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Why stay here? Push and pull factors influencing migration of university-educated individuals in a structurally disadvantaged region

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Abstract

Several typical negative phenomena can be observed in a structurally disadvantaged region. Economic factors (often linked to higher unemployment rates, less developed infrastructure, and services) but also demographic factors (ageing population) play a key role. The overall quality of life in a given locality is usually lower, which can be influenced by leisure opportunities, environmental quality or crime rate. It is most often due to a combination of these factors that young and talented people start to leave the region. Structurally disadvantaged regions are paying considerable attention to the issue of the Brain Drain, as the exodus of highly skilled labour further worsens their economic and social situation. The aim of this study is to find out what push and pull factors influence young, university-educated individuals to make migration decisions. We specifically focus on the individuals who live in the Ústí Region, one of the structurally most affected regions in the Czech Republic. Based on a qualitative analysis of data gained from focus groups, the main factors that are important for young people about mobility were defined. Subsequently, a quantitative survey was conducted (N=462), which included university students under 25 years of age residing in the Ústí nad Labem region. Based on Friedman's ANOVA and subsequent post hoc analysis, the main factors influencing migration were identified. Three main push factors (i.e. driving outmigration) consist of the: 'Opportunity to spend leisure time'; 'Good job'; and 'Convenient and nice surroundings of residence'. Pull factors (i.e. what keeps individuals in the region) are 'Social connections' and 'Affordable housing'. The results of the study can be used by cities and regions to develop strategies for talent stabilization.

Highlights for public administration, management and planning:

- Push and pull factors for migration decisions of university-educated individuals in the structurally disadvantaged region are analysed.
- Perception of push and pull factors is studied focusing on the extent to which the respondent would be better off or worse off if they moved from the region.
- Based on descriptive and statistical analysis, it was found that university-educated individuals mostly miss more cultural, sporting and social opportunities (generally more leisure opportunities), a good job and a comfortable and nice neighbourhood to live in (push factors).
- Pull factors, on the other hand, include social connections (family, friends, place of birth) and affordable housing. Local municipalities can build their strategies for retaining talent in the region on these findings.
- Future research should delve deeper into social and psychological factors that have not yet been explored in detail.

Keywords

Brain drain,
Push and pull factors,
Highly–skilled labour,
Structurally disadvantaged region

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1 Introduction

One of the many problems facing many countries is the high level of migration, with migration of highly skilled young people being particularly acute. This phenomenon is often referred to as the Brain Drain.

1.1 Migration to another country

The reasons that lead to migration have been the subject of a number of studies. For example, Urbański (2022) investigated which factors influence the migration of people in Poland and Romania. In collaboration with another author, he has previously compared the factors influencing the migration of Poles and Thais (Khalid & Urbański 2021). In his work, Doerschler (2006) investigated the reasons for Turkish migrants heading to Germany. In this case, the respondents declared family and a better life (economic factors) as the main motives. The migration of talented people in the Caribbean was investigated by Parkins (2010). In his work, he identified four groups of factors that influence migration. In the first group, he included crime, violence and illegality. The second group is the mismatch between occupation and skills. Economic factors are only in the third group and the last fourth group includes lack of social opportunities. Also, Kazlauskiene & Rinkevičius (2021), who address the Brain Drain phenomenon in Lithuania, point out that economic factors may not always play the most important role. Based on factor analysis, they determined that the state academic system, state macroeconomic conditions and government policies are important for highly skilled Lithuanians, in addition to the motivating professional attraction of foreign countries and socio-economic conditions

As already mentioned, and illustrated by several examples, migration is addressed by countries around the world. Not only do the reasons for migration differ, but also its intensity. Migrants from the Middle East and North Africa are most strongly attracted by democratic governments and good employment prospects (Ferwerda 2021). However, migration from these areas is so strong that some countries where migrants have been heading in large numbers have turned to the European Commission to manage this migration and spread the burden among host countries. Poland was identified as a suitable country where large numbers of migrants would find employment (Ambroziak & Schwabe 2016).

1.2 Intra-country migration (regional migration)

In relation to types of migration, it is important to note that it is not necessarily always just migration to another country. In some countries, especially those where there are significant differences between regions, there is also intra-country migration (interregional, inter-urban). An extensive study on this topic has been carried out by Niu (2022). Based on an analysis of nearly 14 million records of population migration in China, he identified the main factors that influence this migration. These are employment opportunities, quality of education and quality of housing. Other authors have similarly addressed migration issues at the city and provincial levels in China (Wang et al. 2021; Cui et al. 2022). In Korea, Ye & Lim (2015) find the impact of the regional creative environment and other push and pull effects on the inflow and outflow of highly educated people between urbanized areas. In Japan, the Brain Drain issue has been studied, e.g., by Higa et al. (2019). The migration patterns of college students in the U.S. have been studied by Faggian & Franklin (2014) or also by Stephens (2019),Kazakis & Faggian (2017) and others. The outflow of skilled labour causing hardship in rural areas of Kazakhstan is addressed by Buchenrieder et al. (2020). The Brain Drain phenomenon is not only seen as a loss, but some authors also see it as an opportunity. Delisle & Shearmur (2010) suggest that cities and regions in Canada that want to develop further should focus specifically on attracting talented people.

From European countries, one can then cite authors such as Gärtner (2016), who looks at internal migration in Sweden. Interregional migration is described by Andrews et al. (2011) based on a longitudinal panel survey of British households. Even Italy, which is characterized by significant differences between the less developed south and the more developed centre and north, address internal migration issues (Marinelli 2011; Ermini et al. 2019; Ruiu et al. 2019).Détang-Dessendre & Molho (2000) also look at migration in France through a gender lens. They conclude that over time, women develop weaker ties to employment than men, but stronger ties to their home. In Poland, Maleszyk (2021) focuses on the migration of skilled young people. In Germany, internal migration flows are tracked by Kremer (2022) or Haussen & Uebelmesser (2018), who attempt to identify migration patterns of university-educated people based on secondary data, with a particular focus on regional imbalances.

This issue is also addressed in Switzerland (Oggenfuss & Wolter 2019). Here, all cantons have to contribute to the financing of public education, regardless of the place of study a student chooses. Not all cantons have their own universities, and some students have to leave their homes. The study found that about half of the students who leave home do not return to their place of origin after graduation. Another finding was that it was mostly the students with the best academic results who did not return. The cantons that had to bear the cost of their studies were thus losing potential taxpayers. Those cantons that do not have their own university are at a distinct disadvantage.

The Czech Republic is not as economically strong a country as the aforementioned Switzerland or Germany. Nor is it very large in terms of area. Nevertheless, there are significant differences between the various regions (especially economic and environmental), which also lead to internal migration. Some inequalities may also arise as a result of joining the European Union.Sardadvar & Vakulenko (2021) point out that skilled migration improves the economic potential of prosperous regions, but also acknowledge that it probably increases intra-country disparities. Structurally affected regions then look for ways to retain talented people and wonder whether it is possible to influence these migration processes or at least predict migration more accurately.

1.3 Occupation-related migration

Migration can also be tied to certain occupations. Botezat & Ramos (2020) report that the medical profession is among the most mobile and highly skilled professions and that the migration of doctors has increased steeply in recent decades, not only in Europe. More generally, we can talk about the migration of health professionals, as it is not only medical but also non-medical professions (Juric 2021; Hlongwa et al. 2023; Kline 2003; Ibrahim et al. 2019; Nadir et al. 2023). Also, in the case of health professionals, it is a highly skilled workforce that has received its education in its home country and now applies its know-how in the host country.

1.4 Theoretical approaches to studying migration

The theoretical and methodological basis of the above studies is also evident in the above studies. The economic factors, saturated mainly with job opportunities and higher earnings, are generally based on neoclassical economic theories. Human capital theory, on the other hand, is based on the assumption that people consider both benefits and costs, not only in the economic sphere but also taking social factors into account. Cultural capital theories then assume that people will migrate to areas that are culturally close to them (especially language, but also religion, mentality, etc.). There are a number of sub-theories, and the conclusions of each study send a relatively clear message. It is not possible to label any one theory as universally valid. In the case of migration, it is usually a combination of several factors. However, it is true that some factors may be more powerful and play a significant role in the decision-making process.

The above theories look for specific factors or categories (reasons) that lead to migration. Roubínek et al. (2015) mention theories that deal with governance and public administration. They cite (among others) Tiebout, the author of the so-called fiscal migration hypothesis. This migration is based on the movement of finances between states or regions, which in turn triggers migration effects. For example, if wealthy firms (or wealthy citizens) leave for countries where lower taxes are paid, the original country becomes even poorer. The effects can also be positive, for example, when a government invests or otherwise intervenes in a region, this incentive can generate interest not only from residents but also from investors. A detailed analysis of regional development processes that are partly influenced by foreign direct investment, multinational companies and global economic trends impacting regional development in the Czech Republic has been described by Hlaváček & Koutský (2011).

Another theoretical anchor for addressing migration issues is the concept of push and pull factors. Lee (1966), whose work is widely cited and developed by other authors, can be considered a modern classic in the field of theoretical definition of push and pull factors. Push and pull factors motivate people to move to a different geographical area. Lee (1966) identifies 4 basic groups of these factors and refers to them as economic, social, political or environmental factors.

Within each group of factors, push and pull factors can be further distinguished. Push factors are those that force (push) an individual to leave their home (Urbański 2022). Examples of push economic factors are typically high unemployment rates, generally low living standards, poverty, and so on. Social push factors may include, for example, social inequality or an inadequate health care system.

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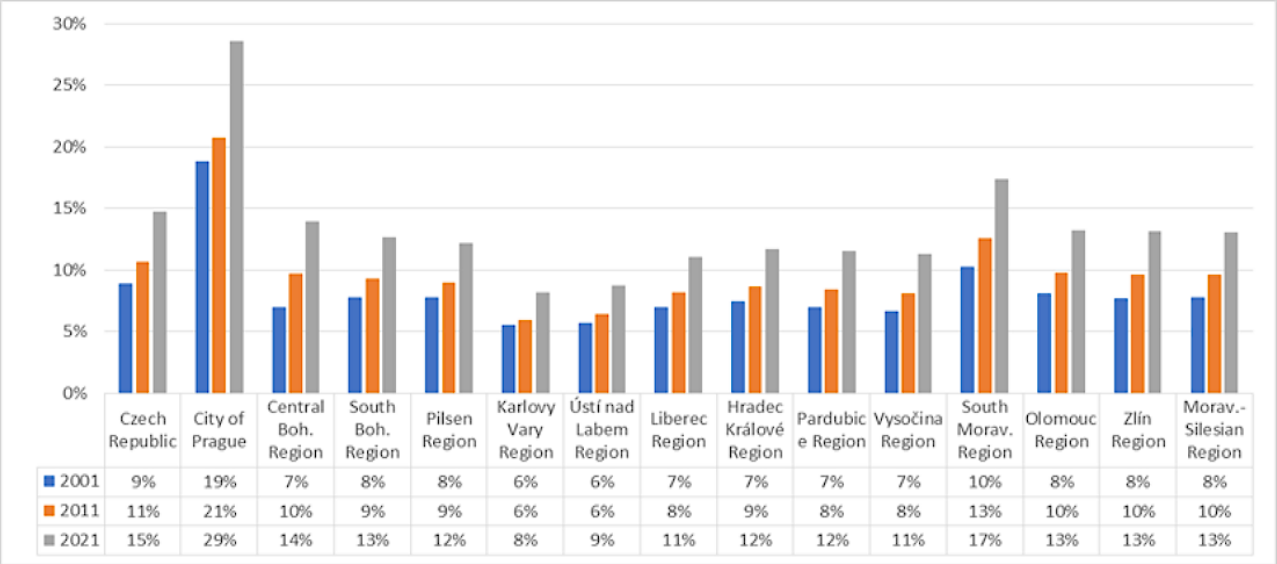
In the political sphere, push factors can be factors such as an unjust legal system, high corruption or a poor political environment in generall Finally, in the environmental domain, there may also be push factors that force individuals to change residence (poor environment, natural disasters, etc.).
On the other hand, pull factors attract individuals to a given area (Urbański 2022). Even pull factors have their typical representatives in each of the groups of factors. In a way, it can be said that these are the opposite of push factors. While high unemployment rates have been reported as a push factor, low unemployment rates can, on the contrary, act as a pull factor. Similarly, an unfair legal system will tend to push people out (push), and a fair legal system will tend to pull individuals in (pull).
The methodology of this research will be built on the concept of push and pull factors. It is a concept that allows for a broader perspective on the Brain Drain issue. It does not focus on finding a single reason or cause but creates an overall picture of the situation in a given locality and allows the 'strength' of individual factors to be captured. The identification of weaknesses then enables targeted remediation, while the identification of strengths points the way and confirms the soundness of the investment. The application of this concept will therefore allow both the targeted elimination of weaknesses and the eventual prediction of migration processes.

2 Methods

The aim of this study is to identify the main push and pull factors for young university students who come from a structurally disadvantaged region within the Czech Republic.

2.1 The structurally disadvantaged region

The Ústí nad Labem Region is one of the structurally disadvantaged regions. In inter-regional comparisons, the Czech Republic has consistently shown unfavourable results in a number of macroeconomic indicators (unemployment rate, GDP, net disposable household income, etc.), but there are also unfavourable data in socio-demographic comparisons (average age, educational attainment). Economic and socio-demographic data are generally correlated. Low educational attainment tends to be a reliable predictor of lower average wages in a region. In the event of an economic recession, regions with a low proportion of university graduates also have the highest unemployment rates. The prosperity of a region is not only about purchasing power, but also about innovation and development, and for this educated and talented people are needed. A comparison of the number or proportion of people with a university degree is shown in Fig. 1.
Fig. 1 shows that while in 2001 all regions in the Czech Republic (except the Capital City of Prague) had a share of the population with a university degree of 10% or less, this share has been increas-



	Czech Republic	City of Prague	Central Boh. Region	South Boh. Region	Pilsen Region	Karlovy Vary Region	Ústí nad Labem Region	Liberec Region	Hradec Králové Region	Pardubice Region	Vysočina Region	South Morav. Region	Olomouc Region	Zlín Region	Morav.-Silesian Region
2001	9%	19%	7%	8%	8%	6%	6%	7%	7%	7%	7%	10%	8%	8%	8%
2011	11%	21%	10%	9%	9%	6%	6%	8%	9%	8%	8%	13%	10%	10%	10%
2021	15%	29%	14%	13%	12%	8%	9%	11%	12%	12%	11%	17%	13%	13%	13%

Fig. 1 Percentage of university-educated members of the population in each region for 2001, 2011, and 2021

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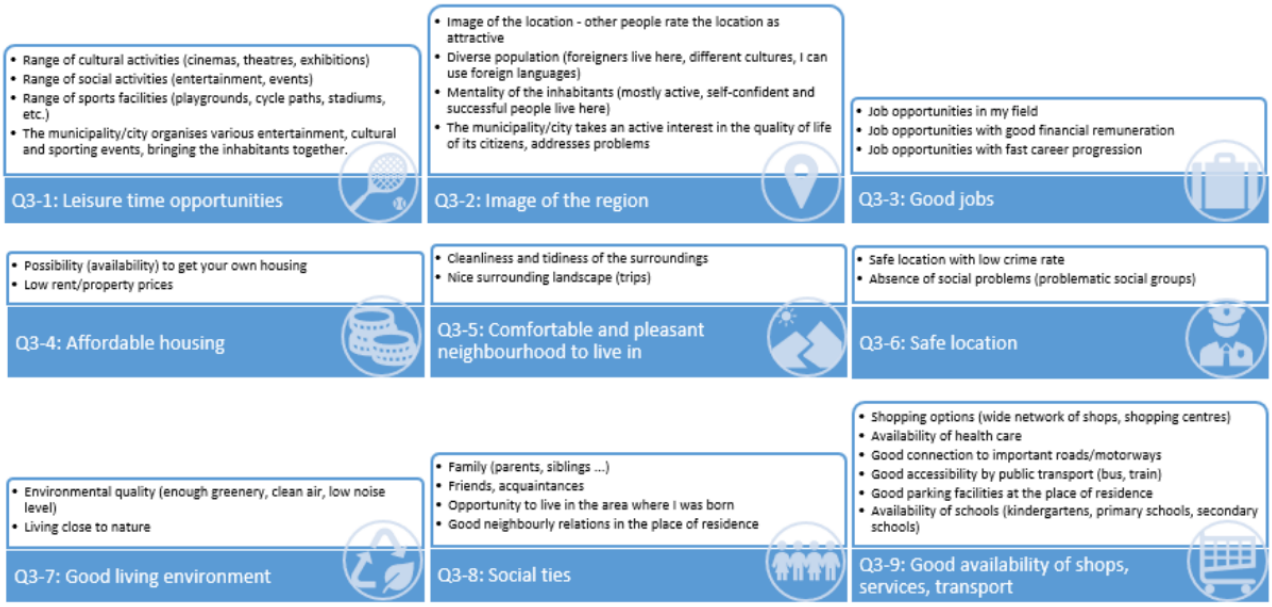

Fig. 2 List of factors related to migration 1

ing significantly in all regions over the last 20 years. Only two regions remain below the 10% threshold, namely the Ústí nad Labem Region and the neighbouring Karlovy Vary Region. The Ústí nad Labem Region, like all other regions (except the Karlovy Vary Region), has a regional university. It is evident that the retention of university-educated people is least successful in the Ústí nad Labem Region.

2.2 Description of the target group and methods used

As is evident from the objective, the target group is young people studying at university and residing in the Ústí nad Labem Region. The research was based on both qualitative and quantitative designs. Firstly, two focus groups were organised where the participants were young people (up to 25 years old) who were studying at university. There were 9 participants in the first group and 8 in the second. The aim of these focus groups was to identify individual items (aspects) that young people rate as important in relation to their considerations about their future housing and living arrangements. Based on the findings of the focus groups, 32 items were identified and then sorted into 9 groups, resulting in 9 factors. The results are shown in Figure 2. Each of these factors can have both a push and a pull effect.

In addition, a quantitative survey was carried out using an electronic questionnaire. The sample consisted of university students residing in the Ústí nad Labem Region. Graduates of Jan Evangelista Purkyně University in Ústí nad Labem were contacted and the directory was supplemented from the STEM/MARK database.

In constructing the questionnaire, reference was made to Lee (1966), who, as mentioned above, is considered one of the creators of the modern theoretical anchors of push and pull factors, stating in his work that migration is not so much caused by actual factors at the place of origin and destination, but rather by the perception of these factors. Based on these findings, the following question was formulated: "If you moved away, what do you think you would obtain that would be better than you have now?" On a Likert scale of 1 to 10, the respondent then indicated to what extent they would be better off or worse off by moving away (1 = definitely worse off, 10 = definitely better off).

One of the other questions in the questionnaire asked about students' future plans, i.e., whether they wanted to stay or move away. The question was: "Now estimate on a scale of 1 to 10 the probability that you will move outside the region where you live today". This was followed by a scale of 1 to 10, where the extreme points 1 = definitely will not move away, to 10 = definitely will move away, were described. Given that the intention is to identify the most significant push and pull factors, particularly for the group of young people who want to move out of the region, this question further divided respondents into 3 groups based on how likely they were to move. Those who answered 1, 2 or 3 were assigned to Group 1 (low probability of moving away). Respondents who selected the middle num-

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Table 1 Description of individual factors

	Q3-1	*Q3-2*	*Q3-3*	*Q3-4*	*Q3-5*	*Q3-6*	*Q3-7*	*Q3-8*	*Q3-9*
Arithmetic mean	7.37	6.87	7.26	4.96	7.18	6.28	6.55	4.78	6.88
Median	7.5	7	7.33	5	7	6	6.5	4.25	7
Mode	10	7.5	5	5	10	5	10	4.25	7.67
Directional deviation	1.74	1.56	1.83	2.43	1.89	2.04	2.45	2.13	1.49
Pointedness	0.01	0.03	0.14	−0.66	−0.36	−0.32	−0.85	−0.15	−0.19
Slant	−0.51	−0.39	−0.56	0.17	−0.35	−0.18	−0.26	0.79	−0.30
Minimum	1	2	1	1	1	1	1	1	1.67
Maximum	10	10	10	10	10	10	10	10	10
Total	3404.50	3172.00	3355.00	2293.00	3318.50	2903.00	3026.00	2207.25	3176.67
Number of	462	462	462	462	462	462	462	462	462

bers on the scale (i.e., 4,5,6, and 7) were assigned to the group labelled as ”medium likelihood to move away” and the third group, labelled as ”high likelihood to move away,” included respondents who selected 8, 9, or 10.

The results (n = 462) were processed using Excel and Statistica software. The statistical methods used were the Kruskal-Wallis test, Friedman ANOVA, and Wilcoxon paired test. Because the data did not have a normal distribution, non-parametric tests were used.

3 Results

A basic description of the individual factors, which are labelled Q3-1 to Q3-9, is provided in Table 1. An explanation of the content of each of the categories Q3-1 to Q3-9 and their factors is provided graphically in Fig. 2, and this information is also provided in Table 3.

The values shown in Table 1 show the factors with the highest and lowest values of arithmetic means, possibly medians and modes, which are likely to predict future push and pull factors. Table 2 then shows the arithmetic means for the items that saturate the main factors.

Push factors, i.e., factors that push young people out of the region, are ”Leisure time opportunities” (mean 7.37), ”Good jobs” (mean 7.26) and ”Comfortable and pleasant neighbourhood to live in” (mean 7.18).

For the factor ”Leisure time opportunities”, all items exceeded 7. Within the factor ”Leisure time opportunities”, the two items with the highest values were ”Range of cultural activities” and ”Range of social activities”. Within the factor ”Good jobs”, the highest value was achieved by the item ”Job opportunities with good financial remuneration”. The second most popular item was ”Job opportunities in my field” and the third most popular item was ”Job opportunities with fast career progression”. This last item was the only one to fall slightly below 7 (6.88). The third push factor was ”Comfortable and pleasant neighbourhood to live in” (7.18). This factor consists of the items ”Cleanliness and neatness of surroundings” and ”Nice surrounding landscape (trips)”

Based on the data, one of the strongest pull factors (i.e., factors that keep people in a location or draw them to a location) is ”Social ties” (4.78). In this case, amongst strong items are especially ”Opportunity to live in the area where I was born” (3.78) and ”Family - Parents, siblings” (4.24). The second pull factor is Factor 4 ”Affordable housing”, where the most strongly represented item is ”Low cost of rental properties” (4.45), followed by ”Ability (affordability) to own a home” (5.48).

In the basic descriptive data processing, the following graph shows the main push and pull factors for the target group, i.e., university students living in a structurally disadvantaged region (Fig. 3).

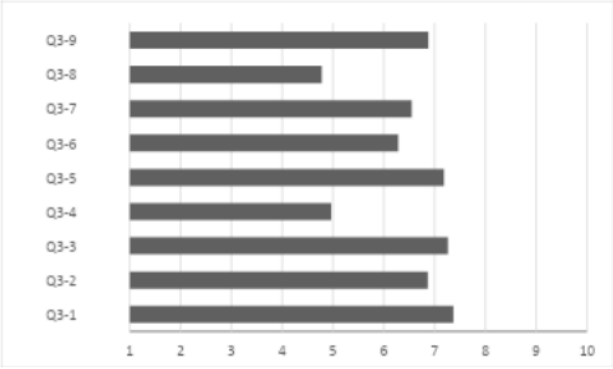

Fig. 3 Identified push and pull factor

This main push and pull factors for the target group, i.e., university students living in a structurally dis-

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Table 2 Arithmetic means for the individual items saturating the main factors

Q3-1	**Leisure time opportunities (sport, culture, entertainment, ...)**	Average
	Range of cultural activities (cinemas, theatres, exhibitions)	7.5
	Range of social activities (entertainment, events)	7.52
	Range of sports facilities (playgrounds, cycle paths, stadiums, etc.)	7.41
	The municipality/city organises various entertainment, cultural and sporting events, bringing the inhabitants together.	7.04
		7.37
Q3-2	**Image of the region**	
	Image of the location - other people rate the location as attractive	7.44
	Diverse population (foreigners live here, different cultures, I can use foreign languages)	6.52
	Mentality of the inhabitants (mostly active, self-confident and successful people live here)	6.98
	The municipality/city takes an active interest in the quality of life of its citizens, addresses problems	6.53
		6.87
Q3-3	**Good jobs**	
	Job opportunities in my field	7.39
	Job opportunities with good financial remuneration	7.52
	Job opportunities with fast career progression	6.88
		7.26
Q3-4	**Affordable housing**	
	Possibility (availability) to get your own housing	5.48
	Low rent/property prices	4.45
		4.96
Q3-5	**Comfortable and pleasant neighbourhood to live in**	
	Cleanliness and tidiness of the surroundings	6.95
	Nice surrounding landscape (trips)	7.42
		7.18
Q3-6	**Safe location**	
	Safe location with low crime rate	6.31
	Absence of social problems (e.g., problematic social groups)	6.26
		6.28
Q3-7	**Good living environment**	
	Environmental quality (enough greenery, clean air, low noise level)	6.57
	Living close to nature	6.53
		6.55
Q3-8	**Social ties**	
	Family (parents, siblings, ...)	4.16
	Friends, acquaintances	5.09
	Opportunity to live in the area where I was born	3.72
	Good neighbourly relations in the place of residence	6.14
		4.78
Q3-9	**Good availability of shops, services, transport**	
	Shopping options (wide network of shops, shopping centres)	7.28
	Availability of health care	7
	Good connection to important roads/motorways	7.23
	Good accessibility by public transport (bus, train)	7.11
	Good parking facilities at the place of residence	5.54
	Availability of schools (kindergartens, primary schools, secondary schools)	7.09
		6.88

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Table 3 Individual items saturating the factor Q3-1 ”Leisure time opportunities”

Item	Item number	”I don’t want to move away”	Neutral group	”I want to move away”
Range of cultural activities (cinemas, theatres, exhibitions)	q3_1	7.66	7.32	7.62
Range of social activities (entertainment, events)	q3_2	7.57	7.38	7.71
Range of sports facilities (playgrounds, cycle paths, stadiums, etc.)	q3-3:	7.43	7.34	7.51
The municipality/city organises various entertainment, cultural and sporting events, bringing the inhabitants together.	q3-23:	6.99	6.89	7.42

Table 4 Item analysis of the Good jobs factor - descriptive data

Item	Item number	”I don’t want to move away”	Neutral group	”I want to move away”
Job opportunities in my field	q3-5:	7.43	7.32	7.47
Job opportunities with good financial remuneration	q3-6:	7.47	7.47	7.69
Job opportunities with fast career progression	q3-7:	6.79	6.89	7.02

advantaged region were verified using Friedman’s ANOVA and subsequent post hoc analysis. Statistically significant differences were found between the mean values of most factors (p =0.00000). However, there is no statistically significant difference between factors 4 and 8 (demonstrated by Freidman’s ANOVA, p = .24712). These are the factors with the lowest mean values (pull factors). And there is no statistically significant difference between factors 3, 1 and 5 (demonstrated by Freidman’s ANOVA, p = .77721). These are the factors with the highest mean values (push factors).

3.1 Item analysis of individual push factors

Based on the identified push factors (i.e., factors that lead to young people leaving the region), an item analysis was then conducted to determine which items saturate these factors the most.
The strongest push factor identified in Table 1 was ”Leisure time opportunities”. This factor has been saturated by the items shown in Table 3.
A subsequent calculation using Friedman’s ANOVA showed a significant difference between all items (p .00000). Even among the first three items, there was a statistically significant difference by Friedman ANOVA(p = .01891) but between the items Range of cultural activities (cinemas, theatres, exhibitions) and Range of social activities (possibility of entertainment, events) there is no significant difference (p = .22856). Given the size of the means, we can therefore conclude that this factor is most saturated by the items’ Range of cultural activities (cinemas, theatres, exhibitions) and Range of social activities (possibility of entertainment, events). The second Push factor was ”Good jobs”. This factor is saturated by three items (see Table 4). Based on Friedman’s ANOVA test, a statistically significant difference was found for all three items but the difference between the items ”Possibility of employment in my field” and ”Possibility of employment with good financial remuneration” is no longer significant. These two items most saturate the factor.
The last push factor was identified as factor 5 ”Comfortable and pleasant neighbourhood to live in”. This factor consisted of two items, which are shown in Table 5. Based on a Wilcoxon paired test, this factor was shown to be more saturated by the item ”Nice surrounding landscape (trips)”. Both respondents who do not want to move away and respondents who want to move away indicate that they would improve statistically significantly more in this item than in the item ”Cleanliness and tidiness of surroundings”. Nevertheless, even the item ”Cleanliness and tidiness of surroundings” scores high, meaning that students believe that they would improve in this area if they moved.

3.2 Item analysis of individual pull factors

”Social ties” were identified as the most significant pull factor. This factor was saturated with five items (see Table 6). The descriptive data shows that the lowest values (i.e., the strongest pull effect) are for the item ”Opportunity to live in the place where I was born”. Table 6 also shows the difference in the statements between the different groups of respondents (wanting versus not wanting to move away).

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Table 5 Item analysis of the factor ”Comfortable and pleasant neighbourhood to live in” – descriptive characteristics

Item	Item number	”I don’t want to move away”	Neutral group	”I want to move away”
Cleanliness and tidiness of the surroundings	q3_16	6.72	7.05	7.17
Nice surrounding landscape (trips)	q3_18	7.25	7.52	7.53

Table 6 Item analysis of the factor ”Social ties” - descriptive characteristics

Item	Item number	”I don’t want to move away”	Neutral group	”I want to move away”
Family (parents, siblings, ...)	q3-10:	3.52	4.45	4.77
Friends, acquaintances	q3-11:	4.40	5.15	6.23
Opportunity to live in the area where I was born	q3-12:	3.44	3.79	4.11
Good neighbourly relations in the place of residence	q3-14:	5.70	6.35	6.51

Table 7 Item analysis of the factor ”Social ties” - statistical calculation

Variable	AverageRank	Sum ofRanks	Mean	Std.Dev.
q3_10	1.956 710	904.000	4.162 338	2.988 345
q3_11	2.304 113	1064.500	5.086 580	2.748 510
q3_12	1.739 177	803.500	3.722 944	3.182 291

Friedman ANOVA and Kendall Coeff. of Concordance ANOVA Chi Sqr. (N = 462, df = 2) = 109.0810 p =0.00000 Coeff. of Concordance = ,11805 Aver. rank r = ,11614

In the item Family (siblings, parents), each group reported averages of 3.52 (does not want to move away), 4.45 (neutral band) and 4.77 (wants to move away). In the next item, ”Friends, acquaintances”, the differences were even more significant (4.40; 5.15 6.23). In this case, the differences were in the range of almost two points on a ten-point scale. While for students who do not intend to move, the item ”Friends, acquaintances” is a strong pull factor, for students who declare that they will move away, family is more of a push factor.

In this subsection, the Friedman ANOVA was used to determine which of the items listed in Table 7 most saturates the ”Social ties” factor. Friedman’s ANOVA and subsequent post hoc tests show that the ”Social ties” factor is most saturated with the item ”Opportunity to live in the area where I was born”.

The second major pull factor was ”Affordable Housing”. For this item, there was also a large difference between the mean value of students who do not want to move away (4.87) - for them, it is more of a pull factor and the mean value of students who want to move away (6.11) - for this group it is more of a moderate push factor (see Table 8).

This difference was statistically significant (see subsection 3.2 Table 6). An item analysis of this factor is shown in Table 9. Wilcoxon’s matched pairs test showed that the Affordable housing factor is statistically significantly more saturated with the item ”Low cost of rent/property”, which remains a pull factor for all groups.

Table 9 Item analysis of the factor ”Affordable housing” - statistical calculation

Pair of Variables	ValidN	T	Z	p-value
q3_8 & q3_9	293	7475.500	9.686445	0.000000

Wilcoxon Matched Pairs Test - tests are significant at p <.05000

4 Discussion

As the migration of talented young people affects many countries around the world, there is also a wealth of research on the subject. Many authors believe that economic factors play a primary role. Novotný et al. (2020) conclude in their research that economic integration rather than perceived socio-cultural integration influences the migration decisions of international students. Economic integration can also be thought of as gaining work experience while studying. This is what other authors (Weisser 2019; Teichert et al. 2020; Hooijen et al. 2020) have found to be a very important factor that will influence the future migration of young university students.

However, it is not only less economically developed countries that face migration problems. For example, many studies have been produced in Germany, which is considered an economically strong

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Table 8 Item analysis of the factor ”Affordable housing” - description of data

Item	Item number	”I don’t want to move away”	Neutral group	”I want to move away”
Possibility (availability) to get your own housing	q3_8	4.87	5.72	6.11
Low rent/property prices	q3_9	3.84	4.84	4.77

country, addressing migration both within countries and regions within Germany and abroad (Busch & Weigert 2010; Buenstorf et al. 2016; Haussen & Uebelmesser 2018; Niebuhr et al. 2022; Kremer 2022). It is thus clear that economic factors are not necessarily the main reason why people leave a country or region. Niebuhr et al. (2022) investigated whether there are differences in mobility between students who studied at secondary school in Germany or abroad. They concluded those who studied abroad do not generally stay in the university region for a long time. The likelihood of leaving is influenced by individual, regional and occupational factors. According to Niebuhr et al. (2022), a significant predictor of mobility for German students is prior study and work experience. International graduates who attended school in Germany show a higher propensity to leave the university region to enter the labour market than other groups of graduates. Similar findings are reported by King & Ruiz-Gelices (2003), who conducted a large-scale survey of Erasmus and Socrates participants.

It is thus clear that migration is indeed not just about better economic conditions. Factors that may constitute significant barriers to migration and may have both social and individual psychological dimensions have received less attention in research to date. Kyei (2021) provides interesting suggestions. In studying motives to migrate, she departs from classical economic models and focuses on the internal psychological aspects such as fears, anxieties, joys and confusions that typically accompany migration decisions. Hooijen et al. (2020) also state that personality traits and unexpected events such as a change in relationship status are significant factors beyond previous mobility experiences and internships during studies. Busch & Weigert (2010) analyze the migration of graduates to other German countries or abroad using panel data and conclude that the decision to go abroad is mostly a matter of socio-economic variables rather than national economic conditions. The longer graduates stay in the country where they study, the lower their propensity to leave.

From the discussion above, it is clear that certain factors can already increase the likelihood of subsequent migration during the study period. Weisser (2020) concluded that the very act of enrolment in tertiary education is influenced by personal and social preferences. These individual characteristics then influence the value of a given location. Thus, the personality of individuals also influences the characteristics of the city or the labour market. Prospective students exhibit different patterns of geographical sorting according to these personality traits. Universities in economically less prosperous regions attract a specific subset of students and this may then be reflected not only in mobility but also in student outcomes. The role of universities in the context of potential talent acquisition is also suggested by the results of a number of other studies (Dotti et al. 2013)

The most significant push factor identified in this research was the ”Leisure Opportunities” factor, which included items containing cultural, social and sporting activities on offer. If a region or city seeks to stabilize students in the region after they graduate, it should be concerned with their needs. It is not just about entertainment and sport, but as Stephens (2019) argues, amenities play a large role in graduates’ decisions about where to live and cities, if they want to retain talent, should do more to build relationships with students.

The results of this research showed that the ”Social Connections” factor can play a significant role as a push factor as well as a pull factor. Within the factor saturated with social items, one of the items ”Opportunity to live in the area where I was born” was rated as the strongest pull factor. According to the findings of the study by Buenstorf et al. (2016), the region of birth is of great importance. According to their findings, in the case of migration, graduates are significantly more likely to move to a region that reminds them of their home region at least in some features (e.g. settlement pattern, language, etc.). Venhorst (2013) also points out that graduate mobility has a strong regional element and relatively many graduates return to familiar home regions.

Many countries or regions are trying to retain their talent on the one hand and attract new talent from other countries on the other (Delisle & Shearmur 2010). Various institutions such as Welcome Offices are emerging to help attract highly skilled workers

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and also to help them with the period of adaptation to a new environment. A number of studies conclude that it is more effective to attract these young talented people during their university studies. Cameron et al. (2019) use the term ”two-stage migration intention” in this context, where people first choose a country to study and then stay to work. Their findings suggest that for many international students, a key factor in their choice and decision-making is that they have a realistic chance of gaining employment in the host country after graduation. In this respect, the Ústí nad Labem Region has a disadvantage, as there are not many attractive job positions for highly qualified employees. As the research showed, the factor ”Good job” is rated by students as a push factor, i.e. something that is missing in the region and pushes them to other regions.

5 Conclusion

The Ústí Region is one of the structurally affected regions and one of the major problems that is further aggravating the situation is the departure of talented young people. Therefore, the aim of this study was to find out what factors can influence this situation. Based on Friedman's ANOVA and subsequent post hoc analysis, push and pull factors were identified that affect the retention or migration of university students.

The push factors (i.e., what students miss most in the region, what pushes them elsewhere) include ”Opportunity to spend leisure time”, ”Good job” and ”Convenient and nice surroundings of residence”. Pull factors (i.e. what students like in a place, what keeps them there) include ”Social connections” and ”Affordable housing”.

Not all students declare their intention to move out of the region. Therefore, further analysis using the Kruskal-Wallis test was used to determine whether the ratings of each factor differed according to the stated rate of moving away (migration). Statistically significant differences were found in this case for the factor ”Affordable housing”. For students who do not want to move away, this factor is more of a pull factor, but students who declare a high likelihood of moving away rate this as more of a push factor.

A further statistically significant difference was identified for the factor ”Safe location”, where students who do not want to move away perceive the location where they live more favourably than those who are not completely decided or are determined to move away. A significant difference between student groups was also found for the factor ”Social ties”.

Subsequent item analysis then used Friedman's ANOVA to determine which of the items most saturated the identified push and pull factors. In the case of the push factor ”Leisure time opportunities”, these were the items ”Range of cultural activities (cinemas, theatres, exhibitions)” and ”Range of social activities (entertainment, events)”.

The second push factor ”Good jobs” is most saturated by the items ”Job opportunities in my field” and ”Job opportunities with good financial remuneration”. The item ”Job opportunities with rapid career progression” is not a major saturating item, yet it also has relatively high mean values and is important for young people. The third push factor ”Comfortable and pleasant neighbourhood to live in” is most saturated with the item ”Nice surrounding landscape (trips)”.

In the case of pull factors, the factor ”Social ties” was found to be most saturated with the item ”Opportunity to live in the locality where I was born”. The second pull factor was ”Affordable housing”. In this case, it was no longer a ”pure” pull factor. There was a large difference between the ratings of students who do not want to move away (for them it is more of a pull factor) and students who want to move away (here it is more of a slight push factor).

Based on these findings, municipalities can take concrete measures if they want to stabilise the region's young and educated people. A limitation of this research is that the results are generalised to the whole region. Although the region is not large in area, there may be considerable local variation in the individual factors (between individual cities). If cities wanted to find out the real push and pull factors in their area, it would always be advisable to conduct a local investigation.

The replication of the methodology used in this paper may be beneficial for regions, cities or municipalities dealing with a similar problem. As mentioned in the Methodology, Factor Generation section, the procedure for calculating push and pull factors was developed and subsequently validated based on both qualitative research and quantitative research supported by the Technology Agency of the Czech Republic.

Further research would do well to focus more on psychological factors (or personality and social preferences), which have not yet been sufficiently explored, and it appears that their influence on migration can be significant.

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