

# The relationship between net migration and financial inclusion in Romania

Stefan JOHNSON<sup>1\*</sup>

<sup>1</sup> Faculty of Science, Department of Demography and Geodemography, Charles University, Prague, Czechia

\* Corresponding author: stefan.johnson@natur.cuni.cz

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## Abstract

Romania has been going through a unique demographic transition resulting in depopulation, partially due to consistently high emigration and low immigration rates. The population leaving has been predominantly those of working age. At the same time, Romania has also seen a stagnated financial inclusion growth rate between 2011 and 2017. This research explores the relationship between the age-group-specific net migration rates and age-group-specific financial inclusion rates provided by Findex. These age groups, which have a significantly strong relationship between net migration and financial inclusion, illustrate the impact of migration on financial inclusion rates. Age groups 25-29, 35-39, 40-44, and 45-49 have shown significantly strong inverse correlations between net migration and financial inclusion.

**Keywords:** Romania, depopulation, migration, financial inclusion, demography, remittances

## Rezumat. Relația dintre migrația netă și incluziunea financiară în România

România a experimentat o tranziție demografică unică, ce a avut ca rezultat o depopulare considerabilă, în mare parte datorită unei rate mari de emigrare și o rată mică de imigrare. Cei care au plecat au fost în principal în vârstă de muncă. În același timp, rata de creștere a incluziunii financiare a stagnat în perioada 2011-2017. Această lucrare explorează relația dintre ratele de migrație pe grupe de vârstă și ratele de incluziune financiară caracteristice grupelor de vârstă furnizate de către Findex. Aceste grupe de vârstă, care sunt într-o relație foarte strânsă cu migrația netă și incluziunea financiară, ilustrează impactul migrației asupra ratelor de incluziune financiară. Pentru grupele de vârstă 25-29, 35-39, 40-44 și 45-49 au fost stabilite cele mai mari corelații inverse între migrația netă și incluziunea financiară.

**Cuvinte-cheie:** România, depopulare, migrație, incluziune financiară, demografie, remitențe

## Introduction

Financial Inclusion is a crucial topic and has origins as early as 1950 (Basix & Ramola, 1996). The topic area was brought to mainstream attention through dialogue about the importance in the discussion of economic development globally (Mohan, 1996), and gained momentum in the early 2000s (Girard, 2021). The world bank has defined this area of research as providing ways for individuals and businesses to access valuable and affordable banking products (Allen, Klapper, & Martinez Peria, 2016). The importance of financial inclusion has been associated with the development of excluded and marginalized populations, such as women and the poor in developing nations (Ozili, 2020; Cabeza-Garcia, Brio, & Oscanoa-Victorio, 2019; Tarsem, 2018). Financial inclusion is a crucial contributing factor to economic development in the EU - significantly more important in low-income countries in the EU (Huang, Kale, Paramati, & Taghizadeh-Hesary, 2021; Danisman, 2020; Pham, Nguyen, & Ngo, 2022).

In 2011, the first large-scale World Bank study was published regarding financial inclusion, called the Findex - the financial inclusion index. The purpose of the study is to track financial inclusion rate changes

around the world triennially (Demirguc-Kunt A., Klapper, Singer, & Oudheusden, The Global Findex Database 2014- Measuring Financial Inclusion around the World, 2015). The study was funded by the Bill and Melinda Gates Foundation, administered by Gallup Inc., and sponsored by the World Bank (Demirguc-Kunt & Klapper, 2013). This triennial survey provides insight into the financial inclusivity in over 140 countries globally, with samples of 1,000 respondents per country, weighted to represent the country's demographic and socioeconomic landscape to correct for unequal sampling probability (World Bank, 2021). Since 2011, the inclusion rates have seen a net positive trend, with nearly all countries experiencing increased financial inclusion (Demirguc-Kunt, 2018). However, Romania, a former communist country in Southeast Europe, is a unique case by global standards, as it has experienced positive and subsequent negative changes since 2011 (Demirguc-Kunt, 2018).

Romanian inclusivity trends varied over the three Findex reported years - 45%, 61%, and 58% in 2011, 2014, and 2017 respectively (Demirguc-Kunt, 2018). In contrast to Romania, the European Area has had an increased and stabilized financial inclusion rate in the three studies - 90%, 95%, and 95%, in 2011, 2014, and 2017, respectively. Moreover, the European

and Central Asian regions have seen a positive trend – 45%, 58%, and 65% in 2011, 2014, and 2017, respectively (Demirguc-Kunt & Klapper, Measuring Financial Inclusion: The Global Findex Database, 2012; Demirguc-Kunt A., Klapper, Singer, & Oudheusden, The Global Findex Database 2014: Measuring Financial Inclusion around the World, 2014; Demirguc-Kunt, 2018). Compared to other Balkan and Southeast European nations, Greece and Serbia have had similar inclusion trends to Romania. Similarly, all three countries - Romania, Greece, and Serbia - show familiar net migration trends (World Bank Group, 2021; World Bank Group, 2021; World Bank Group, 2021). Romania is ranked 16th in outbound migration globally and has had approximately 3.5 million outbound migrants since 2007. Moreover, it is the only country within the Balkans to be included in the top 20 list of highest emigration rates by country (Goga, 2020). Sandu (2012) provides context to the movement outward from the country, as it is generally seen as positive by most of the Romanian population to emigrate (Sandu, 2012). Moreover, Sandu (2012) provides context regarding the importance of returning migrants who bring back the skills developed abroad.

As a European Union member state, Romanian citizens can search within the EU for jobs without applying for work visas, which has impacted Romania's ability to keep well-trained workers within its borders (Goga & Ilie, 2017). Much of this phenomenon began occurring at a greater rate upon accession to the European Union and has been highly impactful on the economy (Botezat & Moraru, 2020; Gavriloaia, 2020). In an example provided by Goga & Ilie (2017), doctors are some of the most common skilled workers to leave the country due to the opportunity to earn more in other European Union member countries (Botezat & Moraru, 2020; Goga & Ilie, 2017). These migrants usually represent some of the most expensive trained employees and the most important human capital (Goga, 2020; Goga & Ilie, 2017). Most seek migration toward well-developed nations, including the United States, Great Britain, Germany, and France (Alexe, et al., 2011; Botezat & Moraru, 2020). Migration, however, is not limited only to the most well-trained employees in the country.

A survey in 2013 of 256 Romanians indicated that only 42.1% of individuals would not consider migration, while 39.9% of the Romanians surveyed indicated a high probability of migrating (Nae, 2013). The most common reason for leaving Romania was that respondents could not find a job, with pay being the second most prominent reason for leaving their homes. The most preventative reasons for emigration were an inability to find work abroad and labor discrimination abroad (Nae, 2013). Moreover, the age groups with the highest tertiary education attainment

in 2010 were 25-34 and 35-44, with 20.6% and 13.4%, respectively (Nae, 2013).

This research will examine the relationship between age-group-specific net migration and the level of financial inclusion by age groups in Romania in the select years of 2011, 2014, and 2017. Mid-year age-group specific financial inclusion rates will be analyzed against mid-year age-group specific migration rates using Pearson  $r$  correlation coefficients. As asserted by Goga & Ilie (2017), migration is a factor associated with employment and pay and will represent the independent factor of analysis. Financial inclusion will be the dependent variable, as this will explore the relationship between the migration rates of mid-year age groups and net migration of mid-year age groups. According to Goga (2017) and Goga & Ilie (2020), high paying countries have lured many of the most well educated in the country to the West. If the impact of migration has been significant to those who seek work elsewhere, the country's total number of financial accounts is predicted to decrease. Financial Inclusion will also be correlated with age-specific education level rates and age-specific income quantiles to provide further evidence that there is a potential link between migration and financial inclusion.

## Literature Review

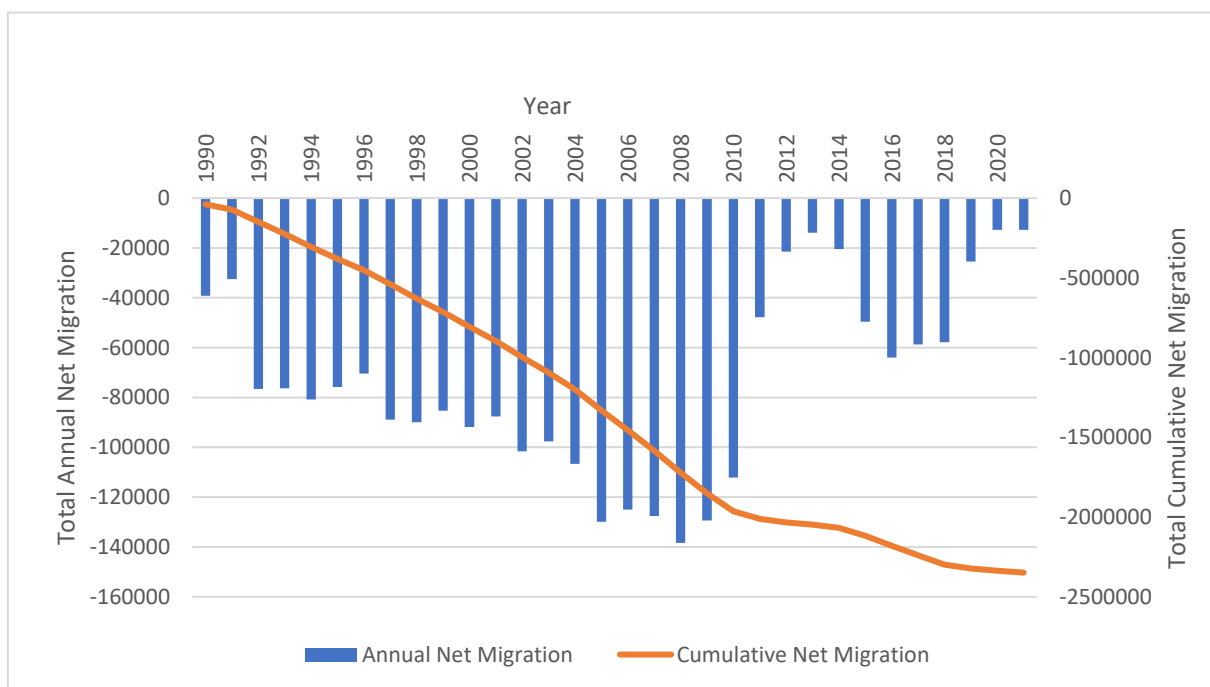
### Migration

Considerable research has been conducted regarding outward migration from Romania, as the problem has raised concern regarding the long-term impact of a depopulation (Otovescu & Otovescu, 2019). Goga & Ilie (2020) discussed the emigration issues associated with high reliance on remittance and the role that Brain Drain plays in the social structure of Romania. Many migrants between 1990 and 2006 moved as low-skilled workers with less education; however, a current problem is that many outbound migrants are high-skilled workers, such as doctors (Otovescu & Otovescu, 2019; Botezat & Moraru, 2020; Gavriloaia, 2020). Botezat & Moraru (2020), using historical data, found that the total number of physicians leaving Romania reached peak between 2007 and 2012 – including 1,160 physicians migrating to France in 2009 alone. This data may not represent the total number of physicians leaving the country; rather, it represents the host countries' records of registered doctor; therefore, the total number of physicians leaving the country is not entirely known (Botezat & Moraru, 2020). Enache & Gonzalez Rabanal (2018) estimate that, as of 2018, there were 15,700 Romanian doctors, 15,000 researchers, and many IT workers living abroad. Of 496 medical professionals who left Romania for opportunities in other European countries, 78.4%

responded that they left due to salary purposes – none of the respondents were satisfied with the salaries in Romania, and equally as problematic is that none of the respondents would go back to Romania (Popescu, Georgina Picu, & Popescu, 2018).

Goga & Ilie (2020) discussed the impact of emigration on Romania - the 16th highest ranking country in terms of diaspora globally. Furthermore, Goga (2017) emphasized the long-term impact of emigration on the GDP, mentioning that it is more than just problematic for the loss of low-skilled workers – as it was until 2007, but now resulting in the loss of many high-skilled workers. Not only is this affecting the income quantiles and the nominal GDP in the short run, but an equally pressing matter is the lower-level health care professionals' availability (Kuhlenkasper & Steinhardt, 2017; Popescu, Georgina Picu, & Popescu, 2018). Kuhlenkasper and Steinhardt (2017) provide more data regarding the movement of high skilled populations from developing to more developed regions. They indicate that many of those who own bank accounts are those who are high-skilled.

Building on the Harris-Todaro model (Harris & Todaro, 1970), Borjas and Bronars (1996) discuss families' decision-making when deciding to migrate. In many cases, the level of skill and availability of work and earning are influential factors when determining whether to leave for other opportunities and whether expectations of the destination were met. This is further corroborated by the study conducted by Gherhes, Dragomir & Cernicova-Buca (2020) which found that that 63.5% of Romanian engineering students would be leaving the country to pursue high-paying opportunities. 9.4% of the respondents stated that they are interested in migrating in order to obtain roles with better working conditions elsewhere. Only 4.6% of the respondents from the Gherhes, Dragomir & Cernicova-Buca (2020) study indicated that they would be leaving because there were not enough opportunities in Romania. Todaro & Smith (2015) indicate that low wages will drive individuals to migrate internationally or to urban areas.



**Fig. 1: Annual and Cumulative Net Migration, Romania, 1990-2021 (Data Source: United Nations Population Projection, 2022)**

Migration remains a strong contributor to the population-related issues in Romania. This is especially true of the populations under 50 years old. As recently as 2017, Romania faced a net migration of -58,865, considering only the emigration and immigration of temporary migrants (United Nations, Department of Economic and Social Affairs, Population Division, 2022). Between 1990 and 2021, Romania has had a net migration total of -2,348,296, observing all types of migration.

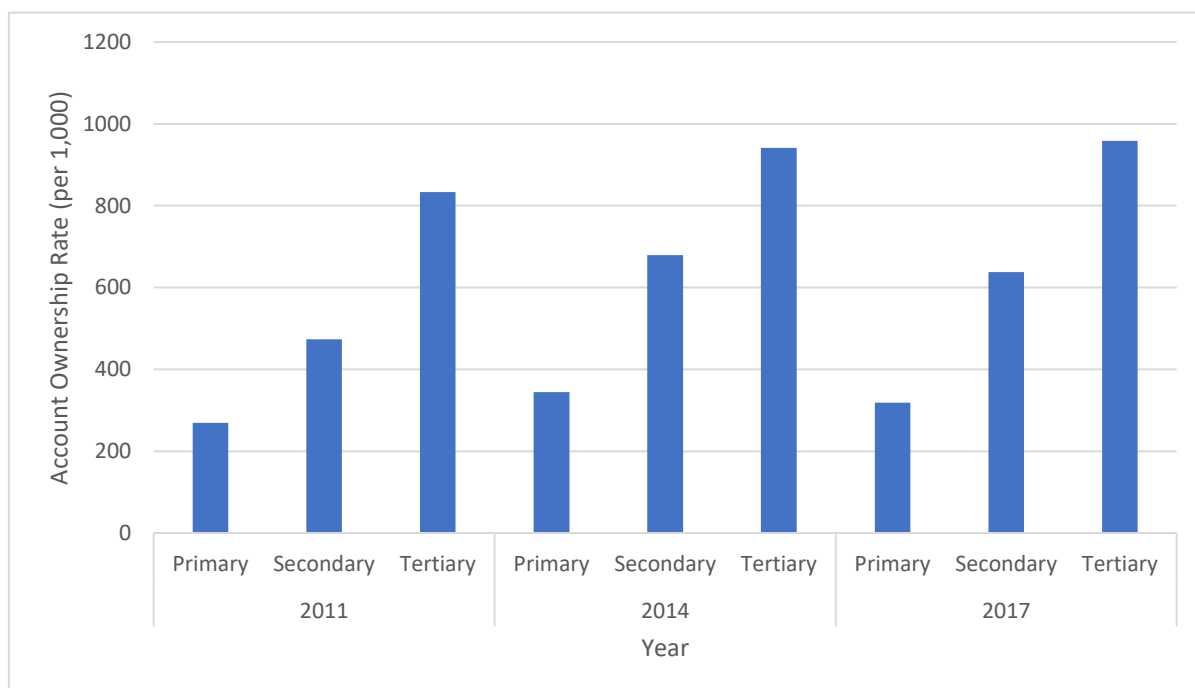
### Financial Inclusion

The World Bank definition of financial inclusion is, "individuals and businesses have access to useful and affordable financial products and services that meet their needs – transactions, payments, savings, credit, and insurance – delivered in a responsible and sustainable way" (World Bank Group, 2021; Chakrabarty, 2011). There is evidence that financial

inclusion and development move closely with each other, and as early as 2011, using the Index of Financial Inclusion introduced by Sarma (2008), Sarma & Pais (2011) found that there is a strong correlation between per capita GDP and financial inclusion. In subsequent studies, it has been further discovered that as countries continue to reduce financial exclusion, females become more included in the financial system, infrastructure and human capital investments tend to increase, and the GDP tends to rise (Demirguc-Kunt & Klapper, 2013; Demirguc-Kunt A., Klapper, Singer, & Oudheusden, 2014; Demirguc-Kunt, 2018).

According to Al-Nimri and Al Nuaimi (2020), financial inclusion determinants for Romania are non-linear based on age and have an inverse relationship - older individuals in Romania tend to be without accounts. Moreover, this research corroborates the

findings from Goga (2017), where individuals with higher levels of education tended to be more included in the financial system in 2014 compared to other years. Individuals with little money in Romania do not feel the need to open accounts (Altarawneh, Al-Nimri, & Al-Nuaimi, 2020). In the same study, it was found that education tends to remain the most significant obstacle for Romanians. Goga's (2017) research explains that the pay associated with high-skilled jobs such as Doctors is far less than other European counterparts and has contributed to brain drain. Similar data was found that 55% of engineering respondents would possibly or likely migrate permanently, and 57.9% of respondents suggested that they would possibly move abroad temporarily for work. The second highest response for reasons to leave Romania, after hard to find a job, was the level of income in Romania (Nae, 2013).

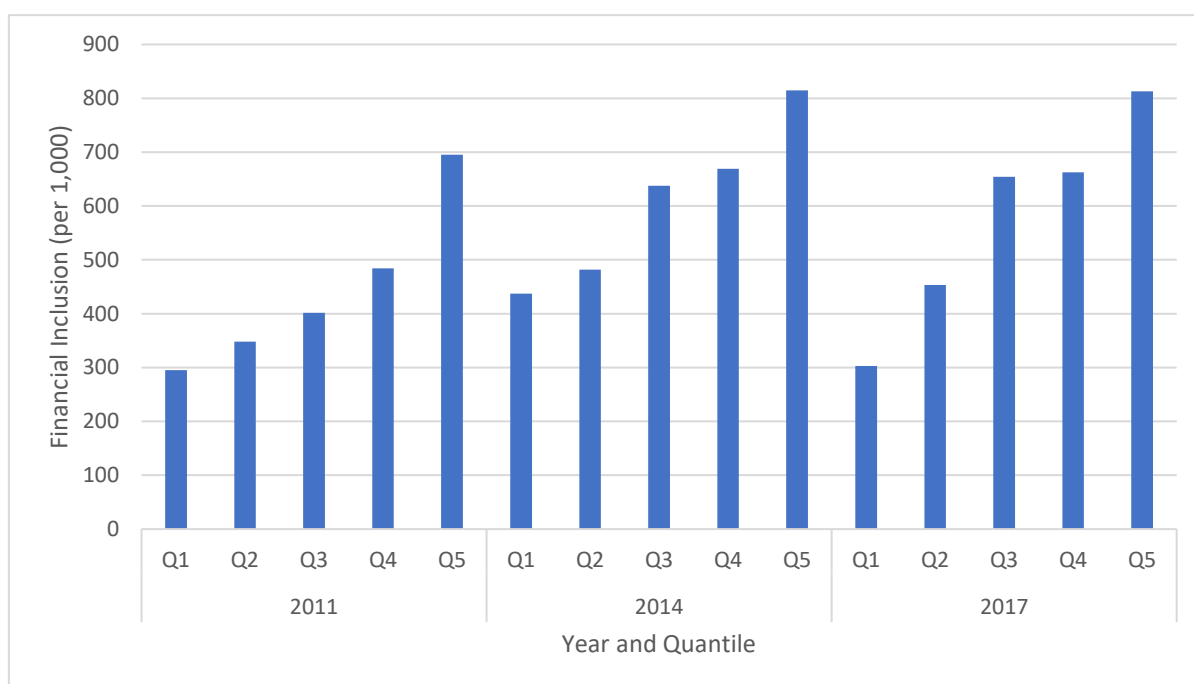


**Fig. 2: Financial Inclusion Rates by Level of Education per 1,000, Romania, 2011-2017 (Data Source: World Bank Findex 2011, 2014, 2017)**

As can be observed in Figure 2, the most significant financially included population are those who are trained to a secondary level. In contrast, as expected, those with the least education are those who are also the least financially included. Moreover, the movement in inclusiveness for these variables appear to be very similar to the overall Financial Inclusion rates. A Pearson r correlation coefficient will be calculated by age group and education level in order to understand the relationship between migration and education-level age-specific financial inclusion in Romania.

Income quantiles indicate 20-percentile units of the population that hold a proportion of the total wealth. This is an indicator of the amount of wealth a

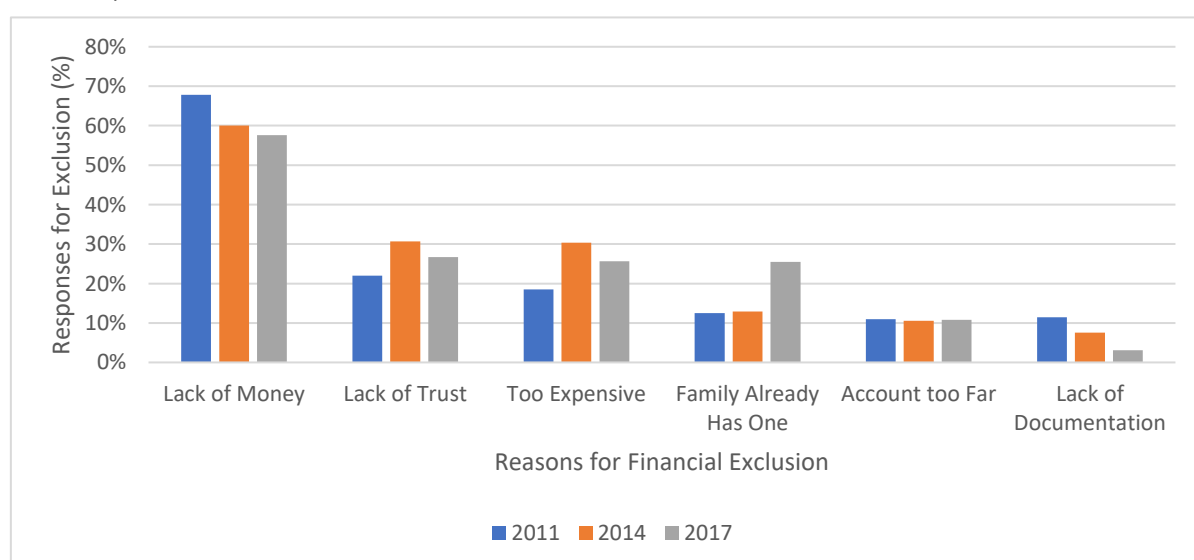
given 20% of the population holds – broken up into the poorest 20%, the second-poorest 20%, the third 20%, the fourth 20%, and the richest 20% - each quantile holds a total percentage of income. A typical method of identifying disparity between the richest and poorest in a country is observing the S80/S20, which works as a ratio between the top quantile and the bottom quantile – identifying how much the wealthiest have per 1 unit of the poorest (Popescu A., 2022). In observing the income quantiles and financial inclusion, the results are quite clear – Figure 3 illustrates that a higher income quantile means a higher probability of financial inclusion. This will be the final factor compared to migration.



**Fig. 3: Financial Inclusion by Income Quantile, Romania, 2011-2017 (Data Source: World Bank Findex, 2011, 2014, 2017)**

A significant finding from the Findex was that in 2017, 23.7% of respondents who did not have an account stated that it was because banks are too expensive. In addition, 25.8% of respondents did not have an account because of a lack of trust in the banks or government (Demirgüç-Kunt, 2018). In 2014, these findings were 9.3% and 31.5% respectively (Demirguc-Kunt A., Klapper, Singer, & Oudheusden, The Global Findex Database 2014:

Measuring Financial Inclusion around the World, 2014), meaning that the cost constraint became larger, but the trust in government became less of an issue. Generally, the largest constraint in each survey year, as seen in Figure 4, is that there was a lack of money to put into accounts – in 2017 58% of respondents indicating this as the case, down 10% from 2011.



**Fig. 4: Reasons for Financial Exclusion, Romania, 2011-2017 (Data Source: World Bank Findex, 2018)**

Romania is on par with the rest of the EU by per capita bank branches and ATMs – 28 branches per 100,000 adults and 68 ATMs per 100,000 adults. This

is slightly above the EU average of 25 and 63, respectively (World Bank, 2020). The disparities between rural and urban Romania, however, are quite

vast - only 14% of the total branch networks are in rural Romania – 8 per 100,000 adults (World Bank, 2020). This disparity might also provide insight into why wealthier and more educated people own bank accounts – there is more wealth in urban centers, where there may be more career opportunities. This can be corroborated through data from Eurostat as GDP by region. Figure 2 illustrates the disparity

between Bucharest and the rest of the regions in Romania in GDP. Additionally, Figure 3 provides context for total deposits by county. Not only by GDP, but also by total personal deposits, Bucharest is the highest earning region in Romania. Beyond the GDP and the deposits, Bucharest also had the highest personal deposits per capita in all of Romania in 2017, as seen in Figure 4.

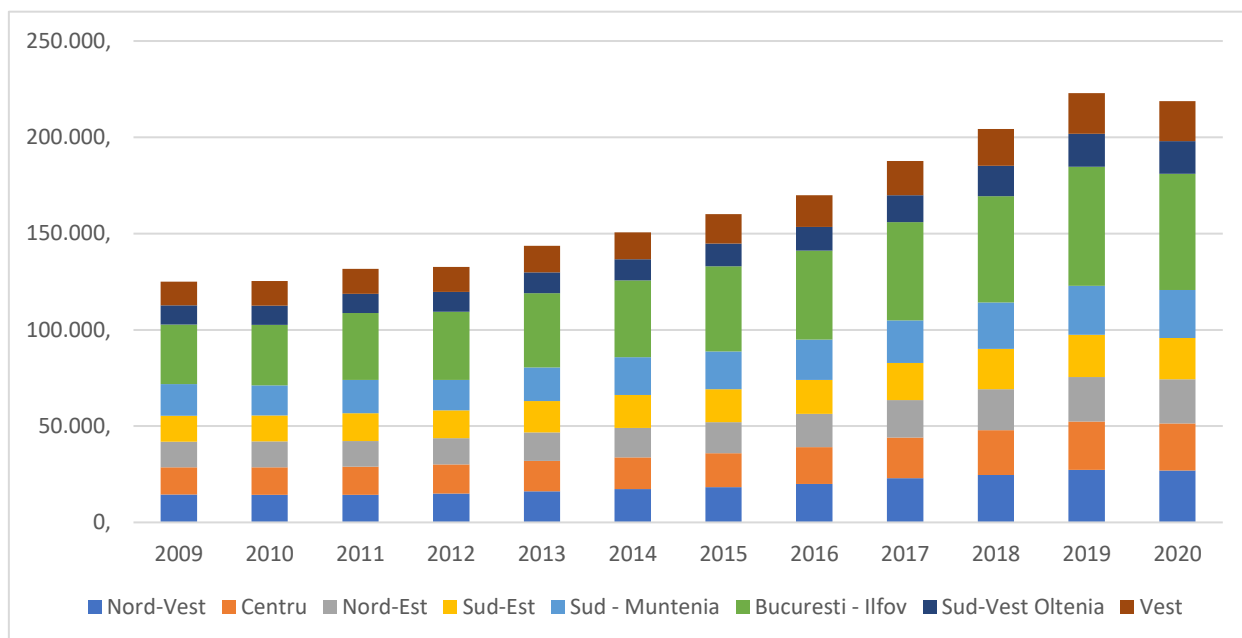


Fig. 5: GDP by Region, Romania, 2009-2020 (Data Source: Eurostat, 2023)

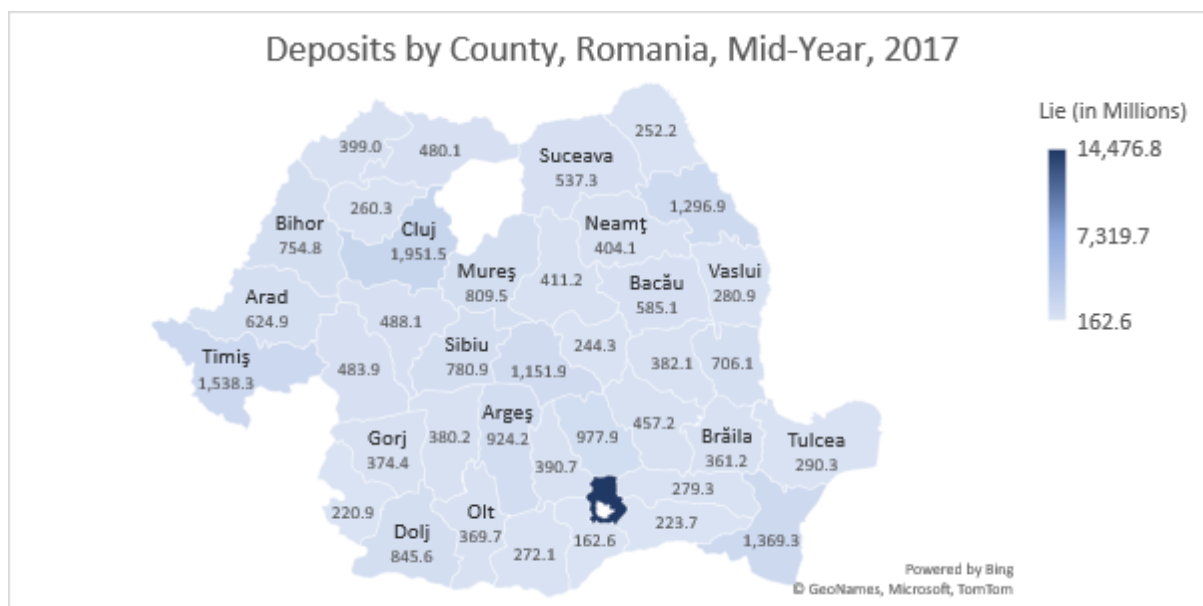
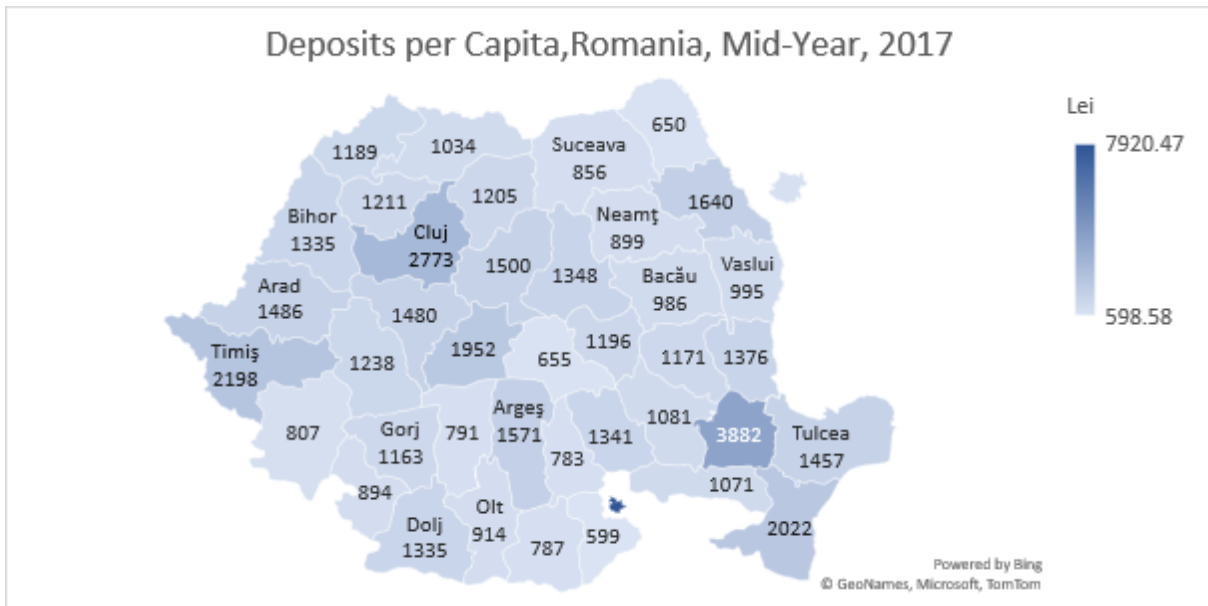


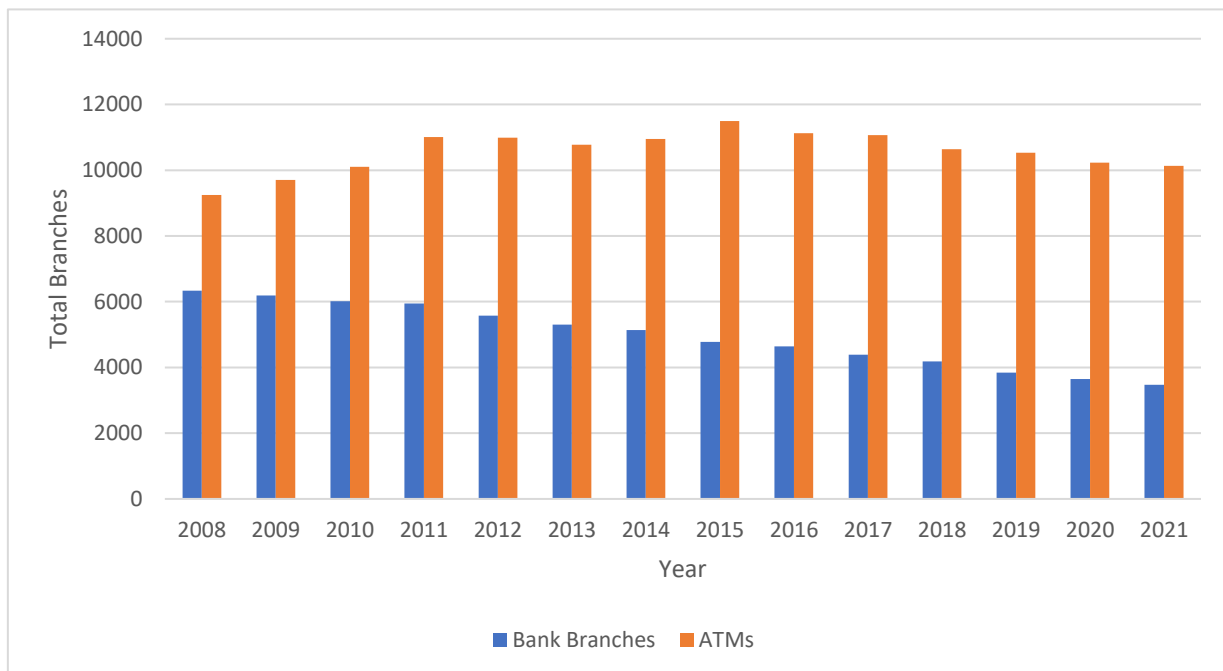
Fig. 6: Deposits in Personal Bank Accounts by County, Romania, 2017 (Data Source: National Bank of Romania, 2023)



**Fig. 7: Deposits per Capita by County, Romania, Mid-Year 2017 (Data Sources: National Bank of Romania, 2023; National Institute of Statistics - Romania, 2022)**

According to the Bank Deposit Guarantee Fund (FGDB) in Romania, in 2017, there were 10,322,388 individual depositors. In the same year, a single depositor had deposited to 1.4 of the Romania FGDB member banks, on average (Bank Deposit Gurantee Fund, 2017). This, in effect, means that the actual number of individuals who held bank accounts could be as low as 7,142,857 individual dispositors. Of the population over the age of 14 on December 31, 2017

– 16,612,165 – the percentage of adults with bank accounts was a mere 43%. This contrasts with the Findex, which, in 2017, illustrates a different 58% (Bank Deposit Gurantee Fund, 2017). In 2019, the total number of bank branches had declined to 3,844 total branches – from 6,338 in 2008. Figure 5 demonstrates the decrease of bank branches, and the relative increase in ATMs in Romania.



**Fig. 8: Commercial Bank and ATM Branches, Romania, 2008-2021 (Data Source: IMF Access to Financial Data, 2023)**

The GDP in Romania continues to increase, as with the level of deposits According to Amari, Anis, et al. (2021), evidence from the case of Tunisia points to an issue of exclusion resulting from distance from bank branches. However, contra to the issues discussed, in 2017 only 12.2% of respondents in Romania stated that the reason for financial exclusion was due to a branch being too far away (Demirgüç-Kunt, 2018). Financial education may play a role in the exclusion of individuals from financial products – as described by Drugă (2021), there was restraint and hesitancy for individuals to use financial products, as respondents felt that they lacked the in-depth knowledge to make accurate decisions (Drugă, 2021). Though proximity itself may not play a large role, the subsequent access to financial education could play a role. Moreover, as per Figure 8, there are fewer bank branches in each subsequent year since 2008, likely being replaced with ATMs.

There has been ample research to suggest that the current trends in financial inclusion in Romania remain stagnant, while in other parts of Europe these rates continue to increase. Moreover, there is research that indicates that there is a trend between increased income and urban living. Income tends to be an indicator of financial inclusivity, as does urban migration. These factors generally align with the data found in other places; however, Romania has had a somewhat stagnated urbanization rate. Research and discussion into the relationship between net migration and financial inclusion appears to be warranted based on these factors.

### Remittances

Remittances received continue to have a large impact on the Romanian economy, rising from 0.93% of the total GDP of Romania in 2007 upon accession to the EU, up to 3.22% in 2021 (Kersan-Skabic & Tijanic, 2022). In absolute dollars, in 2006 total received remittances were \$1.16 billion USD, which grew to \$9.16 billion USD in 2021. Notably, between 2009 and 2012, remittances received as part of the GDP was less than that of the European Union. In contrast, the EU average for received remittances in 2021 was 0.78. Moreover, the level of remittances paid from the EU and Romania are inverse to that of remittances received. Romania's outbound remittance level was only 0.22% of the GDP of the country, whereas, the European Union had an outward remittance level of 0.71% of the GDP.

Compared to neighboring countries, the level of remittances to Romania is relatively low. In comparison to the 3.8B Euro that was remitted back to Romania from other EU countries – accounting for approximately 2% of the total GDP in 2017 (OECD, 2019). For example, remittances to Moldova

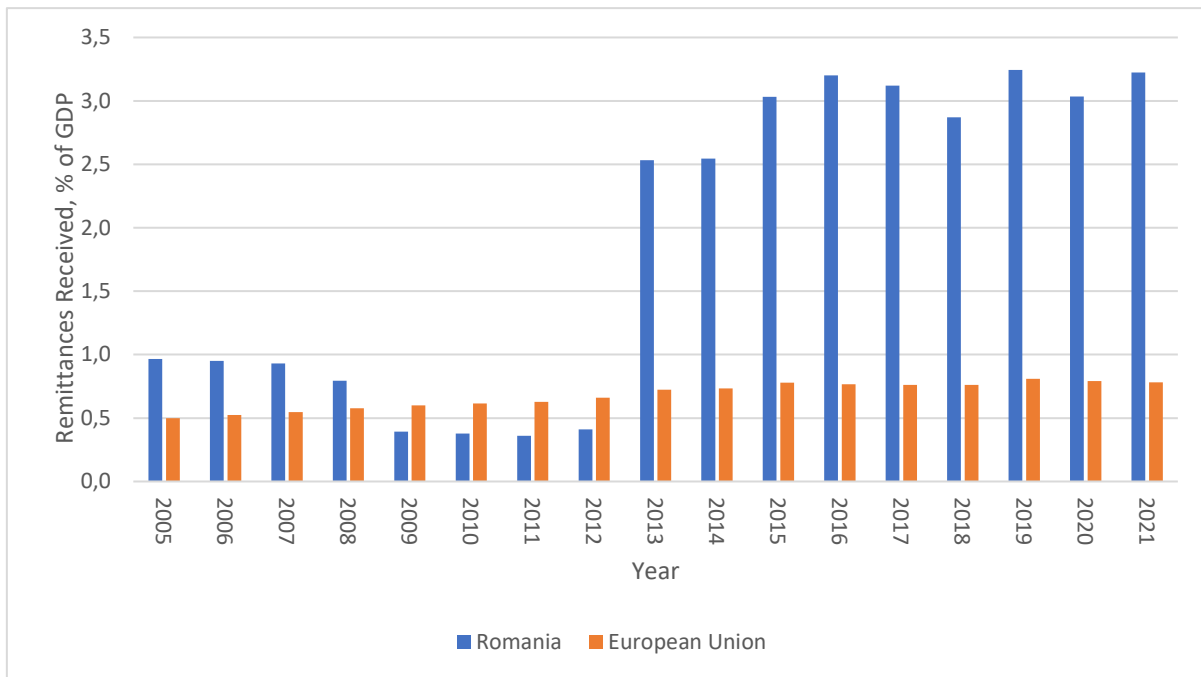
represent up to 20% of the GDP, 14% of the Ukrainian GDP, 9% in Serbia, 3.5% in Bulgaria, and 3% in Hungary. There is evidence that suggests that this lower level of remittance from Romanians back home is due to the level of pay – in countries with higher levels of pay, there tends to be a higher level of remittance; whereas, from many European countries, levels of remittances are lower due to lower earned wages of the diaspora population (OECD, 2019).

Presumably, the lower remittances in the years 2008-2012 was due to the global financial crisis of 2008 (Roig & Recano, 2012). Prior to 2007, Morocco represented the highest number of foreign-born persons in Spain; however, in 2007, upon Romania's accession to the EU, Morocco moved to second behind Romania. In 2013, the remittances received in Romania rebounded quickly, and bounced to pre-crisis levels – up to 3.24% of the total Romanian GDP in 2019. Even during the COVID-19 Pandemic, in 2020 and 2021, remittances remained an important part of the Romanian economy. Figure 9 demonstrates the difference in remittances received as part of the GDP between 2005 and 2021 in Romania and the European Union. After the rebound of the financial crisis of 2008-2012, remittances to Romania jumped significantly, and remained high throughout the COVID-19 pandemic.

Roman (2013) provided insight as to determinants of remittance from Spain back to countries in Central and Eastern European Countries, with Romania in consideration. The level of education was a determinant of the level of remittance back to home countries – the higher the education, the greater the remittance paid. This could possibly be due to the income earned in the country of immigration. In contrast, the greater investment in the host country of immigrants was a predictor of lower remittances. In effect, if migrants had a greater number of investments in the new place, less would be sent back to the home country (Roman, 2013). Demographic factors, such as age, gender, or education are not determinants of remittance; however, education is a predictor of the amount of remittance.

Home ownership in the migrant's home country is a strong predictor of remittance behavior, as it was found that the money is remitted frequently to improve or build a new dwelling (Roman, 2013). This factor both influences the probability of remittance, and the level of remittance (Roman, 2013). Though Romanians are more prone to remit to their origin country, it does not represent a higher probability of remittance if one is Romanian. Finally, it was found that migrants who have relatives in their origin countries are more likely to remit back to their home country (Roman, 2013).





**Fig. 9: Remittances Received, % of GDP, Romania and EU, 2005-2021 (Data Source, Eurostat, 2022)**

Remittances received in Romania have become heightened since the accession to the European Union, and despite a drastic drop between 2009 and 2012 relative to the European Union, as a percent of the GDP derived from remittances received, the overall level of remittances has increased 400% since pre-financial crisis levels (Eurostat, 2022). Key reasons for these remittances appear to be family and ties to Romania (Roman, 2013). Goga (2020) suggests that as families grow away from their origin countries, the probability of sending remittances back home become lower. Education, age, and gender are not determinants of remittance; rather, they are indicators how levels of remittance. Determinants of remittance tend to be the types of relationships migrants have to their origin countries. Indeed, migrants with family members and permanent dwellings in Romania will continually send money back (Roman, 2013).

## Methodology

### Financial Inclusion Data

The data used in this research is taken from the World Bank Findex surveys from 2011, 2014, and 2017. The Findex is a triennial cross-sectional questionnaire that polls 1,000 samples from over 140 countries globally. The sampling is stratified by population size, geography, or both (World Bank Group, 2015). Weighting ensures that the data does not over-represent geographic regions, socio-economic groups, age, or individuals in various household sizes. Gallop Inc. has administered the

Findex. The polling has been sponsored by the Development Research Group - Finance and Private Sector Development Unit of the World Bank, and the Bill and Melinda Gates Foundation provided financial support. There appears to be no conflict of interest in the funding or execution of the questionnaire. Questionnaires were administered in two main forms – face-to-face in 2011 and Computer Assisted Personal Interviews in 2014 and 2017. In all years, interviews were administered in both Romanian and Hungarian languages. All questionnaires were conducted during mid-year. The 2011 Findex questionnaire was administered from April 14, 2011, to May 12, 2011 (Demirguc-Kunt & Klapper, 2012). The 2014 Findex questionnaire was conducted from July 1, 2014, to August 12, 2014 (Demirguc-Kunt A. , Klapper, Singer, & Oudheusden, 2014). Finally, the 2017 Findex questionnaire was administered in Romania from April 12, 2017, to June 15, 2017 (Demirguc-Kunt, 2018).

The specific Findex vectors that will be utilized are the ages - separated into age groups associated with the groups determined by the NIS, Financial Account Ownership, Income Quantile, and Level of Education. These data will act as variables to correlate against corresponding migration and urbanization data from the National Institute for Statistics – Romania. The data samples from the Findex are microdata – individual responses from the country.

### Financial Inclusion Data Limitations

The most prominent limitation of the Findex is the frequency at which it is conducted. Trends are harder

to identify when the number of data points are limited to triennial reporting. Moreover, the Findex is a cross-sectional survey - it does not track the same 1,000 participants each of the survey years. The weights are designed to provide a more vital comparison level. A broader range of factors can be included and adjusted for each survey depending on the country-level demographic and socio-demographic trends.

### Migration Data

The National Institute of Statistics – Romania (NIS) draws country-specific data concerning migration and urbanization. The migration data is categorized into two main fields: temporary and permanent immigration and emigration. Temporary migration is considered when an individual is gone for at least 12 months – having left the country, but they have not de-registered from their home in Romania. In contrast, residence changes are associated with the permanent migration – those who may have registered elsewhere as residents and may let the government in Romania know they are not planning to return. These data – temporary and permanent migration, combined, provide total migration for a given year. This data tracks regionalities, development regions, and country-level migration; thus, this same data will be used to determine the total migration rates throughout the years.

Migration rates are tracked each year – both fields of migration differ in the mode in which they are tracked or estimated. Permanent changes are tracked by those individuals who change their legal residence to one abroad. In contrast, those listed as temporary are estimates based on correlating data sources. The NIS pulls data from the statistical offices of Italy and Spain, "mirror statistics" on international migration, and administrative data (National Institute for Statistics - Romania, 2022; National Institute for Statistics - Romania, 2022).

### Migration Data Limitations

Though there are many benefits to using national data, it is not without its issues. The age categories and sex data differ between the two fields of migration data. This means that the study will not be able to include a gender-based discussion in the context of net migration rates and financial inclusion; however, permanent migration will be able to be discussed within the context of financial inclusion. Additionally, due to further constraints presented by temporary migration data tracking, specific ages are unavailable; therefore, only age groups can be used to determine relational aspects between FI and Migration rates. These age groups will be used to identify the most related groups between account ownership and migration patterns.

### Data Analysis Methodology

In order to determine the relationship between migration and financial inclusion, correlation testing using Pearson's r will be based on data intervals. Spearman's coefficient was considered; however, the scales are not ordinal. Due to the limited number of survey years, it is challenging to distinguish between a statistical anomaly and a normal data point (Mukaka, 2012). Correlative tests will be administered to several groups of data to help identify a relationship between financial account ownership and migration & education levels.

### Age-Group Specific Net Migration Rates

Due to limitations associated with data availability – especially in terms of the specificity related to the temporary migration rates- the National Institute for Statistics and Eurostat uses 5-year age groups. Moreover, the Findex data is only available every three years; for this reason, the migration data will be assessed based on a five-year average across each of the age groups. The population data will be used similarly, with corresponding age groups. To illustrate, the following data preparation will be completed for each age group in Romania.

#### Equation 1 Net Migration Rate

$$nm_{(x,t)} = \frac{(i_{(x,t-2)} + i_{(x,t-1)} + \dots + i_{(x,t+2)}) - (e_{(x,t-2)} + e_{(x,t-1)} + \dots + e_{(x,t+2)})}{p_{(x,t-2)} + p_{(x,t-1)} + \dots + p_{(x,t+2)}}$$

Where:

- nm is Age (group) Specific Net Migration
- x represents the age group
- t represents the year calculated
- i is the age-specific immigration
- e is the age-specific emigration.

In the case of Romania, in the year 2011, for the age group 20-24, the syntax would be as follows:

*Equation 1 Net Migration Rate, Age Group 20-24, Year 2011*

$$nm_{(20-24,2011)} = \frac{(i_{(20-24,2009)} + i_{(20-24,2010)} + \dots + i_{(20-24,2013)}) - (e_{(20-24,2009)} + e_{(20-24,2010)} + \dots + e_{(20-24,2013)})}{p_{(20-24,2009)} + p_{(20-24,2010)} + \dots + p_{(20-24,2013)}} \times 1000$$

$$nm_{(20-24,2011)} = \frac{834 + 615 + 2388 + 3592 + 3755 - 780 + 656 + 2021 + 2152 + 2245}{1397944 + 1386794 + 1371513 + 1350389 + 1273671} \times 1000$$

$$nm_{(20-24,2011)} = \frac{2236.8 - 1570.8}{1,356,062.2} \times 1000$$

$$nm_{(20-24,2011)} = 0.49$$

Thus, the net migration for individuals between the ages of 20 and 24 in the year 2011, utilizing a 5-year average net migration calculation, indicates that there is nearly one person immigrating to Romania for every two-thousand people in that population category over the same period. Due to data limitations, these figures are those of permanent residential changes – individuals legally registered elsewhere as residents. This calculation will be used for each age group from 15 and above. The overall value in this is derived from smoothing the migration trend over two years preceding and two years after the Findex years.

The data presented by the NIS is that of years reached in the data year; thus, the individual's age is taken in the year. For example, as per the methodology presented by Caselli & Vallin (2006), a person who reached 24 years and 11 months by mid-year (July 1) would be considered 24 years (E Type 1). This method is usually used for longitudinal analyses; thus, it aligns with the purpose of a population-wide study over a long-term period (Caselli & Vallin, 2006).

**Financial Inclusion Rates**

Each survey year provides insight into global financial inclusion rates through microdata and macrodata. Macrodata is such that it provides a country-level rate amongst the variables – it is not dynamic and is limited in the scope of the possible uses; however, it is an adequate method of quickly observing the elemental trends. For this research, Findex Microdata will be the primary database. The microdata is the individual responses from each of the country-level sample units. In each of the years, the total number of respondents is weighted to be 1,000 total; thus, the survey represents 1,000 respondents even though, for instance, only 998 sample units successfully completed the survey within Romania in 2011. The rate of inclusion and exclusion based on account ownership will be the variables analyzed – including account ownership rates with respect to income quantile and education. These rates will be

used to cross-examine, by way of correlative testing and regression analysis, the relationship, if any, between migration and the Findex rates.

The calculation of the inclusion rate will be as follows:

*Equation 3 Financial Inclusion Rate*

$$FR_t^x = \frac{\sum_x^t w_i}{\sum_x^t w}$$

Where:

FR is the Financial Inclusion Rate

x is the age group

t is the year observed

w<sub>i</sub> is the weight of the respondents with accounts

w is the weight of all respondents in the corresponding cohort

As an example, using the Romanian (ROU) data from the Findex to determine the financial inclusion rate of individuals in 2011 between the ages of 20-24, the following formula would be used:

*Equation 4 Financial Inclusion Rate, Age Group 20-24, Year 2011*

$$FR_{2011}^{20-24} = \frac{53.83}{95.29}$$

$$FR_{2011}^{20-24} = 0.56$$

Therefore, based on the example of 20-24 during the 2011 survey year, the weighted total Financial Inclusion rate is 0.56 (56%). By tracking this from survey year to survey year, the rate changes can be postulated to represent the changing financial inclusion rates of the population in the age group listed in the equation. Education and income quantiles will be calculated using the same method.

**Correlation Testing**

This study aims to identify if there is a relationship between two variables on a non-ordinal scale. For this reason, Pearson's r coefficient will be utilized. The data that will be examined will be Age-Specific Net

Migration Rates from Romania against various Age-Specific Financial Inclusion Rates. Pearson's r coefficient will be calculated as such:

Equation 5 Pearson R Correlation Coefficient

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n \sum x^2 - (\sum x)^2][n \sum y^2 - (\sum y)^2]}}$$

As there is no distinction between dependent and independent variables in the case of Pearson's coefficient, Age-Specific Net Migration Rates will serve as the x, and the Age-Specific financial inclusion Rates will serve as the y variables. These variables will remain the same for regression analyses. The same method will be utilized in order to identify a relationship between net migration and age-specific quantile-specific financial inclusion rates.

## Results and Discussion

Initial findings were quite interesting and aligned well with the expected results based on previous literature regarding the changes in migration due to brain drain. Individuals of University age – 20-24 had increased age-specific net migration, while the age-specific migration of those 25-29, 35-39, 40-44, and 45-49 all consistently saw net negatives in 2014 and more drastically in 2017, based on the 5-year net migration averages. What is notable about this data is the strength of the correlation between age-specific net migration rates and age-specific financial inclusion rates.

### Correlative Tests

Correlative testing was utilized to determine whether there may be a relationship between the sets of tested variables – migration and financial inclusion rates. In these tests, there were several considerably significant findings. The Pearson r method was utilized, as it is non-ordinal data. The null hypothesis was that the two variables were independent of each other and there would be no correlation. The correlations were negatively significant in the age groups 25-29, 35-39, 40-44, and 45-49.

Figure 10 highlights the Pearson R coefficients of several age groups with strong correlative associations, including groups 25-29, 35-39, 40-44, 45-49, 55-59, and 65-69. The latter two are positive correlations and may be explained as an inverse relationship to those with strong negative correlations. These strong negative correlations indicate an association between the Age-Group Specific Net Migration Rate and the Age-Group-Specific Financial inclusion Rate, where there is increased outbound migration, as Goga (2020) discussed. Many are educated as observed in the testing between. Moreover, an increased net

migration inflow for the ages 55-59 and 65-69 illustrates a possible relationship between the two variables. A possible reason for this is that individuals in this age group return from abroad at pensioner age; thus, it would explain the increase in both variables (Snel, Faber, & Engbersen, 2015). In line with the research completed regarding the ages of individuals leaving the country and why, Goga's (2017) explanation touches on those who have finished university, which can explain why those are 20-24 such a low correlation between inclusion and migration. Though there appears to be some change to account ownership, it is not significant enough to be considered associated.

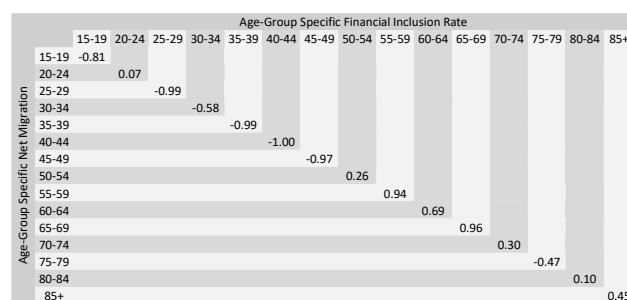


Fig. 10: Correlation by Age Group, Net Migration Rates, and Financial Inclusion Rates, 2011-2017

An interesting finding that is somewhat addressed by the flow of labor from developing countries to many developed countries is the strong negative correlation between net migration rates and the age-specific rates of financial account ownership for the age groups 40-44 and 45-49. For the age group 30-34, the correlation between net migration and financial inclusion rates for those who have secondary school only, and those with tertiary or more education, is -0.78 and -0.92, respectively – both of significant importance.

Table 1: Pearson's r Coefficients, Net Migration and Financial Inclusion by Education Level Attainment, Romania, 2011-2017 (Data Sources: Own Calculations, based on data from NIS, 2022, World Bank Findex, 2022)

Pearson r Coefficient, Age-Specific Net Migration and Age-Specific Financial Inclusion by Income Quantile, Romania, 2011-2017				
Age Group	Age-Specific FI	Primary	Secondary	Tertiary
15-19	-0.81	-0.12	-0.74	-0.95
20-24	0.07	0.80	-0.37	-0.11
25-29	-0.99	0.89	-0.99	-0.99
30-34	-0.58	0.73	-0.24	0.02
35-39	-0.99	-0.23	-1.00	0.84

40-44	-1.00	0.99	-0.98	0.00
45-49	-0.97	-0.89	-0.67	0.57
50-54	0.26	0.16	0.21	-0.77
55-59	0.94	0.58	-0.24	0.98
60-64	0.69	-1.00	0.84	0.90
65-69	0.96	0.93	0.96	0.98
70-74	0.30	-0.08	0.93	0.92
75-79	-0.47	-1.00	-0.60	-0.62
80-84	0.10	-0.52	-0.98	-0.38
85+	0.45	-0.93	0.55	0.99

25-29	-0.99	0.06	0.72	-0.87	-0.85	0.21
30-34	-0.58	0.19	-0.84	-0.27	-0.60	-0.71
35-39	-0.99	0.21	-0.30	-0.70	-0.87	-0.86
40-44	-1.00	-1.00	-0.87	-0.68	-0.88	0.74
45-49	-0.97	0.56	-0.86	-0.95	-0.13	-0.83
50-54	0.26	0.98	-0.17	-1.00	0.65	0.20
55-59	0.94	-0.55	0.33	0.86	0.64	0.35
60-64	0.69	-0.76	0.98	0.64	0.91	0.65
65-69	0.96	-0.54	0.90	0.91	0.32	0.99
70-74	0.30	-0.66	-0.05	0.60	0.98	0.73
75-79	-0.47	0.32	-0.99	-1.00	-0.06	-0.02
80-84	0.10	-0.99	-0.39	-0.58	-0.48	-0.88
85+	0.45	-0.91	-0.94	-0.94	-0.74	-0.81

Table 1 provides the outputs for Pearson’s r correlative coefficients using the variables of age-specific net migration rates and age-specific financial inclusion rates based on the highest level of educational attainment. What is interesting about these figures is how closely related the primary and secondary education attainment data are to the migration and financial inclusion rates of the entire age group. There are several age groups that offset one group with another by relationship with migration. For example, the age groups 25-29, 35-39, 40-44, and 45-49 show considerably coefficients, and they are all represented quite well by way of secondary school education. There appears to be a very strong relationship between these variables.

Results from correlative testing between age-specific net migration and financial inclusion by income quantiles provide insight into possible links between socioeconomic groups and the way in which migration may affect their levels of financial inclusion. Key age groups are those 25-29, 35-39, 40-44, and 45-49. In all these circumstances, the highest negative correlations appear in the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> income quantiles. Notable findings are those in the categories 25-29, 30-34, and 45-49, which emphasize the inverse relationship between income-quantile distribution, financial inclusion, and migration. In plain terms, net migration has the strongest relationships with the middle-income quantiles.

**Table 2: Pearson's r Coefficient, Age-Specific Net Migration and Age-Specific Financial Inclusion Rate by Income Quantile, Romania, 2011-2017 (Data Sources: NIS, 2022, World Bank Findex, 2022)**

Pearson r Coefficient, Age-Specific Net Migration and Financial Inclusion by Income Quantile, Romania, 2011-2017						
	Age-Specific FI	Q1	Q2	Q3	Q4	Q5
15-19	-0.81	-0.43	-0.24	-0.99	-0.67	-0.99
20-24	0.07	0.03	1.00	-0.81	-0.96	-0.39

### Regression Analyses

In response to correlative testing and the indications that migration is the cause of changes in financial inclusion by way of brain drain and exit of employable persons, linear regression analyses have been conducted. In the analysis, p-Values, Significances, and multiple r regression have been observed with similar results to correlative tests. Only two variables have been tested by way of linear regression, as the number of variable points is limited.

#### Results: Regression Analyses: Migration (x) and Financial Inclusion (y)

When observing the linear regression analysis outputs, certain age groups had greater statistical significance than others. It was discovered that when observing key age groups associated with the correlative tests conducted, the Anova p-values were statistically significant for those same age groups with strong negative correlations. Age groups 25-29, 35-39, 40-44, and 45-49 all show a significance of less than 0.01 (1%); thus, their probability of occurring under normal circumstances is below 1% - a highly significant finding.

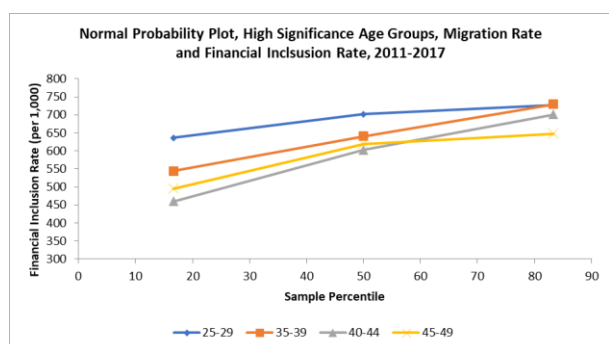
**Table 3: Regression Analysis Outputs by age groups, 2011-2017, Net Migration (x) and Financial Inclusion (y) (Data Source: Own Calculations)**

Linear Regression Analysis, Age-Specific Net Migration (x), and Age-Specific Financial Inclusion Rates (y)			
Age Group	Pearson R	Multiple R	p-Value
15-19	-0.81	0.81	0.563
20-24	0.07	0.07	0.113
25-29	-0.99	0.99	0.008*

30-34	-0.58	0.58	0.157
35-39	-0.99	0.99	0.008*
40-44	-1.0	1.0	0.0004*
45-49	-0.97	0.97	0.030**
50-54	0.26	0.26	0.314
55-59	0.94	0.94	0.129
60-64	0.69	0.69	0.253
65-69	0.96	0.96	0.257
70-74	0.30	0.30	0.179
75-79	-0.47	0.47	0.022
80-84	0.10	0.10	0.242
85+	0.45	0.45	0.235

\* Significance level of <0.01 \*\* significance level of <0.05

The outlier regarding p-values happens to be the age group of 75-79 – an age group with an insignificant correlation between migration and financial inclusion. However, the association is considered statistically significant because it would be outside the null hypothesis that there would be no relationship between the two variables. The age groups of 25-29, 35-39, and 40-44 had a significance level of <0.01 – which provides evidence for and corroborates the hypothesis that migration impacts financial inclusion. The age group, 45-49, shows a significance level of <0.05 (0.030) with a Multiple R of -0.97. Migration and the subsequent change in financial inclusion rates are observed to have a strong relationship.



**Fig. 11: Normal Probability Plot, High Significance Age Groups, Migration Rate, and Financial Inclusion Rates, 2011-2017 (Data Source: Own Calculation)**

Figure 11 illustrates the closeness of data for age groups based on Net Migration Rates (per 1,000) (x variable) and the Financial Inclusion Rate (per 1,000) (y variables). In years with positive net migration, the rate per 1,000 of Romanians have financial accounts, while in years with lower net migration, there are, per

1,000, fewer who own accounts at formal financial institutions.

## Discussion

Some of the most interesting findings occurred in several age categories - 25-29, 35-39, 40-44, and 45-49- these age groups were found to have significant inverse relationships between net migration and financial inclusion. There were some other significant observations to consider – those who were 60-64 and 65-69 had positive correlations between migration and financial inclusion, meaning that this group had increased positive net migration and financial inclusion rates. This may be due to individuals returning at retirement age and utilizing financial accounts. As Roman (2013) discussed, individuals with ties back home are more likely to remit money and potentially return home. What is interesting about the over-55 population was the strong positive correlation between inward migration and greater financial inclusion – notably, the 55-74 age groups had an  $r > 0.89$ .

The evidence presented in this research points to a significant relationship between net migration rates and financial inclusion rates. This has been postulated to be because those in the select age groups seek work and higher pay. The otherwise unbanked in the country remain, causing a spike in the exclusion rates within their respective age categories. This may be corroborated in the level of inverse correlation discovered for individuals in the 2nd, 3rd, and 4th income quantiles and those with secondary school education. Further research is necessary to determine the true impact of county-specific exclusion rates and internal migration rates' impact on financial inclusion. Understanding county-level financial literacy and specific financial inclusion rates may provide more insight into the true impact of financial literacy.

What can be gathered from this data is that individuals at the beginning and middle of their careers are leaving Romania behind, resulting in lower financial inclusion rates within the formal banking system. This may have detrimental long-term effects so long as those who migrate remain outside Romania into their pensioning years. Fewer accounts may ultimately result in more individuals who will be paid in cash, contribute less to social welfare systems, and be less likely to receive electronic transfers from the government. Moreover, the results can be even more impactful to human capital investments, with fewer taxes paid and fewer skilled individuals available per individual.

It is not all bad, however, as there is evidence to suggest, based on this research, that migration also affects the remittance rates in Romania. The level of remittances as a proportion of GDP has continued to rise despite the stagnation of financial inclusion rates.

This has been especially evident in the main region of Bucharest; however, it has also been found in other smaller counties. The year-over-year increase has contributed to the economy – albeit at a lower rate than neighboring countries. Remittances are predicted to continue to play a role in the development of the Romanian economy in the future; however, as Roman (2013) points out, there is a chance that individuals may remit less when there are fewer ties home. With the quickly aging population of Romania on its current trajectory, there is a question of how long these remittances will last.

When considering the impact of depopulation, a perpetual outward migration will have a double-edged negative effect on the country – lower investments and fewer individuals contributing into the economy. Greater long-term diaspora will also result in a perpetual, and potentially accelerated depopulation from a combination of lower birth rates within the country, a rapidly aging population, and a greater number of job seekers leaving for better opportunities elsewhere with family. Romania continues to develop at a rapid rate, and the economy certainly does continue to grow. The future of financial utilization in Romania remains to be seen – the lower number of formal bank branches, mixed with an increased number of ATMs indicates that there may be a requirement for more third-party financial education to the under-banked.

## Conclusion

Migration and depopulation have been significant issues in Romania since the fall of Communism and have been especially problematic since Romania acceded to the European Union in 2007. Since 1991, it is estimated that over 3.5 million Romanians have left the country, and the population has dropped significantly due to a mix of outward migration, low fertility rates, and low immigration rates. The first Findex publication in 2011 illustrated Romania as a country with low financial inclusion rates – some of the lowest in Europe and Central Asia. In the years since 2011, rates increased to 63% in 2014, and dropped again in 2017 to 58%.

Romania's poorest population is the most underbanked in many situations but is not the cause of declining rates of inclusion; rather, these poorest individuals tend to be more well banked year-over-year. Based on data gathered from the research conducted by Goga (2017; 2022), the hypothesis was presented that changing financial inclusion rates were driven by outward migration. Individuals leaving the country are doing so in order to find a better life by way of finding gainable employment or greater pay. After accession to the EU in 2007, migration has become more rapid. The slowdown between 2008

and 2012 during the global financial crisis was quickly overshadowed by rapid net negative migration.

It was discovered that in the age groups 25-29, 35-39, 40-44, and 45-49, there were quite strong correlations: -0.987, -0.995, -1.0, and -0.972, respectively. Moreover, the significance level was <0.01 for all these age categories using linear regression. This discovery corroborates the assertion that outward migration impacts Romania's financial institution utilization. What was interesting about migration and financial inclusion were the income quantiles and education levels of those who saw much of the change in relation to the migration rates. In particular, the aforementioned age groups were of great interest, but it was predominantly those in the 3rd and 4th income quantiles who were most inversely correlated between FI and net migration.

It is not all bad, however, as some indicators of increased migration and account ownership were linked in a few age groups, predominantly in those preparing for retirement. Age groups of 55-59, 60-64, and 65-69 saw correlations of 0.936, 0.694, and 0.959, respectively. This indicates increased net migration toward Romania, with increased financial inclusion rates in these age groups. However, the significance level is not as high as those in the younger age groups. These outputs allow this research to postulate a strong relationship between migration and financial inclusion for select age groups. Moreover, remittances continue to play a strong role in the development of Romania's economy and will likely continue to do so in the future as the Romanian diaspora continues to grow.

Financial inclusion, much like migration, is a challenging subject to discuss in general terms. Just as there are many reasons for people to leave a country, there are many reasons for individuals to remain unbanked. In Romania, those leaving the country appear to be leaving behind those who have traditionally remained excluded from the system, voluntarily or involuntarily. Further research must be conducted to determine the specific regions of importance in terms of financial inclusion rates and investigate how internal migration and mortality rates have affected financial inclusion – if at all. Slowing migration-related depopulation may have a positive impact on the financial inclusion rate, thereby increasing the overall standard of living and speed of development in the Romanian economy.

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## Conflicts of Interest

The authors declare no conflict of interest.

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