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Interrelationship between Migration, Employment and Economic Growth in the United States: A Dynamic Analysis from 1990 to 2022

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ABSTRACT

The study aims to explore the intricate relationships between migration flows, employment dynamics, and economic growth in the United States from 1990 to 2022. Specifically, it assesses the impact of refugee admissions and legal permanent residents on GDP and GDP per capita in both the short and long term. A comprehensive econometric approach was employed, including correlation analysis, regression modeling, and dynamic trend evaluation. The study tested three hypotheses concerning the effects of employment growth on GDP, the distinct impacts of different migration flows, and the influence of these factors on employment rates. The study utilizes data from Statista for employment and migration figures, and GDP data from the World Bank. The analysis revealed a significant negative correlation between employment rates and GDP ($r = -0.701$, $p < 0.001$) and GDP per capita ($r = -0.686$, $p < 0.001$), indicating that declining employment rates are associated with increased economic output. Employment growth, counterintuitively, correlates negatively with GDP, suggesting that other factors such as productivity and technological advancements offset labor market contractions. Key results highlight the differentiated economic contributions of various migrant categories and their implications for policy. The findings underscore the complex and multifaceted nature of migration's impact on the U.S. economy. While migration generally contributes positively in the long term, short-term challenges, particularly from refugee admissions, can strain economic resources. The study highlights the need for tailored economic and integration policies to maximize the benefits of migration while mitigating its challenges.

KEYWORDS: Economic Growth, Econometric Modeling, Migration Flows, Employment Rates, Refugee Integration, Legal Permanent Residents, Labor Market

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Взаимосвязь между миграцией, занятостью и экономическим ростом в Соединенных Штатах: динамический анализ за 1990 – 2022 гг.

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АННОТАЦИЯ

Исследование направлено на изучение взаимосвязей между миграционными потоками, динамикой занятости и экономическим ростом в Соединенных Штатах за период с 1990 по 2022 год. В частности, оценивается влияние приёма беженцев и легальных постоянных жителей на ВВП и ВВП на душу населения в краткосрочной и долгосрочной перспективе. В статье используется комплексный эконометрический подход, включающий корреляционный анализ, регрессионное моделирование и оценку динамических тенденций. В рамках исследования были проверены три гипотезы, касающиеся влияния роста занятости на ВВП, различий в воздействии различных миграционных потоков, а также влияния этих факторов на уровень занятости. В статье использованы данные Statista по занятости и миграции, а также данные Всемирного банка по ВВП. Анализ выявил значительную отрицательную корреляцию между уровнями занятости и ВВП ($r = -0,701$, $p < 0,001$) и ВВП на душу населения ($r = -0,686$, $p < 0,001$), что свидетельствует о том, что снижение уровней занятости связано с ростом экономического выпуска. Рост занятости, как ни парадоксально, коррелирует отрицательно с ВВП, что указывает на то, что другие факторы, такие как производительность и технологические достижения, компенсируют сокращения на рынке труда. Основные результаты подчеркивают дифференцированные экономические вклады различных категорий мигрантов и их значение для разработки политики. Выводы подчеркивают сложный и многоаспектный характер влияния миграции на экономику США. Хотя миграция в целом способствует экономическому росту в долгосрочной перспективе, краткосрочные вызовы, особенно связанные с приёмом беженцев, могут оказывать давление на экономические ресурсы. Исследование подчеркивает необходимость разработки специализированной экономической и интеграционной политики, направленной на максимизацию выгод от миграции и смягчение связанных с ней проблем.

КЛЮЧЕВЫЕ СЛОВА: экономический рост, эконометрическое моделирование, миграционные потоки, уровень занятости, интеграция беженцев, законные постоянные жители, рынок труда

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INTRODUCTION

The United States, a center of significant importance in global economic and cultural dynamism, is the focus of this study. Understanding the interaction between demographic trends and economic performance is crucial as a country is shaped by diverse migration patterns and economic cycles. This study investigates the intricate relationships between migration flows, employment rates, and key economic indicators such as GDP and GDP per capita in the United States from 1990 to 2022. By integrating correlation analysis, regression models, and dynamic trend evaluations, a comprehensive assessment is provided of how different categories of migrants – specifically refugees and legal permanent residents – impact economic growth and stability.

The analysis extends beyond static metrics by incorporating the broader socio-economic landscape's temporal dynamics. Major global events, such as the 2008 financial crisis, the COVID-19 pandemic, and significant shifts in U.S. immigration policy, are contextualized to understand better how they influence economic patterns. These historical and cultural factors and the nation's evolving labor market form the backdrop for understanding America's resilience and adaptability.

Through this lens, the study quantifies migration's direct contributions to economic performance and highlights the nuanced, often counterintuitive interactions between employment, demographic shifts, and long-term economic health. The insights derived from this research are intended to contribute to ongoing discussions surrounding migration policy, labor market trends, and the enduring strength of the American economic model, engaging the audience in the conversation.

This research aims to examine the complex interactions between migration patterns, employment dynamics, and economic indicators in the United States from 1990 to 2022. The mixed approach, which consisted of correlation analysis, regression modeling, and dynamic assessments, was used to study the relationship between various migration factors, including refugee admissions and the number of legal permanent residents, that influence GDP and GDP per capita. Additionally, the research explores how broader socio-economic events, such as economic crises and shifts in immigration policy shape these economic outcomes. Ultimately, the goal is to provide a nuanced understanding of the interplay between demographic changes and economic growth, offering insights that are relevant for policy-making and strategic economic planning.

LITERATURE REVIEW

The relationship between migration, cultural diversity, and economic growth has been central in economic and sociological research for decades. Scholars have long argued that the influx of diverse talents, skills, and cultural perspectives fosters innovation, enhances productivity, and drives economic dynamism. One primary argument supporting the positive impact of migration on economic growth is rooted in the idea that diversity spurs innovation. Culturally diverse societies are more likely to generate new ideas, create innovative solutions, and adapt to changing circumstances. Research shows that regions with higher levels of cultural diversity tend to have more dynamic economies characterized by higher rates of entrepreneurship, creativity, and technological advancement (Leung & Chiu, 2010; Freeman & Huang, 2014; Wang et al., 2019). This is particularly evident in urban areas where diverse populations converge, leading to creative economies. These studies argue that blending different cultural backgrounds, experiences, and perspectives drives economic performance and creates environments where new industries can emerge. This notion is particularly relevant in the United States, which is often described as a nation of immigrants (Handlin, 2002; Mendoza, 2010; Lauret, 2016). Unlike many other countries where immigration is a relatively recent phenomenon, the U.S. has historically relied on the continuous influx of migrants to build and sustain its economy. Over the past century, waves of immigrants from Europe, Asia, Latin America, and other regions have significantly shaped the U.S. labor market, culture, and innovation landscape. The "American Dream" concept is intrinsically linked to the idea that anyone, regardless of background, can succeed in the U.S. (Cullen, 2003; Hauhart & Sardoč, 2021). This narrative has attracted millions of people who, in turn, have fueled economic growth and development. Research consistently shows that immigrant communities play a vital role in both traditional sectors and emerging industries, ranging from agriculture and manufacturing to technology and finance.

The central issue remains the impact of migration on the economy and integration policies in modern research through various approaches across countries reflecting distinct social and economic contexts. This review synthesizes critical studies chronologically and highlights how their findings intersect, creating a cohesive narrative around the complexities of integrating migrants into labor markets.

Dixon et al. (2010) set the foundation by analyzing the effects of reducing illegal immigration in the U.S. labor market. Their work underscores the macroeconomic consequences of removing undocumented workers, revealing that a 28.6% reduction would shrink GDP by 1.6%. The study emphasizes the importance of alternative strategies, like taxing employers who hire undocumented workers, to mitigate negative economic outcomes while benefiting legal residents. This early work provides a backdrop for later studies that explore how legalization and formal market access could either support or destabilize economies.

Building on these ideas, Hazans (2011) investigates informal employment in Europe, highlighting the role of strict labor regulations and high minimum wages in driving informal work, especially in Southern and Eastern Europe. Hazans' findings complement those of Dixon et al. (2010), showing that labor policies intended to protect workers can have unintended consequences, pushing more individuals into informal sectors, particularly in economies with strong growth dynamics. Both studies collectively suggest that balancing regulation with flexible policies is essential to avoid creating barriers to formal employment.

Moving forward to more recent analyses, Clemens et al. (2018) focus on Turkey and Kenya, offering a nuanced perspective on formal labor market access for refugees. In contrast to the earlier studies that focused on informal employment and undocumented workers, this research shifts attention to formalization processes. In Turkey, where informal work is prevalent, the formalization of refugee labor would likely yield modest economic shifts, while in Kenya, where refugees are primarily confined to camps, such formalization could trigger significant structural changes. This work aligns with Hazans (2011) by highlighting how the structure of existing labor markets determines the impact of integration policies.

Kancs and Lecca (2018) extend these discussions to the European context, focusing on the long-term benefits of integrating migrants into formal labor markets. Their findings, predicting a 1.6% GDP increase in the EU by 2060 with full integration, mirror the earlier work by Clemens et al. (2018) but with a specific emphasis on strategic investment and planning. Both studies underline the importance of viewing integration as a short-term response and a pathway to sustained economic growth. This perspective is critical in understanding how long-term policy commitments can yield broader societal benefits.

Noja et al. (2018) elaborates further on the positive effects of migration in Europe, emphasizing how economically advanced countries like Germany and Sweden benefit from migrant labor through increased employment and GDP per capita. Their work resonates with the conclusions of Kancs and Lecca (2018), reinforcing the idea that effective integration measures are key to harnessing migrants' economic potential. These studies collectively argue that, while immediate impacts may be limited, the cumulative effects of well-implemented policies can significantly boost economic performance.

Ortega et al. (2019) explore similar themes in the U.S., focusing specifically on the DREAMers and the potential economic outcomes of providing them legal status. Their analysis, which projects a $15.2 billion GDP increase through programs like DACA and the DREAM Act, reflects the broader findings of European studies. The central idea is that legalization and access to formal education and employment can drive economic growth, particularly when targeted at younger, educated populations.

Hailat et al. (2023) return to the issue of informal employment, examining the case of Jordan, one of the largest hosts of refugees worldwide. Like Hazans (2011) and Clemens et al. (2018), they highlight the challenges of informal labor markets, where refugees often find themselves trapped in low-wage, insecure jobs. The study underscores the need for more robust policies to formalize employment and reduce inequality—paralleling the conclusions reached in European and U.S. contexts.

These works collectively reveal that while migration undeniably brings economic benefits, the extent of these benefits depends heavily on the adaptability and structure of local labor markets. The broad narrative emphasizes that flexible and inclusive policies can turn diversity into a significant economic advantage (Jones et al., 2019; Rodríguez-Pose & Von Berlepsch, 2019). This finding aligns with the broader discussion on how migration has historically contributed to the United States' economic growth. The U.S. serves as a critical case study, demonstrating how a nation's ability to harness its cultural diversity and immigrant workforce is crucial in maintaining competitiveness and fostering innovation.

However, gaps remain in understanding how different types of migration, such as refugee flows, legal permanent residents, and undocumented migrants, contribute uniquely to economic performance. Much of the literature tends to group migrants into broad categories, overlooking the nuanced ways different migrant groups affect the economy. This review integrates global and U.S.-specific insights, showing that while the economic benefits of migration are clear, the pathways through which these benefits are realized are complex and require a tailored policy approach that considers local conditions, the specific nature of migrant flows, and long-term planning.

As the U.S. and other nations grapple with immigration policy, these studies suggest that success lies in fostering environments where diverse populations can thrive economically. The intersection of migration and economic growth is not simply a matter of numbers; cultural dynamics, labor market conditions, and the strategic direction of policy deeply influence it. Understanding these interconnections is essential for maximizing the benefits of migration while minimizing associated risks, ensuring that economies continue to grow and innovate in a globally interconnected world.

In addition to these broad economic insights, recent studies have examined the specific mechanisms through which migration influences economic performance.

Hypothesis 1: Changes in the employment rate are associated with shifts in GDP and GDP per capita, indicating that labor market dynamics significantly influence economic performance.

Hypothesis 2: Migration flows, specifically refugee admissions and the number of legal permanent residents, have distinct impacts on GDP and GDP per capita, with varying short-term and long-term economic effects.

Hypothesis 3: Different types of migration, including refugee admissions and the acquisition of permanent resident status (green cards), have varying impacts on employment levels in the United States.

METHODOLOGY

During the research, several hypotheses were formulated to guide the analysis. These hypotheses were designed to explore the relationship between migration, employment, and economic performance in the United States from 1990 to 2022.

The methodology for this study involves a comprehensive econometric analysis to test two key hypotheses: (1) the relationship between employment growth and GDP dynamics, and (2) the impact of migration factors - specifically, the number of legal permanent residents and refugee admissions - on GDP and GDP per capita. The dynamics for employment migration (the number of persons obtaining legal permanent resident status and refugee admissions) covering the period from 1990 to 2022 were collected from the online platform Statista. The rest of the data, including GDP (in current US$) and GDP per capita, was collected from the World Bank.

The first hypothesis concerned the correlation between the growth in employment rates and GDP and GDP per capita. Initially, a Pearson correlation analysis was applied to evaluate the strength and direction of these relationships. The Pearson correlation coefficient (r) is calculated using the formula (1):

$$r = \frac{n(\sum xy) - (\sum x)(\sum y)}{\sqrt{[n\sum x^2 - (\sum x)^2]\,[n\sum y^2 - (\sum y)^2]}} \qquad (1)$$

where:

n - the number of observations;

x - represents the employment rate;

y - is GDP / GDP per capita.

Following the correlation analysis, a linear regression model was developed where:

GDP / GDP per capita - are dependent variables

employment rate - is the independent variable.

The regression equation is expressed as formula (2):

$$Y = \beta_0 + \beta_1 X + \epsilon \qquad (2)$$

In this equation:

Y - the economic development (GDP or GDP per capita);

X - the employment rate;

- the intercept;

- measures the influence of employment on economic output;

- the error term.

The statistical significance of will be tested to determine whether employment growth significantly contributes to economic growth. The goodness-of-fit will be evaluated using the R-squared value.

The second hypothesis focuses on the relationship between migration factors and economic development (including GDP and GDP per capita). A multiple regression model was developed, incorporating the number of legal permanent residents and refugee admissions as independent variables. The regression formula is (3):

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon \qquad (3)$$

where:

Y the economy development (GDP or GDP per capita);

- the number of persons obtaining legal permanent resident status;

- the number of refugee admissions.

/ - the relative impact of each migratory factor on economic performance;

ϵ is the error term, accounting for the variability in the employment rate not explained by the model.

The third hypothesis examines whether migration flows (refugee admissions and legal permanent residents) influence the employment rate. The analysis involves applying a multiple regression model, where the employment rate is the dependent variable, and the number of legal permanent residents and refugee admissions are the independent variables. The regression equation for this hypothesis is as follows (4):

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon \qquad (4)$$

where:

Y - the employment rate;

- the number of persons obtaining legal permanent resident status

- the number of refugee admissions.

- the intercept, representing the baseline employment rate when both independent variables are zero. The coefficients measures the effect of legal permanent residents on the employment ratуж

the effect of refugee admissions on the employment rate.

ϵ - the error term, accounting for the variability in the employment rate not explained by the model.

The three models collectively highlight the complex relationship between employment, migration, and economic performance. While migration flows influence GDP and employment, their effects vary depending on migration and the economic context. These results underscore the need for tailored policies that address the distinct economic contributions and challenges associated with different migration patterns.

RESULTS

This study conducted a comprehensive analysis to explore the relationship between key economic indicators and migration patterns in the United States from 1990 to 2022. The approach involved a multi-step process, beginning with a correlation analysis to identify the initial associations between variables such as GDP, GDP per capita, employment rates, refugee admissions, and the number of legal permanent residents. This was followed by regression modeling, through which the impact of these factors was quantified, with a particular focus on how migration and employment influence economic outcomes. In addition to these econometric analyses, the dynamics of these variables over time were also examined, considering historical events and external factors such as economic crises, policy shifts, and cultural developments. By incorporating dynamic analysis, deeper insights were gained into how short-term fluctuations and long-term trends interact to shape the overall economic landscape, providing a well-rounded understanding of the complex interplay between migration, labor markets, and economic growth in the U.S.

Next, in Table 1, the results of the correlation analysis of the first hypothesis are presented.

Table 1. Correlation matrix Hypothesis 1

Variable Pair	Pearson's r	Degrees of Freedom (df)	p-value	Spearman's rho	Spearman's p-value
Employment Rate vs. GDP (current US$)	-0.701	31	<.001	-0.675	<.001
Employment Rate vs. GDP per Capita (current US$)	-0.686	31	<.001	-0.669	<.001
GDP (current US$) vs. GDP per Capita (current US$)	0.999	31	<.001	1.000	<.001

Note: compiled by author

The correlation analysis showed a significant relationship between the employment rate and economic development (GDP and GDP per capita). Specifically, there was observed a strong negative correlation between the employment rate and both GDP ($r = -0.701$, $p < .001$) and GDP per capita ($r = -0.686$, $p < .001$), indicating that periods of declining employment rates are associated with increases in economic output. The nearly perfect positive correlation between GDP and GDP per capita ($r = 0.999$, $p < .001$) is expected, as GDP per capita is directly derived from overall economic output.

The consistency between Pearson's r and Spearman's rho across these variables supports the robustness of these relationships, even when accounting for potential non-linearities. The significant p-values further reinforce the reliability of the findings, allowing for confident conclusions about the inverse relationship between employment rates and economic indicators in this context. However, while correlation analysis is valuable for identifying associations, it does not account for the direction or magnitude of causal relationships. Therefore, the next logical step is to conduct a regression analysis to quantify the specific impact of employment rates and migration factors (number of legal permanent residents and refugee admissions) on GDP and GDP per capita.

By introducing regression models, we can isolate the contribution of each variable and control for potential confounding effects. This approach will allow us to determine the degree to which changes in the employment rate and migration factors predict economic outcomes, thereby providing a more nuanced understanding of the underlying mechanisms driving the observed correlations. The regression analysis will be critical in testing the hypotheses and exploring the broader economic implications of labor market and demographic shifts.

Table 2 shows results for regression results of the first hypothesis.

Table 2. Regression results from Hypothesis 1

Model	R	R²	Predictor	Estimate	SE	t	p-value
Model 1: GDP per Capita (current US$)	0.686	0.471	Intercept	336,025	55,449	6.06	<.001
			Employment Rate	-4,746	904	-5.25	<.001
Model 1: GDP (current US$)	0.701	0.491	Intercept	1.26e+14	2.05e+13	6.14	<.001
			Employment Rate	-1.83e-12	3.34e+11	-5.47	<.001

Note: compiled by author

The regression analysis presents significant results, demonstrating the impact of the employment rate on both GDP and GDP per capita. For the model assessing GDP per capita as the dependent variable, the R^2 value of 0.471 suggests that approximately 47.1% of the change in GDP per capita is explained by changes in the employment rate. The negative coefficient for the employment rate (-4,746) indicates an inverse relationship, implying that although the number of employed populations decreases, GDP per capita tends to increase. This finding is statistically significant, with a t-value of -5.25 and a p-value less than 0.001, confirming that the employment rate is a crucial determinant in this model. The intercept value of 336,025 represents the predicted GDP per capita when the employment rate is zero, though this value is more of a theoretical anchor than a practical expectation.

For the model focusing on GDP as the dependent variable, the R^2 value of 0.491 indicates that nearly 49.1% of GDP variation can be attributed to fluctuations in the employment rate. Similar to the first model, the employment rate demonstrates a negative relationship with GDP, with a coefficient of -1.83e-12. While this coefficient appears small in magnitude due to the scale of GDP figures, the relationship is significant, as indicated by the t-value of -5.47 and the p-value of less than 0.001. The intercept of 1.26e+14 signifies the baseline GDP level when the employment rate is zero, again serving primarily as a theoretical construct.

Thus, even with decreasing labor market participation, economic growth can continue through productivity gains, technological innovations, and shifts toward capital-intensive sectors that do not rely heavily on labor. The negative relationship between employment and economic output underscores the complex dynamics at play within the U.S. economy, where other macroeconomic factors might offset declines in labor participation.

Table 3 shows results for correlation analysis of the second hypothesis.

Table 3. Correlation matrix Hypothesis 2

Variable 1	Variable 2	Pearson's r	df	P-value
GDP (current US$)	GDP per capita (current US$)	0.999	31	< .001
GDP per capita (current US$)	Number of refugee admissions in the U.S.	-0.758	31	< .001
Number of refugee admissions in the U.S.	Number of persons obtaining legal permanent resident status	0.231	31	0.197
Number of refugee admissions in the U.S.	Number of persons obtaining legal permanent resident status	0.231	31	0.197

Note: compiled by author

The correlation analysis provides critical insights into the relationships among GDP, GDP per capita, refugee admissions, and the number of legal permanent residents in the U.S. The almost perfect positive correlation between GDP and GDP per capita ($r = 0.999$, $p < .001$) is expected, given that GDP per capita is directly derived from overall economic output. The high degree of correlation confirms that any changes in GDP closely mirror changes in GDP per capita. However, the analysis reveals a fascinating and counterintuitive result when considering the relationship between refugee admissions and economic indicators. Specifically, the negative correlation between refugee admissions and both GDP ($r = -0.747$, $p < .001$) and GDP per capita ($r = -0.758$, $p < .001$) suggests that increases in refugee numbers are associated with declines in economic output. This could indicate the initial economic burdens of integrating large numbers of refugees, including short-term costs in social services and labor market absorption challenges. Conversely, the weak and statistically insignificant correlation between the number of legal permanent residents and both GDP ($r = -0.055$, $p = 0.760$) and GDP per capita ($r = -0.058$, $p = 0.747$) indicates that this migration category does not have a straightforward or immediate impact on overall economic indicators. The moderate correlation between refugee admissions and legal permanent residents ($r = 0.231$, $p = 0.197$) suggests some alignment in the trends of these migration streams. However, the relationship is not strong enough to be deemed significant.

Economically, the negative correlation between refugee admissions and economic growth raises questions about the short-term effects of migration flows on GDP. It suggests that while migration generally has positive long-term effects, certain categories of migrants may present short-term challenges that temporarily suppress economic output. This could involve factors such as the cost of resettlement, difficulties in immediate labor market integration, or shifts in public spending. On the other hand, the lack of significant correlation between legal permanent residents and GDP underscores the complexity of migration's economic effects, where broader macroeconomic factors might dilute the measurable impact of this variable.

To explore these dynamics further, the analysis will proceed with a regression model incorporating migration factors - refugee admissions and legal permanent residents—as independent variables predicting GDP and GDP per capita. This approach will allow for a more detailed examination of how each migration stream contributes to economic performance while controlling for the influence of other factors. By quantifying the individual contributions of these variables, the regression analysis will offer a clearer understanding of the underlying economic mechanisms and provide insights into policy implications.

Table 4 shows the regression results of the second hypothesis are presented.

Table 4. Regression results in Hypothesis 1

Model	Predictor	R	R²	Estimate	SE	t	P-value
GDP (current US$)	Intercept	0.757	0.572	1.97e+13	2.90e+12	6.78	< .001
GDP (current US$)	Number of refugee admissions	0.757	0.572	-1.33e-8	2.11e+7	-6.32	< .001
GDP per Capita (current US$)	Intercept	0.767	0.588	61270.18334	7553.93042	8.11	< .001
GDP per Capita (current US$)	Number of refugee admissions	0.767	0.588	-0.35819	0.05485	-6.53	< .001

Note: compiled by author

The regression analysis reveals crucial insights into the relationship between migration factors -specifically, refugee admissions and the number of legal permanent residents - and GDP per capita. The model predicting GDP (current US$) shows an R^2 value of 0.572, indicating that changes in these migration variables can explain 57.2% of the variation in GDP. The coefficient for refugee admissions is negative and highly significant (Estimate = -1.33e-8, $p < .001$), implying that an increase in refugee numbers is associated with a decrease in GDP. This result aligns with the earlier correlation analysis, reinforcing that the short-term economic effects of rising refugee numbers could be negative, likely due to the initial costs of integration, social services, and labor market challenges. Conversely, the coefficient for the number of legal permanent residents, though positive (Estimate = 2.81e+6), is statistically insignificant ($p = 0.322$), suggesting that this migration category does not substantially influence overall GDP in the short term.

In the second model, predicting GDP per capita, the R^2 value is slightly higher at 0.588, indicating that the included predictors capture 58.8% of the variance in GDP per capita. Like the first model, the coefficient for refugee admissions remains negative and statistically significant (Estimate = -0.35819, $p < .001$), reflecting a consistent inverse relationship between refugee inflows and per capita economic output. This finding suggests that the short-term pressures associated with integrating refugees, including potential strains on public resources and labor markets, might outweigh any immediate economic contributions they bring. Although showing a positive coefficient (Estimate = 0.00742), the number of legal permanent residents remains statistically insignificant ($p = 0.315$), indicating that this variable does not significantly impact GDP per capita in the short term.

Table 5 shows the results of the correlation analysis of the third hypothesis are presented.

Table 5. Correlation matrix Hypothesis 1

Variable	Employment rate	Number of refugee admissions in the U.S.	Number of persons obtaining legal permanent resident status in the U.S.
Employment rate	Pearson's r: —	Pearson's r: 0.317	Pearson's r: -0.082
	df: —	df: 31	df: 31
	p-value: —	p-value: 0.073	p-value: 0.649
Number of refugee admissions in the U.S.	Pearson's r: 0.317	Pearson's r: —	Pearson's r: 0.231
	p-value: —	p-value: 0.073	p-value: 0.649
Number of persons obtaining legal permanent resident status in the U.S.	Pearson's r: -0.082	Pearson's r: 0.231	Pearson's r: —
	df: 31	df: 31	df: —
	p-value: 0.649	p-value: 0.197	p-value: —

Note: compiled by author

The third hypothesis explores the relationships between the employment rate, the number of refugee admissions, and the number of persons obtaining legal permanent resident status in the U.S. The analysis shows a moderate positive correlation (Pearson's r = 0.317) between the employment rate and refugee admissions, but with a p-value of 0.073, this relationship is not statistically significant. The correlation between the employment rate and the number of legal permanent residents is weak and negative (Pearson's r = -0.082), with a high p-value (0.649), indicating no significant relationship. Additionally, the correlation between refugee admissions and legal permanent residents is weak and insignificant (Pearson's r = 0.231, p-value = 0.197).

Table 6 shows results for regression results of the third hypothesis.

Table 6. Regression results from Hypothesis 1

Model Fit Measures		**R**	**R^2**	
Model 1		0.354	0.126	
Model Coefficients - Predictor	Estimate	SE	t	p
Intercept	61.2	1.59	38.450	<.001
Number of persons obtaining legal permanent resident status in the U.S.	-1.43e−6	1.53e-6	-0.934	0.358
Number of refugee admissions in the U.S.	2.33e-5	1.16e-5	2.020	0.052

Note: compiled by author

The regression analysis examines the impact of the number of persons obtaining legal permanent resident status in the U.S. and the number of refugee admissions on the employment rate. The model fit measures indicate that the regression model has modest explanatory power, with an R-value of 0.354 and an R^2 value of 0.126. This suggests that approximately 12.6% of the variance in the employment rate is explained by the predictors in the model. The intercept is estimated at 61.2, with a highly significant t-value (38.450, $p < 0.001$), indicating that the baseline employment rate, when all predictors are held constant, is robustly estimated. The coefficient for the number of persons obtaining legal permanent resident status is negative but close to zero (-1.43e-6) and is not statistically significant ($t = -0.934$, $p = 0.358$). This result suggests that changes in the number of legal permanent residents have little to no meaningful impact on the employment rate in this model. In contrast, the coefficient for the number of refugee admissions is positive (2.33e-5) and approaches statistical significance ($t = 2.020$, $p = 0.052$). Although the p-value is slightly above the conventional 0.05 threshold, the result indicates a potential positive association between refugee admissions and the employment rate. The estimate suggests that, on average, an increase in refugee admissions could correspond to a slight rise in the employment rate, though the near-significant p-value warrants cautious interpretation.

Econometrically, these results highlight the importance of distinguishing between different types of migration flows when analyzing their economic effects. The statistically significant negative relationship between refugee admissions and GDP and GDP per capita underscores the need for targeted economic policies addressing the initial integration challenges associated with refugee populations. Meanwhile, legal permanent residents' lack of significant impact suggests that their long-term economic contributions might be more gradual and less directly observable in short-term GDP metrics. From an economic perspective, these findings support the argument that while migration is generally beneficial in the long run, the immediate effects can vary depending on the type of migration. Refugees, who often require more immediate support and integration efforts, may initially strain economic resources, leading to short-term declines in GDP. In contrast, legal permanent residents, who typically arrive with more excellent economic stability, may have a more neutral immediate effect, with their positive contributions likely manifesting over time.

The additional analysis of the third hypothesis, which investigates the relationship between employment rate changes and migration flows, further reinforces these conclusions. The regression model results show a near-significant positive association between refugee admissions and the employment rate ($p = 0.052$), suggesting that as more refugees are admitted, the employment rate may increase slightly. However, the result is not statistically significant. The impact of legal permanent residents on the employment rate remains insignificant, reflecting their neutral effect on short-term labor market dynamics. These findings underline that the economic effects of migration are multifaceted and may manifest differently depending on the nature of the migration flow. While refugee admissions show some immediate influence on employment, legal permanent residents seem to integrate more gradually, with their contributions becoming evident only over a more extended period.

Table 3 provides a summary of all three hypotheses.

Table 7. Hypotheses summary

Hypothesis	Confirmation Status	P-Value
Changes in the employment rate are associated with shifts in GDP and GDP per capita.	Partially confirmed	<0.001 (for employment rate impact on GDP and GDP per capita)
Migration flows (refugee admissions and legal permanent residents) directly impact GDP and GDP per capita.	Partially confirmed	<0.001 (for refugee admissions impact on GDP and GDP per capita); 0.322 (for legal permanent residents impact on GDP)
Refugee admissions and legal permanent residents influence the employment rate differently.	Partially confirmed	0.052 (for refugee admissions impact on employment); 0.358 (for legal permanent residents impact on employment)

Note: compiled by author

The table summarizes the results of the hypotheses regarding the relationship between migration flows, employment rates, and key economic indicators like GDP and GDP per capita. The first hypothesis indicates that while changes in the employment rate significantly affect GDP and GDP per capita, the correlation is negative, suggesting that short-term employment dynamics may not always align positively with economic growth.

The second hypothesis reveals that refugee admissions have a clear negative impact on GDP, highlighting the initial economic strain of integrating refugee populations. In contrast, the effect of legal permanent residents on GDP is positive but insignificant, suggesting that their contributions might be more gradual and long-term.

The third hypothesis shows that refugee admissions significantly positively affect the employment rate, indicating a potential for labor market integration over time. In contrast, the influence of legal permanent residents remains statistically insignificant. Overall, the findings emphasize the varied and complex ways different migration flows influence economic outcomes, reinforcing the importance of tailored policies for different types of migrants.

Next, in Figure 1, the dynamics of these variables over time were analyzed to explore how these relationships evolve and to identify potential trends or lagging effects that may influence economic outcomes.

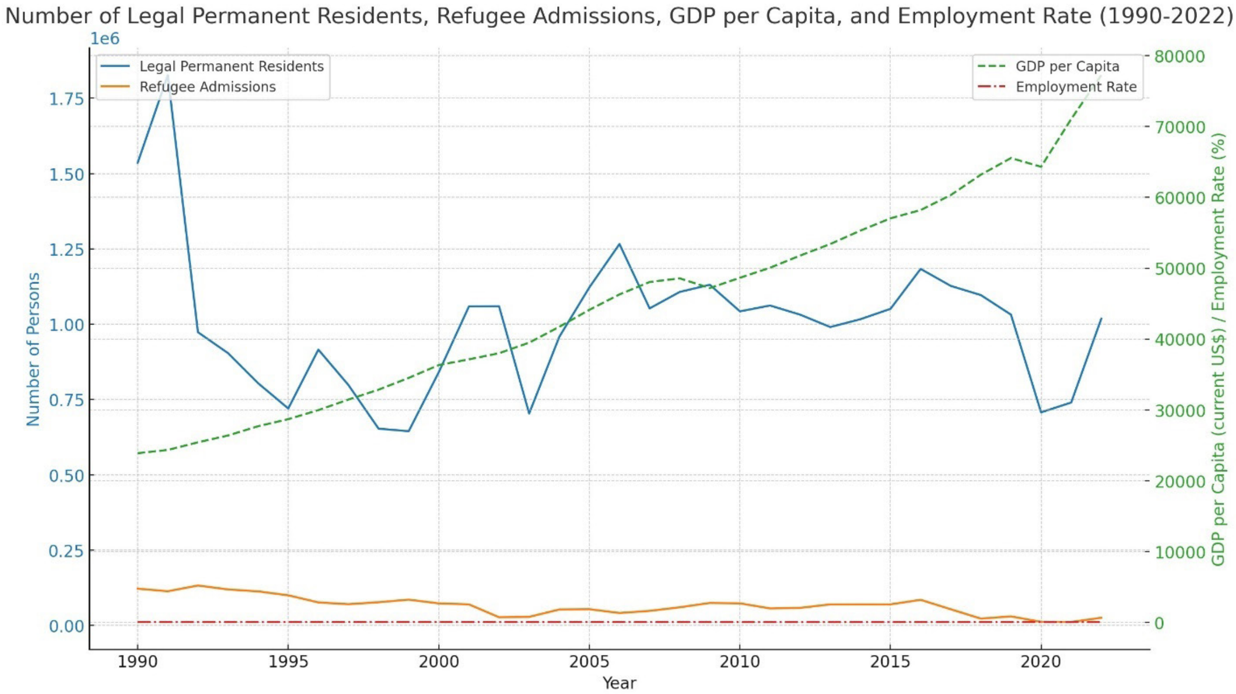

Figure 1. The dynamic of key economic indicators and migration patterns

Note: compiled by the author based on source Statista (2022), World Bank (2022)

The data analysis from 1990 to 2022 provides a comprehensive perspective on the dynamics between migration patterns (number of legal permanent residents and refugee admissions) and key economic indicators such as GDP, GDP per capita, and the employment rate. An analysis of the relationship between employment rates and GDP reveals that during periods of declining employment, notably during the 2008 financial crisis and the subsequent years (2009-2012), GDP levels remained stable or even increased. This aligns with the regression findings, which indicate a negative correlation between employment and economic growth. These results suggest that other macroeconomic factors, such as productivity improvements, technological advancements, or a shift toward capital-intensive industries, may offset declines in labor market participation. For instance, during the 2008 financial crisis, businesses turned to automation and more efficient processes, which sustained GDP growth despite falling employment levels.

The impact of migration is particularly evident when analyzing refugee admissions and legal permanent residents. Refugee admissions show significant fluctuations, particularly in response to geopolitical events, such as the conflicts in the Middle East, which led to a spike in refugee arrivals in the mid-2010s. The regression analysis confirmed a negative relationship between refugee admissions and GDP per capita. Periods with high refugee inflows, such as 2001-2004 and 2015-2017, correlate with slower growth in GDP per capita, indicating that the short-term economic impact of absorbing large numbers of refugees can be challenging due to the immediate costs of resettlement, social services, and integration into the labor market. Additionally, the Trump administration's restrictive immigration policies in the late 2010s led to a sharp decline in refugee admissions, which might have alleviated some of the short-term economic pressures, though it also limited the long-term economic contributions these migrants could have made.

Conversely, the trend for legal permanent residents has been more stable, with a consistent increase over time. Although the regression analysis found a positive but statistically insignificant effect on GDP, the steady rise in the number of legal permanent residents suggests that their contributions may be more gradual and accumulate over time. These migrants are more likely to be economically active, investing in education, starting businesses, and contributing to long-term economic stability. However, significant events like the COVID-19 pandemic in 2020 caused disruptions, leading to a sharp decline in both legal permanent residents and refugee admissions. The economic uncertainty and border restrictions during this period temporarily reduced migration flows, which may have slowed GDP growth and hindered labor market recovery.

The cultural and political climate in the U.S. has also played a role in shaping migration patterns and their economic impacts. This, in turn, impacted the labor market and GDP growth, particularly in industries reliant on migrant labor. The dynamic analysis highlights that while refugee admissions can create short-term economic challenges, legal permanent residents contribute to sustained economic growth. The regression analysis moving forward will incorporate these dynamic trends to quantify lagging effects and capture how migration interacts with employment and other macroeconomic factors over time. This deeper exploration will refine the models, offering a more detailed understanding of the complex relationships between migration, economic performance, and cultural shifts in the U.S. context.

CONCLUSION

The objective of this research was to examine the relationship between migration patterns, employment dynamics, and economic performance in the United States from 1990 to 2022. The study tested hypotheses on how refugee admissions, legal permanent residents, and employment rates influence GDP and GDP per capita. Through correlation analysis, regression modeling, and trend analysis, key insights were gained into the economic roles of migration and employment changes.

The first hypothesis, suggesting a significant link between employment rates and economic performance, was confirmed but with unexpected results. A negative correlation between employment rates and GDP indicates that economic output in the U.S. can rise even when employment declines, suggesting the influence of factors like productivity gains, technological advances, or shifts toward capital-intensive industries during labor market contractions.

The second hypothesis, which explored the distinct impacts of refugee admissions and legal permanent residents on GDP and GDP per capita, also provided valuable insights. The findings confirmed that increased refugee admissions tend to negatively affect GDP and GDP per capita in the short term, likely due to the immediate integration and resettlement costs. Conversely, the number of legal permanent residents had a positive but statistically insignificant effect, implying that their contributions accumulate more gradually over time. These results emphasize the importance of distinguishing between different categories of migrants when evaluating their economic impact.

The third hypothesis analyzed the relationship between migration flows (refugee admissions and legal permanent residents) and employment rates. The regression results indicated that while refugee admissions have a near-significant positive effect on employment rates, legal permanent residents show no significant impact. This finding suggests that while refugees may exert short-term pressure on employment dynamics, legal permanent residents integrate more gradually into the labor market. The partial confirmation of this hypothesis highlights the differentiated roles these migrant groups play in shaping employment trends, reinforcing the importance of targeted policy responses. The study's unique findings highlight the complexities of migration in the U.S. economy, particularly how different types of migrants contribute to economic growth in varied ways. Based on these insights, several recommendations can be made. First, policymakers should consider tailored integration strategies that maximize the long-term economic benefits of both refugees and legal permanent residents. This could involve targeted investment in education, training, and workforce integration programs that enhance migrants' contributions to the economy. Second, economic planning should account for the varying short-term and long-term impacts of migration, ensuring that resources are allocated efficiently to support sustained economic growth. Lastly, future research should continue to explore the nuanced economic roles of diverse migrant groups, especially in a country like the U.S., where migration and diversity are integral to national identity and economic resilience.

AUTHOR CONTRIBUTIONS

Conceptualization and theory: OR; research design: OR; data collection: OR; analysis and interpretation: OR ; writing draft preparation: OR; supervision: OR; correction of article: OR; proofread and final approval of article: OR. All authors have read and agreed to the published version of the manuscript.

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