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Economic Impacts of Immigration

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Master in Political Economy

Supervisor:

Professor João Miguel Duarte de Carvalho, Invited Principal Investigator, CIES-ISCTE

Co-supervisor:

Professor Sofia Vale, Associate Professor and integrated researcher, BRU-ISCTE

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CIÊNCIAS SOCIAIS
E HUMANAS

Department of Political Economy

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Resumo

Esta dissertação examina o impacto da imigração na economia portuguesa, uma área onde a investigação limitada avaliou os efeitos diretos através de modelos econométricos de crescimento. Apesar de estudos existentes sugerirem que a imigração suporta o crescimento económico, existe uma lacuna de conhecimento sobre a sua influência nos salários, produtividade e equilíbrio orçamental em Portugal.

Os dados utilizados neste estudo provêm de fontes oficiais como o SEF, Eurostat, OCDE e ONU, cobrindo o período entre 1980 e 2021. A análise estatística, incluindo coeficientes de correlação de Pearson e gráficos de dispersão, foi utilizada para avaliar a relação entre a imigração e as variáveis económicas.

Os resultados revelam uma correlação fraca e inconsistente entre a imigração e os principais indicadores económicos. Em conclusão, não foram identificadas relações estatisticamente significativas entre a imigração e as variáveis dependentes (crescimento do PIB, crescimento do PIB per capita, entre outros).

Abstract

This dissertation examines the impact of immigration on the Portuguese economy, an area where limited research has assessed direct effects through econometric growth models. Despite existing studies suggesting that immigration supports economic growth, there is a knowledge gap regarding its influence on wages, productivity, and fiscal balance in Portugal.

The data used in this study comes from official sources such as SEF, Eurostat, OECD and UN, covering the period between 1980 and 2021. Statistical analysis, including Pearson correlation coefficients and scatter plots, was employed to assess the relationship between immigration and the economic variables.

The results reveal a weak and inconsistent correlation between immigration and the main economic indicators. In conclusion no statistically significant relationships between immigration and the dependent variables (GDP growth, GDP per capita growth, among others) were identified.

Index

Table Index

Figure Index

1- Introduction

Immigration has become a defining feature of modern economies, driven by globalization and demographic shifts. According to the World Migration Report (2022), there were 281 million international migrants worldwide in 2020, accounting for 3.6% of the global population. In Portugal, immigration has grown substantially, with nearly 800,000 immigrants residing in the country in 2022, representing 11.9% of the population (SEF, 2022). This trend underscores the importance of understanding the economic implications of immigration in a national context.

These statistics do not account for the children born to at least one non-European parent. According to the Annual Statistics Report of the year 2022 from the Observatório de Migrações (OM), foreign-born women exhibited a crude birth rate of 32.1 births per thousand women, compared to 13.5 births per thousand native women.

Extant research on the Portuguese context underscores immigration as a critical driver of economic growth, asserting that larger immigrant inflows correlate with better economic performance (Faculdade de Economia do Porto, 2024). However, limited research exists on the direct link between immigration and economic growth using econometric growth models, and the few available studies are often inaccessible to the public (Ferreira et al., 2000).

Furthermore, few studies address immigration's effects native worker's wages, government expenditures, long-term fiscal impact on social security contributions and the impact on the general price of goods, most notably the housing market. In the Annual Statistics Report of 2022 from Observatório das Migrações (OM), Catarina Reis de Oliveira highlights the critical role of foreign workers in enhancing market efficiency. However, no direct analysis has been conducted on this topic. The report notes that in certain professional groups, immigrant workers outnumber natives, particularly among low-skilled roles.

This research aims to answer critical questions: Does immigration positively contribute to GDP growth in Portugal? What are its effects on wages and productivity? Do immigrants' fiscal contributions offset their social benefit costs? By addressing these questions, this study contributes to a more nuanced understanding of immigration's multifaceted role in shaping Portugal's economy. The findings provide empirical evidence

to inform public discourse and policy development, ensuring that immigration is managed to maximize its benefits while addressing potential challenges.

Global studies reveal a lack of consensus on immigration's economic effects. This work takes inspiration from studies done by specialists on the subject, such as the works of the economist George Borjas, who dedicates most of his research time, to studying immigration and its economic effects. Given the contradictory findings in migration studies, this dissertation adopts a cautious approach, considering diverse perspectives.

This study aims to examine the direct impact of immigration on the Portuguese economy through an empirical analysis of official data from SEF. The analysis employs a statistical framework to measure immigration's economic effects on key variables.

The anticipated outcomes suggest that increased labour supply due to immigration may, ceteris paribus, reduce the wages of comparable workers. However, in practice, these adverse effects could be mitigated as native workers adapt by relocating to less-impacted regions or shifting to different skill sets or occupations. Additionally, the degree of impact is likely uneven across regions, with some areas experiencing greater effects than others.

As noted by Borjas and Edo (2021), the initial wage shock induced by increased labour supply diminishes over time, contingent on native workers' responses. Immigration is also expected to inflate real estate prices in high-immigrant areas (Gonzalez and Ortega, 2009).

Further expectations include strain on public services, such as healthcare, and cultural adaptation challenges. Moreover, additional costs associated with immigration are frequently overlooked in existing studies (Ekberg, 1999; Wadensjö, 2007; Nannestad, 2004). Finally, high-skilled immigrants are generally more beneficial than low-skilled immigrants (Borjas, 2019).

The rest of the dissertation is organized into a literature review, in which mentions about the studies that this study took inspiration from and their several approaches to the analysis of the economic impacts of immigration at global level, highlighting relevant findings and theories that guide the research. Following the literature review, an explanation in more detail the methodology that inspired this work, the statistical methods used, followed by the analysis and discussion of the results and analyse the data available between the years 1980 to 2021 about immigration impacts on productivity, wages and public finance in Portugal.

This research seeks to contribute to the empirical understanding of immigration's economic impact on Portugal, providing evidence-based insights to inform academic discourse and policy decisions, thereby shaping more effective public policies for Portugal’s economic future.

2- Literature Review

This chapter provides a systematic review of the economic impacts of immigration worldwide. Studying immigration is crucial due to the ongoing advancements in technology and globalization, which have made migration a pervasive phenomenon. Immigrants exert significant influence on host economies, as they can address labour shortages, introduce new business opportunities, and stimulate consumption (Edo et al., 2020). However, they may also displace native workers, escalate living costs, and place additional strain on public services (Nannestad, 2004).

Results can vary regarding the wages, housing market, public finances, depending on how native workers and governments respond. These outcomes also differ based on the geographic context and skill levels of the immigrant population (Angrist and Kugler, 2003).

All else being equal, an immigration-induced increase in the workforce should lead to a reduction in wages for comparable workers. As illustrated by Michael (2011), using the principles of the Solow model, constant returns to scale imply diminishing marginal products of labour.

For example, consider two locations, A and B. If location A has a larger workforce than location B, the diminishing marginal product of labour implies that the marginal product in location B will be higher than in location A. Consequently, real wages in location B will exceed those in location A. Assuming freedom of movement between the two locations, the higher wages in location B will motivate workers from location A to migrate there. As labourers settle in location B, the marginal product will diminish. Conversely, as the labour supply in location A decreases, the marginal product will rise.

2.1- Labour reactions to immigration

In practice, the impacts can vary depending on how the market responds to the labour supply shock induced by immigrants. Since immigrants typically affect particular jobs, recent research by Borjas and Edo (2019) indicates that native workers often adapt by transitioning to roles less impacted by the increased labour supply. Additionally, natives may respond by relocating to other regions or countries when their employment prospects or wages are adversely affected by immigration.

2.2- Difficulties measuring immigration impacts

Current research highlights that the impacts of immigration are closely linked to the skill levels of immigrants (Weinar et al., 2019). While in theory everything remains constant, the reality is that the natives will respond to the immigrant supply shock. And sometimes certain artificial impacts can happen due to a change of social opinions or other problems, making it more difficult to measure the impact.

A noteworthy phenomenon is the exodus of natives from low-skilled occupations at a higher rate than the arrival of immigrants in these roles (Cattaneo et al., 2014). This dynamic can artificially inflate the wages of low-skilled jobs, as labour scarcity drives up their value.

Recent studies have also identified significant obstacles in accurately assessing the economic effects of immigration. One key issue is the inconsistency in definitions and methodologies; governments and organizations often define migrants differently, which complicates data integration and cross-country comparisons in studies focused on a specific nation (Jenrick et al., 2024).

2.3- Labour-market impacts of immigration

2.3.1- Short-term labour-market impacts of immigration

In the short run, most researchers characterize immigration as “both a challenge and an opportunity for destination countries.” Immigrants may pose initial difficulties for local labour markets, potentially suppressing wages, straining public budgets, and displacing some native workers (Koczan et al., 2021). Conversely, some studies argue that the primary beneficiaries of immigration are businesses that capitalize on lower-cost immigrant labour (Borjas, 1995, 2013).

An important consideration in these analyses is the skill level and substitutability of immigrant and native workers. For instance, high-skilled immigrants may reduce wage inequality and have a positive impact on native workers, whereas low-skilled immigration could widen the wage gap (Edo et al., 2020).

In the USA the effects of immigration have been predominantly negative. During the 1970’s and 1980’s, studies found that immigration reduced native wages by 1.2%, with disproportionate impacts on low-skilled workers (Altonji and Card, 1991). A boarder study covering 1980 to 2000 reported that a 10% increase in the labour supply of working men resulted in a 3% to 4% decline in average native wages (Borjas, 2003).

Additional factors, such as labour market regulations, also play a critical role. Recent research indicates that states with weaker labour protection laws experience more pronounced negative effects of immigration (Edo and Rapoport, 2018). Furthermore, Borjas (2019) found that the slope of a regression relating GDP growth to net migration is 0.008, while the respective coefficient in per-capita growth regressions is -0.010. Native-born workers experience a 2.9% GDP loss, whereas businesses gain approximately 3.2% of GDP.

European studies present mixed findings. Research from the 1980s and 1990s concluded that immigrants consistently have a negative impact on native workers, contingent on the labour market's elasticity (Angrist and Kugler, 2003). In Germany, a country with a less flexible labour market, immigration led to a less than 0.1% increase in unemployment and a 0.1% wage decline (Brücker and Jahn, 2008).

In the UK, a study from the early 2000s indicated that a 1% increase in the share of immigrants reduced wages by around 0.3%, attributed to immigrants' lower efficiency compared to natives (Reed and Latorre, 2009). However, other European studies reveal positive outcomes for natives. For instance, immigration may enhance the likelihood of native workers transitioning to higher-skilled jobs rather than facing unemployment (Ortega and Peri, 2009).

2.3.2- Long-term labour-market impacts of immigration

In the long run, the negative impacts of immigration are often mitigated and, in some cases, may transition into positive outcomes for native populations. Most studies suggest that, following the initial short-term challenges, immigration can enhance production, create new business opportunities, provide essential skills for economic growth, and contribute to the long-term fiscal balance (Koczan et al., 2021).

However, the realization of these positive impacts or the attenuation of negative effects depends on various factors. Research indicates that negative consequences may persist if governments fail to implement effective policies. For example, countries with rigid labour market institutions face greater difficulty in adjusting to labour supply shocks caused by immigration (Angrist and Kugler, 2003).

Additionally, product market neutrality plays a crucial role. If immigration expands the consumer base for domestic products, this could exert a positive influence on wages by stimulating demand within the economy (Borjas, 2003).

2.4- Other important considerations

Several critical factors must be considered when analysing immigration's economic impact, including the slope of the labour demand curve (i.e. market flexibility), the degree of complementarity between native and immigrant workers with varying skill levels, and the presence of heterogeneous skills among the immigrant population. Most studies address at least one of these aspects in their analysis.

2.4.1- The slope of the labour demand curve/flexibility

Studies suggest that the flexibility of the labour market significantly influences the impact of immigration, with more flexible markets experiencing greater negative effects. For instance, in highly flexible labour markets, immigration tends to amplify downward pressure on wages and exacerbate job competition (Brücker and Jahn, 2008).

A recent study highlights that, initially, indicating that they are less likely to adjust their labour supply in response to an influx of immigrant workers. This reduced responsiveness can intensify competition for jobs and place downward pressure on wages (Borjas and Edo, 2021).

Quantitative analyses provide further insight. One study reports that the own-factor price elasticity, which measures the responsiveness of wages to changes in labour supply due to immigration, ranges between 20.3 and 20.4 (Borjas, 2003). Another study finds that wages exhibit a short-run negative elasticity of -0.3 in response to immigration (Borjas, 2013).

The role of market competitiveness and labour market conditions is also critical in determining wages and employment outcomes. Factors such as the degree of competition among firms, the level of industry regulation, and barriers to market entry directly affect the flexibility of the labour market and the marginal productivity of labour, thereby influencing wage levels (Reed and Latorre, 2009).

2.4.2- Complementary between natives and immigrants

As previously discussed, immigrants with similar skill sets to native workers tend to negatively impact natives, whereas those with different skills may benefit the native workforce.

A recent study demonstrates that an "unbalanced" supply shock across skill groups can render long-term capital adjustments inefficient in achieving equilibrium. Quantitatively, a 10% increase in the size of a specific skill group reduces the wage of

that group by 3% to 4%, even after accounting for potential cross-effects. This supply shock has been shown to reduce the wages of the least skilled workers by 6.3% in the short run and by 3.1% in the long run (Borjas, 2019).

Another study highlights that the impact of immigration depends on the assumed elasticity of substitution between immigrants and natives. If substantial complementarities exist, meaning that immigrants and native workers with similar skills are not perfect substitutes in production, then natives experience a wage increase due to immigration. Conversely, if immigrants and natives are assumed to be perfect substitutes, the wages of natives will decrease.

This analysis underscores the sensitivity of simulation results to assumptions about elasticity of substitution, emphasizing the critical importance of accurately estimating this parameter in economic research (Borjas et al., 2008).

2.4.3- Heterogeneity

Heterogeneity plays a crucial role in understanding the varying outcomes of immigration across different nations. Countries exhibit diverse economic structures, with some being more adaptable while others adhere to stricter regulations.

Many research efforts recognize heterogeneity as a realistic perspective; for example, various production functions like Cobb-Douglas indicate differing degrees of substitution between labor and capital. The concept of imperfect substitution suggests that labor and capital are not entirely interchangeable within production processes, indicating that fluctuations in one factor's supply may not correspond proportionately to changes in demand for the other (Borjas, 2013).

Similar principles apply to immigrants: those arriving from distinct countries bring unique cultural backgrounds and areas of specialization. Workers can be categorized into groups based on their education levels, experience, and nationality (Nannestad, 2004).

Studies indicate that market heterogeneity extends beyond merely high- versus low-skilled distinctions; even among individuals possessing varied skill sets, immigrants can complement each other's capabilities. For instance, both a native worker and an immigrant might share identical manual skills but differ significantly in communication abilities (D'Amuri & Peri, 2011).

A study highlights that as immigrants lack the communication skills from the host country, regardless of their education, they often find themselves relegated to lower-skilled positions due solely to this gap in communication skills (Voitchovsky, 2014).

Furthermore, another examination addresses challenges posed by heterogeneity which complicate accurate estimations regarding the elasticity of substitution between similarly skilled natives and immigrant workers (Borjas et al., 2008).

A study points out an interesting topic, employers may have heterogeneous preferences when it comes to hiring native versus immigrant workers. Some may prioritize hiring native workers due to cultural preferences, language requirements, or concerns about turnover and integration. Others may actively seek out immigrant workers for their skills, work ethic, or willingness to accept lower wages (Borjas and Edo, 2021).

An interesting phenomenon to consider is that immigrants tend to concentrate in specific industries, this concentration can lead to varying effects on labour market outcomes across different sectors. The labour market may be segmented along industry lines, implying that the impact of immigration could differ significantly depending on the industry, some industries may experience more intense competition between immigrants and less-skilled natives, while others may be less affected (Altonji and Card, 1991).

2.5- Fiscal impacts

2.5.1- Short-term fiscal impacts

In terms of short-term public finance, a recent study indicates that immigrants in general may impose a fiscal burden on the host country's welfare systems, due to their potential reliance on social assistance programs and unemployment benefits upon arrival (Edo et al.,2020).

However, when examining immigrants by nationality, research indicates that these fiscal effects differ significantly among various groups. Particularly for those from non-European nations migrating to Europe, there is an increased demand for access to diverse public services and social welfare programs. Additionally, this demographic typically experiences lower employment rates coupled with higher dependency levels (Wadensjö, 2007 & Nannestad, 2004).

A crucial aspect worth noting is that children of immigrants are often classified as natives; consequently, this can lead to misleading interpretations regarding the dependency patterns between immigrant families and native populations concerning

welfare support. Research in the American context highlights that households led by immigrants tend to be more likely recipients of welfare benefits (Borjas, 2009), while also contributing approximately $80 less per individual annually in taxes compared to native residents (Card, 2007).

2.5.2- Long-term fiscal impacts

In the long term, most studies suggest that once immigrants gain employment, they begin contributing to the economy. However, the extent of this contribution depends on several factors, including the skill composition of migrants, their access to education and employment opportunities, and the effectiveness of integration policies. Some immigrants, however, may never fully offset the fiscal burden they impose (Koczan et al., 2021).

It is also crucial to distinguish between different groups of immigrants. Studies from Europe, particularly in Sweden and Denmark, indicate that non-European immigrants tend to remain a fiscal burden over time (Ekberg, 1999; Wadensjö, 2007).

2.6- Impacts on the housing market

When it comes to the housing market in general studies indicate that immigrants increase the cost of rent and houses, making it worse for natives in the short run, but in the long run, new housing units are built and some residents move to other cities, offsetting the initial rent increase (Card, 2007).

Both European and American studies confirm that immigration contributes to rising housing market prices. For instance, a study on Spain demonstrates that an increase in the foreign-born population drives up housing prices. Specifically, a 1% increase in the foreign-born population correlates with a €45 increase in housing prices per square meter. This influx also stimulates construction; a 10-unit increase in the working-age immigrant population leads to the construction of 4.6 new housing units (Gonzalez and Ortega, 2009). Similar findings have been observed in the United States. A study reports that immigrants contribute to a 6.2% rise in rents (Saiz, 2006).

2.7- Methodological approaches

2.7.1- The Local Approach Versus the National Approach

The immigration debate also addresses the most suitable geographic framework for analysing immigration's effects on host countries. Two main approaches are widely accepted by specialists in the field.

The first method is the local approach, it examines the effects on native workers within specific regions. This approach focuses on the interactions between immigrants and natives at a localized level, allowing for the identification of region-specific factors that attract immigrants and influence wage differentials. It also provides insights into the displacement of native workers from these regions. Economist David Card (2007), whose work strongly influences this study, is a prominent advocate of the local approach, arguing that immigrants not only choose their destination country but also a specific region within that country.

The second method is the national approach, which analyses immigration's impact on the economy of a country as a whole. Economist George Borjas, a leading proponent of this approach, asserts that local labour markets adjust to immigrant inflows, making the national level more appropriate for capturing immigration's broader effects on wages. Borjas critiques the local approach for overlooking interregional economic dynamics and spillover effects.

Given these two methodologies, this study adopts the national approach, as it aligns with the objective of analyzing immigration's impact on Portugal as a whole.

2.7.2- The Area Approach Versus The Factor Proportions Approach

The debate surrounding the effects of immigration on wages extends beyond geographic considerations to encompass methodological approaches. Two prominent methods are used to measure the impacts of immigration: the area approach and the factor proportions approach.

The area approach examines the spatial concentration of immigrants and assumes that an increase in immigrant population within a given area leads to a decrease in native wages. This method typically employs regression analysis, where native wages are regressed against immigrant stock and various control variables. However, it faces criticism for potential biases, such as model misspecifications and endogeneity in

explanatory variables. Additionally, the assumption that immigration exerts a uniform effect on wages across all contexts is contested.

The factor proportions approach, grounded in microeconomic theory, assumes that native and immigrant workers are not perfect substitutes but instead represent distinct factors of production. This approach estimates the elasticity of substitution between native and immigrant workers and converts it into an estimate of immigration's effect on wages. Despite its theoretical foundation, this method is criticized for relying on numerous assumptions and being prone to omitted variable bias.

To address the limitations of both approaches, some researchers advocate for a hybrid model. For instance, Michael (2011) proposed an approach that combines elements of both methods. This hybrid model employs a production function, similar to the factor proportions approach, while utilizing regression analysis akin to the area approach. In this model, native and foreign-born workers are treated as distinct factors of production, consistent with microeconomic theory. Instead of estimating substitution elasticities, the hybrid approach uses real wages as the dependent variable and incorporates control variables to mitigate omitted variable bias.

In conclusion, the studies show mixed results, in the short-term the immigrants cause negative impacts for example on the native wages and on the welfare system, in the long-term generally these problems are hastened.

Labour market flexibility also plays a critical role; more flexible markets often exacerbate negative effects on native workers. Additionally, immigration consistently places upward pressure on housing market rents, negatively impacting affordability.

To navigate these challenges effectively, policymakers must balance the opportunities and challenges posed by immigration. Crafting efficient immigration policies that maximize economic benefits while mitigating adverse impacts is essential for the long-term prosperity of host countries.

3- Methodology

3.1- Research Analysis

The 2022 Annual Statistics Report from the Observatório das Migrações and the Migration Report from SEF provide comprehensive analyses of immigration trends and the immigrant population in Portugal.

The Observatório das Migrações report includes detailed data on various aspects of immigration, such as the age demographics of immigrants compared to natives, education levels and qualifications, and accident rates by nationality. It also covers key economic indicators, including activity rates by nationality, the distribution of workers across occupational categories by nationality, and the fiscal contributions of immigrants. Additionally, the report examines poverty risks, living conditions, and other statistics essential for accurately assessing immigration's economic impacts.

3.2- Descriptive and statistical analysis

The methodology of this dissertation uses a quantitative approach to analyse the relationship between immigration and multiple economic variables in Portugal, this analysis is important as it permits us the quantify the relationship between the variables and analyse specific patterns, I resorted to the following statistical tools:

1- **Pearson coefficients:** The correlation coefficients are measured to quantify the strength and the direction of the linear association between the growth rate of immigrants and other relevant economic indicators such as productivity. These coefficients vary between -1 and +1, with +1 indicating a strong positive correlation, meaning that both variables tend to increase and decrease at the same time. The -1 variable indicates a strong negative relationship so if one variable tends to increase that means the other variable is decreasing. And at last, the null value means that there's a weak or inexistent correlation.

2- **Scatter Plots:** The Scatter graphs were used to visualize the relationship between the immigrant growth rate and the other economic variables being studied, the distribution of the plots enables the identification of association patterns, that can be positive, negative or a not clear relationship. The dispersion of those plots indicates how strong the correlation between the variables is.

3- **Line Graphs:** The line graphs are used to represent the how the growth rate of the variables in study evolved around time, the overlapping of the

lines in the graph allows us to compare the growth trends of different variables and identify periods of divergence or convergence.

4- Results

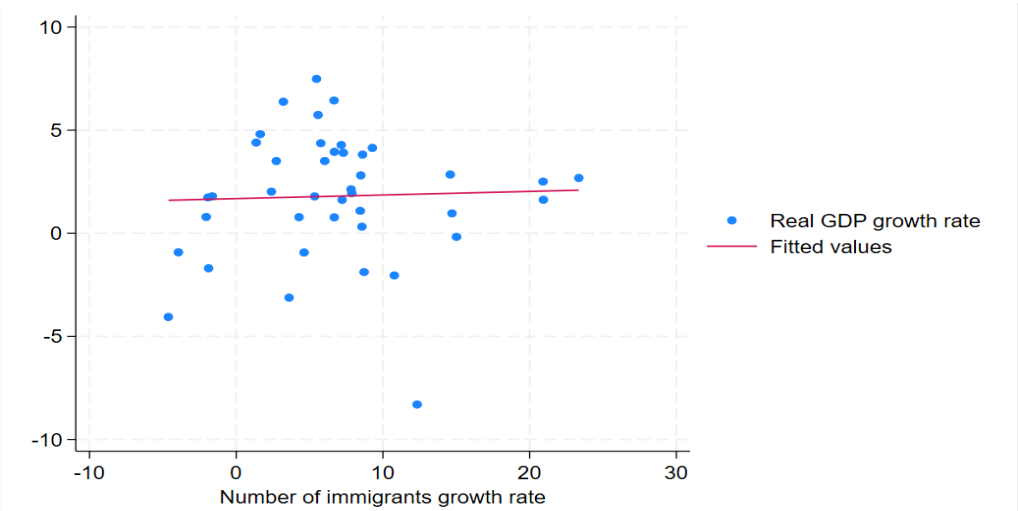
4.1- Immigration and GDP

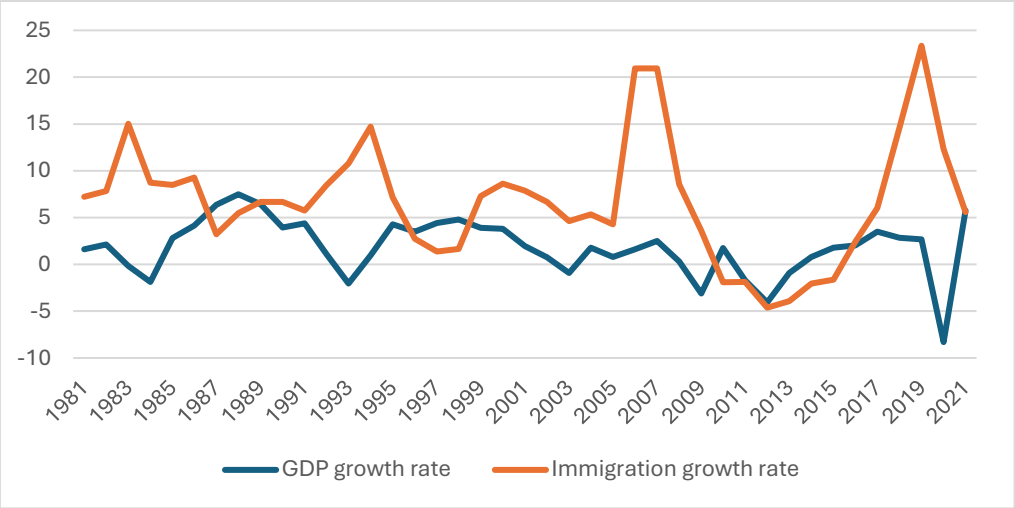
This section examines the relationship between GDP growth and immigration rates in Portugal, following a methodology similar to that of Borjas (2019). The GDP and GDP per capita variables are expressed in real terms, and immigration data is based on the number of residents with immigrant status, as recorded by SEF (Serviço de Estrangeiros e Fronteiras). The data excludes immigrants who have acquired Portuguese citizenship and second-generation immigrants.

Portugal's economy is heavily influenced by global economic conditions, with periods of negative growth aligning with major international crises, such as the 2008 financial crisis and the COVID-19 pandemic. At first glance, immigration does not appear to be a significant variable in shaping the country's GDP.

Figures 1 and 2 illustrate that between 1981 and 2021, immigration in Portugal grew by an average of 7% annually, while GDP and GDP per capita grew at rates of 1.9% and 1.7%, respectively. Both figures exhibit highly scattered plots, indicating a non-linear relationship and a weak correlation between immigration and productivity. The calculated p-values further support this weak relationship, with values of 0.8211 for GDP and 0.9971 for GDP per capita.

Figure 1: GDP and Immigration growth rates

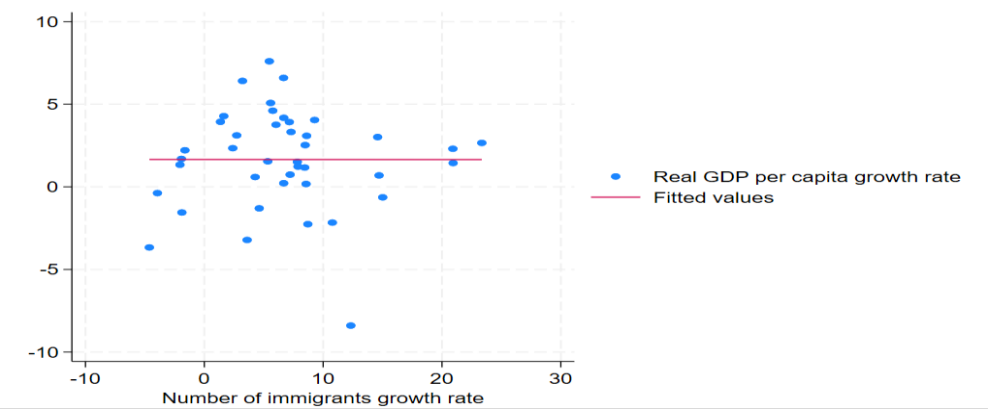


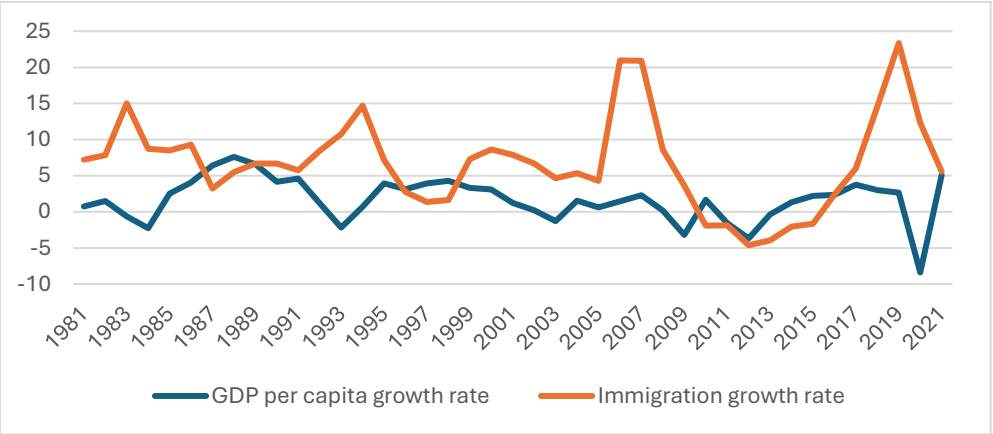


GDP data from Worldbank Data

Immigration growth data taken from SEF (years 1980 to 2021)

Figure 2: GDP per capita and Immigration growth rates





GDP per capita data from Worldbank Data

Immigration growth data taken from SEF (years 1980 to 2021)

The correlation coefficients between immigration and GDP are summarized in Table 1. The correlation between immigration and GDP per capita is slightly negative (-0.0006), while the correlation with GDP is positive (0.0364). These results suggest that immigration may have a positive effect on national output but a slightly negative impact on economic output per capita.

However, given the high p-values, these findings indicate that immigration is likely an insignificant factor in influencing productivity.

Table 1: Correlation Coefficients and their significance between Immigrants and GDP and GDP per capita

	GDP growth rate	GDP per capita growth rate	Immigration growth rate
GDP growth rate	**1.0000**		
GDP per capita growth rate	**0.9928**	**1.0000**	
Immigration growth rate	**0.0364 (p-value 0.8211)**	**-0.0006 (p-value 0.9971)**	**1.0000**

These findings indicate that, all else being equal, immigration positively impacts national output (GDP), consistent with the Solow Growth Model. According to this theory, an increase in the labour force leads to higher productivity. However, immigration appears to have a slightly negative effect on economic output per person (GDP per capita).

The line graphs (Figures 3 and 4) and correlation coefficients (Table 1) suggest that immigration contributes to higher total output but may place downward pressure on the distribution of economic gains per capita. This aligns with findings from Borjas (2019), who observed similar trends.

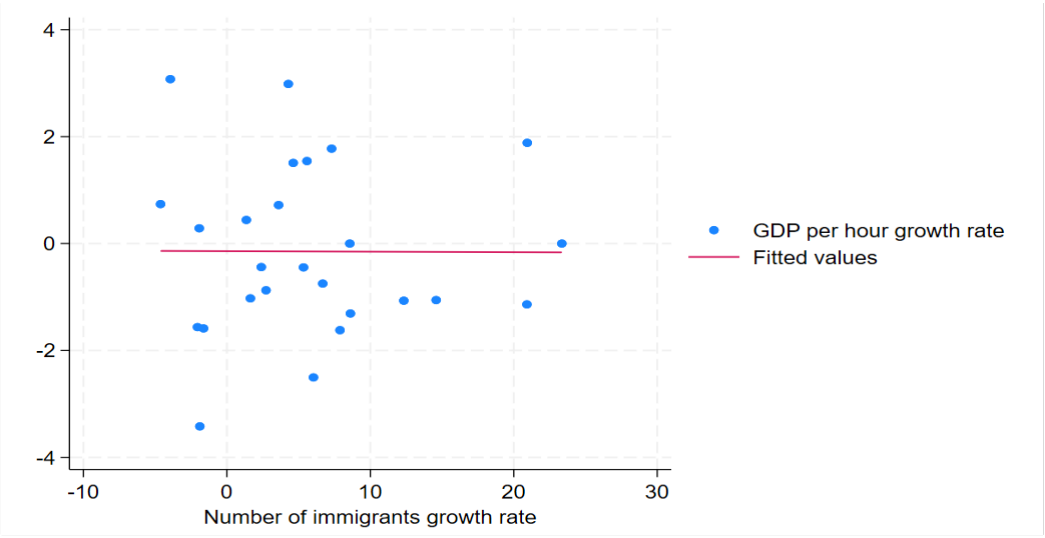
This phenomenon is explained by economies of scale: when the growth in immigrant labour is not matched by a corresponding increase in capital, productivity per worker declines. However, the scatter plots, which analyse the relationship between immigration and productivity, show a weak correlation, indicating that these results should be interpreted with caution. These weak correlations contradict Borjas's (2019) findings in the case of the United States.

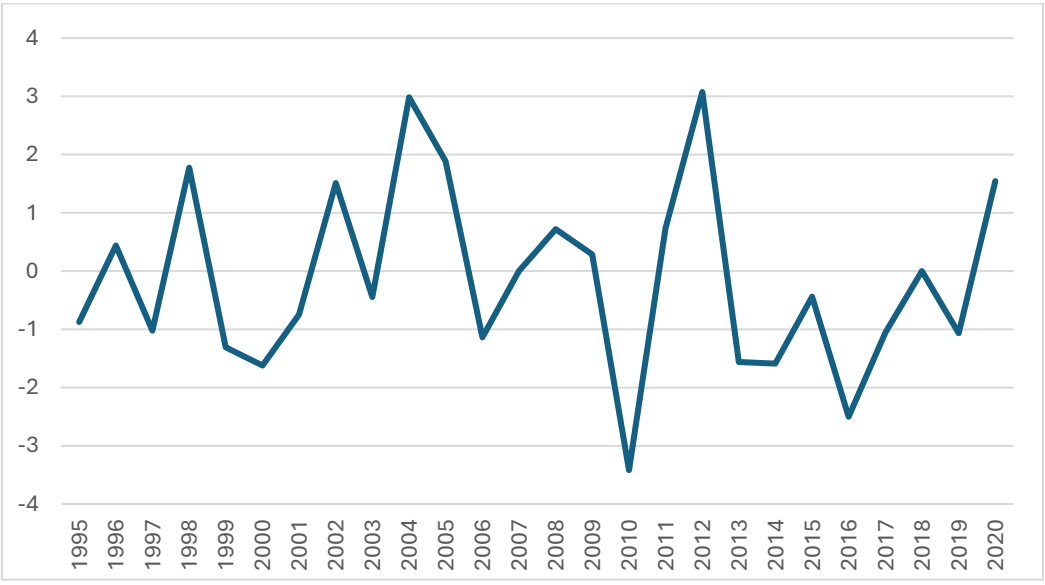
To further examine the relationship between productivity and immigration, GDP per hour worked was analyzed. Between 1995 and 2021, GDP per hour worked declined at an average rate of -0.1478% (Eurostat-Ameco). Figure 3 reveals a weak, non-

linear relationship between GDP per hour worked and immigration, with a correlation coefficient of -0.0045. This result is also consistent with economies of scale, as an increase in the labour force without a proportional increase in capital results in declining productivity (Table 2).

These results align with previous findings and corroborate Borjas's (2019) analysis. While the negative correlation suggests a loss of resource allocation efficiency, the values indicate a very weak relationship. Consequently, no definitive conclusion can be drawn regarding whether immigration has a positive or negative impact on productivity.

Figure 3: GDP per hours worked and number of Immigrants





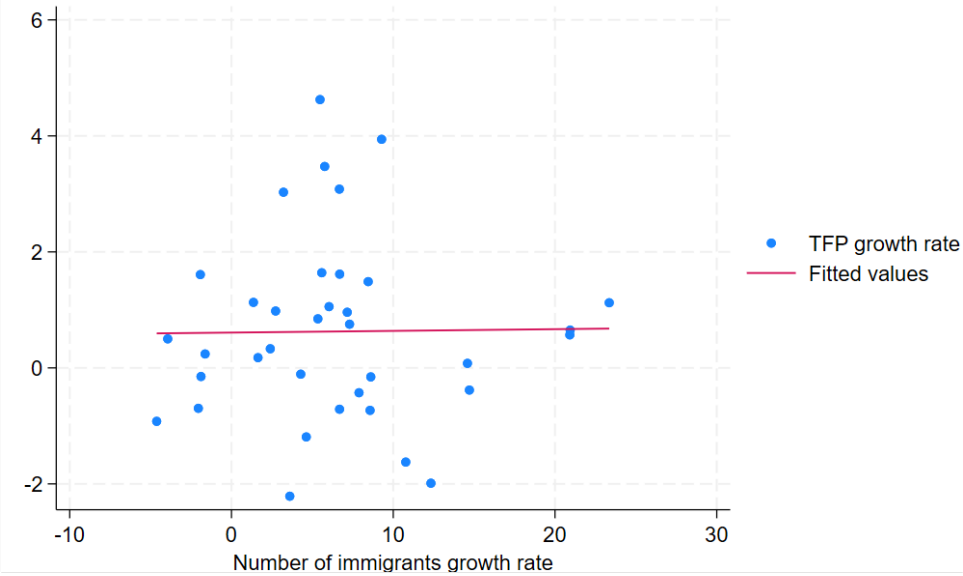
GDP per hour worked, at current prices, relative to a country or aggregate (HVGDHR) PPS: EU-27 = 100, growth rate (years 1995 to 2021) data from Eurostat-Ameco

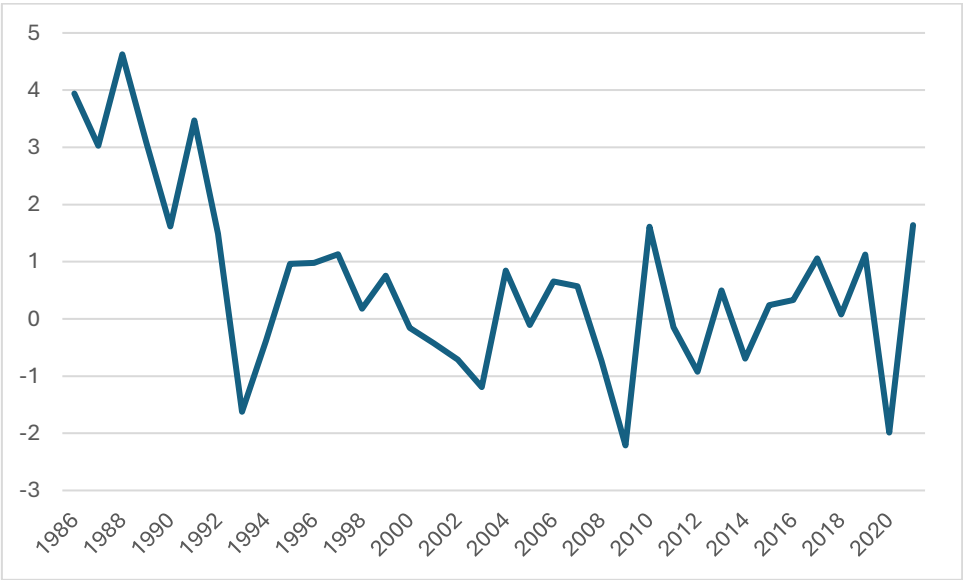
Immigration growth data taken from SEF (years 1980 to 2021)

Despite technological advancements, the multi-factor productivity (MFP) growth rate between 1985 and 2021 averaged 0.6278% (OECD; Figure 4). The positive correlation coefficient of 0.0853 suggests a potential link between immigration and productivity, possibly explained by economies of scale or improved resource allocation (Table 2).

However, the data in Figure 4 exhibits significant dispersion, indicating a weak association between immigration and MFP. This observation is further supported by the p-value of 0.9825 in Table 2, which is well above the conventional significance threshold of 0.05. Consequently, immigration does not appear to have a statistically significant impact on productivity.

Figure 4: TFP growth rate and number of immigrants





Multifactor productivity (OECD) 2015=100 growth rate (years 1985 to 2021) Data from OECD

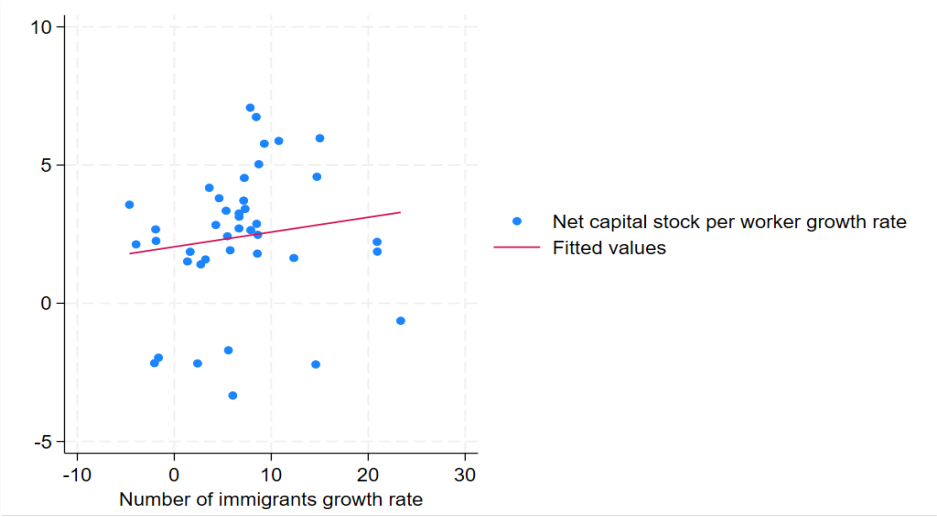
Immigration growth data taken from SEF (years 1980 to 2021)

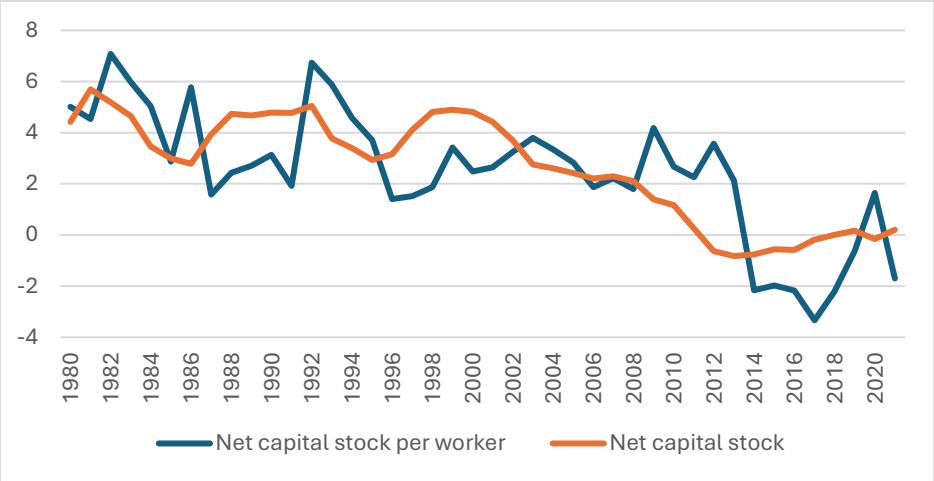
The net capital stock per worker grew at an average rate of 2.47% between 1985 and 2021 (Eurostat-Ameco; Figure 5). A negative correlation of -0.0730 was observed between net capital stock per worker and immigration growth. This result aligns with theoretical expectations: an influx of immigrants into the labor market without a proportional increase in capital leads to a diluted distribution of capital among workers (Table 2).

Conversely, a positive correlation of 0.1796 was found between marginal capital efficiency and immigration growth. This suggests that immigration may expand the labor force, stimulate economic output, and encourage investment by driving demand for goods and services (Table 2). These findings imply that, while immigration might initially reduce capital allocation per worker, it could ultimately improve overall capital efficiency over time.

However, statistical significance was not achieved. The p-value for the relationship between net capital stock per worker and immigration growth was 0.3982, and Figure 5, a scatter plot of these variables, reveals significant dispersion, indicating a weak relationship. Similarly, the p-value for marginal capital efficiency and immigration growth was 0.5277, and Figure 6 shows scattered values, reinforcing the weak association between these variables. As a result, no definitive conclusions can be drawn.

Figure 5: Net capital stock per worker growth rate and number of immigrants

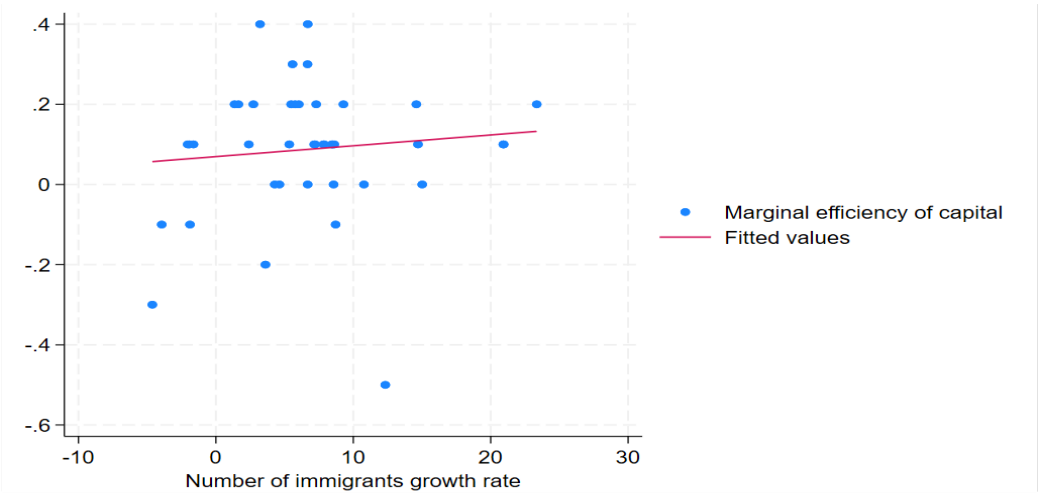


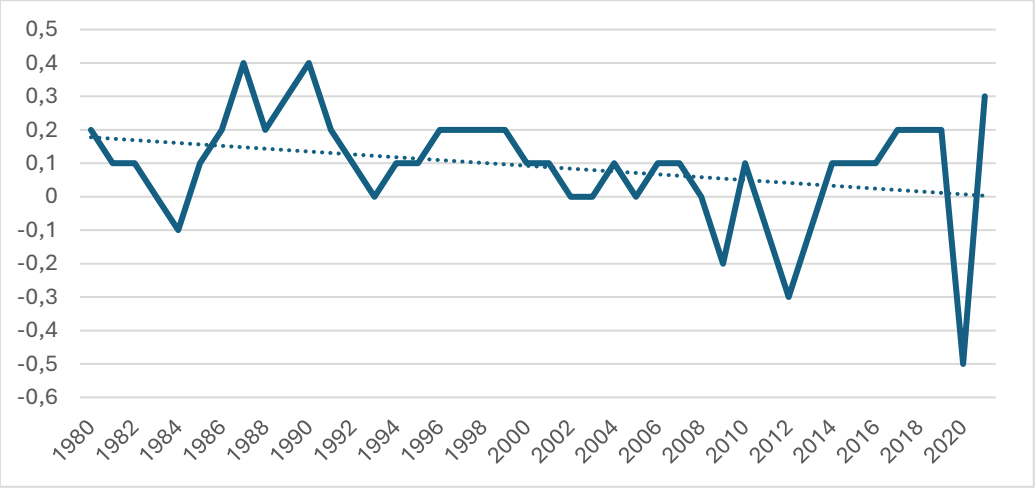


Net capital stock, per person employed (RKNDE) 1000 EUR-PTE growth rate (years 1980 to 2021) Data from Eurostat-Ameco

Immigration growth data taken from SEF (years 1980 to 2021)

Figure 6: Marginal efficiency of capital and number of immigrants





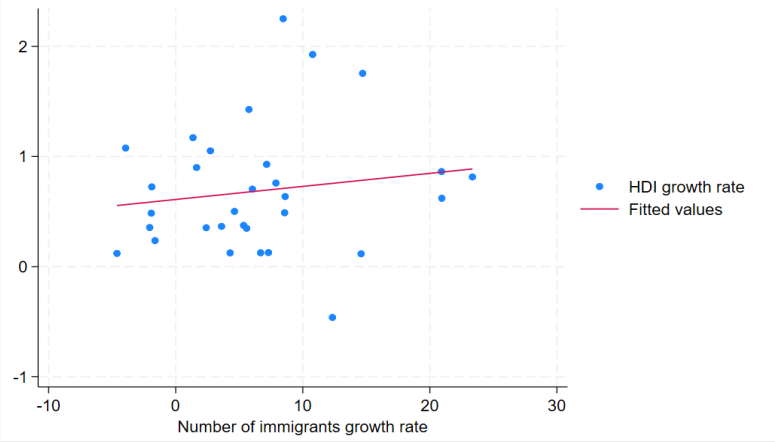
Marginal efficiency of capital, total economy (AKGDV) (years 1980 to 2021) Data from Eurostat-Ameco

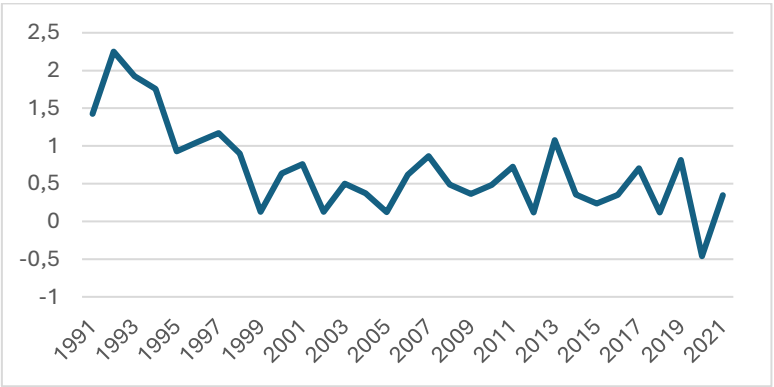
Immigration growth data taken from SEF (years 1980 to 2021)

The Human Development Index (HDI), which is assessed through metrics of educational attainment and per capita income, experienced an average growth rate of 0.6858% from 1990 to 2021 (UN; refer to Figure 7). The relationship between HDI and immigration rates exhibits a slight negative correlation (-0.0258), potentially due to the resource strain resulting from population increases and difficulties in obtaining stable employment, with many immigrants relegated to low-paying jobs (see Table 2).

Numerous studies have indicated similar trends regarding HDI, including research conducted by Koczan et al. (2021). This analysis highlights that current immigration patterns predominantly involve individuals with lower levels of education who are engaged in poorly compensated positions. This factor significantly influences HDI measurements (Oliveira, 2022). As illustrated in Figure 7, there exists considerable variability among data points, suggesting a weak association between these two variables. Furthermore, given the p-value of 0.4358, it remains inconclusive whether immigration exerts any significant impact on HDI.

Figure 7: Human Development Index growth rate and Immigration growth rate





HDI growth rate (years 1990 to 2021) Data from United Nations

Immigration growth data taken from SEF (years 1980 to 2021)

Table 2: Pearson correlation coefficients

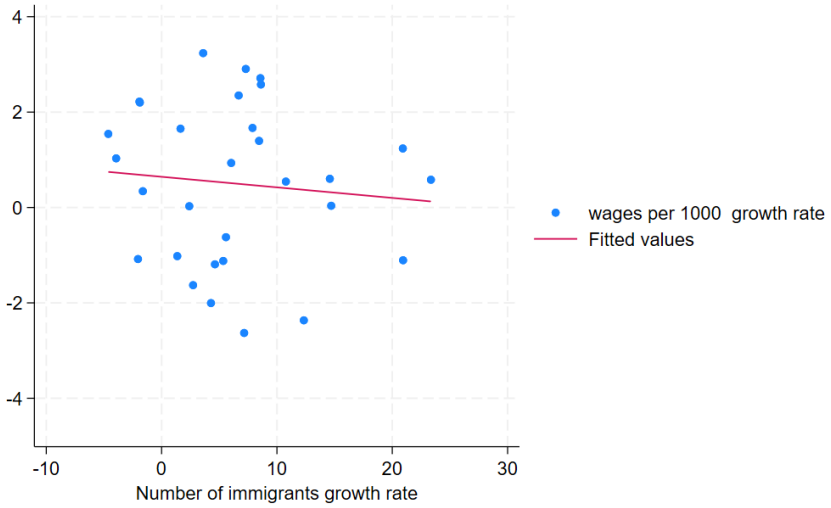
	GDP per hour growth rate	TFP growth rate	Net capital per worker growth rate	HDI growth rate	Marginal efficiency of capital	Immigration growth rate
GDP per hour growth rate	**1.0000**					
TFP growth rate	**0.0846**	**1.0000**				
Net capital per worker growth rate	**0.3524**	**-0.3494**	**1.0000**			
HDI growth rate	**-0.0538**	**0.4845**	**0.0102**	**1.0000**		
Marginal efficiency of capital	**-0.0520**	**0.7664**	**-0.4298**	**0.4797**	**1.0000**	
Immigration growth rate	**-0.0045 (p-value 0.9852)**	**0.0123 (p-value 0.9435)**	**-0.0730 (p-value 0.3982)**	**-0.0258 (p-value 0.4358)**	**0.1796 (p-value 0.5277)**	**1.0000**

4.2- Immigration and Wages

Examining the impact of immigration on wages, evidence indicates a weak correlation (Figure 8). Specifically, an increase of 1% in the immigrant population corresponds with a minor decline of around 0.1% in average wage levels (Table 3). This negative association implies that while immigration may exert some downward influence on overall wage standards, its effect is relatively marginal; furthermore, the relationship exhibits such weakness (p-value: 0.6513 - Table 3) that no definitive conclusions can be drawn.

Research conducted by Edo and Rapoport (2018) found that nations offering lower protections for workers' wages experience significant adverse effects from immigration. Conversely, countries with stronger worker protections appear insulated from this impact. This observation could elucidate Portugal's situation. When solely assessing the connection between immigration and wages, one might infer a detrimental effect; however, their data does not suggest any substantial relationship at all; likely due to robust labour protection regulations.

Figure 8: Wages and immigration



Average wages per year (PORDATA)

Immigration growth data taken from SEF (years 1980 to 2021)

Table 3: Wages and immigration

	Wages growth rate	**Immigration growth rate**
Wages growth rate	**1.0000**	
Immigration growth rate	**-0.911 (p-value 0.6513)**	**1.0000**

Although correlation does not equate causation, it is important to note that several reports highlight the positive impact of immigrants on the Portuguese economy. Particularly in sectors where native workers are less inclined to participate, such as factory jobs. Immigrants are therefore recognized as an essential productive factor and should be considered in analyses of economic production issues.

These correlations align with the research by authors like Jenrick et Al.(2024), whose study of the UK identifies similar social challenges present in many Western countries. These include the difficulties of integrating immigrants, the prevalence of poor working conditions, and the mismatch between immigration levels and market requirements.

However, what stands out in this analysis from the one made by Jenrick et al.(2024) is the weak strength of correlations between immigration and the various

economic variables, offering a nuanced perspective compared to other studies that have emphasized stronger associations.

4.3- Immigration and the housing market

The authors Gonzales and Ortega (2009) estimate the impact of immigration on prices and quantities in regional housing markets.

Table 4 plays a crucial role by illustrating one contributing factor to the rise in rental costs. A significant proportion of immigrants either rent or sublet accommodations, which results in heightened demand for rental properties. This elevated demand subsequently drives up prices, elucidating the social issue of overcrowded living situations; as rents escalate, many individuals are left with no choice but to share their residences in order to afford lower monthly payments.

Table 4: Type of property ownership and number of residents by nationality

	Total	**Type of property ownership**		
		Property or co-property	Renting or sub-renting	Other situations (grants, doorman etc.)
Total Population	10 178 146	7 250 070	2 190 584	737 492
Portuguese nationality	9 647 174	7 069 835	1 882 878	694 461
Foreign nationality	530 828	180 163	307 679	42 986

	Total	Capacity Index		
		Under Capacity	Normal Capacity	Over Capacity
Total Population	10 178 146	5 682 518	2 638 989	1 856 639
Portuguese nationality	9 647 174	5 495 766	2 494 888	1 656 520
Foreign nationality	530 828	186 708	144 057	200 063

Table created by me

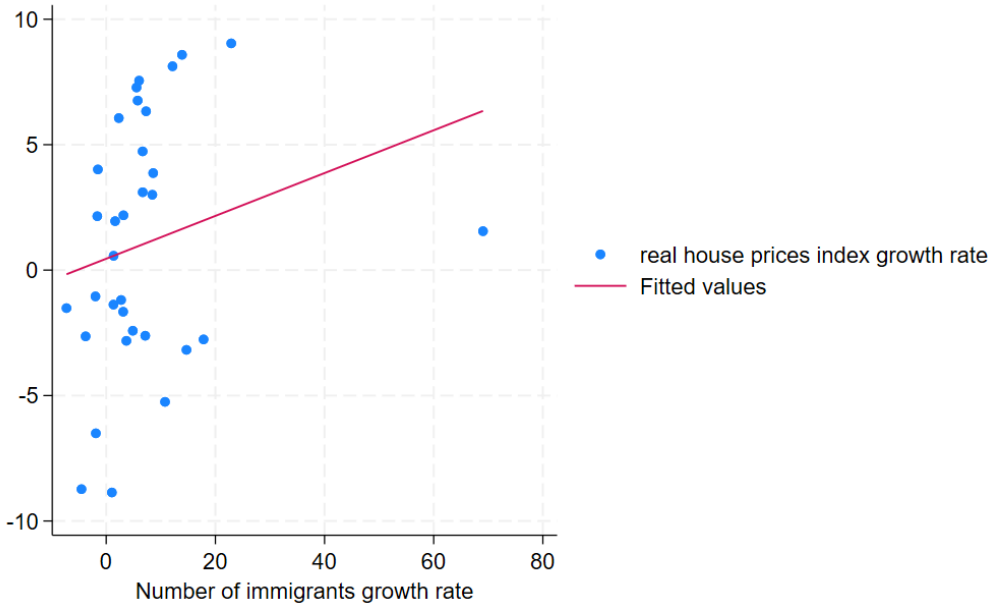
Data from INE

The correlation between immigrations between housing prices index growth rate is 0.2226% and 0.0477% (Table 5). The accompanying scatter plots exhibit a semi-linear upward trend, indicating a weak correlation between these variables. Therefore, it is challenging to definitively ascertain their impacts (Figure 9 and 10).

Table 5: Correlation Coefficients between Immigrants and Rents and Housing prices

	Immigration growth rate	Real house prices index	Real rent prices index
Immigration growth rate	**1.0000**		
Real house prices index	**0.2226 (p-value 0.2130)**	**1.0000**	
Real rent prices index	**0.0477 (p-value 0.7920)**	**0.1575**	**1.0000**

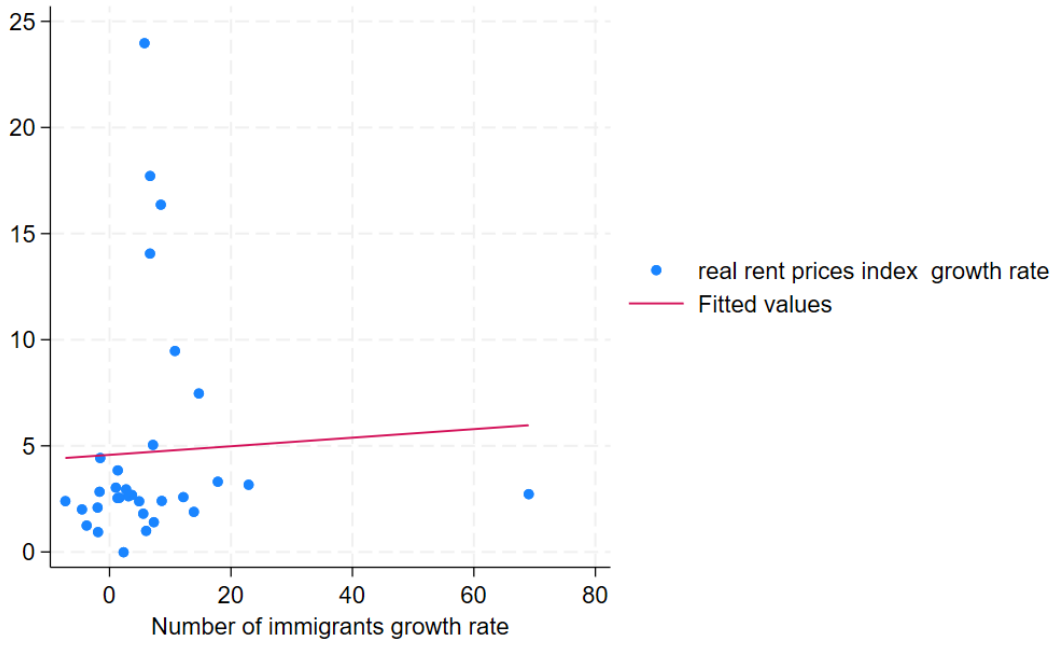
Figure 9: Housing prices index and immigration



Real housing prices Index (2015=100) data taken from OECD (1988 to 2021)

Immigration growth data taken from SEF (years 1980 to 2021)

Figure 10: Housing prices index and immigration



Real rent prices Index (2015=100) data taken from OECD (1988 to 2021)

Immigration growth data taken from SEF (years 1980 to 2021)

4.4- Fiscal impact of immigration, discussion, Time series limitations (An analysis on the work of Oliveira, 2022)

Studies suggest that immigration has either a small positive or small negative impact on productivity, and in most cases, this effect is statistically insignificant. Consequently, the influence of the welfare system on immigration appears to be minimal.

In 2021, immigrants received €221.78 million in unemployment benefits, representing 8.4% of the total benefits granted and involving 91,739 recipients (9.4% of active individuals). Sickness benefits amounted to €30.24 million (3% of the total), with immigrants comprising 5.6% of recipients. Paternity and family subsidies totaled €30.23 million (4.1% of the total) and €30.83 million (3.7% of the total), with immigrants representing 7.4% and 5.1% of recipients, respectively. Additionally, Social Integration Income (RSI) for immigrants was €12.15 million, corresponding to 3.7% of the total and 4.6% of recipients (MTSSS).

Although these amounts are lower than those received by natives, immigrants accounted for approximately 7% of the population. The unemployment rate for natives was 13.5%, compared to 16.2% for immigrants. On average, immigrants receiving

unemployment benefits were granted €2,418, 90% of the average immigrant wage. Benefits for sickness, paternity, family, and RSI ranged between 53% and 82% of the respective average values.

The Observatório de Migrações' 2021 report categorized workers into nine professional groups. Immigrants were concentrated in lower-skill occupations (e.g., unskilled and factory workers), while natives predominated in higher-skilled roles.

Average wages varied by group, with immigrants generally earning less than natives in lower-skilled roles. For example, Group 9 – Unskilled Workers: Natives earned €776.43, while immigrants earned €734.08.

Conversely, in higher-skilled groups, immigrants occasionally earned more than natives, such as in Group 1 (legislators and executives), where immigrants earned €3,704.92 compared to €2,414.63 for natives.

Total annual contributions from dependent workers amounted to €14.3 billion for natives and €1.12 billion for immigrants. Natives received €5.35 billion in benefits (37% of contributions), while immigrants received €325.23 million (29% of contributions). These figures indicate that both groups contribute sufficiently to cover their respective benefits.

Comprehensive econometric analysis of immigration's impact on the welfare state remains limited due to data constraints. However, Borjas' findings highlight a common pattern: high-skilled immigrants contribute more due to higher wages, while low-skilled immigrants contribute less.

An additional complexity arises from the inclusion of children born to immigrant parents as "natives" in the data. This implies that native contributions fund not only native benefits but also those of "former immigrants."

These findings align with studies such as Mendes, Magano, and Candeias (2014), which emphasize the varying demands on welfare resources by different demographic groups. This diversity underscores the need for nuanced policies that address the economic contributions and demands of immigrant populations while considering their integration into the labour market.

5- Conclusion

The impact of immigration on the Portuguese economy reveals a complex and multifaceted narrative, underscoring the need for a nuanced understanding of its effects. This study's findings indicate weak and inconsistent relationships between immigration and key economic indicators such as GDP, GDP per capita, productivity, and wages. Specifically, the analysis identifies no statistically significant relationships between immigration and the dependent variables (GDP growth, GDP per capita growth, among others)25.

Drawing on data from SEF, Eurostat, OECD, UN, and existing literature, including Borjas (2003, 2019) and Gonzalez and Ortega (2009), the study highlights structural factors such as labour market policies and sector-specific dynamics that mediate immigration's impacts. Although immigration contributes to GDP growth and addresses labour market gaps, it also exerts downward pressure on wages and raises housing prices. Fiscal contributions from immigrants generally balance out their social benefit costs, suggesting a net neutral effect on public finances.

Nonetheless, limitations in the available data, particularly concerning immigrant qualifications and employment history, restrict deeper exploration of their economic contributions. Future research should prioritize regional analyses and broader datasets to capture the heterogeneous effects of immigration. Moreover, investigating the intersection of economic and social impacts, such as integration and access to public goods, would provide a more comprehensive perspective on immigration's role in shaping Portugal's economy.

Immigration's multifaceted role extends beyond the economy; it influences societal structures and public policy. To foster informed policy development, future studies must explore the qualifications and skills of immigrant workers and their substitutability with native workers. Comparative analyses across countries or regions could further contextualize these dynamics, providing actionable insights for policymakers. By addressing these gaps, research can better inform strategies that maximize immigration's benefits while mitigating its challenges.

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