"How will Serbia's EU accession impact its labor migration patterns?"

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Abstract

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This paper explores the dynamic interplay between Serbia's anticipated accession to the European Union (EU) and its labor migration patterns, with a focus on the socio-economic implications of this significant transition. Given the profound impact of labor migration on Serbia's economy and society, particularly among the youth, this study delves into the potential shifts in migration trends in response to the changing political, economic, and legal landscapes that EU accession entails. Through an analysis of current labor migration trends and economic disparities, this research employs both qualitative and quantitative methodologies to offer insights into the drivers of migration. It critically examines the existing literature and statistical data to assess the extent to which EU integration could serve as a catalyst for altering labor mobility patterns. The study further investigates the ramifications of Serbia's EU accession on labor rights, job opportunities, and social protections, drawing parallels with the experiences of other EU member states. By offering a nuanced understanding of the expected socio-economic changes post-accession, this thesis aims to contribute valuable perspectives to the discourse on labor migration and regional integration within the EU framework.

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- EU - European Union
- NELM - New Economics of Labor Migration
- SORS – Statistical Office of the Republic of Serbia
- GNI - Gross National Income
- GDP - Gross Domestic Product
- VIF - Variance Inflation Factor
- PSAVT - Political Stability and Absence of Violence/Terrorism: Estimate

1. Introduction

Serbia's journey towards European Union (EU) accession represents a pivotal phase in its post-Yugoslav transformation, marking a significant political, economic, and social shift. Initiated formally in 2012 with the status of a candidate country, the accession process has unfolded against a backdrop of regional stabilization efforts and comprehensive reforms aimed at aligning with EU norms and standards. This journey is not merely a diplomatic endeavor but a transformative process that impacts the fabric of Serbian society, economy, and governance. As Serbia navigates through the complexities of negotiations, the anticipation of EU membership brings to the fore the potential for substantial socio-economic changes, influenced by the harmonization of laws, adoption of EU policies, and access to a broader market and developmental funds.

Labor migration has long been a significant aspect of Serbia's socio-economic landscape, shaped by historical, economic, and social factors. The phenomenon is multifaceted, driven by a quest for better employment opportunities, higher living standards, and an improved quality of life, often against the backdrop of economic disparities within the country. For many, migration presents a pathway to overcoming the limitations posed by the local labor market, which is characterized by high unemployment rates and a mismatch between educational outcomes and market needs (Đerčan, et. al. 2014). For others, it is an opportunity to pursue their political aspirations towards a more liberal approach. Moreover, labor migration impacts Serbia's economy not just through remittances but also through the potential loss of skilled labor, posing challenges and opportunities for policymaking and development strategies (Bajić-Hajduković, 2023).

This thesis explores the intricate relationship between Serbia's impending EU accession and its labor migration patterns, with a focus on the anticipated socio-economic transformations. It aims to investigate how the prospect of joining the EU could reshape the dynamics of labor mobility, considering the pivotal role of economic disparities, job opportunities, and quality of life in influencing migration decisions. By examining the current state of labor migration in Serbia and the potential impacts of EU integration, this study seeks to offer insights into the future trajectory of migration flows and the broader socio-economic implications for Serbia and the EU. Through a comprehensive analysis of the factual information at our disposal as well as some econometric tools, the thesis aims to contribute to the discourse on migration, integration, and development, providing evidence-based recommendations to inform policy and practice.

2. Contextual Background

The phenomenon of labor migration within the context of European Union (EU) integration presents a significant area of study due to its profound socioeconomic impacts. As countries align with EU standards and open up to the single market, migration patterns often shift dramatically, reflecting new economic realities and opportunities (European Union, n.d.).

Serbia officially acquired EU candidacy status in March 2012, marking a pivotal step in its long-term efforts to join the European Union (European Council, n.d.). But, already in 2009, the EU lifted visa requirements for Serbs traveling to the Schengen Area, which significantly eased the mobility of Serbian citizens. This change allowed Serbians to travel more freely within the EU, which, while primarily aimed at short stays, also indirectly facilitated longer-term migration for work. This status of an EU candidate kicked off a comprehensive reform process aimed at aligning Serbia's institutions, systems, and policies with EU norms and standards. These reforms cover a broad range of areas, from judicial changes and anti-corruption measures to economic restructuring and environmental protection (European Commission, 2023).

Given that the interest of this thesis is labor migration, there are a few implications worth looking into here. These systemic transformations that are necessary for accession have direct and indirect impacts on labor migration. Economically, as Serbia works to meet EU economic criteria, it has been undertaking substantial changes that affect job markets, investment climates, and overall economic stability. Such changes can alter employment opportunities locally and influence migration decisions, especially among the youth and working professionals (European Commission, 2023).

But, there are also the socioeconomic factors that often drive migration. For many Serbs, the prospect of EU membership is synonymous with enhanced job prospects, higher living

standards, and improved social rights across the EU (ILO, 2010). This view encourages an initial surge in migration towards more established EU economies, driven by the anticipation of more open labor markets and freedom of movement, which are core benefits of EU integration. Moreover, the socio-economic disparities between Serbia and existing EU countries often serve as a significant push factor for migration.

As of now, Serbia is actively engaged in the negotiation process, having opened several chapters of the acquis, which are key for the full integration into the EU (European Council, n.d.). Each step forward in this process potentially influences migration trends, as improvements in economic and social conditions within Serbia might gradually reduce the outflow, while setbacks or delays could exacerbate it.

This complex interplay between EU integration efforts and migration dynamics exemplifies why understanding Serbia's path to EU membership is crucial. It not only shapes the immediate economic opportunities and social landscapes for its citizens but also dictates long-term demographic trends and labor market structures both within Serbia and in the wider European context.

It is important to explain some of the key aspects of EU membership that directly influence individual and collective decisions to migrate. As Serbia moves closer to EU membership, new avenues are slowly opening, and we see both challenges and opportunities for its citizens. These elements are not just peripheral benefits but are central to understanding the motivations behind migration trends.

One of the most significant changes that come with EU membership, and was briefly mentioned before, is the freedom of movement within the union. For new member states, this means that citizens can move to other EU countries to live, work, or study without the need for visas or

work permits. This immediately broadens the opportunities available to the populace, particularly the youth and the working-age population (European Commission, n.d.).

Often, new EU member states have economies that are less developed than those of older members. This disparity creates strong pull factors as individuals migrate towards higher-paying jobs, better employment conditions, and more robust economies in other EU countries (Ruspini & Eade, 2014).

Also, with accession, there is usually an increase in information flow about opportunities in other EU countries. Furthermore, as people begin to migrate, they create networks that further facilitate migration, providing information and support to new migrants (Arandarenko, 2022).

The initial surge often moderates over time. As the new member state's economy begins to integrate more deeply with those of other EU countries, economic disparities may lessen, reducing the economic incentives for migration (Reiner & Radu, 2012). Additionally, return migration might occur as migrants move back to take advantage of opportunities in their home countries that arise from EU membership benefits like increased investment and economic development.

3. Literature review

In this section, I delve into the existing research concerning labor migration in Serbia and the broader implications of EU accession. This examination aims to synthesize key findings and theoretical perspectives from various studies, providing a comprehensive understanding of how these dynamics have been previously analyzed and interpreted. By exploring these scholarly contributions, the review will highlight the continuity and changes in the discourse on labor migration within the context of Serbia's ongoing integration into the European Union.

3.1. Historical Context and Comparison

Academic research underscores that EU integration processes influence migration dynamics, notably among younger demographics in accession countries. According to a study by Fassmann and Hintermann (1998), accession to the EU often results in an initial surge of migration due to the opening of labor markets and the removal of mobility restrictions. This effect is particularly pronounced among the youth, who are typically more mobile and more responsive to international labor market opportunities.

For instance, after joining the EU in 2004, Poland saw a substantial increase in emigration, with the UK's Office for National Statistics reporting that the number of Polish nationals residing in the UK rose from around 75,000 in 2003 to over 600,000 by 2010 (Burrell, 2009). This migration was particularly pronounced among the younger, economically active age group, who were drawn by the higher wages and better employment opportunities in Western European countries. Similarly, Hungary, also a 2004 EU entrant, witnessed a significant migration wave, particularly to Austria and Germany. According to Eurostat, the number of

Hungarian nationals in Germany increased by 50% in the five years following accession (Bodnár & Szabó, 2014), with a substantial portion of these migrants being under 30. These migration trends are not just isolated incidents but are indicative of a broader pattern of increased mobility among young Europeans post-EU integration. Studies suggest that younger individuals are more likely to migrate due to fewer familial obligations and a greater propensity for risk-taking, which are crucial in adapting to new environments and job markets (Eurostat, 2023). This demographic shift underscores the profound impact of EU integration on labor mobility, providing both challenges and opportunities for the economies involved.

The phenomenon of Serbs moving to EU countries has deep historical roots, stretching back several decades before Serbia's contemporary migration trends came to the forefront. The article "Moving to the Welfare Countries: Emigrants from Serbia 1961-2002" outlines that economic motives primarily propelled these movements, with significant spikes in migration occurring during periods of political instability and economic downturn within Serbia. Notably, after World War II, economic necessity drove many to seek better opportunities in Western Europe, where industrial economies were in demand for labor (Bubalo-Živković, et al., 2014). The trends evolved over the decades, influenced by political changes in the Balkans and broader socio-economic conditions, reflecting a longstanding pattern of migration influenced by a complex interplay of economic necessity and political circumstances. This historical context underscores that the movement of Serbs towards EU nations has been a significant, enduring feature of the region's demographic shifts, deeply embedded within the socio-political fabric of Serbia's relationship with Europe.

Moving from this historical context of migration to more present times, Serbia's current focus is significantly shaped by its anticipated accession to the European Union. This prospect of EU membership has infused new dynamics into migration patterns, with potential economic and

political changes influencing decisions at both individual and national levels. As Serbia draws closer to joining the EU, the motivations and implications of migration are likely to evolve.

A report by the Serbian Statistical Office (2019) indicates a steady increase in emigration rates among individuals aged 20-30 years, which correlates with key milestones in Serbia's EU accession negotiations. According to the Statistical Yearbook of the Republic of Serbia for 2019, there has been a steady rise in the emigration of this age group, a trend that not only reflects the aspirations of young Serbs to capitalize on the opportunities offered by the broader European market but also highlights the challenges faced by the Serbian labor market in retaining its younger workforce (SORS, 2019).

An examination of the migration patterns from Serbia to select OECD countries between the years 2010 and 2015 reveals variable trends. According to the available data, Germany experienced an increase of 3,838 Serbian migrants, indicating a modest but steady influx (OECD, 2022). Austria, showcasing a more pronounced growth, saw an uptick of 20,077 migrants from Serbia within the same timeframe (OECD, 2022). France also noted an increase, with an additional 9,114 Serbian migrants by the end of 2015. Hungary's figures followed a growth trajectory similar to Austria and France, with an increase of 15,481 Serbian migrants. Collectively, these figures culminate in a net increase of 40,035 Serbian migrants moving to the aforementioned countries between 2010 and 2015, reflecting the dynamic nature of migration flows and the varying appeal of destination countries within the OECD (OECD, 2022).

These numbers might not look worrisome if you have a sizable population number within a country. However, for a relatively small country, such as Serbia, which has been steadily losing population since 1981, had a record low of 6.647.003 at the latest 2022 census, and has had the lowest birth rate of 9 newborns per 1000 people, this is nothing short of a concern (SORS, 2024).

Post 2015 period is pretty much an extension to what we have seen between the years of 2010 and 2015. From 2015 onwards, there has been a significant increase in labor migration from Serbia to EU countries. Once again, this trend is largely attributed to better job opportunities and improved living standards in the EU. In fact, the number of first residence permits issued for remunerated activities to Serbian citizens in the EU has increased fivefold between 2011 and 2019 (OECD, 2022).

Specifically, Germany, Austria, and Switzerland are among the top destinations for Serbian labor migrants due to their robust economies and high demand for skilled labor. Additionally, these countries have established Serbian communities that further attract migrants. Data from Eurostat shows a noticeable trend where Serbian migrants are increasingly moving for work-related reasons, highlighting the economic motivations behind their migration (Eurostat, n.d.).

Overall, the growing trend of labor migration from Serbia to the EU reflects both the opportunities within the EU and the challenges within Serbia's own labor market, driving individuals to seek better prospects abroad.

3.2. Economic Theories of Migration

3.2.1. Neoclassical Theory

In order to understand why Serbia has this particular labor migration pattern, I will introduce some of the economic theories which have been widely used and accepted when talking about labor migration and patterns thereof. The first theory which I looked at was the neoclassical theory.

Neoclassical theory of migration suggests that international migration flows are primarily driven by differences in economic opportunities across geographic regions (Sjaastad, 1962).

This theory posits that individuals make migration decisions based on wage differentials, moving from areas with lower wages to those with higher wages to maximize their earnings. This perspective argues that migration is viewed as a rational, individual decision influenced by the potential for higher income (Borjas, 1989). This model assumes that workers have perfect information about job opportunities and can move freely, focusing on the individual as the primary decision-making unit. Neoclassical theory is particularly useful in explaining large-scale labor migration, where economic incentives in the destination country are significantly better than in the origin country. This theory is often applied to contexts where the economic conditions between the origin and destination countries are starkly different, making it a relevant model for analyzing potential migration trends in Serbia as it moves towards European Union accession.

Many Serbian citizens are likely to perceive significant wage differentials between Serbia and EU countries and not only thanks to technological developments. Also, a large part of information diffusion comes from the fact that in recent history, there were multiple waves of migration towards the West, and many families have members living abroad with whom they communicate (OECD, 2022).

For example, average wages in Serbia are significantly lower than in almost all EU countries, making the prospect of working in the EU financially attractive (Yanatma, 2024). This disparity serves as a strong incentive for migration, as individuals seek to improve their economic status and quality of life by moving to countries where their labor is valued more highly.

In my analysis, I apply the neoclassical theory to explore and explain the motivations behind Serbian migration to the EU. The theory's emphasis on wage differentials as a key motivator for migration will help elucidate why, despite potential cultural and social ties to their home country, many Serbs are attracted to the economic opportunities available within the EU. This approach will allow for a deeper understanding of the economic factors driving migration

patterns and offer insights into how Serbia's potential EU integration might influence these trends.

3.2.2. New Economics of Labor Migration (NELM)

Expanding on the limitations of neoclassical theory, NELM introduces a broader perspective by considering that migration decisions are not made entirely by isolated individuals but by households or broader units of related individuals (Stark & Bloom, 1985). This approach recognizes that households use migration as a strategy to diversify risks and overcome capital constraints that they face in their local environments. According to NELM, migration allows households to improve their income distribution and hedge against income uncertainties or failures in local markets.

Households engage in migration as a way to spread and manage economic and social risks. By sending members to more prosperous regions, households can mitigate the impact of local economic downturns or agricultural failures, which are frequent in rural and less developed regions.

Then, there is also the phenomenon of income pooling. Migration allows households to pool income through remittances (Bárcena-Martín, et al. 2020). These remittances play a crucial role in household economics, often providing for basic needs, financing education for younger members, or investing in local businesses, which can spur further economic development at the community level (Taylor, 1999).

There are two more important caveats of NELM worth mentioning in the context of this research. First is overcoming market failures. NELM suggests that migration is a strategy to overcome local market constraints, such as lack of employment opportunities or credit restrictions. Migrants can provide financial capital through remittances, which also helps households to overcome liquidity constraints and invest in their livelihoods. The second is

social capital. The theory also emphasizes the role of social networks and capital in facilitating migration. Migrants rely on and contribute to networks that can lower the costs and risks of migration, making it more accessible and safer for other potential migrants from their households or communities.

It is not difficult to see exactly how this theory is relevant for labor migration in Serbia. In anticipation of EU accession, it becomes evident that Serbian households might view migration as a strategic response to economic uncertainties and the prospect of future EU membership. The potential for increased labor mobility within the EU can make migration even more attractive as a risk diversification strategy. Furthermore, as Serbian migrants establish themselves in EU countries, the remittances they send home can significantly enhance the economic stability of their households. These funds are often critical in improving the living standards of remaining family members and can be reinvested into local businesses or education, fueling further socio-economic development.

Moreover, Serbian households might also utilize migration strategically to access better education and healthcare services available in the EU, thereby investing in the human capital of their family members. This aspect of migration underscores the multi-dimensional benefits that migration, as conceptualized by NELM, can bring to households that are part of global migration systems.

Apart from theory, there is also some empirical evidence to go along in building the case for Serbia. Although limited, there is research which shows that the region of Western Balkans aligns with the NELM model, suggesting that migration patterns are complex and significantly affect economic, social, and political landscapes (Arandarenko, 2021). Understanding which aspects of Serbian migration align with the neoclassical theory versus the NELM model is crucial, particularly as neoclassical migration can be detrimental to countries with declining populations, impacting long-term growth. In contrast, NELM-type migration can be beneficial,

alleviating labor market pressures in the short term as migrants earn abroad but spend at home, and in the long term, they contribute gained knowledge and experience upon returning (Arandarenko & Aleksic, 2021). Despite data limitations, EU migration statistics provide indirect evidence, suggesting notable insights into migration trends by examining annual flows and stocks of Serbian nationals in the EU, based on their legal residency statuses (Eurostat).

Lastly, I briefly review the main concepts of the push-pull theory, as I found this framework holding the most explanatory power and because I used the economic reasoning behind this theory in order to support my data analysis later in the thesis.

3.2.3. Push-Pull Theory

The push-pull theory, first conceptualized by Everett Lee in his seminal 1966 article "A Theory of Migration," provides a straightforward yet comprehensive framework to understand the migration decisions of individuals or groups. According to this theory, migration is typically triggered by push factors, which are adverse conditions such as lack of job opportunities, poor living conditions, safety concerns, and environmental problems that compel people to leave their place of origin (Lee, 1966). Conversely, pull factors are favorable conditions like better employment prospects, higher living standards, political stability, and better educational opportunities that attract individuals to new locations (Lee, 1966).

According to this theory, push factors are conditions within a country that compel its residents to migrate. These factors include economic distress, such as unemployment or underemployment, political instability or repression, environmental challenges like drought or flooding, and social strife, which can include discrimination or a lack of essential services (Lee, 1966).

In Serbia, many of the push factors mentioned above are evident. Economic challenges, for instance, are represented by relatively low wages and scarce job opportunities, especially in

advanced or specialized sectors (Arandarenko, 2021). Additionally, political uncertainties and the slow pace of reforms contribute to an environment that drives individuals to seek better prospects elsewhere. These aspects are particularly pronounced in Serbia, pushing its residents to look for opportunities beyond their national borders.

To find the pull factor, one simply must invert the push factors. The pull factors are usually reflected in higher employment rates and better economic opportunities, political stability and freedom, attractive climates and safer environments and last, but certainly not least, superior educational and health facilities.

The EU presents several pull factors that attract migrants from Serbia. These include higher wages and greater economic opportunities available in many EU countries, which are a significant draw for those seeking to improve their economic situation. Additionally, the political and economic stability provided by EU institutions offers a secure and predictable environment, which is highly valued. Furthermore, the advanced educational and healthcare systems, particularly notable in Western EU states, are also key attractions. These factors collectively create a compelling case for Serbs to move towards the EU, seeking better living conditions and brighter futures.

The push-pull theory can provide a structured approach to understanding how these factors interact to influence migration decisions among Serbs, especially the youth and educated professionals. As Serbia moves closer to EU membership, the anticipation of easier mobility and access to the EU labor market could strengthen these pull factors, potentially increasing migration flows.

Some socio-economic studies, such as the one from 2021 by Radonjić and Bobić have highlighted the push and pull factors driving this trend. The push factors include high youth unemployment and mismatches between education and job market demands, leading to brain

drain (Radonjić & Bobić, 2021). The pull factors are better job opportunities, higher living standards, and stronger democratic institutions in destination countries, particularly OECD states (Radonjić & Bobić, 2021). The article also notes the role of remittances and the socio-economic impacts of migration on Serbia's development. These factors collectively illustrate the complex dynamics that drive skilled individuals to migrate.

4. Data and Methodology

In this chapter, I outline the methodologies employed in the analysis of migration trends, focusing on the economic and social determinants impacting migration flows. I first describe the data collection process, primarily leveraging datasets from the World Bank, which provide useful socio-economic and political indicators across multiple countries. Next, I explain the important procedures I used to ensure data integrity, such as handling missing values, and transformation of variables. Later, I explain and comment on the analytical techniques employed, highlighting the use of panel data regression models to explore the effects of various push and pull factors on migration, with a specific focus on Serbia compared to other European countries. Lastly, I address the limitations of my study, acknowledging potential biases and the implications of chosen methodologies on the findings. This critical evaluation ensures that the conclusions drawn are both transparent and grounded in a rigorous analytical framework.

4.1. Data sources

The primary datasets used for this study were sourced from the World Bank (WB, 2024), OECD (Organisation for Economic Co-operation and Development, 2024) and Eurostat (Eurostat, 2024). These databases provided all the key economic and political indicators across multiple countries.

For one of the two models presented in the thesis, I used a panel data regression, allowing for the control of variables that change over time but not across entities, thus providing more accurate insights into the effects of the studied variables on migration. For the other model, I employed a time series dataset that tracks various data points over multiple years but only for a single country (in my example - Serbia).

Unfortunately, the datasets were not as far-reaching as I hoped, but I still got over a 20-year range from my dataset. I was able to acquire data from the year 1995 until 2023 for all the relevant variables. But, for the purposes of this study, I believe both the variables and the year range were sufficient.

4.2. Methodology

I utilize multiple linear regression analysis to examine the push and pull effects between Serbia and the European Union. To ensure a comprehensive analysis, I settled on two separate regression models, one focusing on the EU (which represent pull effects) and the other on Serbia (conversely, these represent the push effects). This dual-model approach caters to the different scopes and depths of available data for each entity, providing a nuanced understanding of the push and pull dynamics.

For the push model, I used net migration as the dependent variable, which I regressed against a set of key economic indicators: GDP per capita, inflation and a political stability index. I chose these variables based on their relevance and potential influence on migration patterns, reflecting economic conditions and stability factors that could drive emigration.

I used multiple linear regression because it allows for direct estimation of the relationship between predictors and the outcome. The dataset I worked with did not have the necessary structure (lack of data variability over time) to justify more complex models such as fixed effects or time series analyses.

The model for the pull effects was similarly structured, but it had a significant difference in the approach. The dependent variable remained the same – net migration. The independent variables in the regression analysis, however, had a slight change. I regressed net migration over GDP per capita, inflation, political stability index and employment rate.

Working with panel data in this model includes multiple observations over time for the same countries, which is ideal for fixed effects models as it allows for controlling for characteristics that are not measured but vary across entities and could bias the results if unaccounted for. By using country-specific fixed effects, the model controls for all time-invariant differences between the countries. This means any permanent characteristics of these countries that could influence migration patterns—such as cultural factors, geographic location, or stable economic conditions—are accounted for.

I also incorporate time-specific effects to control for all factors that vary over time but are constant across countries. These could include EU-wide economic trends, policy changes, or other temporal effects like global economic crises or changes in EU legislation that impact migration. By including time effects, the model corrects for variations that happen in a specific year but affect all observed countries similarly.

The use of two-way fixed effects is particularly powerful for isolating the impact of the variables of interest (employment rate, GDP per capita) on migration patterns, by removing both observed and unobserved confounding influences that could distort the estimated effects. Given the policy-oriented nature of my research question, I find the two-way fixed effects model to be appropriate.

4.3 Identification Strategy

4.3.1. Serbia model

As briefly mentioned, in my analysis I present two main models. For the first model, I focused on Serbia only, and I investigate the relationship between net migration and two different economic factors (GDP per capita, inflation) and one political factor (political stability). I focused on the strongest factors I could get the data on which push workers from Serbia towards EU countries, in search of better living.

The regression model used to analyze the expected push effects can be represented as follows:

$$Net\ Migration = \beta_0 + \beta_1 \times GDP\ per\ capita + \beta_2 \times Inflation + \beta_3 \times Political\ Stability + \epsilon$$

- β_0 is the intercept of the model.
- β_1, β_2, β_3 are the coefficients representing the impact of GDP per capita, inflation, and political stability on net migration, respectively.
- ϵ represents the error term, capturing all other factors not included in the model.

For the analysis of the expected push effects, I utilize a simpler model framework than in the EU model, due to the specific nature of the data (covering only one country) and to avoid overfitting with fewer data points. Also, I acknowledge that due to data restrictions, I could not include all potential push variables. This is a limitation in my work, and it prevents me from conducting a more comprehensive and precise analysis of all possible push factors influencing Serbian migration.

4.3.2. EU model

In the second model, I use a panel data approach to investigate the relationship between net migration and a set of explanatory variables: employment rate, GDP per capita, inflation rate, and political stability. The model employs a two-way fixed effects framework to control for both time-invariant characteristics that may differ across entities (countries, regions, etc.) and common patterns over time that might affect all entities similarly.

The regression equation for the panel data model is given by:

$$Net\ Migration_{it} = \alpha_i + \gamma_t + \beta_1 \times Employment\ Rate_{it} + \beta_2 \times GDP\ per\ Capita_{it} + \beta_3 \times Inflation\ Rate_{it} + \beta_4 \times Political\ Stability_{it} + \epsilon_{it}$$

Where:

- i indexes the countries.
- t indexes the time periods.
- α_i represents the country-specific fixed effects.
- γ_t represents the time-specific fixed effects.
- β_1, β_2, β_3, β_4 are the coefficients for the employment rate, GDP per capita, inflation rate, and political stability, respectively.
- ϵ is the error term.

This model structure allows us to isolate the effects of each explanatory variable on net migration while accounting for unobserved heterogeneity both across countries and over time.

Here, the focus shifts to examining pull effects in the EU, specifically looking at data for Austria, Germany, Sweden, Italy, and Hungary. Due to data constraints and strategic selection, I chose these five countries to represent potential pull factors influencing migration flows into the EU. This subset of countries, while not exhaustive of the EU, was selected based on several key factors including geographical proximity to Serbia, existing diaspora communities, and economic stability. Here is a brief explanation of why I believe my analysis still holds, despite this limitation.

First, geographical closeness increases the likelihood of migration flows. These countries are relatively close to Serbia, making them more accessible for migrants, thus potentially exerting stronger pull effects. Poot et al. suggest so too in their 2016 paper on the gravity model of migration (Poot, et al, 2016).

Second, with significant Serbian diaspora communities present in Austria, Germany, Sweden, and Hungary, there is a network effect that can facilitate migration and integration in these countries, enhancing their pull effect (Poros, 2011).

And at last, Serbia's status as an EU candidate country makes it more oriented towards the EU, which can strengthen the pull effects due to anticipated benefits from future integration (Heinz, 2006).

I also cannot claim or extract the specific pull effects which come from the side of the EU and affect Serbian citizens specifically. However, economic theory suggests that migration is influenced by both push and pull factors, where push factors drive individuals away from their home country and pull factors attract them to a new location. Given Serbia's geographical and socio-political context, it is reasonable to theorize that the selected EU countries have stronger pull effects due to their proximity, economic opportunities, and established Serbian communities. In other words, while the model assesses pull factors, it does not directly measure how these factors specifically attract Serbian citizens, rather than migrants in general[1]. The assumption that these factors have a stronger pull effect on Serbian workers is based more on theoretical reasoning and contextual evidence rather than direct empirical measurement. Again, this is an assumption which I must take up for my empirical results to hold and be meaningful[2].

4.4. Variable explanation

The variables I used in my research serve as expected push or pull factors in economic theory. In my analysis, those are are net migration, gross domestic product (GDP), employment rate, political stability, and inflation. These indicators are important for analyzing migration trends

[1] Perhaps there is a way to control for this in the model which I used, but it escapes my capabilities.
[2] It would be interesting, perhaps for future work, to figure out precisely how strong the pull effects are for different countries. My assumption is that we can expect a gradient-looking map which is stronger at the core EU countries and it slowly diminishes as we move towards the periphery and EU borders. Piras did something similar to what I am talking about in his 2015 article. However, on a lower scale, looking at push and pull effects on migration in Italy.

as they represent both the push factors in the origin country of Serbia, and pull factors in destination countries, in other words, the EU.

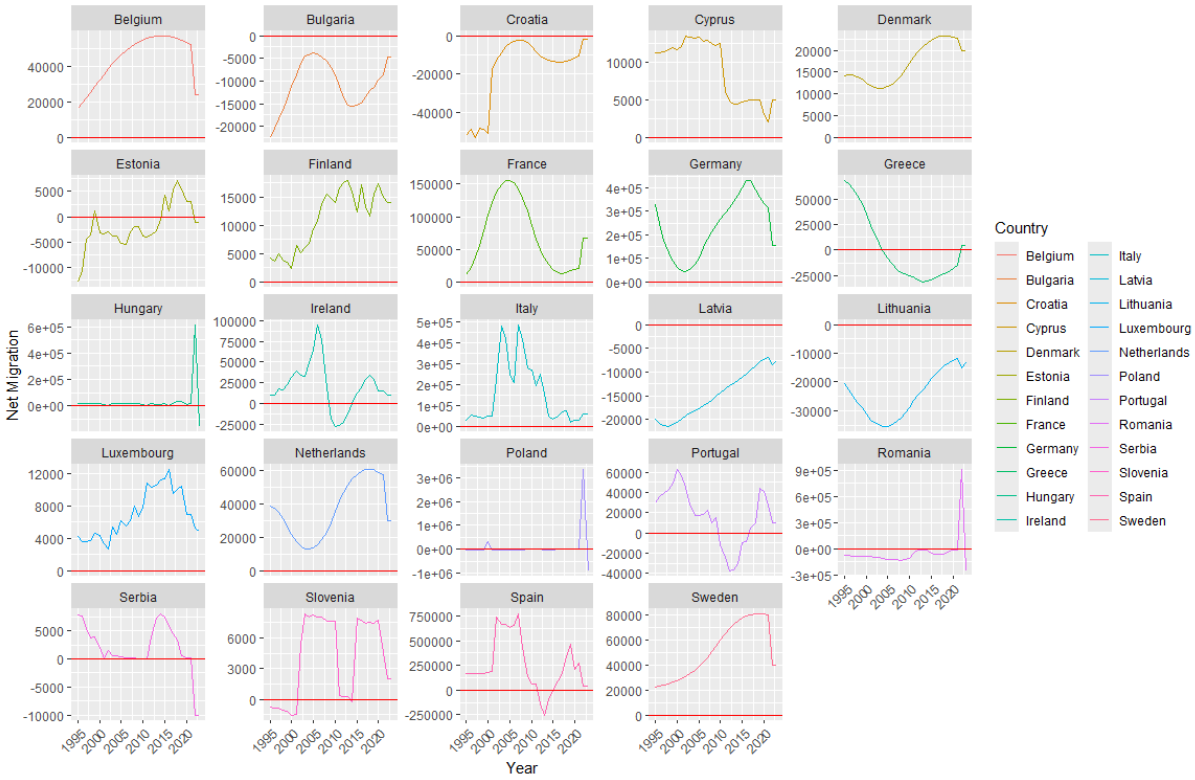
4.4.1. Net Migration

I utilize net migration as the dependent variable in both of my models. Net migration represents the difference between the number of immigrants entering a country and the number of emigrants leaving it over a specific period. This metric is pivotal for understanding the balance of migration flows and provides a nuanced view of a country's migration dynamics.

This metric is particularly effective for understanding the real impacts of migration policies, economic conditions, and political stability on migration trends. For instance, if economic opportunities in the EU are significantly better than in Serbia, or if political stability is greater in the EU, these factors would likely result in a positive net migration from Serbia to the EU. This indicates a pull effect where the conditions in the destination region attract individuals. Conversely, negative conditions in the origin country, like high unemployment or political unrest in Serbia, can push residents to leave, impacting the net migration negatively. Thus, using net migration as the main dependent variable in the regression models offers a holistic view of migration influences and outcomes.

To aid in the visualization of migration trends across different countries, Figure 4 presents the net migration plotted over time. This figure illustrates just how severe the immigration numbers run in Serbia.

Figure 1. Net migration Trends by Country



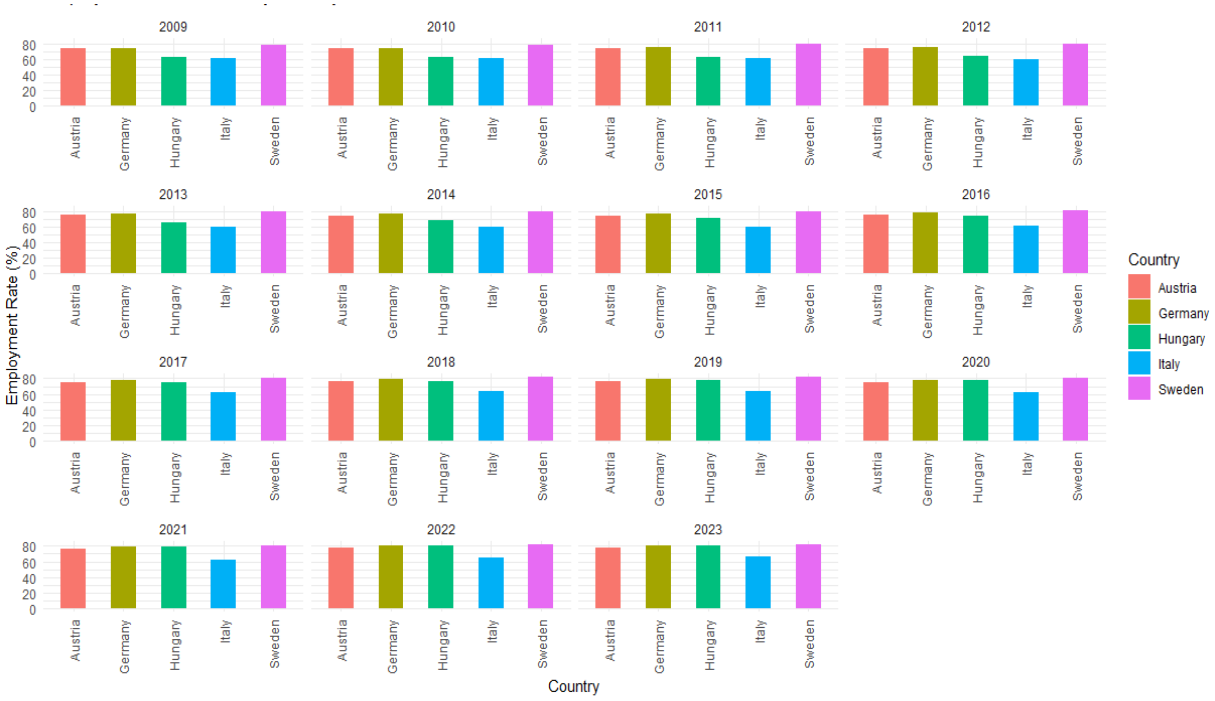
Source: World Bank data and author's calculations

One extremely important thing to note when discussing the net migration variable is that, although I do not have the exact inflow and outflow data on workers, I still consider this proxy to be the most relevant for my regression analysis. Given the data constraints and the difficulty in securing a more suitable proxy for my dependent variable, net migration represents the best available option for this thesis. This choice captures the overall migration trends effectively, despite the detailed data limitations.

4.4.2. Employment Rate

Employment rates are a critical indicator of a country's job market health and directly influence migration decisions, especially labor migration. High employment rates in a region suggest a robust job market with numerous opportunities, which can attract migrants looking for work. Conversely, low employment rates can indicate limited job opportunities, pushing individuals to seek employment in regions with better prospects.

Figure 2. Employment Rate Trends by Country



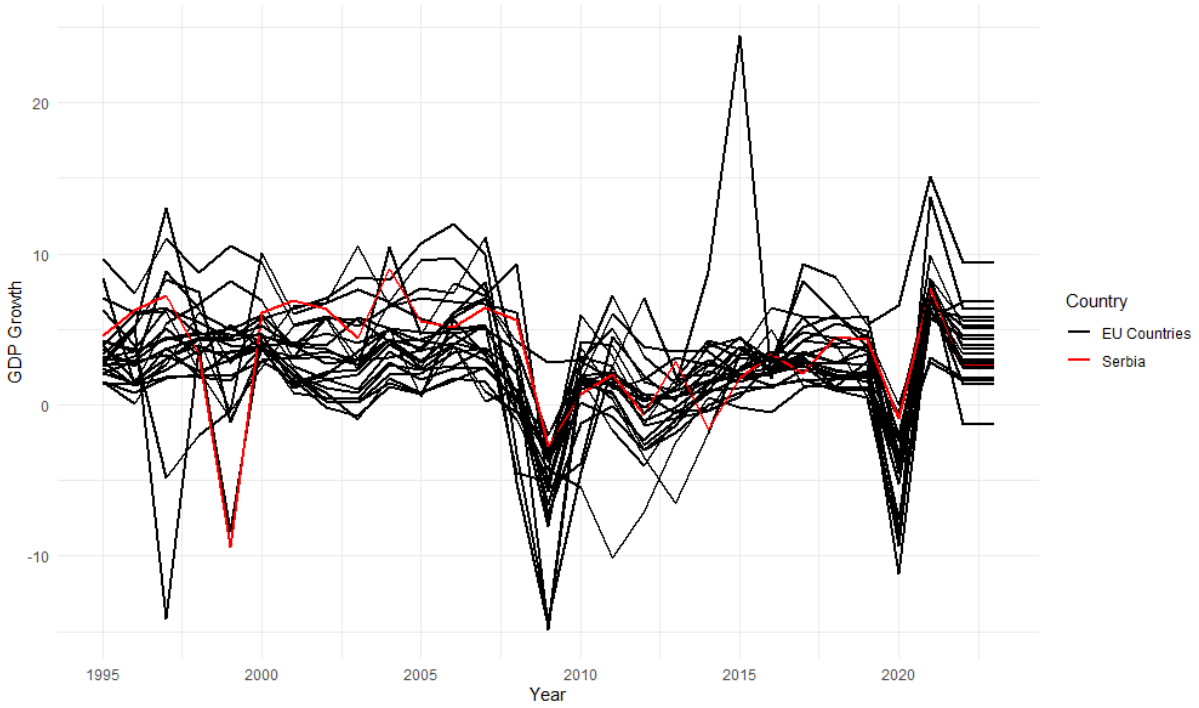
Source: World Bank data and author's calculations

In the context of Serbia, the employment rate serves as a vital metric for comparing job market conditions with those in various EU countries. If the employment rates in EU countries are generally higher than in Serbia, this disparity can create a strong pull for Serbian workers seeking better job opportunities abroad. This perspective allows for a comprehensive analysis of the labor market dynamics that drive migration from Serbia to the EU. Including the employment rate in the regression models thus helps to quantitatively assess how job availability and economic opportunities in the EU influence Serbian migration trends.

4.4.3. Economic Performance (GDP):

When we examine the economic performance of Serbia compared to other EU countries through the lens of GDP per capita, we see an interesting trend. The charts showing GDP per capita over time reveal that while Serbia's economy has been improving, it still lags behind most of the EU state members. This means that, on average, people in EU countries earn more than people in Serbia.

Figure 3. GDP Growth Serbia & The EU



Source: World Bank data and author's calculations

GDP per capita is an important economic indicator that reflects the average economic output per person in a country. It provides a more detailed measure of economic health and prosperity than overall GDP, by accounting for the size of the population. High GDP per capita generally indicates that individuals in a country are on average generating more economic value, which often correlates with higher living standards, better public services, and increased individual income. These factors can make a country more attractive to immigrants (pull effect) and also decrease the desire of the local population to migrate (reducing push effect).

Including GDP per capita in my regression models helps to assess the economic attractiveness of a region from a personal economic benefit perspective. For migrants from Serbia considering relocation, higher GDP per capita in EU countries can signify better personal economic prospects. This could include higher wages, better job opportunities, and a higher standard of living compared to their home country.

Conversely, if Serbia's GDP per capita is increasing, it might reduce the push factor for migration by improving conditions at home. This could mean that as Serbia's economic conditions per capita improve, fewer people might find it necessary to leave in search of better opportunities.

4.4.5. Inflation

Inflation is a critical economic indicator that measures the rate at which the general level of prices for goods and services is rising, and subsequently, how purchasing power is falling. High inflation can erode purchasing power and reduce the real income of individuals, making domestic economic conditions less favorable. This could potentially increase the push factor for migration as individuals seek more stable economic environments with lower inflation rates, where their income buys more in terms of goods and services.

Conversely, low inflation can indicate economic stability and control over price levels, which could act as a pull factor attracting migrants in search of stable cost-of-living conditions. By including inflation in the regression models, the analysis can capture how fluctuations in the cost-of-living impact migration decisions. For migrants from Serbia, higher inflation in their home country compared to lower inflation in EU countries could be a decisive factor in their decision to migrate, seeking better economic stability and preservation of purchasing power abroad.

The study by Ratha, Mohapatra, and Scheja (2011) from the World Bank investigates the complex interplay between economic factors and migration patterns. Their research highlights how macroeconomic stability, signaled by indicators like GDP and inflation rates, can influence the decisions of individuals to migrate. Specifically, they explore how variations in economic performance and cost of living (through GDP and inflation) affect both the origins and destinations of migrants, emphasizing the push and pull effects in migration theory.

Following their findings, I decided to incorporate GDP per capita and inflation into my regression models to examine how these economic indicators could affect labor migration from Serbia to the EU. The rationale was to understand if higher GDP per capita and lower inflation in destination countries act as pull factors attracting migrants, while higher inflation in origin countries serves as a push factor encouraging individuals to leave.

4.4.6. Political Stability and Absence of Violence/Terrorism ("PSV")

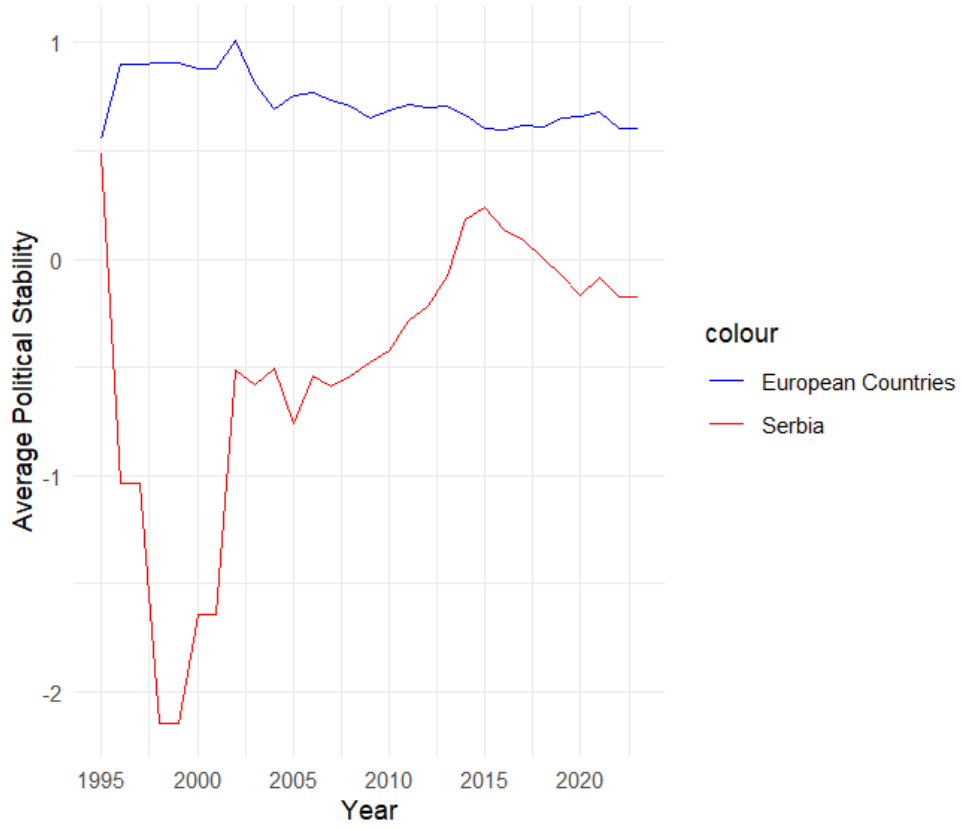
The variable political stability and absence of violence/terrorism is a measure that reflects perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism. This indicator is assessed on a scale that mirrors a standard normal distribution, generally ranging from about -2.5 to 2.5, where higher values suggest greater political stability and lower values indicate less stability. In the regression model, I rescaled the variable using min-max scaling to enhance the practicality and simplicity of its interpretation. This normalization technique adjusted the range of the data to [0,1], thereby facilitating a more straightforward comparison of coefficients across different variables in the model.

Including PSV in the regression models allows for the assessment of how political conditions influence migration patterns. Political instability can be a strong 'push' factor in migration, as individuals and families seek safety and security away from their home country's unpredictable political climate or violent disruptions. Conversely, political stability in a destination country can act as a 'pull' factor, attracting migrants in search of a safe and stable environment.

The decision to use this variable is based on the understanding that alongside economic factors, political conditions significantly impact migration decisions. Migrants often consider the political environment as critical when choosing a destination, looking for places where they can live without fear of violence or political upheaval. Therefore, this measure provides critical

insight into the non-economic factors that drive migration flows, helping to create a comprehensive analysis of the push and pull dynamics at play.

Figure 4. Average Political Stability Over Time EU & Serbia



Source: World Bank data and author's calculations

Serbia experienced significant political instability during the 1990s, primarily due to the political and economic turmoil following the dissolution of Yugoslavia. This period was marked by widespread violence, economic sanctions, and a series of conflicts that severely impacted the region (Šantić, 2020). As a result, many Serbians emigrated, seeking stability and better living conditions elsewhere. This historical context provides some justification for including the 'political stability' variable in the regression models. The variable measures perceptions of political stability and the likelihood of violence or terrorism, which are crucial in understanding migration trends. By analyzing how political stability influences migration, the study can discern whether historical patterns of political instability continue to affect

emigration trends from Serbia today. This approach not only aligns with the push/pull theory in migration studies but also enables a detailed examination of how past and present political conditions in Serbia drive migration decisions.

Finally, political stability is an attractive pull factor from the side of the EU, which has had stable and healthy levels. However, I do believe that this variable is a stronger push factor for Serbia than it is a pull factor from the side of the EU.

5. Results and Discussion

In this chapter, I present the findings of my work. The primary goal of the regression analysis is to identify and demonstrate the significant push factors emanating from Serbia and the pull factors from the European Union that influence labor migration. I aim to establish a case, showing that Serbia already exhibits substantial labor migration flows to the EU. This baseline scenario suggests that full EU membership would likely exacerbate these existing migration dynamics. I believe this to be the case because of earlier examples of countries which witnessed increased labor migration following their accession to the EU, such as Poland and Hungary (Kancs & Kielyte, 2010). Therefore, I think it's not surprising to anticipate a similar outcome for Serbia.

5.1. Results

5.1.1. Push factors (Serbia Model)

Table 1 shows the results of the regression analysis for the "Serbia model" in order to capture the push factors. I ran a regression with net migration as my left-hand side variable (LHS) and as my right-hand side variables (RHS) I used GDP per capita, inflation and PSV.

Table 1. Linear regression for push effects

	Estimate	Std. Error	t-value	Pr(>|t|)
Intercept	2859.2097	2857.5419	1.001	0.3270
GDP per Capita	-1.0136	0.4415	-2.296	0.0307*
Political Stability Scaled	7393.0922	3305.5582	2.237	0.0349*
Inflation	3.9994	32.2752	0.124	0.9024
Note: $^{***}p < 0.001, ^{**}p < 0.01, ^{*}p < 0.05$				

5.1.2. Interpretation of Regression Results in the Serbia Model

The intercept (estimated at 2859.2097) suggests the baseline level of net migration when all other variables (GDP per capita, political stability, and inflation) are held at zero. This value, however, isn't practically interpretable as these variables can't actually be zero.

The coefficient for GDP per capita is -1.0136. This suggests that as GDP per capita in Serbia increases, net migration is expected to decrease. For each unit increase in GDP per capita, net migration is expected to decrease by approximately 1.0136 units, holding other variables constant. This indicates that higher economic output per person reduces the motivation for people to leave Serbia.

The positive coefficient for political stability (7393.0922) in the regression analysis indicates that higher levels of political stability in Serbia are associated with increased net migration. This suggests that as Serbia becomes more politically stable, it either attracts more immigrants or sees a decrease in emigration rates. This positive relationship could be interpreted as evidence that political stability makes the country a more attractive destination for migrants or lessens the desire of residents to leave due to increased security and better governance. This aligns with broader migration theories that suggest stable and secure environments are likely to draw people looking for reliable living conditions and opportunities.

Research in the field of migration has shown that political stability can indeed attract migrants. A stable political environment makes a country appealing due to the predictability and security it offers. Studies have documented that countries with stable political conditions tend to attract more immigrants, as stability is linked to economic opportunities, better governance, and overall better living conditions, which are major pull factors for migrants (Koinova et al, 2023).

The inflation coefficient (3.9994) suggests that when we see an increase in inflation rates we can, on average, expect to see a slight increase in net migration. This can be interpreted as

higher inflation eroding purchasing power and economic stability, thereby pushing people to migrate in search of better economic conditions.

The p-values for GDP per capita and political stability indicate that these variables are statistically significant (p-values < 0.05), meaning there is strong evidence that changes in these variables are reliably associated with changes in net migration. However, the p-value for inflation is not statistically significant (p-value > 0.05), indicating that we cannot confidently say inflation impacts net migration based on this data alone.

The adjusted R-squared (0.17) suggests that about 17% of the variability in net migration is explained by this model. While this shows some level of fit, it also indicates that there are other factors not included in the model that could be influencing net migration.

5.1.3. Pull factors (The EU Model)

Table 2 shows the results of the "EU" Model. The second model explores the impact of economic indicators which serve as pull factors within the EU on the net migration from Serbia. The independent variables in this model include GDP per capita, employment rate, inflation rate and PSV (this time the values for EU).

Table 2. Linear regression for pull effects

	Estimate	Std. Error	t-value	Pr(>|t|)
Employment Rate	1.875×10^4	5.211×10^3	3.599	0.00075 ***
GDP per Capita	2.8215	5.1172	0.551	0.584
Inflation Rate	5.944×10^4	9.118×10^3	6.519	4.024×10^{-8} ***
Political Stability	-2.632×10^5	1.152×10^5	-2.284	0.027 *
Note: $^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$				

5.1.4. Interpretation of Regression Results in the EU Model

The coefficient for employment rate is 18,753. This suggests that a one-unit increase in the employment rate is associated with an increase of about 18,753 units in net migration. This relationship is statistically significant, implying strong evidence that changes in the employment rate have a meaningful impact on net migration. The positive and significant coefficient for the employment rate suggests that as more jobs become available in the EU, it becomes an increasingly attractive destination for Serbian workers. This implies that job creation in the EU directly correlates with increased migration, possibly due to perceived better employment opportunities and higher potential earnings compared to what is available in Serbia.

Then, the coefficient for GDP per capita is 2.8215, which indicates that a one-unit increase in GDP per capita is associated with an increase of approximately 2.8215 units in net migration. However, this effect is not statistically significant, suggesting that within the context of this model, GDP per capita does not have a discernible impact on net migration. Surprisingly to me, GDP per capita proved itself more as a push factor in Serbia than as a pull factor coming from the EU, according to the results of my research.

The coefficient for the inflation rate is 5,944. This indicates that a one-unit increase in the inflation rate is associated with an increase of about 5,944 units in net migration. This relationship is statistically significant, meaning that inflation rate changes are likely to influence net migration significantly.

Typically, higher inflation is associated with economic instability and decreased purchasing power, which might be expected to deter migration. However, the positive coefficient indicates that higher inflation in the EU paradoxically corresponds with increased people coming to the EU. This could imply that even with rising prices, the overall economic conditions or opportunities in the EU are perceived as better compared to other places, including Serbia, or

that inflation coincides with economic activities that generate employment. However, given that I used inflation figures for only 5 countries in the EU, this variable is difficult to interpret.

The political stability index is the last variable in the model and the coefficient for PSV is -263,200, which means that a one-unit increase in political stability is associated with a decrease of about 263,200 units in net migration. This effect is statistically significant (p-value = 0.0268190), suggesting a strong inverse relationship between political stability and net migration.

The negative coefficient for the political stability index in this model indicates that increased political stability in the EU is associated with a decrease in migration from outside countries. This finding can be counterintuitive but there are ways of interpreting this result.

One explanation could be that greater political stability in the EU might correlate with more effective and stringent migration policies and border controls. Stable political systems often have the capacity to enforce laws and regulations more consistently, including those related to immigration. This could make it more difficult for migrants to enter or stay in the EU, effectively reducing the number of migrants from regions like Serbia.

Alternatively, political stability often leads to economic stability, which can reduce the economic push factors that often drive migration. If the EU's political environment is stable, it may be perceived as economically stable as well, reducing the economic disparities that drive migration. Conversely, if Serbia is experiencing political instability, it might push more people to leave in search of safer, more stable environments.

5.2 Discussion

5.2.1. Result interpretation

There are a few conclusions I made looking at the results of the regressions and comparing them between the two models.

While political stability decreases migration in the EU model, it increases it in the Serbian model, suggesting different roles of political stability in migration decisions depending on whether it is viewed from the perspective of the origin or destination. I somewhat anticipated the results of the push model, given that the PSV index had oscillations over the last 20 years and the political landscape of Serbia is what I personally believe to be one of the strongest push effects in Serbia. However, the result of the pull model did surprise me. Even though the coefficient is not extremely high (compared to the total population of the countries included in the variable) and the rescaling of the variable could have interfered with the precision of the results, I still expected to see a positive correlation between net migration and PSV in the EU model.

Even though I slightly mentioned GDP per capita and the results, I want to briefly expand on that mater here. In the Serbian model, GDP per capita acts as a push factor, where improvements in the local economy decrease migration. In contrast, GDP per capita in the EU model did not significantly influence migration as a pull factor. This contrast might suggest that economic improvements at home are more effective at retaining residents than economic allure abroad, especially when the benefits of migration are uncertain or marginal. Economic opportunities may not solely be defined by GDP per capita but also by the quality of life, job security, and potential for career advancement. These factors might be implicitly valued more by potential migrants and could explain the differing impacts of GDP on migration in the two models.

5.2.2. Technical aspects

The EU model reports a highly significant F-statistic[3], indicating that the model is statistically significant and at least some of the predictors are related to changes in net migration.

The Serbian model hovers near the commonly used significance level of 0.05 for the F-statistic[4]. The model is at the borderline of being considered statistically significant, which only shows what I feared for the most in the beginning, once I started working on this model. Further refinement, mostly in terms of additional data, is necessary for this model to provide more significant results. More on technical aspects in the appendix.

[3] 16.9672 on 4 and 48 DF, p-value: 9.8258e-09
[4] 2.844 on 3 and 24 DF with a p-value of 0.05898

6. Policy Implications

Understanding the existing economic and socio-political dynamics between Serbia and the EU is crucial as it provides insights into how these interactions might evolve once Serbia achieves full membership status. This analysis is vital for informing both economic and policy decisions. It aims to help policymakers and economic planners in both Serbia and the EU anticipate changes and make informed decisions that could facilitate smoother integration and maximize the benefits of Serbia's accession to the EU.

Given that my analysis relied on general economic indicators, the policy recommendations derived from the regression results are necessarily broad. While this approach provides valuable insights into the overall trends and factors influencing migration, it also means that the recommendations cannot be as precise as those based on more detailed, sector-specific data. However, I can still offer meaningful suggestions for both current and future policymakers, addressing the pressing issue of labor migration and preparing for potential labor supply shocks post-EU accession.

6.1. Current policy implications

From our push model, we can see that GDP per capita appears to be a significant determinant of net migration. The negative coefficient for GDP per capita suggests that higher economic development could reduce emigration. Given that economic factors like GDP per capita are significant, policies should focus on economic development initiatives. Serbia could implement programs to boost job creation, particularly in sectors that are globally competitive. Investments in technology, education, and infrastructure could enhance productivity and economic growth, making staying in Serbia more attractive.

Serbia's participation in programs like the World Bank's SURGE initiative demonstrates a commitment to sustainable urban and regional development. The SURGE program supports the creation of inclusive, resilient, and sustainable communities, which are essential for stimulating local economic growth and improving living standards. This type of development is crucial for retaining the population and attracting returning migrants by enhancing the attractiveness of urban and regional areas in Serbia (World Bank, n.d.).

Furthermore, the National Alliance for Local Economic Development (NALED) has been instrumental in improving the business environment and fostering economic development in Serbia. Through its various initiatives, NALED promotes entrepreneurship, supports digital transformation, and improves the regulatory framework for businesses. Such improvements are vital for creating jobs and providing opportunities that can reduce the push factors associated with migration (NALED, n.d.).

6.2. Future Policy Recommendations (Post-EU Membership)

As Serbia moves towards EU membership, it is crucial to develop policies that will mitigate potential labor supply shocks and leverage the benefits of integration into the European Union. Learning from the experiences of other member states that have faced similar challenges can provide valuable insights. Based on the findings of my EU model regression and the experiences of countries that joined the EU, here are several policy recommendations for future policymakers in Serbia.

The positive outcomes observed from the initiatives such as SURGE and NALED indicate that similar programs could be expanded or introduced in the context of Serbia's EU accession. EU accession is likely to bring additional funds and support for development programs, which could further enhance economic stability and growth. The EU's involvement might also help scale successful initiatives, making them more effective and far-reaching. This could include

more comprehensive regional development programs, increased investment in technology and infrastructure, and enhanced support for sectors critical to Serbia's economy.

Given the success of existing programs and the potential benefits of EU accession, it is recommended that Serbia and the EU continue to support and expand these initiatives.

Programs like SURGE and others should be maintained and expanded with additional funding and resources to maximize their impact. Upon accession, Serbia should advocate for the integration of similar development programs funded by the EU to ensure a seamless transition and continued economic growth. Also, continuous monitoring and evaluation should be implemented to assess the impact of these programs on migration patterns and economic development, allowing for adjustments and improvements based on empirical evidence.

Lastly, by leveraging the success of existing initiatives and anticipating the benefits of EU accession, Serbia can effectively address the economic underpinnings of migration and foster a more stable and prosperous economic environment.

7. Conclusion

This thesis explores how economic growth and political stability in Serbia influence people's decisions to move abroad. We found that as Serbia's economy improves, fewer people choose to leave the country. Interestingly, when Serbia is more politically stable, more people seem willing to migrate, possibly because they feel more secure to make such a big life change. These results show how economic and political conditions at home can push people either to leave or to stay.

Experience has shown, and for Serbia I doubt the situation is going to be any different, that joining the EU could significantly change migration patterns. EU membership will make it easier for Serbians to work in other EU countries, likely leading to more people moving for better job opportunities, similar to what has happened in other countries that joined the EU. This increase in migration presents both challenges and opportunities, needing careful policy planning to ensure that it benefits both Serbia and the EU. That is why I believe topics such as the one I took will only spark more interest in the future, specifically of policy makers in both Serbia and the EU.

Although this study provides insights it also has limitations that should be considered. Available data on Serbian migration is not very detailed, which makes it hard to understand all aspects of why people decide to migrate. Additionally, the methods used in this study couldn't specifically identify how attractive the EU is to Serbians compared to other non-EU countries, which might affect the accuracy of our findings (or particular EU countries, for that matter). These issues suggest that further studies are needed with better data and methods to fully understand migration patterns related to EU accession.

As Serbia stands on the cusp of EU accession, this thesis underscores the interdependencies between migration, economic policies, and political stability. By studying about these complex dynamics, we not only enrich our understanding of migration patterns but also provide a grounded basis for crafting informed policies that support sustainable socio-economic development in both Serbia and the European Union. Looking ahead, the continued evolution of these migration trends will offer further insights into the transformative impact of EU integration on member states, guiding future academic inquiry and policymaking.

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Appendix

1. Robustness checks

1.1. Push (Serbia) model

1.1.1. VIF Test results:

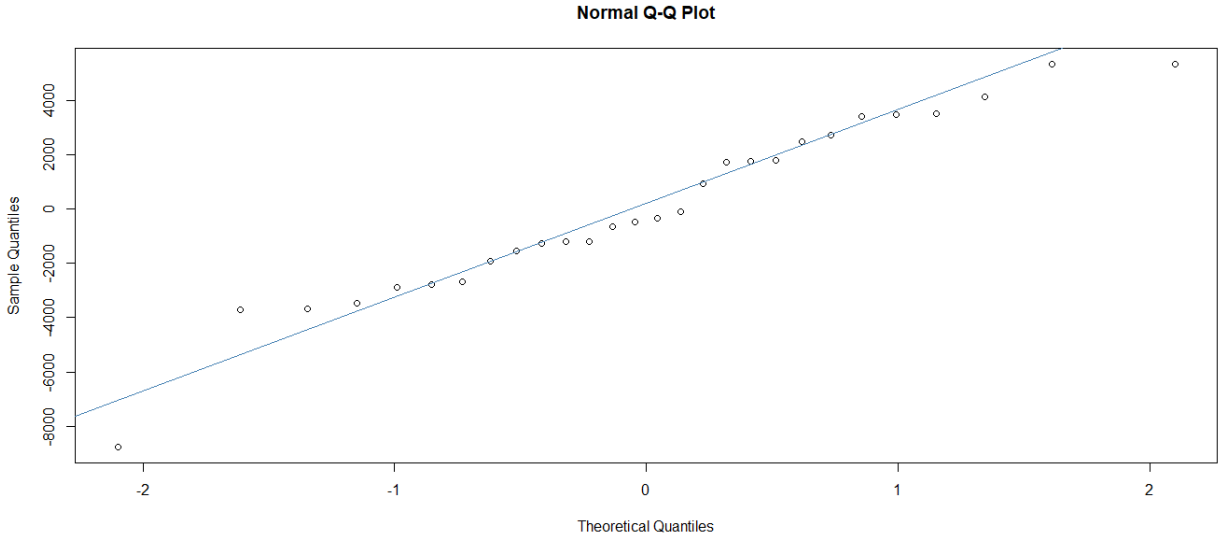
GDP per capita: 2.393255

PSV: 1.663046

Inflation: 1.955011

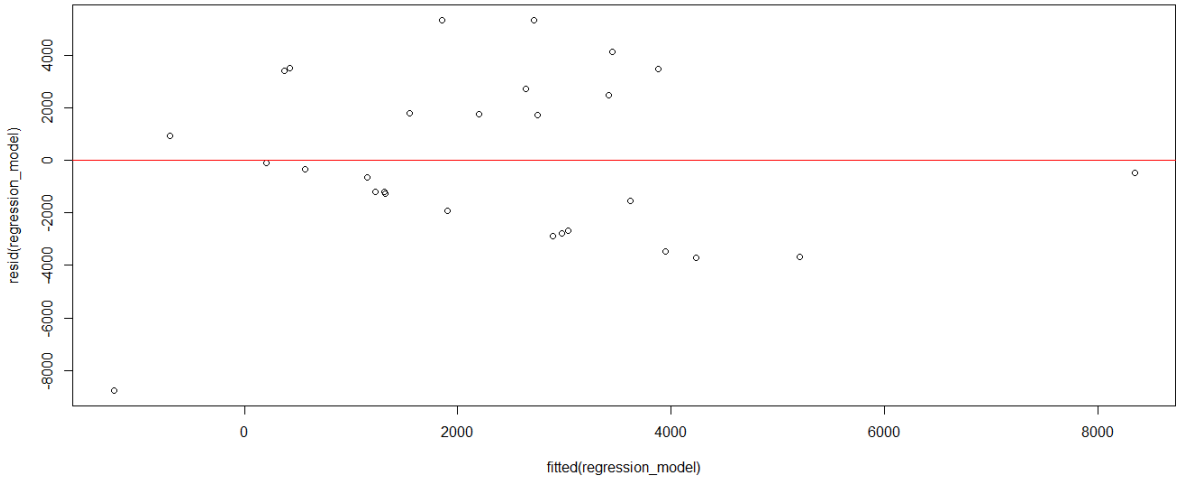
1.1.2. Normality of residuals

Figure 5. Q-Q Plot for The Push Model



1.1.3. Homoscedasticity

Figure 6. Residuals VS fitted plot for Serbia model



1.1.4. Breusch-Pagan test

- BP (Breusch-Pagan statistic): 2.5538
- df (degrees of freedom): df = 3
- p-value: 0.4656

1.1.4. Durbin-Watson Test Result:

- D-W Statistic (Durbin-Watson Statistic): 0.65611
- p-value: 2e-06
- Alternative hypothesis: true autocorrelation is greater than 0

1.1.5. Regression table from R

```
Call:
lm(formula = net_migration ~ gdp_percap + political_stability_scaled +
    inflation, data = merged_final_serbia)

Residuals:
    Min      1Q  Median      3Q     Max
-8774.4 -2114.8  -395.9  2544.7  5355.3

Coefficients:
                           Estimate Std. Error t value Pr(>|t|)
(Intercept)                2859.2097  2857.5419   1.001   0.3270
gdp_percap                   -1.0136     0.4415  -2.296   0.0307 *
political_stability_scaled 7393.0922  3305.5582   2.237   0.0349 *
inflation                     3.9994    32.2752   0.124   0.9024
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 3448 on 24 degrees of freedom
Multiple R-squared:  0.2622,    Adjusted R-squared:   0.17
F-statistic: 2.844 on 3 and 24 DF,  p-value: 0.05898
```

1.2. Pull (EU) model

1.2.1. VIF Test results:

Employment rate: 1.990819

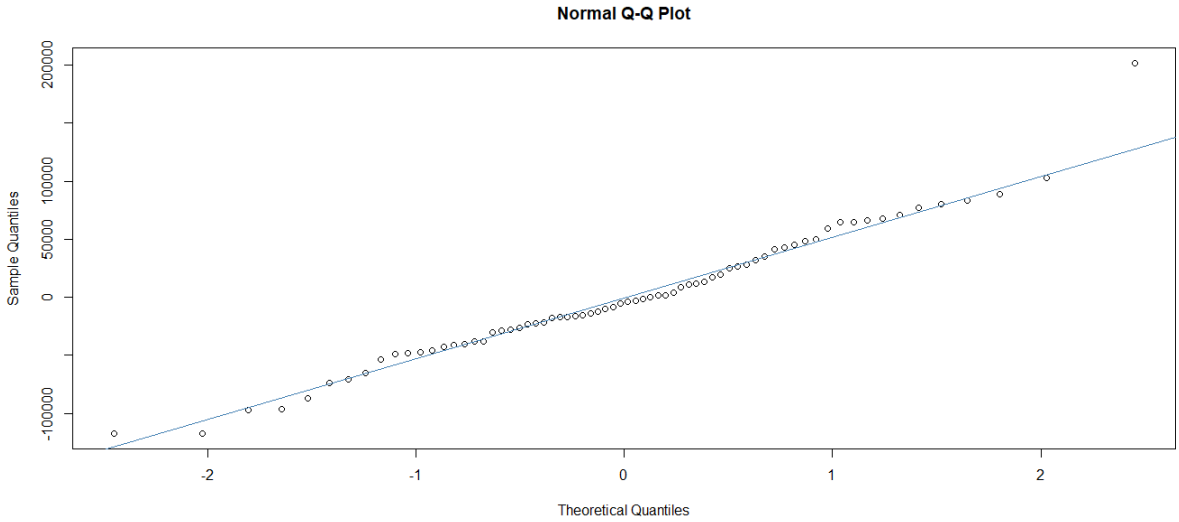
GDP per capita: 1.583210

Inflation rate: 1.126360

PSV: 1.841761

1.2.2. Normality of Residuals

Figure 7. Q-Q Plot for EU Model



1.2.3. Breusch-Godfrey/Wooldridge Test for Serial Correlation

- Test Statistic (chisq): 33.298
- Degrees of Freedom (df): 14
- p-value: 0.002609
- Alternative Hypothesis: Serial correlation in idiosyncratic errors

1.2.4. Breusch-Pagan Test for Heteroscedasticity

- Statistic (BP): 30.339
- Degrees of Freedom (df): 4
- p-value: 4.175e-06

1.2.5. Regression table from R

```
Call:
plm(formula = net_migration ~ employment_rate + gdp_percapita +
    inflation_rate + polstab, data = merged_final_eu, effect = "twoways",
    model = "within")

Balanced Panel: n = 5, T = 14, N = 70

Residuals:
     Min.   1st Qu.    Median   3rd Qu.      Max.
-117525.8  -36081.1   -4674.7   34503.2  201938.4

Coefficients:
                  Estimate  Std. Error t-value  Pr(>|t|)
employment_rate  1.8753e+04  5.2105e+03  3.5992 0.0007538 ***
gdp_percapita    2.8215e+00  5.1172e+00  0.5514 0.5839378
inflation_rate   5.9440e+04  9.1182e+03  6.5188 4.024e-08 ***
polstab         -2.6320e+05  1.1522e+05 -2.2843 0.0268190 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    5.206e+11
Residual Sum of Squares: 2.1567e+11
R-Squared:      0.58574
Adj. R-Squared: 0.4045
F-statistic: 16.9672 on 4 and 48 DF, p-value: 9.8258e-09
```

2. Additional comments on the technical aspects of the thesis

2.1. Serbia robustness checks comments

In the push model, all VIF values are well below 5, indicating that there is no concerning multicollinearity among the independent variables. This suggests that each predictor provides unique information to the model without excessive overlap with other variables.

The points in the Q-Q plot largely follow the theoretical line, which tells us that the residuals of this model are approximately normally distributed. There is a slight deviation in the tails, especially at the lower left end, where one point diverges from the expected line. This indicates some minor deviation from normality, potentially signalling presence of outliers or heavy tails in the distribution of residuals.

The residuals vs fitted plot shows a relatively random scatter of residuals around the horizontal line. There's no apparent pattern or systematic curve, which suggests that there are no major issues with non-linearity. The spread of residuals appears consistent across the range of fitted values, suggesting some levels of homoscedasticity. There are a few points that stand

significantly away from others, especially at the higher end of the fitted values and a couple at the lower end. These are outliers that I did not remove from the dataset since I wanted to preserve the number of observations.

The p-value is above the usual threshold of 0.05, indicating no significant evidence of heteroscedasticity. Therefore, we can safely conclude that the model is fairly reliable.

The Durbin-Watson statistic is significantly lower than 2, which suggests positive autocorrelation in the residuals of the model. The very low p-value supports rejecting the null hypothesis of no autocorrelation.

2.2. EU robustness checks comments

All VIF values in the EU model are well below 5, which suggests that there is no significant multicollinearity among the predictors in this model. Each predictor is providing unique information that is not overly redundant with the information from other predictors. The low VIF values indicate that the regression coefficients and their standard errors are likely reliable, meaning the effects of each variable are well-estimated without undue influence from overlaps in variance with other variables.

The points on the plot largely follow the theoretical line which is a good indication that the residuals are approximately normally distributed. The deviation in the upper tail, where the residuals are higher than expected under normality indicate positive skewness or the presence of a few unusually large values. Unfortunately, I am not sure where these are coming from. I do not think that these deviations significantly impact the regression results.

The heteroscedasticity tests show that there is some heteroscedasticity in the model. I believe this is due to either one of these two possibilities:

a) The large outliers, particularly in employment rate or inflation rate could disproportionately affect the variance of the residuals.

b) Different countries in the EU model may have unique characteristics that impact migration differently. These unique impacts might not be fully captured by the fixed effects, leading to residual variance that changes across countries.

A robust standard error check doesn't give such a massive change either. Here is the table for that regression.

Table 3. Linear regression with robust standard error

```
t test of coefficients:

                   Estimate  Std. Error t value  Pr(>|t|)
employment_rate  1.26903968  0.27264890  4.6545 2.587e-05 ***
gdp_percapita   -0.00027403  0.00028145 -0.9736    0.3351
inflation_rate   4.81381481  0.78707478  6.1161 1.667e-07 ***
polstab         -7.33218038  8.01212663 -0.9151    0.3647
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

The results suggest that economic factors such as employment and inflation rates are still significant drivers of migration, whereas GDP per capita and political stability do not show significant effects in this model. The difference is not staggering, but the use of robust standard errors provides a more reliable statistical inference, particularly in the presence of heteroscedasticity, as they adjust for potential biases in standard error estimation.