscore the imperative of examining demographic resilience in university cities, given the substantial impact of student population flows on local demographic structures. Lerch (2020) further emphasises the increasing significance of both international and internal migration patterns in shaping population growth trajectories and urban age distributions, particularly within the context of the global south (Trow, 2007; Ridley, 2010).

In examining the socio-cultural dimension, empirical research demonstrates the significant role of student populations in both generating social capital and transforming behavioral patterns within host communities. Contemporary scholarship emphasises students' contributions to urban cultural capital development (Russo et al., 2005). Shutaleva et al.'s (2022) analysis of student migration's impact on human capital formation in Russian cities (Ekaterinburg, Kursk, and Tomsk) demonstrates that student populations significantly elevate educational attainment metrics, thereby enhancing aggregate human capital measures. Sage et al. (2011) further document how expanding student populations have catalysed increased youth mobility patterns and fostered distinct university-associated cultural phenomena.

Notwithstanding the extensive body of research examining the economic implications of educational migration, the long-term demographic consequences of this phenomenon remain insufficiently explored in the scholarly literature, particularly regarding the development of demographic resilience at the meso level. Furthermore, integrated analyses that synthesise economic and demographic perspectives on educational migration are notably scarce (Machin et al., 2012; Shutaleva et al., 2022). While existing research predominantly focuses on metropolitan areas (Lu et al., 2009; Russo et al., 2005; Shkuropadska et al., 2024), the dynamics of educational migration in peripheral regions and smaller university towns have received limited scholarly attention (Böckerman & Haapanen, 2013; Chunbing, 2013; Rokita-Poskart & Adamska, 2023). This research lacuna assumes particular significance within the Polish context, where educational migration patterns may have substantial implications for regional and local development trajectories, thereby underscoring the imperative for sys-

DOI: 10.34659/eis.2024.91.4.1016

tematic investigation into the role of educational migration in both mitigating adverse demographic trends and fostering sustainable local and regional growth dynamics.

Area of research and research methods

The Opolskie Voivodeship, encompassing an area of 9,412 km^2 with a population of 936,725 inhabitants, stands as the smallest among Poland's 16 administrative regions in both geographical and demographic terms (GUS, n.d.). The region's distinctive character emerges from an interplay of various factors, including its rich historical heritage, ethnic and cultural diversity, and strategic geographical positioning (Rokita-Poskart, 2021). Despite exhibiting robust socio-economic development indicators, the voivodeship faces significant demographic challenges, characterised by depopulation trends, negative natural population growth, adverse migration balance, and accelerating dynamics of population aging (Samorząd Województwa Opolskiego, 2021).

The region's position between two major urban centers – Wrocław to the west and Katowice to the east – while offering certain economic advantages, simultaneously contributes to the outflow of younger demographic cohorts to neighboring, more demographically attractive regions, thereby exacerbating existing demographic challenges. These structural characteristics shape the distinctive socio-economic context of both the broader region and its administrative capital, Opole (Rokita-Poskart, 2021). The city's demographic trajectory since its designation as the provincial capital exhibits notable fluctuations: from a population of less than 40,000 in the 1950s, it experienced substantial growth to exceed 130,000 residents in the subsequent decade. However, the 1990s marked the onset of population decline (Golata & Kuropka, 2015). While the 2018 administrative boundary modification resulted in a temporary population increase, the underlying trend indicates persistent demographic contraction (Figure 1).

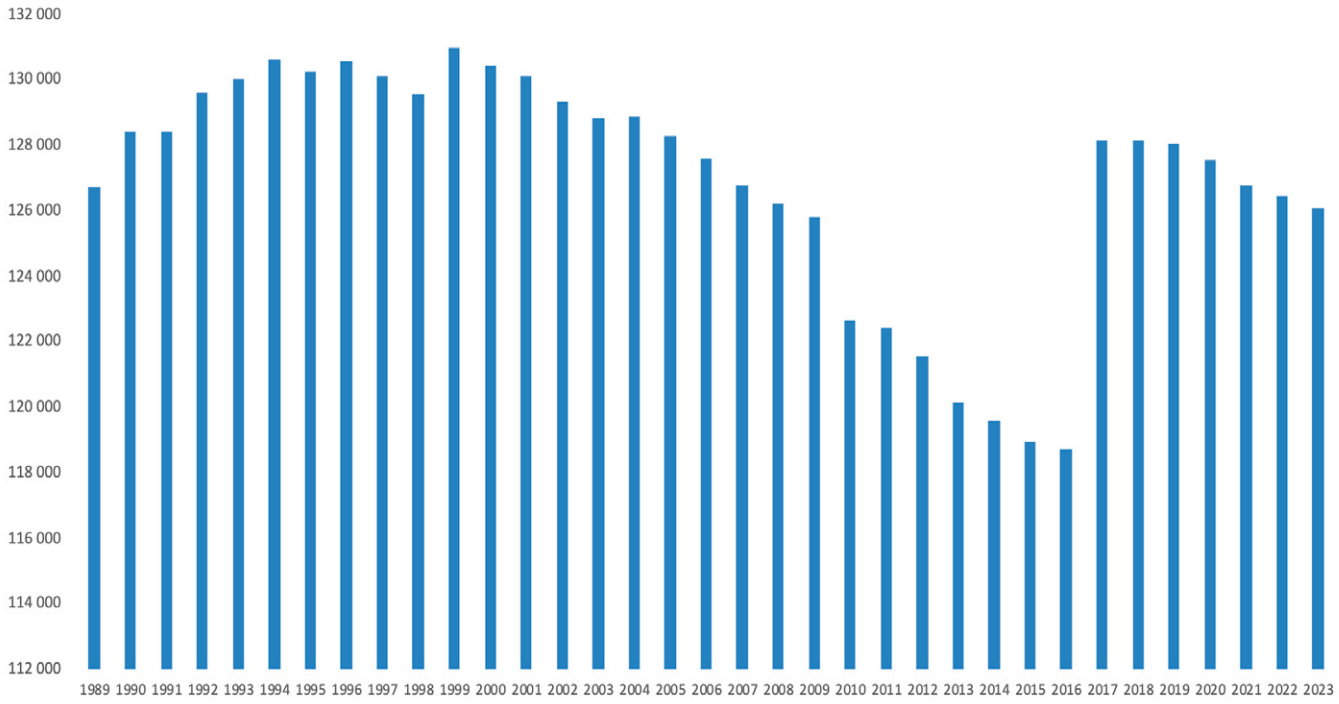

Figure 1. Demographic Dynamics in Opole: Population Change, 1989-2023

Source: authors' work based on GUS (n.d.).

The 1990s and early 2000s marked a period of significant institutional transformation and educational development in Opole. A watershed moment occurred in 1994 with the establishment of the University of Opole, which emerged through the consolidation of the existing Higher School of Pedagogy and a branch faculty of the Catholic University of Lublin. This educational expansion continued

DOI: 10.34659/eis.2024.91.4.1016

with the 1996 transformation of the Higher School of Engineering into the Opole University of Technology, establishing the region's first technical university. In response to increasing demand for tertiary education, the city's institutional landscape further diversified through the establishment of several non-public higher education institutions, including the Higher School of Management and Administration, the Bogdan Jański Higher School, and the WSB Merito University in Opole. Moreover, the early 21st century witnessed the inauguration of Poland's first state-run higher vocational school with a medical specialisation – the State Medical Higher Vocational School. These strategic educational initiatives have proved instrumental in catalysing regional development, generating what scholars have termed educational migration 'behind the diploma' to Opole, thereby counteracting youth outmigration patterns.

Given the described context of Opole's development as an university center, and acknowledging the limitations associated with residential registration and migration data quality in Poland (Śleszyński, 2012; Jończy, 2023), this study employs empirical research findings from surveys conducted among students at Opole's higher education institutions. These surveys constituted part of a comprehensive research project examining both the economic and demographic implications of student influx to the university city, through analysis of students' economic activities during their studies (including expenditure patterns and employment in Opole) and their post-graduation intentions.

The methodological framework employed a two-stage random-quota sampling procedure (Babbie, 2013). The initial stage involved random selection of fields of study across all Opole's higher education institutions. Subsequently, based on preliminary pilot studies, it was determined that students in their final phases of education possessed more comprehensive knowledge regarding their educational experience (including employment and expenditure patterns) and demonstrated more clearly defined post-graduation plans compared to their junior counterparts. Consequently, the primary research phase utilised a diagnostic survey method, implementing an auditorium questionnaire technique among final-year students in both full-time and part-time programs across selected fields of study.

To enhance sample representativeness, quota sampling was implemented, accounting for student population structure by gender and mode of study, in accordance with Central Statistical Office data. The survey process yielded complete questionnaires from over 730 students out of 780 survey recipients. The final analysis excluded students who were Opole residents prior to commencing their studies, resulting in 642 valid questionnaires from respondents categorised as educational migrants according to the operational definition employed.

The sample demographic composition revealed a predominance of female respondents (60.6%) over male respondents (39.4%), with most participants falling within the 21-22 and 23-24 age brackets, while the smallest proportions were observed in the older age groups (25-26 years and 27 years and above). Regarding geographical distribution, respondents primarily originated from the Opolskie Voivodeship (78.3%), with a smaller proportion (21.7%) from other regions of Poland, predominantly from areas adjacent to the Opolskie Voivodeship (20.9%). Consistent with the overall student population in Opole, the sample was characterised by a majority of full-time students (67.6%) pursuing bachelor's and engineering degrees, with smaller proportions of part-time students (32.4%) and second-cycle (master's) degree candidates.

We conducted the study using paper-based questionnaires (PAPI method), which included 17 core questions and 8 demographic items. The questionnaire was divided into four sections designed to assess students' influence on different aspects of university city life: 1. their spending patterns in the local market, 2. employment during their studies, and 3. their post-graduation plans, including both 4. career and settlement intentions (Rokita-Poskart, 2021).

In this paper, we focus on select findings that highlight the connections between student migration, demographic resilience, and local/regional development. Specifically, we examine our respondents' future residential plans and their implications for demographic and economic resilience, with particular attention to gender differences. To provide context, we incorporate statistical data for Opole as a non-metropolitan university city, including the gender distribution of residents aged 20-34 and the proportion of university graduates in Opole compared to other districts in the Opolskie Voivodeship. This approach allows us to evaluate how student migration and retention might contribute to the city's demographic resilience and human capital development.

DOI: 10.34659/eis.2024.91.4.1016

We used the Chi-square test of independence to determine whether the observed differences were statistically significant. The analysis utilised a contingency table comparing residential intentions by gender. Our null hypothesis (H0) assumed no relationship between gender and settlement plans, while the alternative hypothesis (H1) proposed significant gender-based differences in these intentions.

The results of the research should be interpreted with care. It is a case study of a specific city with its unique geographical location and demographic characteristics. As a non-metropolitan city, the results cannot be extrapolated to other cities. And in the future, long term research should provide a clearer picture of the role of student mobility in local development in the city under research.

Research findings

Our empirical research revealed clear patterns in students' post-graduation settlement intentions. Figure 2 demonstrates that over two-thirds of students who migrated to Opole – a regional capital facing depopulation challenges – intended to remain within the Opolskie Voivodeship, while 22.4% specifically planned to settle in Opole.

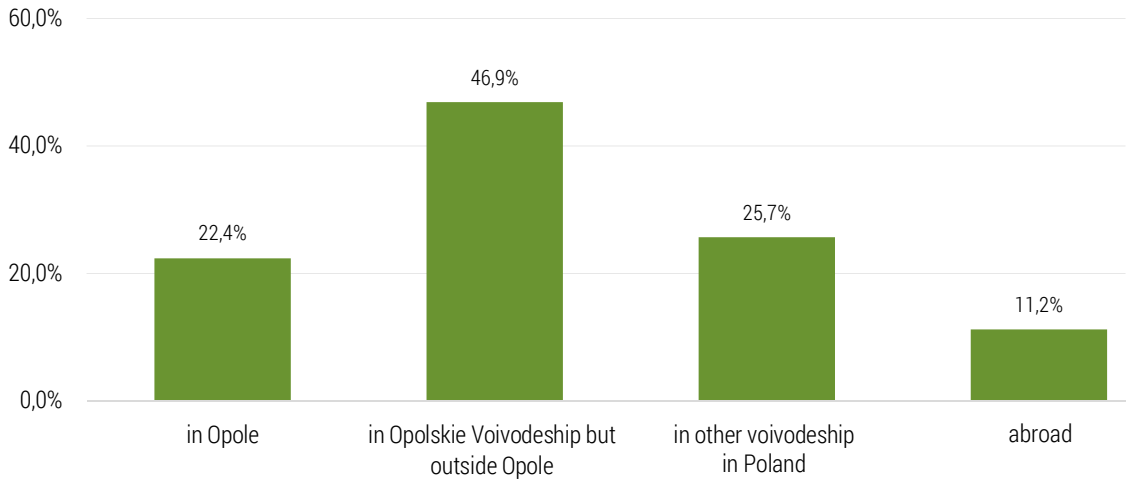

Figure 2. Post-graduation Settlement Intentions

Further analysis of the empirical data, extending beyond the graphical presentations, revealed distinct differences in post-graduation intentions between students originating from the Opolskie Voivodeship and those from other regions of Poland. The findings indicate that while one in four students from the Opolskie Voivodeship planned to settle in Opole, only one in eight students from other regions expressed similar intentions. This pattern was even more pronounced regarding settlement plans within the Opolskie Voivodeship (excluding Opole city): approximately 60% of students from the region intended to remain, compared to merely 7% of those from other regions.

In addition to these geographical variations, our analysis revealed significant gender-based differences in settlement intentions, as illustrated in Figure 3.

Our analysis revealed significant gender differences in post-graduation settlement intentions. Female students showed a markedly higher preference for settling in Opole or other domestic locations, while male students demonstrated greater inclination toward settling outside Opole but within the Opolskie Voivodeship, or abroad. The chi-square test results, at a significance level of $\alpha = 0.05$, led to the rejection of the null hypothesis of independence between gender and settlement intentions. The test statistic $\chi 2$ and associated p-value confirmed that the observed gender differences in response distributions were statistically significant.

DOI: 10.34659/eis.2024.91.4.1016

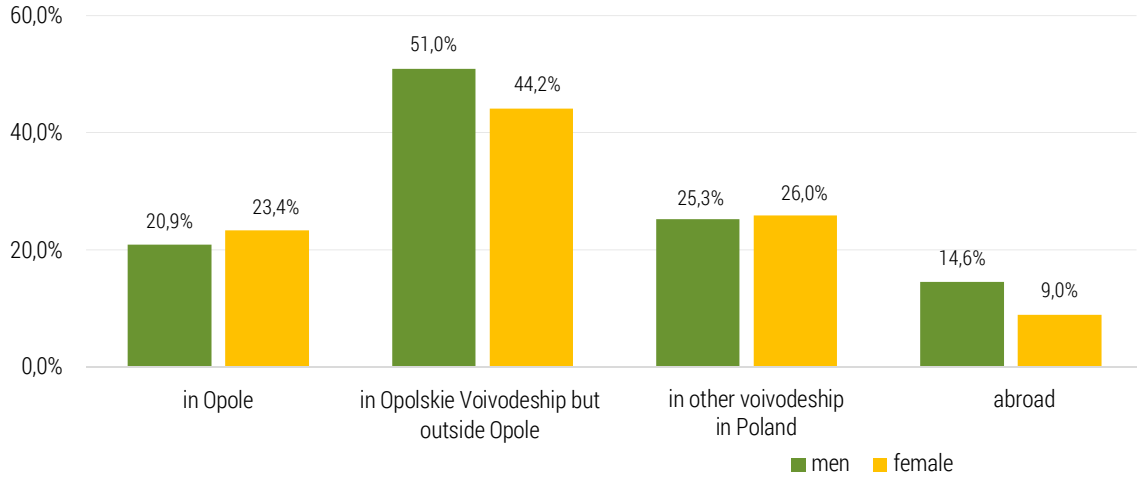

Figure 3. Gender Differences in Post-graduation Settlement Intentions

This statistical analysis confirmed gender as a significant differentiating factor in graduates' settlement intentions among the studied population. Notably for Opole, female students more frequently planned to remain in the university city after graduation. The critical role of women in building demographic resilience stems from multiple biological, social, and economic factors. From a biological perspective, women's reproductive capacity represents a fundamental element of population reproduction (Sobotka, 2017). However, contemporary demographic research emphasises that reproductive capacity alone is insufficient for ensuring demographic stability. Billari and Kohler (2004) emphasise that social, economic, and cultural factors play crucial roles in shaping actual reproductive behaviors. Similarly, Lutz and Skirbekk (2013) argue that biological reproductive potential does not directly translate to population reproduction levels, highlighting the increasing importance of individual preferences, educational aspirations, and career goals, which often compete with childbearing decisions.

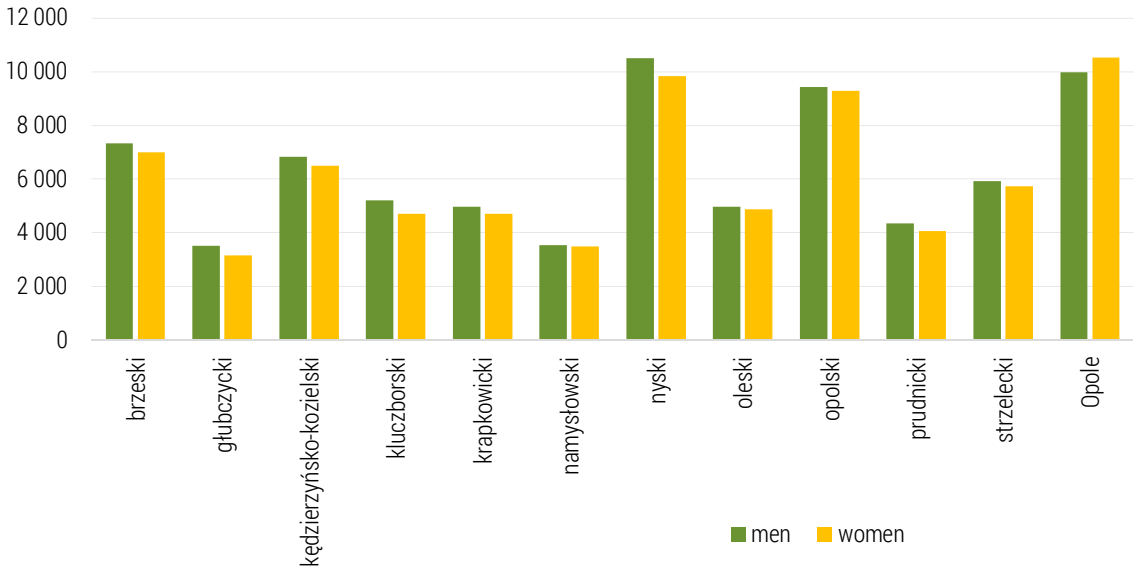

Figure 4. Gender Distribution in the 20-34 Age Group Across Districts of the Opolskie Voivodeship

Further analysis comparing our research findings with statistical data from Opole and other districts in the Opolskie Voivodeship revealed additional patterns. The comprehensive analysis of our empirical data indicated that the intention to settle in the university city after graduation was more prevalent among students who lived in Opole during their studies, full-time students, those originating from the Opolskie Voivodeship, and – significantly – young women who constitute the demo-

DOI: 10.34659/eis.2024.91.4.1016

graphic potential of the center. To explore these findings further and their demographic implications, we conducted a detailed analysis of population statistics. Specifically, we examined the gender distribution in the 20-34 age group – crucial for the region's economic potential and development – across all districts (poviats) in the Opolskie Voivodeship[1] (Figure 4).

An exception to this pattern is observed in Opole, the university city, where women outnumber men. This gender distribution variance in the regional center reflects internal migration trends within the voivodeship. The surplus of young women in Opole can be largely attributed to existing educational migration patterns, in which women predominantly participate. The concentration of young women in Opole indicates both the city's higher residential attractiveness and reflects the overall quality of life it offers.

Career development opportunities play a significant role in this demographic pattern. Opole as an urban center typically offers better professional prospects compared to smaller towns and rural areas in the region, particularly in services, education, and administration sectors – fields characterised by higher female employment rates. Moreover, given the limited availability of specialised jobs in rural areas, especially in professions requiring advanced qualifications, women more frequently opt to settle in the city in pursuit of stable employment. The city also provides access to a broader range of services.

To further explore these socio-demographic patterns, we analysed another crucial indicator: the proportion of population with tertiary education relative to the total population across all districts of the Opolskie Voivodeship (Figure 5).

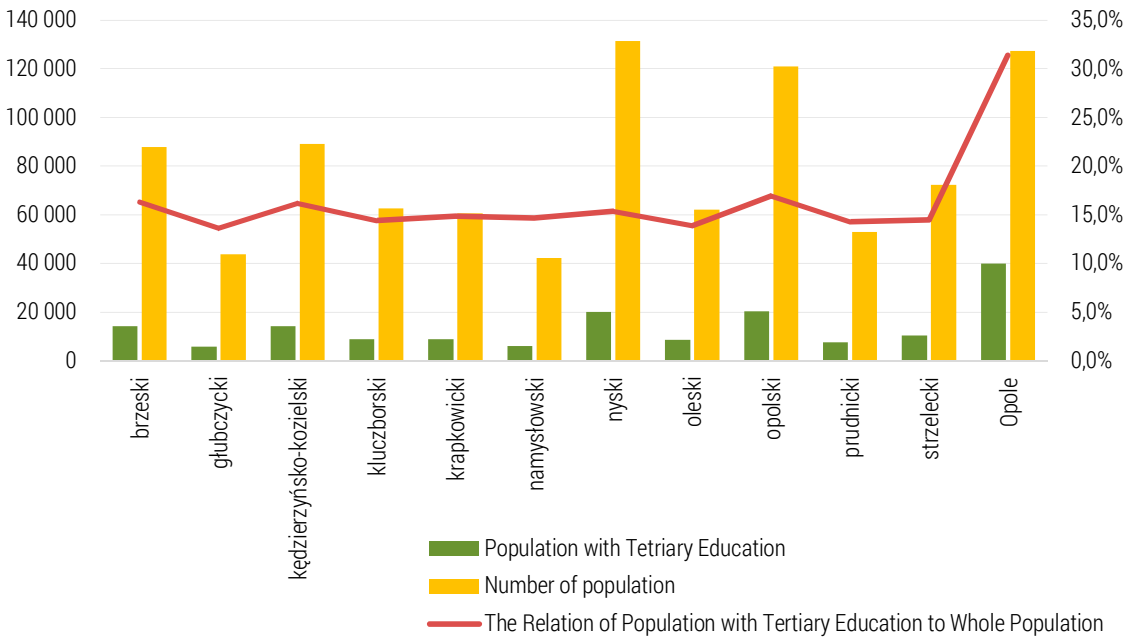

Figure 5. Proportion of Population with Tertiary Education Across Districts of the Opolskie Voivodeship

The highest proportion of tertiary-educated population was recorded in Opole city district, where this indicator exceeded 30% (comparable to levels observed in other non-metropolitan regional capitals in Poland). Conversely, the lowest proportions were found in the Głubczyce and Olesno districts. These substantial spatial variations in human capital distribution result from migration patterns and the enhanced attractiveness of the regional center, as well as the presence of higher education institutions in the city, which not only attract students but also influence the city's economy.

The presented data demonstrates that the 'retention' of educational migrants by the university city correlates with human capital accumulation, as evidenced by Opole's highest proportion of tertiary-educated residents among all districts in the Opolskie Voivodeship.

[1] Poviat's correspond to the NUTS 4 administrative level.

DOI: 10.34659/eis.2024.91.4.1016

Discussion

The analysis presented in this paper, which examines the potential impact of educational migration on the demographic resilience of a university city, aligns closely with the assumptions of economic base theory (North, 1955). This theory posits that economic growth is predominantly driven by activities within the base sector, which attract income and resources from external markets. Within this framework, migration related to tertiary education bolsters the region's and city's human capital stock, serving as a primary driver of local and regional economic development.

This growth is reflected in an increased share of residents with tertiary education, enhanced quality-of-life indicators (Winters, 2011), and accelerated economic growth trajectories (Barro, 1989). These outcomes underscore the critical role of human capital within the core sector, as its accumulation attracts firms seeking to capitalise on a skilled labor force available at competitive wage levels. Consequently, economic activities generate substantial income (Biedka et al., 2022) and create high-quality employment opportunities that benefit both university graduates and local residents.

Furthermore, the associated increase in investment contributes to higher local wage levels (Figlio & Blonigen, 2000), thereby strengthening the city's economic base and catalysing successive waves of migration to the region. These migrants are drawn by higher wages and improved quality-of-life indicators (Berry & Glaeser, 2005). This mechanism of cumulative causality generates a virtuous cycle, wherein the enhanced economic base not only attracts new skilled workers but also retains existing ones, further consolidating the city's position as a regional growth pole.

Economic base theory emphasises that activities driving outward migration are crucial for sustaining local and regional economic growth. Within this framework, educational migration emerges as a key determinant of an expanded human capital stock, serving as a vital source of economic dynamism and constituting a significant component of the base sector. These interconnections are depicted in a corresponding diagram (Figure 6).

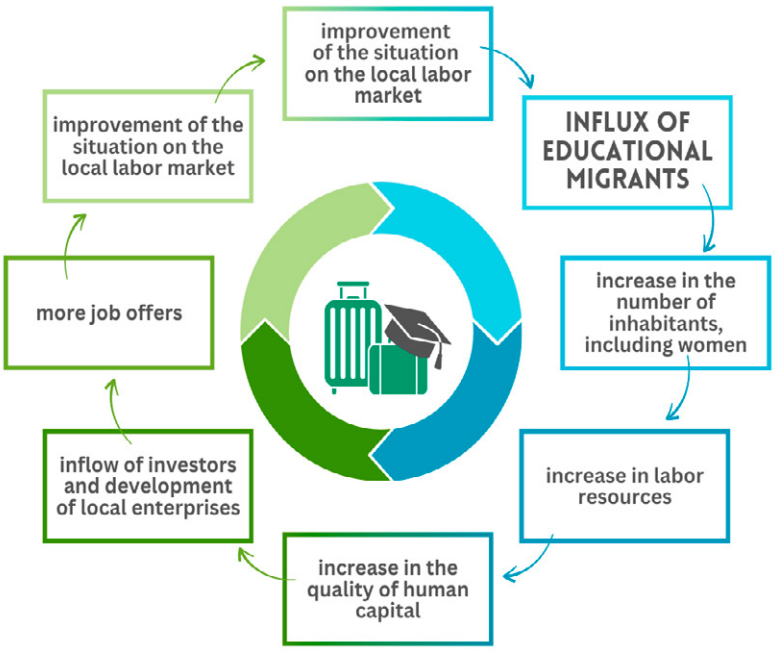

Figure 6. Educational Migration as a Driver of Local Economic Development

Source: authors' work based on Berry and Glaeser (2005), Figlio and Blonigen (2000), Winters (2011), Biedka et al. (2022).

Our analysis suggests that migration inflows associated with higher education contribute, in a broader context, to urban and regional 'self-sustainability'. This phenomenon is particularly evident in non-metropolitan university cities, with Opole offering a compelling case study. Central to this 'self-sustainability' is the emergence of what Suchacek (2019) conceptualises as "the dynamics of territorial consciousness". This phenomenon manifests when a critical mass of residents within a

DOI: 10.34659/eis.2024.91.4.1016

territory exerts a 'contagious influence' on the broader community, drawing previously undecided individuals – including educational migrants – into patterns of sustained local engagement and commitment.

From a broader theoretical perspective, we observe a reciprocal exchange of positive energy between established residents and the migrant population, fostering a self-reinforcing cycle of demographic resilience. This synergy emerges from the territorially connected population – strengthened by the retention of educated migrants – engaging consciously and constructively with their environment while preserving its 'genius loci' (Suchacek, 2019).

The study has several limitations. First, while we argue that educational migration inflow contributes to demographic resilience through more balanced demographic structures, it is important to note that population dynamics present complex challenges. Indeed, while population decrease poses developmental challenges, population growth can threaten sustainable development, as evidenced by environmental sustainability concerns related to projected population growth in Africa (UNPF, 2022; Gouldin, 2014). Second, our analysis focuses exclusively on the receiving area's perspective and the benefits generated by such inflow. We acknowledge that the development of an university city as a destination area occurs at the expense of source regions. This development model reflects a form of neo-colonialism, extracting resources from poorer and peripheral areas (Banfield, 2024). While this situation may not promote sustainable development across the entire region, research indicates that the presence of higher education institutions in non-metropolitan regional centers at least retains a portion of the population during and after their studies. Third, given our research focus, the study concentrated solely on internal educational migration, excluding international students and those who pursued studies in Opole but were not original residents. Additionally, an important research limitation lies in examining intended rather than actual residential decisions.

The findings highlight directions for local and regional policy initiatives. Enhancing the attractiveness of non-metropolitan university cities for both domestic and international students necessitates careful attention to factors that influence female retention. Comprehensive human capital retention strategies should therefore focus on fostering conditions that promote the long-term settlement of female graduates. Central to this process is the systematic development of educational offer, which serves as a vital driver of local and regional development. This dynamic is evident in both attracting potential student inflows and retaining graduates in non-metropolitan centres (UNFPA EECA, 2023).

It is important to note, however, that managing demographic resilience cannot solely target women, as their surplus in university cities may increase competition for partners and limit opportunities to fulfil fertility intentions. A broader perspective is needed, taking into account the sustainability of the region and addressing potential risks such as the Allee effect (Allee, 1939) introduced by the biologist Warder Clyde Allee. This concept posits that both overpopulation and underpopulation can negatively affect population sustainability, underscoring the necessity of balanced population management.

Conclusion

The empirical evidence analysed in this study provides substantial insights into how educational migration contributes to demographic resilience in the university city facing population challenges. Our research reveals several key patterns that illuminate the relationship between educational migration, gender-specific settlement intentions, and demographic and economic resilience.

The analysis of settlement intentions and gender patterns demonstrates significant gender-differentiated trends among educational migrants. Women show a higher propensity to settle permanently in the university city after graduation, which has profound implications for demographic resilience. This female predominance among settling graduates influences both demographic structures and socioeconomic development through multiple channels: modification of age and gender composition in the working-age population, enhanced fertility potential in the receiving city, transformation of local labor market structures, and changes in consumer and investment demand patterns. The observed patterns of settlement intentions strongly align with actual demographic indicators in Opole, confirming previous research findings (Dolińska et al., 2020) about gender-specific migration

DOI: 10.34659/eis.2024.91.4.1016

patterns in the Opolskie Voivodeship. This alignment between intentions and observable trends suggests that educational migration can serve as a reliable mechanism for enhancing demographic resilience.

The contribution of the authors

Conceptualization, D.R.-P.; literature review, D.R.-P., M.A., I.F.M., R.P. and J.P.; methodology, D.R.-P. and M.A.; formal analysis, D.R.-P., M.A. and I.F.M.; writing, D.R.-P., M.A., I.F.M., R.P. and J.P.; conclusions and discussion, D.R.-P., M.A. and J.P.

The authors have read and agreed to the published version of the manuscript.

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MIGRACJE EDUKACYJNE A ODPORNOŚĆ DEMOGRAFICZNA: ROLA MOBILNOŚCI STUDENCKIEJ W ROZWOJU LOKALNYM

STRESZCZENIE: Celem niniejszego artykułu jest ukazanie wpływu migracji edukacyjnych na lokalną odporność demograficzną oraz akumulację kapitału ludzkiego w kontekście współczesnych wyzwań demograficznych. Badanie koncentruje się na dwóch kluczowych aspektach: po pierwsze, na ocenie jak napływ migrantów związanych ze szkolnictwem wyższym oddziałuje na zdolność społeczności lokalnej do regeneracji populacji w obliczu postępujących trendów depopulacyjnych i starzenia się społeczeństwa; po drugie, na ocenie wpływu absorpcji absolwentów przez ośrodek miejski na kapitał ludzki w regionie. Opole – niemetropolitalne miasto akademickie – posłużyło w nim jako studium przypadku. Wyniki badań empirycznych przeprowadzonych wśród opolskich studentów umożliwiły uzyskanie informacji o planach migrantów związanych z okresem po ukończeniu studiów, a dane statystyczne posłużyły ukazaniu długoterminowych konsekwencji w zakresie sytuacji demograficznych i kapitału ludzkiego. Wstępne ustalenia badawcze wskazują na istotną rolę tego rodzaju migracji w kreowaniu mechanizmów odporności demograficznej, przede wszystkim poprzez skuteczne przyciąganie i zatrzymywanie młodych osób, zwłaszcza kobiet, w obszarach pozametropolitalnych. Uzyskane wyniki badawcze dostarczają cennych wskazówek dla decydentów odpowiedzialnych za kształtowanie polityki regionalnej oraz strategii rozwoju szkolnictwa wyższego w regionach zmagających się z analogicznymi wyzwaniami demograficznymi.

SŁOWA KLUCZOWE: migracje edukacyjne, migracje związane z wykształceniem wyższym, odporność demograficzna, kapitał ludzki, rozwój lokalny

DOI: 10.34659/eis.2024.91.4.1016