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## Article

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## Article

# Meta-Analysis: The Impact of Immigration on the Economic Performance of the Host Country

Alexandre Luz <sup>1</sup>, Pedro Cunha Neves <sup>2,\*</sup> , Oscar Afonso <sup>2</sup> and Elena Sochirca <sup>2</sup>

<sup>1</sup> School of Economics and Management, University of Porto, Rua Dr. Roberto Frias s/n, 4200-464 Porto, Portugal; alexandre.luz888@gmail.com

<sup>2</sup> CEF.UP, School of Economics and Management, University of Porto, Rua Dr. Roberto Frias s/n, 4200-464 Porto, Portugal; oafonso@fep.up.pt (O.A.); esneves@fep.up.pt (E.S.)

\* Correspondence: pneves@fep.up.pt

## Abstract

Growing global migration flows highlight the importance of understanding their economic impact. While many studies have explored how immigration affects host countries' macroeconomic indicators, the results are mixed. In this work, we develop a meta-analysis to investigate the effect of immigration on the economic performance of the host country, focusing on key indicators such as economic growth, productivity, unemployment, and innovation. The results indicate that, on average, immigration has a positive and statistically significant impact on economic performance. The effect varies based on immigrant and host country characteristics, including qualifications, age, and economic development level. Additionally, differences in methodological approaches across studies contribute to the observed heterogeneity in findings. These findings underscore the importance of further research on the economic effects of immigration and offer implications for both policy and future research.

**Keywords:** immigration; economic performance; meta-analysis; host country



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## 1. Introduction

The economic consequences of international migration have been extensively examined in academic literature, focusing on its implications for host countries. Numerous studies have investigated how immigration influences key macroeconomic indicators such as economic growth, productivity, employment, and innovation (Boubtane et al., 2013; Koczan et al., 2021). Despite the abundance of empirical evidence, the findings remain somewhat heterogeneous. Some analyses report a generally positive association between immigration and economic performance (e.g., Huber & Tondl, 2012; Kim et al., 2010; Shimasawa & Oguro, 2010), while others highlight potential adverse effects or fail to find statistically significant impacts (e.g., Paraschivescu, 2013; Rowthorn, 2008).

The sustained increase in migration flows further underscores the importance of understanding their economic impact. Europe, in particular, provides a compelling case due to its long-standing role as both a source and a migration destination. While the first half of the 20th century was marked by net emigration, the post-World War II period witnessed a demographic reversal. Decolonization processes between the 1950s and 1970s triggered inflows from North and Central Africa and South and Southeast Asia (Santamaria-Velasco et al., 2021). The following decades saw successive waves of low-skilled labor migration and political asylum seekers, mainly from North Africa, Eastern Europe, and the

Middle East. From 2009 to 2019, for example, Europe experienced an annual immigration growth rate of approximately 4%, rising from 3.5 million to 5 million arrivals, with Germany, the United Kingdom, Spain, France, and Italy consistently receiving the majority share (Santamaria-Velasco et al., 2021).

Given the continued economic and political relevance of migration, this study aims to contribute to the literature by systematically analyzing the impact of immigration on a range of macroeconomic outcomes—namely, economic growth, productivity, (un)employment, innovation, and tax revenues. Given the seemingly conflicting evidence in prior research, we employ a meta-analytical approach to synthesize and quantitatively assess the existing empirical findings.

Meta-analysis is a statistical method for systematically combining results from multiple studies on the same research question. It helps identify consistent patterns, sources of disagreement, or new insights when examining a body of related literature (Greenland & O'Rourke, 2008). Unlike traditional literature reviews, meta-analysis offers a more systematic and objective approach to synthesizing study results, thus reducing the risk of bias and misinterpretations. Initially used in medicine and psychology, it is now widely applied in the social sciences, including economics, especially in areas with conflicting empirical evidence.

Some meta-analyses have been conducted on the economic effects of immigration (e.g., Longhi et al., 2005, 2008; Nedoncelle et al., 2025). However, these analyses are confined to the impact of immigration on the labor market and, more specifically, on wages. In the present paper, we aim to expand the scope of the analysis by examining the effects of immigration on a broader range of economic performance indicators. To the best of our knowledge, this is the first study to do so. Our meta-analysis draws on 41 primary studies, encompassing 1459 individual estimates of the impact of immigration on the host country's economic performance, and examines both substantive and methodological sources of heterogeneity.

Our meta-analysis reveals no clear evidence of publication bias in this literature, showing that immigration has a significantly positive average effect on the host countries' economic performance. However, this effect varies considerably according to the characteristics of the immigrants, namely their skill level and age. In particular, our results suggest that the positive economic effect of low- and middle-skilled immigrants and older immigrants on the host country may be stronger than that of high-skilled and younger immigrants, respectively. The meta-analysis also reveals that certain methodological aspects, such as sample composition, publication type, and immigration measurement, are essential elements to explain heterogeneity in the results reported by the primary studies. Our findings highlight the need for further research into the mechanisms through which immigration affects the economic performance of the host country. They also have important research and policy implications.

The paper is organized as follows. Section 2 provides a brief overview of the relevant literature. Section 3 describes the methodology of meta-analysis and outlines the criteria used to select studies for inclusion. Section 4 estimates the average impact of immigration on the host country's economic performance and examines publication bias. Section 5 presents a multivariate meta-regression to explore the sources of heterogeneity in the study results. Section 6 concludes.

## 2. Literature Review

### 2.1. Immigration: Concept, Types, and Motivations

Immigration is not easily defined because several accepted definitions have been developed in different directions. However, simply put, immigration exists when people reside in a country other than where they were born (Jensen, 2014).

An important issue when studying the phenomenon of immigration is to understand what motivates people to leave their homeland. According to the [International Organization for Migration \(2023\)](#), immigration is related to the host country's social, economic, political, and technological situation and the country of origin. A good example is migration from developing to developed countries, which allows people to increase their income and improve their lifestyle (Gibson et al., 2019). There are also cases in which the motivation for immigration lies in the incentives launched by the host countries, such as the demand for foreign workers in advanced industrial societies (Massey et al., 1993). Individuals, therefore, consider whether they should remain in their country of origin or immigrate to one of the potential countries. After analyzing various alternatives, individuals choose the option that will give them a better lifestyle (Borjas, 1989).

To better study some of the impacts of immigration, Dustmann et al. (2008) distinguish between skilled and unskilled immigrants, assuming that if immigrants have the same qualifications as natives, they will be perfect substitutes. Stark and Taylor (1991) subdivide immigrants into three types: temporary, repetitive, and permanent. These divisions are important because they facilitate the quantification and analysis of the immigration and immigrants' effects.

When characterizing the types of immigrants, it is necessary to understand that immigration may be regular or irregular. According to the [International Organization for Migration \(2023\)](#), regular immigration refers to migration through channels recognized and authorized by the origin and the host country. However, regularized immigration refers not only to how immigrants enter the country, but also to how long they can stay there, so migration can change from regular to irregular after a specific period. In contrast, irregular immigration refers to the movement of people from one country to another without respecting the host's or the origin country's laws, regulations or international agreements.

This diversity within the immigration concept implies that studying its impact is not straightforward, as its characteristics may vary between the existing studies.

### 2.2. Immigration and Economic Performance of the Host Country

The relationship between demographic relocations and economic performance has garnered increasing scholarly attention in recent years. Among these demographic changes, immigration has emerged as a particularly contentious and complex factor. While some policymakers and institutions argue that immigration waves play a crucial role in shaping the economic trajectory of host countries, academic literature offers a more nuanced and often conflicting perspective. As Borjas (2019) notes, empirical findings remain inconclusive, making it difficult to draw definitive conclusions about the overall economic impact of immigration.

In this subsection, we review the literature that examines the impact of immigration on the host country's economic performance. We focus on five key dimensions of economic performance: economic growth, productivity, (un)employment, innovation, and taxation.

#### 2.2.1. Immigration and Economic Growth

A substantial body of literature has examined the impact of immigration flows on the economic growth of host countries, with empirical findings revealing both positive and

negative effects. Spanning a variety of national contexts,<sup>1</sup> some studies report beneficial effects of immigration on growth, while others report adverse consequences.

Existing literature refers to several immigration features that may positively impact economic growth in the host country. For example, immigration may benefit economic growth by increasing labor force and mitigating fiscal pressures associated with aging populations. This is particularly relevant in developed countries, where immigration is seen as a potential corrective mechanism for demographic imbalances (Tolmacheva, 2020; Peterson, 2017). Some of the adverse effects of population aging may be counterbalanced by temporary immigration through boosting employment, wages, and GDP per capita (Muysken & Ziesemer, 2013). Moreover, not only the volume but also the diversity of immigration positively correlates with regional economic growth (Di Berardino et al. (2021).

Integration and acceptance of immigrants are also recurring themes in the related literature. Analyzing short- and long-term immigration effects in Turkey, Tanrikulu (2021) finds that easing competitive conditions for refugees could yield immediate gains in productivity and output and that the long-term impacts are positive if immigrants integrate into the labor market.

Skill level is another critical factor in determining the economic impact of immigration. For example, Tupalayalai (2020) finds that while both skilled and unskilled immigrants contribute positively to growth, the effect of the former is more pronounced. Similarly, Kim et al. (2010) find that low-skilled immigrants are associated with lower economic growth; Şerban et al. (2020) argue that benefits from high-skilled immigration can be increased when there is a higher share of skilled population in the host country.

Finally, studies on the European Union provide additional support for the positive growth effects of immigration, sustaining that immigration has generally contributed to increases in GDP per capita and productivity across EU member states (Huber & Tondl, 2012; Manole et al., 2017).

However, a strand of related literature also identifies adverse effects of immigration on economic growth. In particular, some studies find that immigration may erode competitiveness and lead to declines in human development indicators and per capita income, primarily due to the low skill levels of migrants (Coleman & Rowthorn, 2004; Akanbi, 2017). Moreover, while high immigration volumes increase GDP and its components, they may also lead to lower wages due to increased labor supply, resulting in declining individual income and welfare when population growth outpaces output (Lutz & Wolter, 2001).

In sum, related literature on immigration and economic growth suggests that immigration effects are context-dependent and mediated by a complex interplay of demographic, institutional, and labor market conditions.

### 2.2.2. Immigration and Productivity

Productivity is widely recognized as a key driver of economic growth and a fundamental indicator of economic performance. A growing body of empirical research has examined the relationship between immigration and productivity.

Shimasawa and Oguro (2010), analyzing the case of Japan, compared scenarios with and without immigration. Their findings suggest that immigration positively contributes to productivity, primarily through labor force expansion and demographic rejuvenation. These outcomes underscore the importance of immigration in addressing aging populations and labor shortages in advanced economies.

The impact of immigration on productivity, however, is not uniform across contexts and depends significantly on the absorptive capacity of the host country. Kim et al. (2010) find that productivity gains are more likely when migrants move from lower-productivity to

higher-productivity economies, facilitating labor reallocation and efficiency improvements that ultimately enhance economic growth.

Immigrant qualifications also play a critical role in shaping productivity outcomes. [Quispe-Agnoli and Zavodny \(2002\)](#) report that both low-skilled and high-skilled immigration can be associated with slower productivity growth in the short run, potentially due to transitional challenges such as language acquisition and cultural adaptation. These short-term frictions may mask the longer-term benefits of immigration on productivity.

Further evidence of temporal heterogeneity is provided by [Kangasniemi et al. \(2012\)](#), who assess the effects of immigration on productivity in Spain and the United Kingdom. While the short-run impacts were negative in both countries, the long-run effects diverged: positive in the U.K. and negative in Spain. This divergence may reflect differences in immigrant composition, labor market integration, and institutional frameworks. Institutional settings and labor market structures are thus critical to understanding the heterogeneous impacts of immigration. [Freeman \(1988\)](#) highlights how variations in wage dispersion and institutional configurations influence how much immigration affects productivity.

Taken together, the literature suggests that the productivity effects of immigration are mediated by the skill composition of migrants, the structural characteristics of the host economy, and the adaptability of labor market institutions.

### 2.2.3. Immigration and (Un)employment

While immigration is frequently debated in public discourse for its potential to displace native workers, empirical studies present a more nuanced picture. [Simionescu et al. \(2017\)](#), examining migration from Poland to the United Kingdom, find evidence that immigration contributed to easing labor market pressures and reducing the unemployment rate, despite prevailing negative perceptions among native populations. This finding supports the view that immigration can have positive effects on the labor market, especially when it helps address labor shortages. Similarly, [Maffei-Faccioli and Vella \(2021\)](#) analyze the differentiated impact of immigration on the unemployment rates of natives and immigrants in Germany. Their results show that while native unemployment decreased significantly and persistently after one year, immigrant unemployment rose in the short term, particularly six months after arrival. This suggests an asymmetric adjustment in the labor market, with native workers potentially benefiting from the presence of immigrant labor.

[D'Amuri and Peri \(2014\)](#) emphasize that newly arrived immigrants often fill low-skilled positions, thereby enabling native workers to transition into roles that require higher levels of qualification. This occupational reallocation can enhance labor market efficiency and mitigate displacement effects. [Șerban et al. \(2020\)](#), in turn, find that only skilled immigration has a statistically significant and positive impact on unemployment rates across European Union member states.

However, not all findings point to benign effects. For example, [F. Islam and Khan \(2015\)](#) find no evidence that immigration leads to higher unemployment in host countries. Even in cases where a short-term rise in unemployment occurs, their results suggest the effect is transitory and dissipates over time. [Tanrikulu \(2021\)](#) finds that the immigration of Syrian refugees in Turkey led to higher unemployment in the short run, primarily due to increased competition between refugees and low-skilled native workers. [Edo \(2019\)](#) similarly concludes that the short-term impact of immigration on wages and employment is negative, although longer-term outcomes may vary.

### 2.2.4. Immigration and Innovation

Innovation is widely recognized as a fundamental driver of economic growth and a critical determinant of competitive advantage. The relationship between immigration

and innovation has attracted growing attention in the literature, with empirical analyses adopting both macro-level (country) and micro-level (firm) perspectives.

From the firm-level viewpoint, the composition of the workforce in terms of foreign employees plays a significant role in shaping innovation outcomes. [Ozgen et al. \(2013\)](#) find that foreign workers generally enhance a firm's innovative capacity. However, their findings also indicate a nonlinear relationship: while a moderate share of foreign employees contributes positively to innovation, an excessively high proportion may have the opposite effect, possibly due to integration challenges or coordination costs.

Importantly, the impact of immigration on innovation is not solely determined by the quantity of foreign workers, but also by their diversity. Using U.S. data, [Ager and Brueckner \(2018\)](#) show a positive correlation between immigrant diversity and innovation outcomes, thus complementing earlier findings by [Ozgen et al. \(2010\)](#). Their results suggest that greater genetic and cultural diversity within the workforce enhances the potential for knowledge recombination and creative problem-solving, thereby stimulating innovation.

However, the realization of these innovation gains hinges on the absorptive capacity of the host country. [Ozgen et al. \(2017\)](#) emphasize the importance of contextual conditions that enable the positive spillovers from immigration to materialize. These include firm characteristics (e.g., size and market orientation), macroeconomic conditions, and the quality of surrounding institutions ([A. Islam et al., 2017](#)). In their absence, the potential benefits of immigration for innovation may be limited or reversed.

The role of immigrant skill levels has also been investigated, though the evidence remains mixed. [Bratti and Conti \(2018\)](#) find no systematic differences in the innovation impact of immigrants by qualification level. In contrast, [Pholphirul and Rukumnuaykit \(2017\)](#) argue that low-skilled immigration provides only transitory gains in firm competitiveness through reduced labor costs. Over time, however, this reliance on low-skilled labor may undermine firms' innovation capacity and reduce their long-term productivity and global competitiveness.

#### 2.2.5. Immigration and Taxation

The fiscal consequences of immigration remain a subject of ongoing academic and policy debate. Estimating the budgetary implications of immigration involves considerable methodological challenges due to many factors influencing public finances. As [Vargas-Silva \(2014\)](#) highlights, key determinants include immigrants' educational attainment, family composition, health status, duration of stay, and age distribution. These variables significantly affect both tax contributions and the demand for public services.

Empirical evidence from the United States suggests that the fiscal impact varies across generations of immigrants. [Blau and Mackie \(2017\)](#) find that while first-generation immigrants, typically less educated, exert a negative net fiscal effect at the state level, second and third-generation immigrants, who receive their education in the host country, tend to contribute positively to public revenues. Similar conclusions are drawn by [Rowthorn \(2008\)](#), who finds that highly qualified immigrants contribute more in taxes than they consume in public services, whereas low-skilled immigrants are more likely to impose a net fiscal burden.

Adverse fiscal outcomes of immigration referred to in the literature are usually related on the one hand, to low-income immigrants' enrollment in social assistance programs and, on the other hand, to their limited capacity to generate sufficient tax revenue on the other (see, for example, [Borjas \(1994\)](#) and [Chen and Fang \(2013\)](#)). Although young immigrants are often seen as an instrument to mitigate ageing-related fiscal pressures, this effect may be limited in the short term. Demographics play a critical role in this case. Using data from Japan, [Shimasawa and Oguro \(2010\)](#) show that even an influx of younger immigrants may

be insufficient in specific demographic contexts to ease the tax burden in the near term, possibly possibly placing added strain on pension systems in the long term.

### 3. Methodology and Selection of Studies

Meta-analysis is a systematic approach to reviewing literature that uses statistical techniques to merge findings from various studies examining the same research question. Its purpose is to uncover patterns in the results, identify potential inconsistencies in the existing research, and reveal other noteworthy relationships that may arise when analyzing multiple studies together (Neves et al., 2016).

The initial phase of a meta-analysis involves selecting and gathering the studies to be examined. After defining our research question—the effect of immigration on the economic performance of the host country—we used bibliometric methods to identify and choose the relevant studies.

We started by searching in the Web of Science and Scopus databases for references containing the following keywords and expressions: “Immigration”, “Economic growth”, “Economic performance”, “Impact of immigration on the economic performance”, “Immigration and innovation”, “Immigration and economic growth”, “Immigration and labor market”, “Immigration and trade”, and “The impact of immigration in the host countries”. We also extended our search to Google Scholar, where we looked for additional studies on the topic under analysis. From this initial search, we obtained a total of 122 studies. After removing 28 duplicate studies, we screened the abstracts and removed a further 13 studies.

We then examined the main text of the remaining 81 studies. Given our research questions, we excluded: (i) theoretical studies; (ii) articles that estimate the impact of immigration on the origin country; (iii) articles that do not present the necessary information for the elaboration of a meta-analysis, namely coefficient estimates and standard errors; (iv) papers that study the impact of immigration on other variables outside the scope of our analysis.

Applying these exclusion criteria, we were left with a final set of 41 articles, from which we obtained a total of 1459 estimates of our effect size—the impact of immigration on the economic performance of the host country. The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) flowchart—Figure 1—illustrates the study selection process.

Of the 41 studies in the meta-analysis, 29 analyze developed countries, 4 focus on developing countries, and 12 examine a mixed sample that includes both developed and developing economies. The studies vary significantly in terms of their level of analysis: while nearly half of them use macro data at a country level, the rest use a variety of different levels of analysis, such as state, province, region, sector, or firm-level data.

Furthermore, the primary studies analyze the impact of immigration on various dimensions of economic performance, including economic growth, aggregate output, employment, unemployment, innovation, and international flows. Due to these differences, the studies use different metrics to estimate the effect size. Therefore, they must be standardized and converted to a common metric to ensure comparability and combine all the different measures in one analysis. For that purpose, we employ a commonly used method in meta-analysis: the calculation of the partial correlation coefficient (Cardoso et al., 2021). The partial correlation coefficient ( $r_i$ ) and the respective standard error ( $SE_{r_i}$ ) are equal to:

$$r_i = t_i / \sqrt{t_i^2 + df_i} \quad (1)$$

$$SE_{r_i} = \sqrt{(1 - r_i^2) / df_i} \quad (2)$$

where:  $t_i$  represents the t-statistic of the coefficient of each study associated with the effects of immigration on the economic performance of the host country;  $f_i$  represents the degrees of freedom of each of the reported estimates.

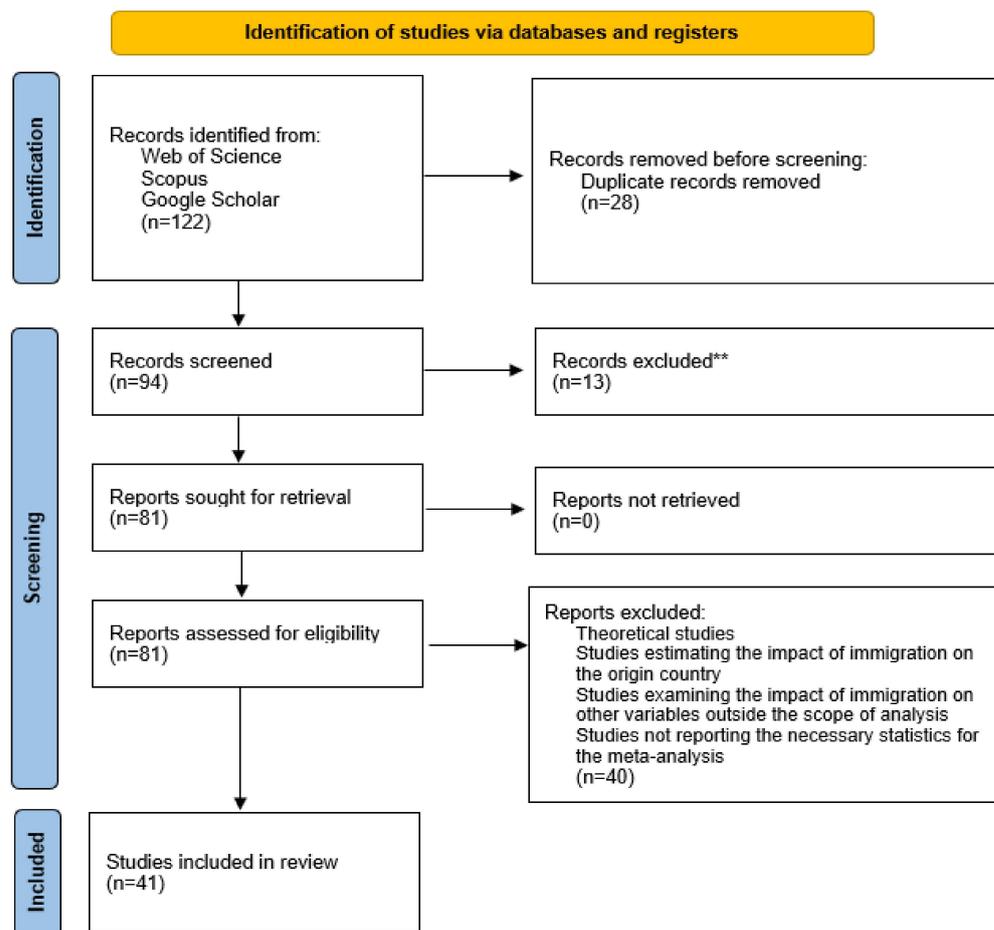


Figure 1. PRISMA flow diagram for new systematic reviews.

Table 1 lists the studies that are included in the meta-analysis, their main characteristics, and the average values of the respective  $r_i$  and  $SE_{r_i}$ . Figure 2 displays the respective forest plot.

Table 1. Summary table of the studies included in the meta-analysis.

Study	Sample	Nr. of Est.	Average $r_i$	Average $SE_{r_i}$	Data Structure	Estimation Method	Impact of Immigration on	Measure of the Dependent Variable	Level of Analysis
1 AboElsoud et al. (2020)	Australia	14	0.0429	0.0472	Cross-section	VEC	Unemployment	Unemployment rate	Country
2 Alesina et al. (2016)	World	94	0.2324	0.0871	Panel	2SLS OLS.	Aggregate output	GDP per capita	Country
3 Altonji and Card (1991)	USA	40	-0.0157	0.0865	Cross-section	WLS	Labor market	Labor force Employment rate	Individuals
4 Angrist and Kugler (2003)	EU	48	-0.0998	0.0622	Panel	OLS IV	Employment	Employment rate	Country
5 Bashier and Siam (2014)	Jordan	1	0.2408	0.1772	Cross-section	FMOLS	Aggregate output	GDP per capita	Country
6 Di Bernardino et al. (2021)	Italy	16	0.0725	0.0309	Panel	OLS S-GMM	Growth	GDP growth rate	Province
7 Bonin (2005)	Germany	32	-0.0134	0.0629	Cross-section	OLS	Unemployment	Unemployment rate	Individuals
8 Bratti and Conti (2018)	Italy	76	0.0160	0.0034	Panel	OLS	Trade flows	Exports Imports	Province
9 Carrasco et al. (2004)	Spain	36	0.0583	0.1302	Cross-section	OLS IV FE	Employment	Employment rate	Sector
10 Cuadros et al. (2019)	World	90	0.0802	0.0406	Panel	PPML	FDI flows	FDI	Country

Table 1. Cont.

Study	Sample	Nr. of Est.	Average $r_t$	Average $SE_{r_t}$	Data Structure	Estimation Method	Impact of Immigration on	Measure of the Dependent Variable	Level of Analysis	
11	D'Amuri and Peri (2014)	EU	20	0.0130	0.0282	Cross-section	OLS IV	Employment	Employment rate	Country
12	Dolado et al. (1997)	Spain	6	0.0961	0.1366	Cross-section	OLS IV	Employment	Employment levels	Province
13	Erol and Unal (2022)	Germany	22	0.0499	0.0227	Panel	POLS IV FE GMM	Employment	Employment rate	Region
14	Esposito et al. (2020)	EU/ OECD	19	-0.3082	0.0640	Panel	CCE-GMM FMOLS PECM	Unemployment	Unemployment rate	Country
15	Etzo (2008)	Italy	30	-0.0027	0.0796	Panel	OLS	Growth	Regional output growth rate	Region
16	Felbermayr et al. (2010)	World	10	0.3241	0.0910	Cross-section	OLS IV	Aggregate output	GDP per capita	Country
17	Gross (2004)	Canada	3	0.0648	0.1292	Cross-section	2SLS	Unemployment	Unemployment rate	Region
18	Hatzigeorgiou (2010)	Sweden	64	0.0979	0.0329	Cross-section	OLS TOBIT	Trade flows	Exports Imports	Country
19	Huber and Tondl (2012)	EU	9	0.0243	0.0294	Panel	GMM	Aggregate output Unemployment Productivity	GDP per capita Unemployment rate Labor productivity	Region
20	F. Islam and Khan (2015)	USA	1	0.3540	0.1261	Cross-section	VECM	Aggregate output	GDP per capita	Country
21	Jaumotte et al. (2016)	World	27	0.1689	0.1052	Panel	OLS IV FE	Income Employment Productivity	GDP per capita; Income shares Employment rates Labor productivity	Country
22	Jean and Jiménez (2011)	EU	256	0.0600	0.0614	Panel	OLS FGLS	Unemployment	Unemployment rate	Labor market segments
23	Kang and Kim (2018)	World	16	0.0937	0.0618	Panel	OLS FE GMM	Aggregate output	Real GDP per capita	Country
24	Kangasniemi et al. (2012)	Spain/ England	6	0.0369	0.0520	Cross-section	POLS FE	Aggregate output	Gross Value Added	Sector
25	Tipalayalai (2020)	Thailand	52	0.2743	0.1763	Panel	OLS POLS FE	Growth Productivity	GDP growth rate Labor Productivity	Region
26	Latif (2015)	Canada	4	-0.0147	0.0596	Panel	DOLS FMOLS VECM	Unemployment	Unemployment rate	Province
27	Manole et al. (2017)	EU	1	0.1440	0.0724	Panel	PLS	Aggregate output	GDP per capita	Country
28	Mariya and Tritah (2009)	OECD	102	0.0237	0.1077	Panel	FE IV Robust	Aggregate output Productivity Human capital Employment	GDP per capita Capital productivity Labor productivity Human capital TFP Employment rate	Country
29	Marr and Siklos (1994)	Canada	8	0.0532	0.1729	Cross-section	BSR	Unemployment	Unemployment rate	Country
30	Moreno-Galbis and Tritah (2016)	EU	20	0.0546	0.0416	Cross-section	OLS IV	Employment	Employment rate	Occupational groups
31	Muysken and Ziesemer (2013)	Netherlands	6	0.1087	0.1632	Cross-section	VECM	Growth Labor market	GDP growth rate Unemployment rate Activity rate	Country
32	Ortega and Peri (2009)	World	45	0.2809	0.0678	Panel	OLS 2SLS	Aggregate output Employment	GDP per capita Employment rate	Country
33	Ortega and Peri (2014)	OECD	37	0.2487	0.0894	Cross-section	2SLS	Aggregate output Productivity	GDP per capita Labor productivity TFP	Country
34	Ozgen et al. (2013)	Germany	54	-0.0114	0.0151	Cross-section	OLS	Innovation	Product innovation Process innovation Total innovation	Firm
35	Paserman (2013)	Israel	56	-0.0158	0.0236	Cross-section	OLS FE POLS WLS Robust	Productivity	TFP Output per worker	Firm
36	Peri (2012)	USA	42	0.1671	0.0647	Panel	OLS 2SLS	Productivity	TFP Total employment Gross state productivity	State
37	Peri and Requena-Silvente (2010)	Spain	6	0.0665	0.0044	Cross-section	OLS	Trade flows	Exports	Firm
38	Pholphirul and Kamlai (2014)	Thailand	24	0.0595	0.1708	Panel	OLS FE	Growth	GDP growth rate Labor productivity growth rate	Sector
39	Pischke and Velling (1997)	Germany	42	0.0574	0.0682	Cross-section	OLS	Unemployment Employment	Unemployment rate Employment rate	Region
40	Quispe-Agnoli and Zavodny (2002)	USA	12	-0.1344	0.1335	Cross-section	OLS IV	Productivity Employment	High-skilled productivity Low-skilled productivity Total employment	State
41	Šerban et al. (2020)	EU	12	-0.0504	0.2189	Panel	GMM	Aggregate output Unemployment	GDP per capita Unemployment rate	Country

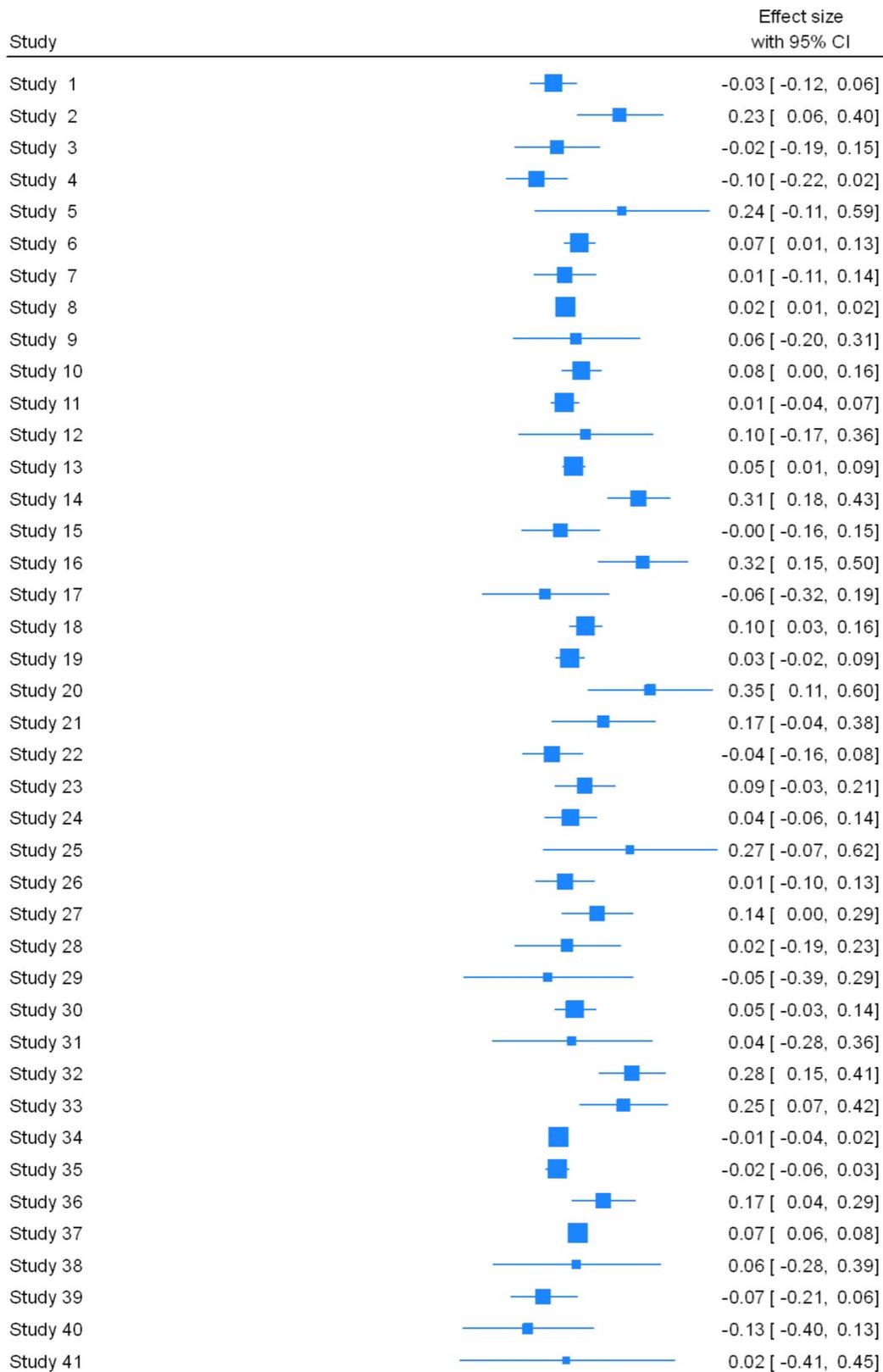


Figure 2. Forest plot.

#### 4. Estimation of the Average Effect and Publication Bias

In this section, we estimate the average effect of immigration on the host country's economic performance and test for the presence of publication bias in the literature under analysis.

Generally, in a meta-analysis, the average effect can be estimated through fixed or random effects (Neves & Sequeira, 2018). Both options are weighted averages of the sizes reported in the primary studies but differ in their underlying assumptions. While the fixed effects estimator considers that there is only one true average effect size (common to all studies) and that differences in the reported estimates result from the different sample types used in the various studies, the random effects estimator considers that each study has its own effect size (Cardoso et al., 2021).

To calculate the fixed effects (FE) estimator, it is necessary to compute the weighted average of all  $r_i$  reported in the primary studies, the weights being given by the inverse of their variance,  $\frac{1}{(SE_{r_i})^2}$ . In the case of the random effects (RE) estimator, the weights correspond to the inverse of the sum of the variance of each observation (within-study variance) and the population variance (between-study variance),  $\frac{1}{[(SE_{r_i})^2 + \theta^2]}$ .

$$FE = \frac{\sum \left( r_i \times \frac{1}{(SE_{r_i})^2} \right)}{\sum \left( \frac{1}{(SE_{r_i})^2} \right)} \quad (3)$$

$$RE = \frac{\sum \left( r_i \times \frac{1}{SE_{r_i}^2 + \theta^2} \right)}{\sum \left( \frac{1}{SE_{r_i}^2 + \theta^2} \right)} \quad (4)$$

Applying expressions (3) and (4), we find that the FE and RE average estimates equal 0.01804 and 0.05741, respectively. Since both estimates are positive, a first conclusion of the meta-analysis is that immigration has an overall positive impact on the economic performance of the host country.

To test the assumption of homogeneity of the effect sizes, we calculate the traditional  $Q$ -statistic. The  $Q$ -statistic is equal to 189.41, with a  $p$ -value lower than 1%, which clearly rejects the hypothesis of homogeneity of the effect sizes. The degree of heterogeneity can be quantified using the  $I^2$  index, which expresses the proportion of total variation across studies due to heterogeneity. In our case,  $I^2 = 92.76\%$ , indicating a high degree of heterogeneity. These statistical results have two key implications. First, the random effects estimator is more appropriate than the fixed effects, since the assumption underlying the latter is not valid. Second, the observed estimates of the effect size display a high degree of variability that needs to be explained. In Section 5, we address this issue using a meta-regression analysis.

However, before doing that, we should check if the effect sizes are distorted by publication bias. According to Rothstein et al. (2005), publication bias exists when the results of published articles on a given topic do not truly reflect reality. One of the main reasons for that is the attractiveness of significant studies; i.e., articles with higher statistical significance tend to be published more easily (Neves & Sequeira, 2018; Field & Gillett, 2010). In contrast, studies with lower statistical significance are viewed as less appealing and, as a result, face greater difficulty in getting published. Thus, in the presence of publication bias the effects reported in the primary studies tend to be stronger than the real effects, which leads to a distortion in the published results (Neves & Sequeira, 2018).

The most common tool to detect the presence of publication bias is the funnel plot (Egger et al., 1997). The funnel plot is a scatter diagram that compares the reported effect sizes ( $r_i$ ) on the horizontal axis with the precision of the estimates ( $\frac{1}{SE_{r_i}}$ ) on the vertical axis. With no publication bias, the estimates vary randomly and symmetrically around the mean effect. Because studies with small sample sizes tend to have larger standard

deviations and because the estimates with low precision lie at the bottom of the funnel plot, the dispersion will be greater at the bottom than at the top (Stanley, 2005). Thus, when there is no publication bias, the funnel plot will have the shape of a symmetric inverted funnel. Conversely, when there is publication bias, the inverted funnel plot is not symmetric in shape, as the estimates at the bottom tend to be more concentrated either to the right or to the left of the mean value.

Figure 3 shows the funnel plot for our meta-sample. The estimates seem fairly symmetrically dispersed around the average effect, suggesting the absence of publication bias.

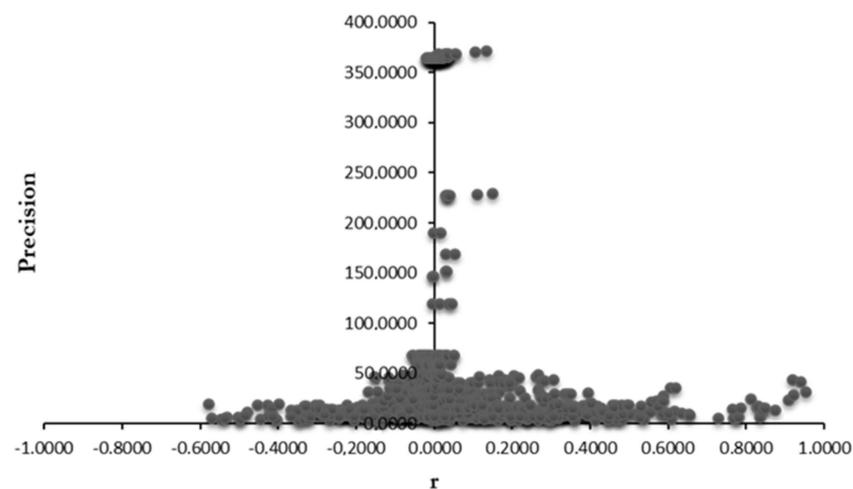


Figure 3. Funnel plot.

The symmetry of the funnel plot can be formally tested using the PET/FAT (Precision Effect Test/Funnel Asymmetry Test), which consists of estimating a simple regression of  $r_i$  on the respective  $SE_{r_i}$ :

$$r_i = \alpha_0 + \alpha_1 SE_{r_i} + u_i \quad (5)$$

In this equation,  $\alpha_0$  represents the average effect size and  $\alpha_1$  is the coefficient associated to publication bias: in the presence of publication bias, there is a significant association between the effect sizes and the respective standard errors, and therefore  $\alpha_1$  is statistically different from zero; in the absence of publication bias, the estimates vary around the average effect regardless of the value of the standard error, and therefore  $\alpha_1$  is not statistically different from zero. Thus, testing  $\alpha_1 = 0$  is a test for publication bias.

According to Ugur et al. (2016), estimating Equation (5) by OLS raises two problems. First, the model is heteroscedastic because each observation has its own standard error. This problem can be solved by dividing both sides by  $SE_{r_i}$ , which leads to:

$$t_i = \alpha_0 precision_i + \alpha_1 + \epsilon_i \quad (6)$$

Now, the dependent variable ( $t_i$ ) is the t-statistic associated with each estimate reported in the primary study and the independent variable is *precision* (the inverse of  $SE_{r_i}$ ). Moreover, the coefficients are now reversed: while the intercept corresponds to the coefficient of publication bias, the slope stands for the average effect size beyond publication bias.

The second problem with estimating Equation (5) is statistical dependence, which occurs when multiple observations are taken from the same study. In this case, some observations share the same database, specifications or estimation techniques, which may lead to problems of autocorrelation (Neves & Sequeira, 2018). This problem can be addressed using OLS with clustered standard errors, OLS with bootstrapped standard errors, or hierarchical models (Ugur et al., 2016). While the first two approaches only

correct standard errors for the dependence within studies, the third approach also allows regression coefficients to vary randomly across studies, considering that each coefficient has a fixed component (common to all studies) and a random component (resulting from variation between studies).

Table 2 presents the results of the estimation of Equation (6) using these three approaches:

**Table 2.** Estimation of Equation (6).

	OLS with Clustered SE	OLS with Bootstrapped SE	Hierarchical Models
Precision	0.01431 *** (0.00224)	0.01431 (0.01317)	0.21938 *** (0.07376)
Constant	0.67668 (0.46967)	0.67668 (0.47498)	−1.95170 *** (0.85291)
Observations (studies)	1459 (41)	1459 (41)	1459 (41)
F/Wald	40.84 ***	1.18	8.85 ***

The dependent variable is *t*. Standard errors are in parentheses. Significance level: \*\*\* for *p*-value < 0.01.

Table 2 shows that the coefficient of *Precision* ( $\alpha_0$ ) is positive for all estimations and significant at 1% in two of them. This confirms the initial finding that immigration has, in fact, a positive overall effect on the economic performance of the host country. The constant ( $\alpha_1$ ) is not statistically different from zero in any of the OLS models, although it is at 1% in the hierarchical model. These results, together with the visual inspection of the funnel, suggest no strong evidence of publication bias in the literature under analysis.

### 5. Multivariate Meta-Regression

In this section, we estimate a multivariate meta-regression to study whether differences in the methodological characteristics of the primary studies explain the heterogeneity in the reported estimates of the effect sizes. To this end, we consider a set of variables, mostly dummy variables, which assume the value one if a specific characteristic is present in the primary study, and zero otherwise. We define dummies for the following: number and type of host countries included in the sample; measure of immigration; immigrants’ age and level of qualifications; economic dimensions on which the impact of immigration is analyzed (namely, economic growth, productivity, employment, and innovation); data structure; estimation technique; and publication quality. We also include two quantitative variables that account for the study year of publication and the number of citations it has received to account for time trends in the reported effects and differences in the quality of the study. All the explanatory variables included in the multivariate meta-regression are presented in Table 3. The estimation results are reported in Table 4.

**Table 3.** Explanatory variables of the meta-regression.

Variable	Type	Description
Sample	Dummy	1 if the study focuses on one country only; 0 otherwise.
Measurement	Dummy	1 if the variable used to measure immigration is expressed as a percentage of the total population; 0 otherwise.

Table 3. Cont.

Variable	Type	Description
Ageunder40	Dummy	1 if immigrants are under 40 years old; 0 otherwise.
HostEurope	Dummy	1 if the host country(ies) belongs(s) to the European Union; 0 otherwise.
Developing	Dummy	1 if the host country(ies) is(are) a developing country; 0 otherwise.
Highskilled	Dummy	1 if immigrants are high-skilled; 0 otherwise.
Innovation	Dummy	1 if the study analyzes the impact on innovation; 0 otherwise.
Growth	Dummy	1 if the study analyzes the impact on economic growth; 0 otherwise.
Employment	Dummy	1 if the study analyzes the impact on employment; 0 otherwise.
Productiv	Dummy	1 if the study analyzes the impact on productivity; 0 otherwise.
StData	Dummy	1 if the study uses panel data; 0 otherwise.
Endog	Dummy	1 if the estimation method accounts for endogeneity; 0 otherwise.
Publication	Dummy	1 if the study is published in a journal indexed in Web of Science or Scopus; 0 otherwise.
Year_1990	Quantitative	Difference between the year of publication and the year in which the oldest study was published (1990).
Sqrt_cit	Quantitative	The square root of the number of citations obtained by the study in Google Scholar.

Table 4 shows that dummies “Developing”, “Measurement”, and “Ageunder40” play an important role in explaining heterogeneity in the reported effect sizes, as they are statistically significant in all three estimations. The strong significance of “Measurement” implies that the primary studies’ results clearly depend on how immigration is measured. As for dummy “Developing”, its positive coefficient suggests that studies examining the impact of immigration on economic performance in developing countries have larger estimates than the other studies, i.e., the positive effect of immigration on the host country’s economic performance is more pronounced in developing countries. However, this result should be interpreted with caution, given that only a small number of studies relating to developing countries were included in the meta-analysis, and the conclusions are mainly based on data from developed countries. On the other hand, the negative coefficient of dummy “Ageunder40” means that the positive impacts of immigration are weaker in studies using a sample composed mainly of younger immigrants. This is an interesting result, suggesting that the economic benefits of middle-aged and older immigrants tend to be higher than those of younger immigrants. There are several possible explanations for this. Older immigrants tend to have work experience and job-specific skills, meaning they can be productive immediately with less need for training. They also usually migrate for employment and join the labor force quickly, thus promoting labor market participation. Moreover, unlike younger immigrants, who often require education and support before

becoming economically active, older immigrants also contribute to the economy through taxes, thus having a global positive fiscal impact.

**Table 4.** Multivariate meta-regression.

	<b>OLS with Clustered SE</b>	<b>OLS with Bootstrapped SE</b>	<b>Hierarchical Models</b>
Precision	−0.25112 *** (0.08448)	−0.25112 (0.16201)	0.10407 (0.14084)
Sample	0.10345 ** (0.04625)	0.10345 * (0.05794)	0.04495 (0.06561)
Measurement	−0.05430 *** (0.01723)	−0.05430 * (0.03008)	−0.06879 ** (0.03172)
Ageunder40	−0.08096 ** (0.03068)	−0.08096 * (0.04561)	−0.05260 *** (0.00846)
HostEurope	0.02861 (0.03396)	0.02861 (0.07481)	0.22968 *** (0.06342)
Developing	0.52339 *** (0.13096)	0.52339 ** (0.21101)	0.41237 *** (0.12531)
Highskilled	−0.01603 ** (0.00677)	−0.01602 (0.0176)	−0.01621 *** (0.00481)
Innovation	−0.02179 (0.01918)	−0.02179 (0.05149)	0.00376 (0.00352)
Growth	0.05540 * (0.03140)	0.0554 (0.04723)	0.06392 ** (0.02293)
Employment	−0.07349 * (0.04339)	−0.07349 * (0.05766)	0.16789 (0.10231)
Productiv	−0.09690 ** (0.04657)	−0.09690 (0.06942)	−0.02166 (0.02483)
Engod	−0.01432 *** (0.00127)	−0.01432 (0.01224)	−0.01349 * (0.00116)
StData	−0.02151 (0.02074)	−0.02151 (0.04687)	0.01995 (0.05923)
Publication	−0.14904 *** (0.04584)	−0.14904 *** (0.06012)	0.0153 (0.07688)
Year_1990	0.01282 *** (0.00359)	0.01282 *** (0.00497)	0.00605 (0.00552)
Sqrt_cit	0.01004 *** (0.00259)	0.01004 *** (0.0038)	−0.00047 (0.00407)
Constant	−0.14149 (0.41732)	−0.14149 (0.53749)	−1.5431 ** (0.73084)
Observations (Studies)	1459 (41)	1459 (41)	1459 (41)
F/Wald	114.03 ***	76.49 ***	1785.49 ***

The dependent variable is *t*. Standard errors are in parentheses. All moderator variables are divided by the standard deviation. Significance level: \*\*\* for *p*-value < 0.01, \*\* for *p*-value < 0.05, \* for *p*-value < 0.1.

Variables “Publication”, “Sqrt\_cit”, “Year”, and “High-skilled” are also relevant in explaining the heterogeneity in the reported effect sizes, as they are statistically significant at 1% or 5% in two of the three estimations. While the significance of “Publication” suggests that the results of this literature are sensitive to specific dimensions of the publication process, the positive coefficient of “Sqrt\_cit” implies that studies reporting stronger positive effects tend to be more cited. In addition, the positive coefficient of “Year” indicates that more recent studies have also published stronger positive effects, suggesting the existence of a possible time trend in the literature that estimates the impact of immigration on economic performance. As for dummy “High-skilled”, the result is somewhat puzzling. The negative coefficient implies that the economic benefits of highly skilled immigrants tend to be lower

than those of medium/low-skilled immigrants. While at first sight one would expect the opposite result, we can advance some possible explanations for this finding. High-skilled immigrants may often encounter skill mismatches and underutilization due to barriers such as credential recognition, which limit their contributions. In contrast, low- and medium-skilled immigrants can more easily be absorbed into sectors with labor shortages. Moreover, due to labor market segmentation, they may complement rather than compete with native workers, thereby supporting productivity and keeping service costs low. They may also integrate into the workforce more quickly, providing immediate economic benefits. Despite their potential, high-skilled immigrants may take longer to maximize their potential due to possible regulatory and institutional barriers.

Table 4 also shows some slight evidence of the significance of variables “Endog”, “HostEurope”, “Sample”, “Growth” and “Productiv”, with the following implications: (i) endogeneity may be an issue in the estimation of the impact of immigration on the economic performance of the host country; (ii) the magnitude of the impact of immigration on Europe may be different from that on other territories; (iii) the number of countries used in the sample of the primary studies may affect the reported effect sizes; and (iv) economic growth is more positively affected by immigration than productivity. These findings should be taken with caution, though, since each of those four variables is statistically significant (at 1% or 5%) in only one regression.

Finally, variables “Innovation”, “Employment”, and “StData” are not statistically significant in any of the estimations, meaning that the impact of immigration on innovation and employment does not differ significantly from that on other economic dimensions, and that the effect sizes are not sensitive to the use of different data structures in the primary studies.

## 6. Conclusions

In this paper, we conducted a meta-analysis of the impact of immigration on the economic performance of host countries. We collected data from 41 empirical studies that estimate the effect of immigration on several economic outcomes, namely economic growth, productivity, (un)employment, and innovation.

We first estimated a PET/FAT simple regression to test for publication bias and an overall significant effect. We found that, while there is no strong evidence of publication bias in this literature, immigration has a clear positive overall impact on the economic performance of the host country.

Despite this positive average effect, there is a substantial heterogeneity in the primary studies’ findings that needs to be explained. For this purpose, we estimated a multivariate meta-regression, in which we regressed the effect sizes on a set of control variables that capture potential sources of heterogeneity. The results of the estimation of the meta-regression show that there are, in fact, several factors that clearly explain such heterogeneity. Specifically, studies focusing on developing countries, using samples of older immigrants, and employing specific immigration measurement methods tend to report more positive effects. The larger effect sizes in developing countries suggest that even without optimal reception conditions, immigration can yield considerable economic benefits. Conversely, the weaker effects associated with younger immigrant samples challenge conventional expectations and highlight middle-aged and older immigrants’ potential higher economic contributions. Furthermore, the strong influence of measurement strategies underscores the methodological sensitivity of this literature.

Additional variables, such as publication status, citation count, and year of publication, also contribute to the variation of results across studies. This influence of the publication process and the presence of a time trend in the results suggest that academic and temporal

dynamics shape the literature on the economic impacts of immigration. Surprisingly, the variable that captures the immigrants' skill level has a negative coefficient, suggesting that low- and medium-skilled immigrants may provide greater economic benefits than highly skilled ones. This may occur potentially due to labor market mismatches or the inability of host countries to fully leverage high-skill immigration.

Minor evidence is also found for heterogeneity linked to endogeneity concerns, the European-specific context, sample composition, and the economic dimensions under analysis.

Overall, the results highlight the complex and multifaceted nature of immigration's economic effects and underscore the importance of accounting for heterogeneity in methodology, and context, and time trends, and in analyzing the economic impacts of immigration on the host country. At the same time, the conclusions of the meta-analysis have important research and policy implications. Firstly, policymakers should recognize the potential overall economic gains from immigration and consider designing targeted policies to better integrate immigrants. Secondly, research should systematically differentiate between developing and developed countries, as the economic effects of immigration vary according to the host country's development level. Thirdly, the age profile of immigrants merits deeper exploration, especially the underappreciated role of middle-aged and older immigrants. In particular, more emphasis should be put on investigating the mechanisms that explain why the benefits of such immigrants may be stronger than those of younger immigrants. From a policy point of view, integration programs should not be overly youth-focused but leverage the potential of middle-aged and older immigrants. Fourthly, the unexpected finding that high-skilled immigrants may yield smaller economic benefits warrants further research into skill underutilization and labor market integration challenges. Future studies could investigate how institutional factors or host country readiness mediate the impact of skilled immigration. At the same time, governments in host countries should evaluate and improve mechanisms that help high-skilled immigrants apply their expertise effectively within the domestic labor market.

Although the meta-analysis provides several results with important implications, it also has some limitations, which open up avenues for additional possible future research on the topic. For example, the predominance of studies from developed countries limits the generalization of the findings and implications of the meta-analysis. In particular, in the specific context of developing countries, policy recommendations should be viewed as preliminary hypotheses that need additional validation through further research and analysis. In addition, given the strong influence of how immigration is measured on reported outcomes, future studies should aim for greater consistency in measurement methods or explicitly test the sensitivity of their results to alternative immigration variables. Furthermore, the meta-analysis does not account for the different migration periods that have occurred over the past decades in various regions of the world, such as the 1990s (characterized by strict visa regimes), the 2000s (marked by EU expansion and the lifting of visa requirements for several), the 2008–2009 global financial crisis (which triggered widespread job losses and intensified two-way migration between host and home countries), the post-crisis recovery phase and stable growth leading up to the late 2010s, and the more recent major disruption caused by the COVID-19 pandemic and lockdowns. These periods, together with moments of substantial changes in the immigration policies in the major host countries, are likely to have exerted a significant influence on how immigration affects the host country's economic performance. Such an analysis would provide a more detailed picture of the effects of immigration, making it a topic of great importance for future research.

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## Note

- <sup>1</sup> United Kingdom (Kim et al., 2010), Thailand (Tupalayalai, 2020), Italy (Di Bernardino et al., 2021), Japan (Shimasawa & Oguro, 2010), and Norway (Fedirun, 2005).

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