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A New Perspective on European Labour Migration: A Case Study of the Opportunity Cost for Greece and Poland

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Abstract

This paper addresses a critical gap in migration literature by quantifying the opportunity cost of labour emigration for countries of origin within the European Union, using Greece and Poland as case studies from 2004 to 2019. Despite the growing policy and academic interest in the effects of emigration, existing research has largely overlooked its economic cost for sending countries. Building upon the model developed by Radonjić & Bobić (2020), this study develops a framework to estimate the total opportunity cost of emigration, including direct costs of education, the opportunity cost of foregone productivity during education, fixed costs of emigration, loss of GDP contribution, and offsetting factors such as remittances and foregone social benefits. The findings reveal substantial economic costs: approximately €305 billion for Greece and €175 billion for Poland over the 16-year period, translating to annual per capita costs of €23,268 and €7,047, respectively. Despite a higher volume of Polish emigrants, Greece experiences a higher economic burden, primarily due to the higher emigration rates among highly educated individuals. The paper concludes with policy recommendations aimed at reducing emigration outflows, facilitating return migration, and aligning education with labour market needs. The presented model offers a replicable and adaptable tool for policymakers and researchers to assess and address the cost of emigration in emerging and developed economies.

Keywords: Labour migration; opportunity cost; brain drain; impacts of migration; Greece; Poland.

JEL code: F22, J61, O15, O57

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1. Introduction

Employment has always been a major factor driving international migration. The International Labour Organization (ILO) estimates that as of 2019, there were 169 million migrant workers worldwide. They account for most migrants worldwide: 62 per cent of the estimated 272 million international migrants as of 2019 and 69 per cent of those migrants of working age (15 or older). Moreover, they comprise 4.9 per cent of the global workforce (International Labour Organization, 2021). These estimates highlight the importance of labour and employment as factors driving global migration and the contribution that labour migrants make to economies worldwide.

Labour migration happens both internally and internationally, temporarily, and permanently, in different sectors and across different skill levels. Often, temporary migration is a natural development where migrants decide to work abroad for some time, to then return home to their families. Other temporary migration movements occur through organised programmes that often target a specific sector or occupation. This is largely because the rhetoric around migration has changed, and it is now widely associated with its potential outcomes. This specifically refers to the so-called “triple win” situation, where the migrant workers and both the country of origin and the country of destination benefit from this migratory movement. The destination country can fill its labour shortages in times when there are imminent skill shortages and demographic changes and restrict immigration for employment to specific occupations. At the same time, there are advantages for the country of origin, such as potential remittances, skills transfers, and socio-economic development more generally. Thirdly, the migrants themselves and their families can benefit from additional resources, opportunities, and knowledge (Zimmermann, 2014).

Such triple-win effects of (temporary) labour migration have been discussed among key stakeholders in migration governance, such as the European Commission and the Global Forum on Migration and Development, since the mid-2000s (Wickramasekara, 2011). The idea of creating triple-win migration scenarios was included in the *Report of the Secretary-General on International Migration and Development* in May 2006 and put on the agenda for the first *High-level Dialogue on International Migration and Development*, held in September 2006 (United

Nations, 2006). However, the evidence on such effects seems still limited and largely focuses on effects in countries of destination (Centraal Planbureau, 2024; International Labour Organisation et al., 2019; The Migration Observatory, 2023). At the same time, evidence is becoming increasingly important when the creation of regular migration channels is called for and crucial considering the objectives of the Global Compact for Safe, Orderly and Regular Migration (GCM).

However, the effects of labour migration on countries of origin seem not to be well understood at this stage. This paper, therefore, aims to contribute to this literature by analysing the opportunity costs of labour migration for Greece and Poland as two case studies of countries of origin for the period 2004 to 2019. Both countries have experienced significant outbound labour migration and present compelling case studies due to their distinct economic contexts and demographic trends. Poland, a rapidly growing economy within the EU, has seen substantial labour emigration, particularly to other EU countries. Greece, struggling with economic challenges post the 2007-2008 financial crisis, has faced significant emigration driven by economic hardship.

Understanding the opportunity costs of labour migration plays a key role in the development of Greece and Poland. This understanding transcends immediate economic gains, delving into societal, cultural, and human capital implications. By acknowledging these opportunity costs, policymakers can gain a nuanced perspective for informed decision-making, fostering sustainable development strategies tailored to the countries' respective landscapes.

The remainder of this paper is structured as follows. First, it presents a literature review on labour migration and its associated opportunity costs. This is followed by a detailed explanation of the methodology used in the paper, including an overview of the model and the variables it comprises. The findings then inform the presentation of results and conclusions, offering a renewed perspective on labour migration. Finally, the paper concludes with a discussion and recommendations for future research and policy development.

2. Literature review

2.1. Labour migration

Pursuing employment opportunities is a primary driver for international migration, influenced by economic inequality, job seeking, or a combination of both. Rising labour migration is further fuelled by the compounding effects of political, economic, and environmental crises and shifting demographics. The concept of a "youth bulge" in some regions and an aging population in others significantly shapes migration patterns (KNOMAD, 2021).

Despite the absence of a globally recognised statistical definition, the International Labour Organization (ILO) defines migrant workers as "all international migrants currently employed or unemployed and seeking employment in their present country of residence" (International Organisation for Migration, 2017) This definition serves as a cornerstone for understanding the nature of labour mobility. Labour migration is intricately linked to broader processes of globalisation and economic interdependence, forming part of a larger web of interactions defining the modern global economy.

2.2. Effects of labour migration on countries of origin

One important aspect of international mobility is labour migration, which significantly impacts the countries of origin and shapes their socioeconomic environments in various ways. Based on a review of existing literature, these are the main effects that could be identified for countries of origin.

First, it can offer unemployment relief. International labour migration is increasingly seen as a vital part of national development and employment strategies by both sending and receiving countries. Labour migration provides major benefits to the countries of origin, easing pressures associated with unemployment and promoting development through remittance inflows, knowledge transfer, and the creation of business and trade networks. On the other hand, destination nations dealing with aging populations and labour shortages discover that efficient and well-planned labour migration can increase human capital stocks, encourage

mobility, and minimise workforce scarcity (International Organisation for Migration, 2017).

Second, remittances have the potential to promote economic development. Remittances' contributions to economic growth are, in fact, a major factor in labour migration. Migrant workers frequently send remittances in the form of money to their countries of origin (Adams, 2007). Global remittances are estimated to have reached \$857 billion in 2023 (World Bank, 2024). By sustaining family incomes and assisting in the fight against poverty, these remittances can have a major positive economic impact on the countries of origin (Adams, 2007).

In addition, remittances from migrant workers make up a sizable amount of the GDP and balance of payments for some nations. Remittances, for example, account for almost 50 per cent of GDP in low-income countries like Tonga and are essential to raising GDP and living standards (The Economist, 2023). In low- and middle-income nations, remittances have been demonstrated to help reduce poverty, enhance nutrition, and raise school enrolment rates. Additionally, studies have shown that these income inflows can strengthen recipient households' resilience, particularly in the event of calamities (Lionell, 2023).

Remittances can have a mixed effect on an economy, however. A marginal average increase in long-run output corresponds to a rise in remittances. However, this masks a significant cross-country heterogeneity, revealing that the effect of remittances on output ranges from -0.53 per cent in Bosnia and Herzegovina to 0.59 per cent in the Dominican Republic. Differences in the magnitude and sign of the remittance impact on investment and consumption between countries can explain this variation. This advises against making an argument about the overall impact of remittances that is too general (Francois et al., 2022).

Thirdly, knowledge transfer and skill acquisition are also results of labour migration. In their new country of residence, migrant workers pick up new abilities and information they can use when they return. This knowledge and skill transfer can spark the innovation and development of the countries of origin (World Bank, 2019). In addition to transferring or updating skills, migration can be a way to innovate and develop in the countries of origin and destination and meet labour supply and demand needs quickly and effectively. Improving

productivity necessitates the mobility of skilled workers both domestically and internationally. They advance the frontier of knowledge and promote economic expansion (International Labour Organisation, 2021).

However, the value placed on credentials and work experience obtained in non-OECD nations may be lower, which makes it more difficult for unemployed immigrants to find employment that matches their qualifications and experience (Dumont & Lemaitre, 2005). To avoid skilled people leaving and a decline in working conditions for all workers, it is crucial to design and implement sound labour market information systems, including accurate labour market needs assessment and skills anticipation, as well as to put in place processes for skills recognition and matching (International Organisation for Migration, 2017).

Fourthly, the experience of migration may result in the development of networks for trade and business. According to IOM (2017), migrants have the potential to promote economic growth and development by enabling trade and investment between their origin and destination countries. Due to their special ability to maintain ties in both countries, migrants can serve as intermediaries between these two markets. They can use their familiarity with the language, customs, and business environment of their native nation to their advantage when conducting business. Increased trade volume, FDI, and technology transfer between the two nations may result from this (Genç, 2014).

Additionally, migrant communities frequently create diaspora networks, which promote investment and trade even more. Trade can be made more efficient by using these networks to help overcome information asymmetries and lower transaction costs. Moreover, they have the potential to promote the development of transnational communities, thereby strengthening economic connections (UNCTAD, 2018). However, depending on the unique circumstances of each nation, the effects of migration on networks of commerce and business can differ. The extent to which migration contributes to the development of business and trade networks can be influenced by several factors, including the size of the migrant population, the degree of integration of migrants into the host society, and the nature of economic relations between the countries (Abowd & Freeman, 1991).

Lastly, it is important to remember that, despite the many advantages of labour migration, it can also have negative effects. When people with skills needed in the country leave, this may harm countries of origin, especially if the country's capacity to train new skilled workers is outpaced by the emigration of qualified human resources (World Bank, 2019). A lack of vital skills required for social and economic advancement in the countries of origin can result from such a trend, often called *brain drain*. This is particularly detrimental for developing nations, as the departure of highly qualified individuals like physicians, engineers, and scientists can impede progress toward development (Lindsay Lowell, 2002).

It is important to remember that brain drain may also have advantages. It can, for example, promote the growth of robust diaspora networks and improve the flow of innovation, technology, and expertise between the countries of origin and destination. Additionally, it may result in circular migration, which would allow both the home and destination nations to profit from labour mobility (Ilasco, 2024). Overall, the effects of the migration of skilled workers can differ based on the unique circumstances of each country, even though it can present serious difficulties for the countries of origin (Docquier, 2014).

2.3. Opportunity cost to countries of origin

As the previous section shows, it is often proclaimed that countries of origin can enjoy remittances, knowledge spillovers, and a (indirect) broader tax base. Nevertheless, the opportunity costs of labour migration in the countries of origin have been structurally underserved within economic literature and academic research. As one exception, Tarasyev and Jabbar (2018) have tried to model the impact of labour migration on the development of sovereign economic systems. Herein, it is identified that the primary pushing and pulling factor is the income level; these values are converging in the countries of origin and destination regarding the growth of migration flows (Tarasyev & Jabbar, 2018). Furthermore, the OECD, ILO, and the World Bank (2015) touch upon the microeconomic perspective of the opportunity cost of labour migration in their work titled 'Interrelations between Public Policies, Migration and Development'. Parallelly, it mentioned the microeconomic considerations of migrations but did not extrapolate this process of non-monetary costs to macroeconomic scales (Sjaastad, 1962). The OECD also points out that public employment

programs (PEPs) can have differing effects on the incentives for migration. When these PEPs improve local employment, this may decrease the incentives to migrate, thus raising the opportunity cost of labour migration. However, the opportunity cost of labour migration could also be lowered due to PEPs (OECD et al., 2015).

It should also be noted that the opportunity cost of labour migration has already been reviewed in the 1970s by Levy and Wadycki (1974). Herein, prior econometric endeavours overlooked important migration costs, basing their findings on the adult male migration from Venezuela to America in 1961 (Levy & Wadycki, 1974). When factors representing alternative possibilities were considered, the estimated migration elasticity concerning distance dropped from -1.04 to -0.42, indicating that the traditional model could not fully capture the influence of migration. The findings highlight that migrants in Venezuela consider both the potential costs and the rewards of migrating, adhering to the economic tradition of rational choice. This economic rational choice theory cannot be assessed properly due to a lack of existing empirical studies and is therefore not helpful in assessing long-term macroeconomic consequences, such as these opportunity costs (Walerych, 2020).

Transitioning from the literature review to the methodology, the existing body of literature on the opportunity cost of labour migration has highlighted several gaps and limitations. These gaps underscore the need for a more comprehensive macroeconomic analysis that considers both direct and indirect costs associated with labour migration. Building on this foundation, this study seeks to bridge these gaps by replicating the methodology utilised in the most relevant work within this domain. Namely, Radonjic and Bobic's work (2020) on brain drain losses from labour migration from a Serbian perspective serves as the basis in this paper. The methodology furthers the analysis through a neo-Marxist perspective to account for the direct cost of education and the indirect costs of loss of tax revenue due to pursuing further education instead of joining the nation's workforce. Through (partly) replicating and expanding on this methodology, this paper aims to provide a more nuanced and holistic review of the opportunity costs of labour migration while taking relevant underlying variables and new analytical approaches of the case countries, Greece and Poland, into consideration.

3. Methodology

3.1. Background

As the literature has shown, little research has been done on quantifying the impact of labour migration on the origin economy, especially when trying to calculate the costs related to the phenomenon. Our approach is based on the research of Radonjić & Bobić in their work “Brain drain losses – a Case Study of Serbia” (Radonjić & Bobić, 2021). Their approach is straightforward but lacks some of the nuances introduced to the present model based on the broader literature review and specific case studies of Greece and Poland.

Some research has been done on the impact of migration in specific countries from the aspect of brain drain, like that of Glytsos for Albania and Bulgaria, or older studies during the 1980s by Borjia et al, and on Migration and Labour Market Competitiveness in the EU by Přívvara et al. (2023). In Greece, for example, there are few attempts to calculate the costs driven by the severe impact of the economic crisis, but none apply to other countries. The present model has the potential to introduce a more generalised method for calculating the costs of migration and approximating its impact on the origin economy.

There is plenty of literature on the individual costs of emigration for the people who proceed with this choice and the self-selection phenomenon observed in the emigrant population or “the best and brightest” of a country, as is often referred to by emigration and brain drain studies. Furthermore, many attempts have tried to model the decision process of emigration on the individual level (Chiswick, 1999) or mention relative costs while studying the impact on the destination country (Bødker, 2012).

Costs can be direct or indirect for the origin economy. Some of the direct costs are fiscal losses, demographic losses, gaps in the skill pool of the origin country economy, and a decrease in consumption. Some of the indirect costs are the social contribution of the emigrants, the loss of productivity by association with co-workers, or the costs of the lost capacity for innovation.

3.2. Opportunity cost model

Based on the research of Radonjić and Bobić (2021), the following model was developed for this paper:

$$\begin{aligned} & \text{The total cost of Education of Emigrants} + \text{Opportunity Cost of Education} + \text{Fixed} \\ & \text{Cost of Emigration} + \text{Loss of GDP Contribution} - \text{Opportunity Gains of Social Ben-} \quad (1) \\ & \text{efits} - \text{Remittances} = \text{Opportunity Cost of Labour Migration} \end{aligned}$$

First, data on the emigration and return migration of residents from the origin country and their educational profiles need to be collected. Based on this, the average public expenditure on the education of emigrants can be estimated by calculating per capita costs according to their level of educational attainment.

Next, the opportunity cost of pursuing a university education is approximated by considering youth unemployment rates. Specifically, the number of university graduates is multiplied by the youth unemployment rate, assuming that some of these individuals would remain unemployed even without attending university. The remaining portion - those who would likely have been employed - is multiplied by the minimum wage and years spent in university, assuming they would have held entry-level positions during that time.

$$\begin{aligned} & \text{Total Cost of Education of Emigrants} = \text{Number of Emigrants} * \text{Proportion of High} \\ & \text{School Graduates} * \text{Years of Schooling} * \text{Public Spending} + \text{Number of Emigrants} \\ & * \text{Proportion of University Graduates} * \text{Years of Schooling} * \text{Public Spending} - \quad (2) \\ & \text{University Graduates} * \text{Youth Unemployment} * \text{Gross Minimum Wage} * \text{Years of} \\ & \text{Schooling} \end{aligned}$$

Another relevant cost of emigration, as highlighted in many migration models, is the fixed cost associated with relocating. This includes initial expenses such as a housing deposit, flight tickets, and several months of living costs before securing employment abroad. While direct data on these costs is not available, a fixed amount of €5,000 is assumed, based on the cost of

living in major European destination countries. Although this figure may vary, and since migrants may also use personal savings or existing capital, it is considered a reasonable estimate to represent the financial threshold needed to facilitate emigration.

$$\text{Fixed Costs of Emigration} = \text{Number of Emigrants} * \text{Average fixed cost of emigration per person} \quad (3)$$

The next major challenge is estimating the loss of potential GDP contribution from the emigrant population had they remained in their home country. To approximate this, the GDP generated by emigrants abroad must first be estimated. This approach follows the methodology of Radonjić and Bobić (2021), who, using a McKinsey report, assume that remittances represent approximately 8.7 per cent of the total economic output of emigrants. They then estimate total emigrant output by dividing the remittances received by this percentage.

However, a paradox arises in the case of Greece. During the study period, remittances to Greece declined, which is assumed to be a result of emigration increasingly becoming an individual decision, as most emigrants are unmarried and less likely to send money back home.

To address this issue, the proportion of emigrants who actually send remittances must first be estimated. Once this share is known, the total output can be extrapolated. Specifically, if 8.7 per cent of GDP is represented by the remittances sent by this subset of emigrants, the total GDP produced by the entire emigrant population can be calculated accordingly. This provides an approximation of the economic output of all Greek emigrants currently living abroad.

$$\text{GDP Produced Abroad} = \text{Remittances} * 100 / 8,7 = \text{GDP produced by Senders. GDP produced by senders} * 100 / x \quad (4)$$

To estimate the loss of GDP contribution, the GDP produced abroad by emigrants is adjusted to reflect what it would have been had they remained in the origin country. This is done by dividing the GDP generated abroad by the ratio of labour productivity (per hour) between

the average of the main destination countries and that of the origin country. This assumes that labour productivity reflects the institutional, infrastructural, and technological conditions of the country in which the labour takes place.

Next, self-selection among emigrants must be accounted for. Not all emigrants were unemployed before leaving; some chose to emigrate despite having jobs, while others left due to limited employment opportunities. To adjust for this, the figure is further divided by the proportion of the emigrant population employed before leaving the country.

By estimating the adjusted GDP output of emigrants as if it had been generated domestically, this method assumes that such output would have contributed to the home economy, whether through consumption, investment, or fiscal contributions, had the individuals not emigrated.

$$\text{Loss of GDP Contribution} = \text{GDP produced abroad} / \text{Productivity difference between the country of destination and origin} / \text{Employment Rates before Emigration} \quad (5)$$

Finally, emigration also brings certain benefits to the origin economy, which must be accounted for. These include reduced social welfare expenditures since emigrants no longer draw on domestic public services and remittances sent back by those living abroad. Therefore, these indirect gains are subtracted from the total estimated costs of emigration. The opportunity gains of social benefits are calculated as follows, while remittance data is available through official sources, eliminating the need for additional calculations.

$$\text{Opportunity Gains of Social Benefits} = \text{Number of Emigrants} * \text{Unemployment Prior to Emigration} * \text{Social Benefits} \quad (6)$$

In this way, a broad framework for measuring the opportunity costs of emigration was developed, taking into account the specific nuances and circumstances of individual countries. The following section will apply the model to the two case studies to estimate the opportunity cost of labour emigration for Greece and Poland.

4. Case studies

4.1. Greece

4.1.1. Emigration from Greece: Context, profile, and drivers

Greece offers an interesting case study on the cost of emigration for a country of origin. As the 10th country to join the European Union, it gained access to free movement of labour, goods, and capital by 1988. However, this did not immediately transform its emigration patterns. Historically, Greece has experienced two major waves of emigration: the first in the early 20th century toward the United States and Australia, and the second during the 1960s and 70s, when many Greeks migrated to Western Europe under guest worker programs (Labrianidis & Pratsinakis, 2016). In the decades following, particularly the 1980s and 1990s, Greece transitioned into an immigration destination, receiving migrants from the Balkans and ethnic Greeks from the former Soviet Union (Pratsinakis, 2014). Despite the right to free movement, Greeks remained among the least mobile Europeans by 2006 (EU Commission survey), although a small stream of skilled professionals continued to leave in search of better opportunities.

The third and most significant wave of emigration, in the context of this paper, began after the 2008 global financial crisis. Greece suffered one of the most severe economic downturns in recent Western history, with GDP decreasing by nearly 25 per cent between 2009 and 2014, and median incomes falling from €12,000 to €7,710 according to Eurostat. Unemployment peaked at 25 per cent, taxes surged by 337 per cent, and a sense of economic deprivation deepened across society (Kouisis et al., 2022). This crisis triggered an emigration wave of roughly 500,000 people between 2009 and 2019, equivalent to 7 per cent of the workforce and 5 per cent of the population (Labrianidis & Pratsinakis, 2017). However, language barriers, credential recognition issues, and the stabilising role of extended families limited even greater emigration.

Emigration during this period was highly selective. Migrants tended to be ambitious, educated, and risk-tolerant individuals, which the literature often calls the “best and

brightest" (Chiswick, 1999). The majority were of working age: 86.3 per cent were between 15 and 64, and 51 per cent were aged 25–44. The average age rose to around 30, higher than in prior decades. Educational attainment was striking: 69 per cent of emigrants held university degrees, and 26 per cent held a masters. An estimated 300,000 to 500,000 university graduates left the country, representing 17–26 per cent of Greece's total graduates (Labrianidis, 2017). This significant outflow of talent became synonymous with the term "brain drain." Nearly half of the emigrants were employed before leaving, and between 48 per cent and 60 per cent expressed no intention of returning (Gamze, 2018). Low-skilled migrants, comprising about 30 per cent of emigrants, were more likely to be unemployed and relied on established social networks abroad. In contrast, high-skilled migrants typically secured employment and accommodation independently before leaving.

A 2019 EUMIGRE study categorised Greek emigrants into three types: Career migrants (strategic, high-skilled professionals from upper social classes in fields like IT and economics), necessity migrants (crisis-driven, often well-educated but with fewer resources), and middling transnationals (highly educated individuals motivated by personal growth and long-term life improvement). Destination preferences varied accordingly: the UK attracted high-skilled migrants, Germany drew low-skilled workers via existing networks from earlier migration waves, and the Netherlands attracted a mix of students and lower-skilled workers (Labrianidis & Pratsinakis, 2016).

Income also shaped migration patterns. High-income households were consistently more likely to emigrate (9 per cent of outflows). In contrast, low-income households, initially the least mobile, became the most volatile post-crisis, accounting for 28 per cent of emigration. Contrary to other trends, only 20 per cent of Greek emigrants sent money home, and 13 per cent even received financial support from Greece (Labrianidis & Pratsinakis, 2016).

The drivers of this mass migration were both structural and crisis specific. Greece's labour market had long suffered from high unemployment (around 10 per cent even during the 2000s), low job security, and weak absorption of skilled labour. Youth unemployment spiked to 60 per cent during the crisis (Potužáková & Bílková, 2022). Greece expanded higher education without creating sufficient demand for high-skilled labour. R&D expenditure

lagged behind EU averages, and the private sector contributed less than a third of that spending. This mismatch between an oversupply of qualifications and a lack of high-quality job opportunities made the domestic labour market unable to retain its educated workforce. Nepotism, limited career progression, and poor work conditions further pushed individuals to seek opportunities abroad (Labrianidis & Pratsinakis, 2016; Gamze, 2018).

These long-term issues were compounded by governance challenges. Transparency International's Corruption Perceptions Index consistently ranked Greece poorly, between 40 and 50 out of 100, indicating deep-rooted institutional issues (Transparency International, 2024). Greece also ranked last in the EU for employment quality, with Poland—the second worst—scoring twice as high (Piasna, 2023).

Together, Greece's modern emigration story illustrates how structural economic deficiencies, poor labour conditions, and sudden macroeconomic shocks can combine to drive out even the most capable segments of a population, leaving long-term implications for the country's development, human capital, and social cohesion.

4.1.2. Opportunity costs of migration

Determining the cost of emigration to the origin economy, especially Greece, is a task that has rarely been undertaken. While some parts can be quantified, there are factors related to brain drain that are harder to put into numbers. For example, the costs can include the productivity of coworkers had the highly skilled migrants stayed in the origin economy, the influence on social developments, and the demographic costs in the framework of a shrinking population. One of the most worrying facts about the last emigration wave has been the permanent nature of most of the emigrants' decision to emigrate.

In one study, the cost from 2008 to 2016 is calculated at €15.3 billion for graduates and 4.3 billion for low-skilled workers for a total estimated outflow during this period of over 700,000 people. Moreover, in the same study, a total of €10 billion is estimated to be the loss of collected taxes due to the emigration of this population for an estimated monthly wage of €1,200 (Papefthmiou, 2018).

In another study by graduates of the Barcelona School of Economics, an attempt was made to empirically calculate the cost of emigration in correlation with fiscal austerity. The findings are intriguing as they mention the relationship between fiscal austerity and emigration is bidirectional, meaning that austerity leads to emigration and emigration leads to more austerity. In theory, the emigration of unemployed citizens should act as a fiscal stabiliser. It would lessen the burden of welfare spending and eventually increase the negotiating power of the remaining labour force in the origin economy. The benefits, though, are found to be temporary, as in the long term this loss results in increased taxation and a lower reduction rate of national debt that further increases unemployment due to lower demand, thus reversing the benefits. According to Bandeira et al. (2019), fiscal austerity measures implemented during the Greek Depression accounted for approximately one-third of the country's GDP decline and 12 per cent of emigration between 2009 and 2015. Their dynamic stochastic general equilibrium (DSGE) model indicates that a scenario without emigration would have underpredicted the total output loss by about 20 per cent, underscoring the significant economic impact of emigration during this period.

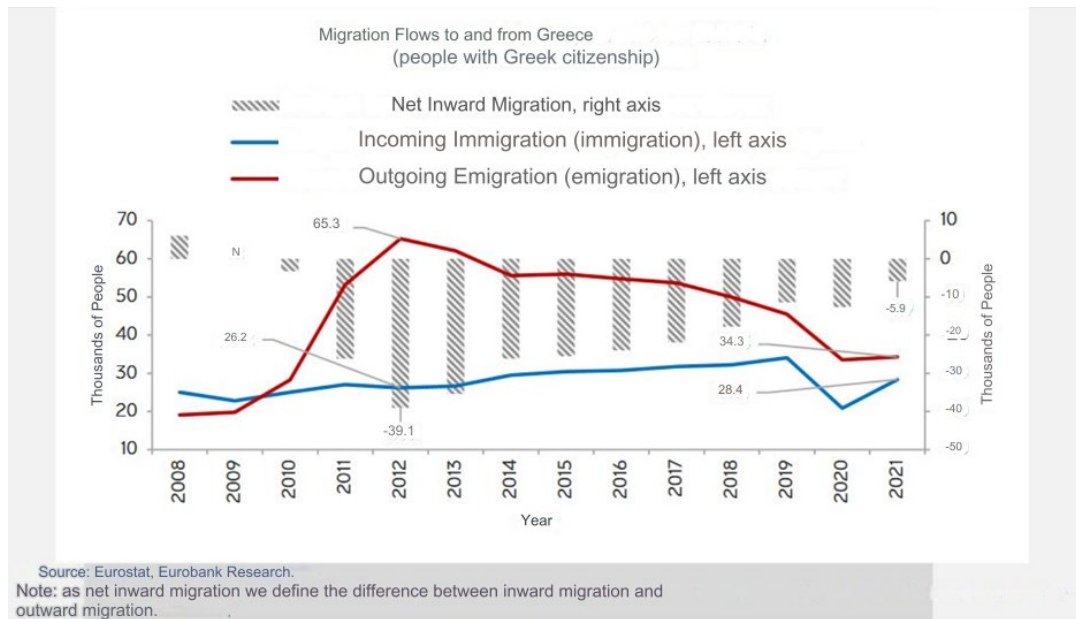
World Bank data shows that Greece's GDP contracted by approximately \$136 billion (in current US dollars) from 2009 to 2015. Applying the one-third attribution from Bandeira et al.'s findings suggests that around \$45 billion of this decline can be linked to austerity measures. Furthermore, the model's indication that 12 per cent of emigration was driven by austerity highlights the role of fiscal policies in influencing migration patterns.

These findings align closely with estimates by Papaefthymiou, who calculated that the economic cost of emigration during this period was approximately \$27 billion. The convergence of these independent analyses reinforces the substantial fiscal and demographic consequences of austerity-induced emigration in Greece.

In this paper, an attempt is made to add to the study of opportunity cost in Greece due to emigration. One of the limitations of studying emigration in the EU is that, oftentimes, the data due to the free movement do not represent the whole picture. Furthermore, some disclaimers need to be made regarding the data. From 2004 until 2007, no data on Greek emigrants were available, so taking into account the context, a steady outflow is assumed,

keeping the earliest known value in 2008 for all previous years. Furthermore, in calculating our model, the risk of double measuring emigrants who emigrated and then returned within the period of this study is taken, therefore a return rate of 35 per cent of total emigration per year is assumed to match the return rates of Eurobank Research graphs regarding the return migration during this period (Γούναρη, 2023).

Figure 1: Greek migration flows, 2008-2021



Some surveys estimate the net outflow of emigrants at a lower rate of 15 per cent (Labrianidis & Pratsinakis, 2016), while others place it as high as 40 per cent. Official immigration data is not used in these estimates because, during this period, Greece served as a key destination for immigrants fleeing conflict zones such as Syria, as well as for irregular migrants. These groups are not reflected in the data concerning non-Greek residents who had lived in Greece for years, emigrated, and potentially returned, such as the Albanian community, the largest foreign group to have migrated to Greece during the 1990s (Pratsinakis et al., 2017).

Moreover, several studies conducted during the crisis years estimate the number of emigrants at around 600,000. Our own findings indicate a higher figure of approximately 820,000, which includes the additional years 2004–2009 and 2016–2019 (see Table 7).

With the number of emigrants established, the next step in the model is to calculate the total cost of education associated with the human capital that has emigrated. For Greek nationals who emigrated, we assume that their publicly funded education spans from primary school to the undergraduate level.

The literature generally agrees on the educational profile of emigrants: approximately 70 per cent are university graduates, while the remaining 30 per cent are assumed to have completed secondary education. For non-Greek residents who emigrated, it is estimated that about 40 per cent participated in Greece's educational system. This figure aims to account for the children of first-generation immigrants and individuals who arrived in Greece during their school years. However, due to limited data, this estimate may either overstate or understate actual participation, to the best of our knowledge. For the purposes of this analysis, we apply the same educational attainment distribution (70 per cent university graduates, 30 per cent high school graduates) to non-Greek emigrants as we do to Greek nationals.

The cost of education is based on figures from Papaefthymiou (2018), using data from ELSTAT, Greece's national statistical authority. The estimated public cost for five years of university education is €17,855 per student, while the cost for 12 years of primary and secondary education is €16,182 per student. Combining the educational costs for both Greek nationals (see Table 8) and non-Greek emigrants (see Table 9) results in a total estimated cost of €25,488,956,904. After applying a 35 per cent return migration rate, representing those who eventually returned to Greece, the adjusted net cost of education is €16,567,821,988.

To finalise the Total Education Costs, the opportunity cost of education must also be included. In Greece, high school students are rarely employed, so this cost is calculated exclusively for university graduates. It is assumed that, on average, five years are spent in university, during which potential earnings are forgone. This estimate considers an average youth unemployment rate of 35.5 per cent during the relevant period. It is based on potential earnings calculated using the average minimum wage of €707 per month, paid over 14 months annually in accordance with Greek labour law (Trading Economics, 2024a).

Table 1: Discounting for return migration, Greece

Number of graduates	Unemployed	Employed	Potential earnings Total for 16 years	Earnings discounting return migration	Average annual opportunity cost
622,105	220,847	401,257	63,546,338,448	41,305,119,991	2,581,569,999

The total cost of education for emigrants is estimated by combining the opportunity cost of education with public spending on education. Between 2004 and 2019, the opportunity cost was €41.3 billion, while public expenditures amount to approximately €16.6 billion. This results in a total estimated education cost of €57.87 billion for individuals who emigrated during this period.

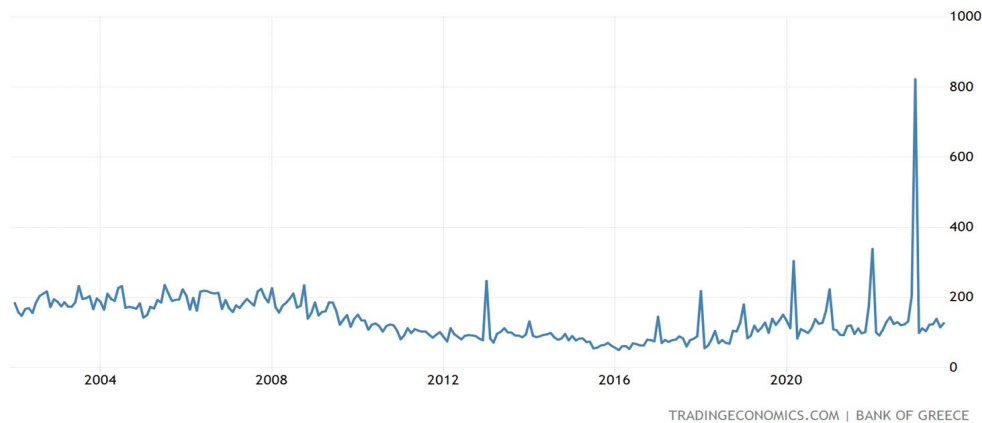
In addition to educational costs, fixed costs related to emigration are also considered. A standard estimate of €5,000 per person represents capital transferred abroad. This amount is assumed to be lost to the domestic economy, even in cases where individuals eventually return to Greece.

Table 2 Fixed costs of migration, Greece

Total emigrants	Capital per emigrant	Fixed cost of emigration
1,262,441	5,000	6,312,205,000

The next variable required to estimate the opportunity cost of migration is the GDP generated abroad by emigrants. According to the methodology outlined in the McKinsey report (Bionducci et al., 2023), remittances are a key indicator in this calculation. Specifically, the decline in remittances received by Greece during the studied period is used to approximate the economic output generated by emigrants outside the country. This reduction reflects not only the outflow of labour but also the shift in productivity and income generation from the domestic to the foreign economy.

Figure 2: Remittances to Greece by month, 2004-2020



Source: Trading Economics (2023).

To estimate the GDP produced abroad by emigrants, the assumption is based on findings from the HO survey, which indicate that 19 per cent of emigrants send remittances back to Greece (Labrianidis & Pratsinakis, 2017). Using this, the average monthly remittance is multiplied by a factor of five to approximate the total emigrant population's contribution to foreign GDP. This results in an estimate that remittances account for approximately 8.7 per cent of the total GDP generated abroad by Greek emigrants, allowing for extrapolation to 100%.

From 2002 to 2020, average monthly remittances were €136 million. Over a 16-year period (2004–2019), this amounts to €26.112 billion. Multiplying this figure by five yields an estimated €130.56 billion, which, according to the model, corresponds to 8.7 per cent of the total GDP produced abroad. Based on this proportion, the total GDP generated by emigrants abroad is estimated at approximately €1.5 trillion (€1,500,689,655,172) over the same period.

The average remittances by month from 2002 until 2020 is €136 million. For 16 years this translates to €26,112,000,000 in remittances for the overall period from 2004 until 2019. This number is multiplied by five times, resulting in €130,560,000,000 billion. This according to our model represents about 8.7 per cent of the total GDP produced abroad. When accounting for 100 per cent of GDP produced abroad the total is €1,500,689,655,172. After accounting for an

assumed 35 per cent return migration rate, representing those who eventually return to Greece, the adjusted figure is reduced to approximately €975.4 billion.

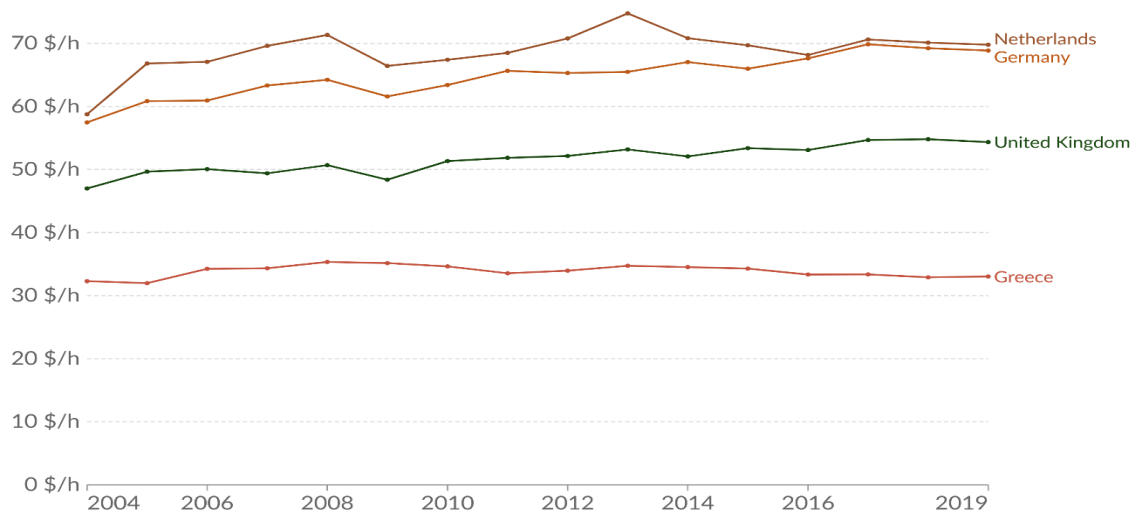
This amount represents a significant economic loss for Greece, as these individuals, had they remained in the country, would have contributed to domestic output through labour, taxes, and consumption. To estimate the true impact on the national economy, the productivity gap between Greece and the main destination countries (such as the UK, Germany, and the Netherlands) is considered. The GDP produced abroad is adjusted to reflect this difference in economic output capacity. Additionally, this figure is halved to account for the fact that only around half of the emigrants were employed before leaving Greece.

During the period studied, the average productivity per hour worked in the destination countries was \$61.70, compared to \$33.80 in Greece (see Figure 3). This means the destination countries are approximately 80 per cent more productive than Greece. To account for this productivity gap, the GDP produced abroad by emigrants is adjusted downward accordingly. Considering that only about half of the emigrants were employed before leaving Greece, the estimated loss in GDP contribution, had these individuals remained in the country, is approximately €270.96 billion over the 16-year period.

Figure 3: Comparative economic output, 2004-2019

Productivity: output per hour worked

Productivity is measured as gross domestic product (GDP) per hour of work. This data is adjusted for inflation and differences in the cost of living between countries.



Data source: Feenstra et al. (2015), Penn World Table (2021)

Note: This data is expressed in international-\$¹ at 2017 prices per hour.

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1. **International dollars:** International dollars are a hypothetical currency that is used to make meaningful comparisons of monetary indicators of living standards. Figures expressed in international dollars are adjusted for inflation within countries over time, and for differences in the cost of living between countries. The goal of such adjustments is to provide a unit whose purchasing power is held fixed over time and across countries, such that one international dollar can buy the same quantity and quality of goods and services no matter where or when it is spent. Read more in our article: What are Purchasing Power Parity adjustments and why do we need them?

While emigration represents a loss in terms of GDP, it also offers opportunity gains for the Greek state, primarily through savings on welfare costs. It is assumed that half of the emigrants were unemployed before migration and that the state saves one year's worth of unemployment benefits for these individuals. Given that the unemployment subsidy during this period was around €400 per month for 14 months, the estimated social benefit savings amount to approximately €3.53 billion. Additionally, remittances sent back to Greece by emigrants, totalling €26.11 billion over the same period, represent an important economic inflow that offsets some of the losses.

Taking all these factors into account, the overall opportunity costs of migration are calculated by combining the total cost of education for emigrants, the opportunity cost of education, fixed migration costs, and the loss of GDP contribution, then subtracting both the opportunity gains from social benefits saved and remittances received.

Table 3: Opportunity cost of emigration for Greece

Cost of education	Opportunity cost of education	Fixed costs of emigration	Loss of GDP contribution	Benefits not given	Remittances
16,567,821,988	41,305,119,991	6,312,205,000	270,957,854,406	3,534,834,800	26,112,000,000
Total opportunity cost of emigration (2004-2019)				305,496,166,585	

Summing the various components, the total education costs, opportunity costs of education, fixed costs of emigration, and the estimated loss in GDP contribution, and then subtracting the opportunity gains from social benefits saved and remittances received, the net opportunity cost of migration is estimated at approximately €305.5 billion over the 16-year period.

When this total is divided by 16, it corresponds to an average annual loss of about €19.1 billion. Further dividing by the net emigration outflow of 820,587 results in an estimated opportunity cost of approximately €23,260 per emigrant per year.

4.2. Poland

4.2.1. Emigration from Poland: Context, drivers, and cost

Poland stands out within the EU as one of the leading countries regarding the number of its nationals living abroad. At the same time, as of 2021, only 1 per cent of Poland's population were foreign-born residents (Eurostat, 2022). This dynamic shifted sharply in 2022, when Poland became a major destination for Ukrainian refugees fleeing Russia's invasion (UNHCR, 2024), although this inflow lies outside the scope of this report. The focus here is on emigration patterns between 2004 and 2019, covering the period from Poland's EU accession to the eve of Brexit, and excluding the post-2022 refugee-driven changes.

Upon joining the European Union in 2004, Polish citizens gained access to broader labour markets, triggering a large and sustained wave of emigration (Grabowska-Lusinska, 2008). By 2011, over 80 per cent of Polish emigrants were residing in other EU countries, particularly the UK, Germany, Ireland, and the Netherlands, while about 13% had moved to North America, mainly the United States (GUS, 2011). Migration during this period was driven overwhelmingly by economic motives: over 70 per cent of emigrants cited employment as

their main reason for leaving. Family-related migration followed, accounting for roughly 15 per cent of departures. Interestingly, family considerations became the main reason reported by returnees for returning to Poland. Notably, unemployment was higher among emigrants before departure than in the general population, but returnees showed even higher unemployment rates than those who had never left (GUS, 2011).

Between 2004 and 2019, over 2.59 million individuals emigrated from Poland, including around 2 million Polish residents and over half a million foreign residents (see Table 10). An estimated 40 per cent of emigrants ultimately returned, producing a net outflow of approximately 1.55 million people. These figures are based on Eurostat data to allow direct comparison with Greece. However, the Polish national statistics office (GUS) has reported significantly lower emigration figures post-2008, highlighting discrepancies in measurement methods. Census-based estimates rely on 10-year intervals and often capture return intentions rather than actual migration behaviour (ICMPD, 2019; White, 2014). At the same time, around 49 per cent of Polish emigrants surveyed expressed plans to return, but only a portion followed through. Narodowy Bank Polski (2016) found that 51 per cent were considering return, and we conservatively assume a 40 per cent return migration rate for cost calculations.

Education levels among Polish emigrants further illustrate the scale and selectivity of this outflow. According to the 2011 national census, 22.8 per cent of emigrants held a university degree, while the majority had completed high school or vocational training. Only 8 per cent of emigrants left the country with no education beyond the mandatory primary level, and even this group likely received close to 12 years of schooling, given Poland's compulsory education laws.

Over the 16-year period, this brain and skills drain had significant fiscal implications. Based on OECD (2020) data on annual educational spending, and average exchange rates from 2004–2019, the per capita public cost of educating a university graduate in Poland is estimated at 406,410 PLN (or approx. €95,500), and for a high school or vocational graduate at 262,092 PLN (approx. €61,500). Applying these costs to net emigration data, accounting for a 40 per cent return migration rate and excluding foreign residents, the total cost of lost public investment in human capital is estimated at €115.3 billion (see Table 11). This estimate is based on 378,632

university-educated emigrants and 1,284,223 high school-level emigrants. The year-by-year cost breakdown shows that the largest outflows—and associated educational losses—occurred between 2009 and 2013, mirroring post-crisis labour market insecurity across the EU.

In contrast to Greece, where emigration was largely crisis-induced, Poland's experience was shaped more by opportunity-pulled economic migration. Nevertheless, structural issues such as limited job opportunities for youth and skilled workers, wage differentials across the EU, and the draw of established Polish communities abroad made long-term emigration a rational choice for many. Unlike the Greek case, there is less evidence of systemic underutilisation of skills in Poland's labour market; however, the scale of outward migration, especially among young and educated citizens, still raises serious concerns about long-term demographic and fiscal sustainability.

4.2.2. Opportunity costs of migration

As Radonjić and Bobić (2020) emphasise, the costs of education extend beyond direct public expenditure to include opportunity costs, namely, the income students forgo while studying. In Poland, education is compulsory until the age of 18, so opportunity costs are calculated only for the period between the ages of 18 and 25. During these seven years, individuals typically engage in full-time education rather than employment.

To estimate these opportunity costs, we draw on the average youth unemployment rate of 18 per cent between 2013 and 2019 (Eurostat, 2024a). In the absence of earlier data, we assume this rate held constant for the full 2004–2019 period. For employed youth, the model assumes that recent high school graduates without university qualifications would earn the minimum wage, which averaged €366.68 per month over the relevant period (Eurostat, 2024b). This reflects the limited earning potential of young workers lacking higher education and experience. Unlike Greece, where wages are often disbursed over 14 months per year due to bonuses, Polish wages are paid monthly over 12 months, with no additional payments. Based on these parameters, the total opportunity costs of education are calculated accordingly.

Table 4: Discounting for return migration, Poland

Number of graduates	Unemployed	Employed	Potential earnings total for 16 years	Earnings discounting return migration	Average annual opportunity cost
463 341	83 401	379 940	26 748 724 058	16 049 234 435	1 003 077 152

The results of this model, factoring in youth unemployment, minimum wage earnings, and a 40 per cent rate of return migration, yield a cumulative opportunity cost of approximately €16.05 billion over the 16-year period, with an average annual opportunity cost of around €1 billion. These figures are based on 463,341 graduates, of whom 379,940 were assumed to be employed, and 83,401 unemployed. Before adjusting for return migration, the total potential lost earnings were estimated at €26.75 billion.

In addition to these costs, Poland also incurs losses in terms of foregone GDP contributions from emigrants. Remittances sent by Polish citizens abroad totalled approximately €10.2 billion over the study period, based on average annual values (National Bank of Poland, 2024). Using the approach proposed by Radonjić and Bobić (2020), the total GDP produced abroad by Polish emigrants is estimated at €117.29 billion. However, since only one-third of emigrants send remittances (National Bank of Poland, 2024), this figure is multiplied by 3.3 to account for the broader economic output generated abroad, resulting in a total external GDP contribution of approximately €387.07 billion.

Applying the previously assumed 40 per cent return migration rate, the GDP generated abroad by the 60 per cent who remained abroad is reduced to €232.24 billion. This figure is further adjusted to reflect the pre-emigration unemployment rate of 30 per cent (GUS, 2011), yielding a refined estimate of €162.57 billion in GDP generated by working emigrants abroad. To estimate the actual loss to Poland's domestic economy, this figure is discounted using a productivity differential of 2.1, representing the gap between GDP per worker in Poland and key emigration destinations such as Germany, the UK, and the Netherlands. This adjustment brings the final estimate of Poland's GDP loss due to emigration between 2004 and 2019 to approximately €77.41 billion.

In addition to the educational and GDP-related losses, emigration also entails significant fixed costs. Following the methodology used for Greece, we assume fixed costs of €5,000 per

emigrant. These encompass the personal belongings, savings, and other financial resources that individuals take with them and spend abroad rather than within the domestic economy. While this estimate is a general approximation, derived from the cost of living in major emigration destinations, it represents a plausible baseline for the expenses associated with settling abroad. Further empirical research would be necessary to refine this figure, but it remains a key element in evaluating the total cost of emigration.

Table 5 Fixed costs of migration, Poland

Total emigrants	Capital per emigrant	Fixed cost of emigration
2,590,831	5,000	12,954,155,000

Applying this fixed cost to the entire emigrant population over the period, 2,590,831 individuals, yields a total of approximately €12.95 billion. This figure does not account for return migration, as it reflects the immediate financial outflow at the point of departure. When added to the previously calculated losses in educational investment and GDP contribution, it significantly raises the cumulative economic impact of emigration on Poland during the 2004–2019 period.

At the same time, emigration generates certain economic offsets or "opportunity gains." Chief among these is the reduction in social welfare obligations. Individuals who would otherwise be unemployed in Poland become economically self-sufficient abroad, alleviating pressure on the domestic welfare system. In particular, unemployment benefits, linked to previous employment duration and minimum wage levels, represent a measurable fiscal saving. In 2008, the average unemployment benefit was €162 per month (Portet & Sztandar-Sztanderska, 2010). Although this value varied over time, we assume it remained broadly stable across the study period due to limited official data. Based on an 18 per cent youth unemployment rate and the total number of emigrants, this results in estimated savings of approximately €35.19 million over 16 years.

A second and more substantial opportunity gain is the inflow of remittances. Polish emigrants sent home around €10.2 billion between 2004 and 2019 (National Bank of Poland, 2024), providing a vital source of income for families and contributing to domestic consumption and

investment. These remittances partially offset the economic losses associated with emigration, though they do not fully compensate for the lost productivity and human capital.

While emigration offers certain fiscal relief through reduced social spending and remittance inflows, these opportunity gains are far outweighed by the fixed, opportunity, and productivity-related costs incurred by the Polish state and society. The resulting balance points to a substantial net loss over the 16-year period, underlining the long-term economic implications of large-scale, skill-selective emigration. The total opportunity cost of migration for Poland is summarised in the table below.

Table 6: Opportunity cost of emigration for Poland

Cost of education	Opportunity cost of education	Fixed costs of emigration	Loss of GDP contribution	Benefits not given	Remittances
79 107 557 494	16 049 234 435	12 954 155 000	77 413 296 551	35 188 882.96	10 204 480 000
Total opportunity cost of emigration (2004-2019)					175,284,574,598

Based on these figures, it is estimated that emigration from Poland cost the national economy approximately €175.28 billion between 2004 and 2019. This translates into around €10.96 billion annual costs, or an annual opportunity cost of €7,047 per emigrant. These results underscore the significant fiscal and developmental burden of sustained outmigration, particularly when it involves a disproportionate share of young, educated, and economically active individuals.

5. Conclusion and recommendations

This paper addresses a critical gap in the literature: the lack of quantification of the opportunity costs of labour migration for countries of origin. While substantial attention has been given to remittances and brain drain, the structural economic impact of migration, particularly the costs borne by the origin countries, has remained underexplored. This paper provides an in-depth analysis of two EU member states, Greece and Poland, over the period 2004 to 2019, offering a comparative framework grounded in a novel cost-calculation model.

Building on the framework Radonjić and Bobić (2021) developed, this research presents a model that estimates the opportunity cost of labour migration by combining several key components. These include the total public investment in education for emigrants, the income they forego by studying rather than working, the fixed costs they carry when settling abroad, and the long-term loss of their contribution to national GDP. From this cumulative cost, the model subtracts the financial gains associated with emigration, namely, the social benefits no longer paid to those who would have been unemployed and the remittances sent back by emigrants to their home country. The resulting figure provides a comprehensive approximation of the net economic impact of labour outflows on the countries of origin.

Using this model, we estimate the total opportunity cost of emigration for Greece at approximately €305.5 billion between 2004 and 2019. With a net outflow of 820,587 people, the annual opportunity cost per capita amounts to €23,268, roughly equal to the average annual salary during this period. For Poland, the estimated total cost is €175.3 billion, with a net outflow of 1,554,499 individuals and an annual per capita cost of €7,047, about 25 per cent lower than the average annual salary.

Interestingly, despite fewer emigrants, Greece faced higher overall costs. This divergence can be attributed to differences in the educational composition of migrants; Greek emigrants were, on average, more highly educated, exacerbating the loss of human capital. The findings reinforce that emigration of highly skilled workers significantly depletes origin countries of skilled labour. In cases of brain waste, where skilled emigrants are underemployed abroad, the loss becomes even more profound.

Addressing these challenges requires both macroeconomic reforms and targeted labour market policies. While migration is a personal choice, the economic context of origin countries can greatly influence that decision. Emigrants do not necessarily seek countries that outperform their origin country; they leave when their own country fails to offer sufficient opportunities. Most people prefer to stay, live, and contribute where they belong. The role of government is to provide the conditions that make this possible.

To that end, several policy recommendations emerge from this study. First, there is a clear need for better data collection. National statistical agencies in Greece and Poland, alongside Eurostat, should enhance monitoring of emigration and return migration flows. Accurate data is crucial for refining cost estimates and informing evidence-based policy.

Second, labour market alignment must be improved. Governments should reduce the mismatch between education outcomes and labour market needs by establishing skill-matching platforms that connect students and institutions with public and private sector demand. This can help young people pursue education paths with clearer employment prospects.

Third, policy must evolve to fit a digitally integrated EU labour market. By promoting remote and cross-border digital work, Greece and Poland can retain skilled workers within their national economies while enabling them to access higher wages abroad. Such strategies require broader EU labour market integration and reforms around tax residency for remote workers.

Fourth, long-term competitiveness must be strengthened. Governments should focus on attracting investment, promoting innovation, and creating high-value jobs. Incentives for multinational enterprises, start-up ecosystems, and research-industry collaboration should be part of a broader industrial policy strategy. Simultaneously, improved labour conditions and work-life balance, supported by modern practices and adherence to international labour standards, can increase domestic job satisfaction and retention.

Additionally, both countries should adopt targeted return migration strategies. This involves not only informing emigrants of job opportunities back home but also facilitating their reintegration through administrative support and providing incentives for both returnees and employers. At the same time, policies to retain current talent must be reinforced through investment in research, reduction of the tax burden on labour, and simplification of the tax system.

Finally, diaspora engagement should be intensified. Networks of Greeks and Poles abroad can serve as bridges for investment, academic collaboration, and research partnerships.

Governments should support this engagement through embassies, chambers of commerce, and university networks.

All of these actions are grounded in a simple yet powerful premise: home is where individuals have cultural familiarity, social bonds, and emotional ties. Making home a viable, competitive, and attractive place to work is not only economically prudent but socially necessary.

The model introduced in this paper offers a replicable and adaptable framework for future research into the opportunity costs of labour migration in other countries of origin. By making visible the hidden costs of inaction, it seeks to inform both policy and public debate on a matter of profound long-term significance for emerging and developed economies alike.

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Appendix

Table 7: Migration Greece, 2004-2019

Year	Greek citizens	Foreign residents	Total emigration	Return migration	Net outflow
2004	19,088	18,953	38,041	13,314	24,727
2005	19,088	19,495	38,583	13,504	25,079
2006	19,088	19,280	38,368	13,429	24,939
2007	19,088	21,312	40,400	14,140	26,260
2008	19,088	23,956	43,044	15,065	27,979
2009	19,799	23,887	43,686	15,290	28,396
2010	28,301	33,740	62,041	21,714	40,327
2011	53,210	39,194	92,404	32,341	60,063
2012	65,264	59,430	124,694	43,643	81,051
2013	62,089	55,005	117,094	40,983	76,111
2014	55,633	51,171	106,804	37,381	69,423
2015	55,977	53,374	109,351	38,273	71,078
2016	54,752	51,783	106,535	37,287	69,248
2017	53,652	49,675	103,327	36,164	67,163
2018	49,979	53,070	103,049	36,067	66,982
2019	45,478	49,542	95,020	33,257	61,763
Totals	639,574	622,867	1,262,441	441,854	820,587

Source: Eurostat Database: Emigration by age, sex, group, and citizenship (Eurostat, 2024b).

Table 8: Estimated education costs of Greek emigrants by level of education, 2004–2019

Year	University graduates	High school graduates	Cost for univ. graduates	Cost for high school graduates
2004	13,362	5,726	454,788,779	92,664,605
2005	13,362	5,726	454,788,779	92,664,605
2006	13,362	5,726	454,788,779	92,664,605
2007	13,362	5,726	454,788,779	92,664,605
2008	13,362	5,726	454,788,779	92,664,605
2009	13,859	5,940	471,728,994	96,116,225
2010	19,811	8,490	674,296,796	137,390,035
2011	37,247	15,963	1,267,776,139	258,313,266
2012	45,685	19,579	1,554,973,538	316,830,614
2013	43,462	18,627	1,479,326,305	301,417,259
2014	38,943	16,690	1,325,506,295	270,075,962
2015	39,184	16,793	1,333,702,404	271,745,944
2016	38,326	16,426	1,304,515,677	265,799,059
2017	37,556	16,096	1,278,307,187	260,458,999
2018	34,985	14,994	1,190,794,656	242,628,053
2019	31,835	13,643	1,083,554,280	220,777,499
Total	447,702	191,872	15,238,426,167	3,104,875,940

Source: Own calculation based on OECD data on costs of education and Eurostat data on emigration.

Table 9: Estimated education costs of non-Greek emigrants from Greece by level of education, 2004–2019

Year	University graduates	High school graduates	Cost for univ. graduates	Cost for high school graduates
2004	5,307	2,274	180,628,913	36,803,694
2005	5,459	2,339	185,794,368	37,856,171
2006	5,398	2,314	183,745,341	37,438,675
2007	5,967	2,557	203,111,032	41,384,494
2008	6,708	2,875	228,309,304	46,518,719
2009	6,688	2,866	227,651,709	46,384,732
2010	9,447	4,049	321,554,346	65,517,682
2011	10,974	4,703	373,532,930	76,108,477
2012	16,640	7,132	566,389,295	115,403,551
2013	15,401	6,601	524,217,452	106,810,909
2014	14,328	6,141	487,678,052	99,365,895
2015	14,945	6,405	508,673,435	103,643,768
2016	14,499	6,214	493,510,632	100,554,301
2017	13,909	5,961	473,420,633	96,460,902
2018	14,860	6,368	505,776,205	103,053,449
2019	13,872	5,945	472,153,095	96,202,637
Total	174,403	74,744	5,936,146,742	1,209,508,055

Source: Own calculation based on OECD data on costs of education and Eurostat data on emigration.

Table 10: Migration Poland, 2004-2019

Year	Polish citizens	Foreign residents	Total emigration	Return migration	Net outflow
2004	18 782	95	18 877	7 551	11 326
2005	22 174	68	22 242	8 897	13 345
2006	46 745	191	46 936	18 774	28 162
2007	35 301	179	35 480	14 192	21 288
2008	30 140	0	30 140	12 056	18 084
2009	178 915	50 405	229 320	91 728	137 592
2010	169 527	48 599	218 126	87 250	130 876
2011	214 758	51 040	265 798	106 319	159 479
2012	206 693	68 910	275 603	110 241	165 362
2013	226 969	49 477	276 446	110 578	165 868
2014	199 696	68 603	268 299	107 320	160 979
2015	169 375	89 462	258 837	103 535	155 302
2016	196 384	40 057	236 441	94 576	141 865
2017	172 660	45 832	218 492	87 397	131 095
2018	146 756	43 038	189 794	75 918	113 876
2019	136 647	43 947	180 594	72 238	108 356
Total	2 034 875	555 956	2 590 831	1 036 332	1 554 499

Source: Eurostat Database: Emigration by age, sex, group, and citizenship (Eurostat, 2024b).

Table 11: Estimated education costs of Polish emigrants by level of education, 2004–2019

Year	University graduates	High school graduates	Cost for univ. graduates	Cost for high school graduates
2004	2 579	8 747	246 335 435	538 815 654
2005	3 039	10 306	290 252 132	634 875 743
2006	6 412	21 749	612 502 207	1 339 741 384
2007	4 847	16 441	463 004 480	1 012 741 271
2008	4 118	13 966	393 318 913	860 316 288
2009	31 330	106 262	2 992 564 471	6 545 711 057
2010	29 800	101 075	2 846 485 775	6 226 189 473
2011	36 313	123 165	3 468 592 584	7 586 939 245
2012	37 653	127 709	3 596 545 203	7 866 813 206
2013	37 768	128 100	3 607 546 127	7 890 875 802
2014	36 655	124 324	3 501 229 963	7 658 327 799
2015	35 362	119 940	3 377 753 401	7 388 244 431
2016	32 303	109 562	3 085 491 610	6 748 972 911
2017	29 850	101 245	2 851 261 976	6 236 636 579
2018	25 930	87 947	2 476 760 776	5 417 480 745
2019	24 673	83 684	2 356 703 245	5 154 875 906
Total	378 632	1 284 223	36 166 348 298	79 107 557 494

Source: Own calculation based on OECD data on costs of education and Eurostat data on emigration.

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