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Projecting the fiscal impact of immigration in the European Union

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Abstract

The increasing flow of immigrants into Europe over the last decade has generated a range of considerations in the policy agenda of many receiving countries. One of the main considerations for policymakers and public opinion alike is whether immigrants contribute their 'fair' share to their host country's tax and welfare system. In this paper, we assess the net fiscal impact of intra-EU and extra-EU migration in 27 European Union (EU) Member States. We find that migrants in the EU, on average, contribute more than natives to welfare states. However, when we take an age-specific life-cycle perspective, we find that natives generally show a higher net fiscal contribution than both groups of migrants. Among migrants, extra-EU migrants contribute less than intra-EU migrants. We then use a demographic microsimulation model to project the potential net fiscal impact of migration in the EU into the future. We show that despite the fact that intra-EU migration contributes to reduce the strong negative impact of population ageing, its contribution is not sufficient to offset the negative fiscal consequences.

KEYWORDS
EUROMOD, fiscal impact, microsimulation, migration, tax–benefit system

JEL CLASSIFICATION
F22, H2, H5, J15

1 | INTRODUCTION

The number of third-country nationals living in the EU has increased in recent years. According to Eurostat figures for 2018, there are more than 22 million third-country nationals residing in the 27 Member States (MSs) of the European Union and the United Kingdom. This is up from 19 million in 2014, the first available year for this series, corresponding to a 14 per cent increase in five years. For many MSs, this phenomenon inevitably generates a range of social, political and economic considerations. One of the main considerations for policymakers and public opinion alike is whether migrants contribute their 'fair' share to their host country's tax and welfare system. Fears of welfare abuse are common among European citizens.[1] along with worries that European welfare systems might act as a magnet for welfare-dependent migrants.[2] These concerns are so deep that they outweigh even concerns about the effects of immigration on the labour market on the evaluation of public opinion,[3] and it is hard for governments to ignore them.

Apart from public attitudes on migration and questions of perceived fairness, understanding the fiscal impacts of immigration is especially salient for the decision-making processes of EU MSs, because it enables the design of an appropriate immigration strategy. EU countries maintain a comparably extensive and generous welfare coverage[4] against the backdrop of deteriorating fiscal balances, in some MSs more than others, since the onset of the global financial crisis.

Migration can have both positive and negative consequences for the economies and public purses of the receiving countries. On the one hand, a growing migrant population, mostly migrating in their most productive years, can help alleviate the financial burden that an ageing population imposes on the pension systems of many MSs.[5] On the other hand, migrants may represent a burden because of the costs associated with their integration and inclusion, family structure and/or to the safety net for their labour career. Depending on whether positive or negative effects prevail, the fiscal impact of migrants might be different from that of the typical native on whom the European welfare states were originally designed.

In this paper, similar to Fiorio et al. (2022), we analyse the direct net fiscal effects of immigration into the EU, that is, the taxes immigrants pay minus the benefits they receive. For this purpose, we use EUROMOD, the tax–benefit microsimulation model for the EU that represents a unique tool for international comparative research on the effects of taxes and benefits. EUROMOD is based on detailed information at the individual level on taxes paid and benefits received contained in the European Union Statistics on Income and Living Conditions (EU-SILC). More specifically, we use the EUROMOD migration extension,[6] which adds information on in-kind benefits. We also complement individual-level data with detailed information on indirect taxation, similar to Fiorio et al. (2022). In this way, we are able to provide a detailed assessment of the fiscal impact of migration. Additionally, contrary to the National Transfer Accounts approach,[7] our approach allows us to distinguish between

[1] Boeri, 2010.

[2] De Giorgi and Pellizzari, 2009.

[3] Dustmann and Preston, 2007.

[4] According to the OECD, on average, EU MSs spent 23 per cent of their GDP to fund their social security programmes in 2018. The average for the other non-EU OECD members was 18 per cent. (Source: https://stats.oecd.org/Index.aspx?datasetcode=SOCX_AGG, last accessed on 07/11/2019)

[5] The effective impact of migration on the pension system of the receiving country is ambiguous. As migrants enter the labour market of their destination country primarily at the beginning of their career, they improve the dependency ratio. But, as they tend to earn lower wages than the native population for long periods of their working life, they could end up receiving higher pensions than their contributions would cover, especially in defined benefit and national account systems. The actuarial fairness of a pension system is also not the only factor to consider when assessing the impact of migration on pension systems. Another important consideration is how portable contributions are across pension systems. In the case of return or repeated migration, migrants may not be entitled to full – or even partial – portability of their contribution due to legal waiting periods that might prevent the establishment of eligibility.

[6] See Fiorio, Frattini and Riganti (2018).

[7] See, for example, Istenič et al. (2016).

natives, intra-EU and extra-EU migrants, and to account for the socio-economic factors, such as education or labour force differentials, that drive the difference in their net fiscal impact.

We estimate the net fiscal impact for natives and migrants in three steps. First, similar to Fiorio et al. (2022), we calculate the current impact of migrants on state budgets and recover the average net fiscal impact of migration. Second, following the approach of Hinte and Zimmermann (2014), we estimate the contribution over the life cycle of each population group. Third, we use these estimates to calibrate CEPAM-Mic, a demographic microsimulation model, to project the net fiscal impact of migration up to 2035.

Fiorio et al. (2022) analyse the net fiscal impact of migrants for the EU-14, also focusing on five countries – France, Germany, Italy, Spain and Sweden – for the period 2014–18. They show that the EU-14 spent on average 9,600 euros per year for each native, compared to 8,200 euros for each migrant. In addition, migrants receive similar fiscal payments (9,600 euros) to natives. Overall, while natives made net contributions to public finances of, on average, 32 euros during this period, migrants contributed, on average, 1,510 euros. We follow this approach by focusing on the whole EU, specific welfare-state regimes, and on three origin groups: natives, intra-EU migrants and extra-EU migrants. Our analysis also goes beyond previous studies on the fiscal impact of immigration that focus on one country[8] or only on subpopulations, such as migrants from the EU.[9] Rather, we are able to account for the different statutes governing welfare provisions across the EU, and we can compute and project the fiscal positions for the whole population.

Our research is quite unique in combining both 'static' and 'perspective' approaches, allowing us to determine the extent to which differences in the age structure between migrants and natives determine their fiscal balance. The life-cycle approach can offer precious indications to policymakers on the possible evolution of the fiscal balance once recently arrived migrants start to become older, approaching the age distribution of natives. Therefore, it also indicates a more long-term perspective of the net fiscal impact of immigration.

Our main findings can be summarised as follows. First, in accordance with Fiorio et al. (2022), the average net fiscal impact (ANFI) for all three groups is negative, but natives show the highest imbalance, indicating that the average immigrant is currently less costly in monetary terms for the state. Accounting for the demographic composition further increases the overall deficit for all groups, but improves the relative position of natives who, in a life cycle, contribute in net terms more than intra-EU migrants, who in turn exhibit a less negative net fiscal impact than extra-EU migrants.

Second, we also find substantial differences between EU MSs with respect to both concepts of net fiscal impact. Most likely, this reflects the differences in types and history of migration that characterise EU MSs. Especially in traditional welfare states, differences in the net fiscal impact between natives and extra-EU migrants over the life cycle are substantial, while differences between natives and intra-EU migrants seem to be less pronounced.

Third, using a demographic microsimulation model, we estimate the future net fiscal impact of migration on the EU level up to 2035. We find that the ANFI (per capita) on the EU level is expected to decline, indicating that migration will not be able to offset the burden an ageing population will place on EU budgets.

The paper is organised as follows. In Section 2.2, we discuss the literature related to the fiscal impact of immigration, focusing on the European context and the general patterns of immigration in the EU. In Section 3, we describe the data and methodology that we use. In Section 4, we present the simulation results from both the EU perspective and the perspective of each MS. In Section 5, we conclude and discuss our main results.

[8] Chojnicki and Ragot, 2016; Dustmann and Frattini, 2014; Storesletten, 2003.

[9] Nyman and Ahlskog, 2018.

2 | BACKGROUND

2.1 | Evidence on the fiscal impact of migration

The analysis of the fiscal impact of immigration in Europe has gained attention in recent years due to growing concerns about the sustainability of welfare states in the context of the major demographic changes and challenges facing Europe.[10]

Empirical evidence on this topic is mixed and largely depends on the economic context, the methodology adopted, and the characteristics of migrants. This literature adopts two main approaches: static or dynamic. The static accounting approach captures a snapshot of public finances over one or more years by allocating contributions made and benefits received between native and immigrant populations. Static analyses result largely from the demographic unit of analysis (individuals or households), its demographic and socio-economic characteristics, as well as the benefits and taxes covered, and the years analysed. The advantage of the static approach is that it does not require assumptions about future demographic trends or public spending. However, the results lack the forward-looking perspective that is increasingly needed to inform public fiscal policy.

Generally, the fiscal impact of immigration is quantified as modest and on average below (+/−) 1 per cent of the national GDP.[11] Studies using this approach find that the favourable demographic structure of migrants, biased toward a younger and active population, benefits their fiscal position.[12] The socio-economic factors that influence the fiscal impact commonly identified in the literature are the age of arrival in the host country,[13] the number of children in the family[14] and whether migrants are high-skilled workers (who generally contribute positively to the fiscal balance) or low-skilled workers (who typically have a less favourable fiscal position).[15]

Dynamic approaches typically focus on the entire life cycle. They can be classified into three groups: a net present value (NPV) approach, generational accounting analysis (GA), and a dynamic applied general equilibrium model (DAGEM). This evidence is forward-looking and the results depend heavily on assumptions about future population and migration trends, government taxes and expenditures, or migrants' rights to access public services and benefits.[16]

Studies using the NPV approach have been conducted, for example, in Sweden, where Storesletten (2003) and Ekberg (2011) estimate a negative net contribution of immigrants. They estimate that immigration to a traditional welfare state such as Sweden typically causes a fiscal burden on the state; however, this result crucially depends on the characteristics of migrants.[17]

GA methods account for the intertemporal distribution of public debt.[18] Evidence using this methodology is available for several countries, while cross-country comparisons are rather scarce.[19] The results show considerable variation depending on immigration and integration policies, but

[10] Lutz et al., 2019.

[11] Chojnicki, 2013.

[12] Fiorio et al., 2022; Bogdanov et al., 2014; Dustmann, Frattini and Halls, 2010; Chojnicki, 2013.

[13] This is due to potential savings on education in young ages (Oxford Economics, 2018).

[14] For example, Dustmann and Frattini (2014) estimate that migrants from countries of the European Economic Area (EEA) contributed positively to the public finances of the UK during the period 1995–2011, while the net fiscal impact of migrants from outside the EEA was negative. The higher number of children of non-EEA migrants may also explain these results, as they represent a fiscal cost for the destination country.

[15] For Ruist (2014), a cohort of Bulgarian and Romanian migrants in Sweden contributed positively to the country's finances in 2011; however, the lack of language skills was an important barrier to entering the labour market. See also Christl, Köppl-Turyna and Gnan (2020).

[16] Vargas-Silva, 2015.

[17] Storesletten (2003) attributes the negative effect that he encounters to migrants' difficult assimilation in the labour market. It should also be noted that he finds a positive contribution for those aged 20–30 years. Similarly, Gustafsson and Österberg (2001) show the importance of integration in the labour market for the net fiscal impact of migration.

[18] OECD, 2013.

[19] Hinte and Zimmermann, 2014.

generally tend to demonstrate a positive effect of increasing immigration flows on the future tax burdens of natives.[20] For Bonin, Raffelhüschen and Walliser (2000), immigration generates a positive fiscal effect and reduces the fiscal burden of future generations in Germany; however, this effect is not sufficient to eliminate future fiscal imbalances resulting from an ageing German population.[21]

As a more comprehensive economic impact assessment, the DAGEM considers the direct and indirect effects of immigration. Adopting this methodology, Schou (2006) finds a positive effect of immigration in Denmark only for immigrants with immediate experience of integration into the labour market and a negative effect for other immigrants. Hansen, Schultz-Nielsen and Tranæs (2017) show for Denmark that immigrants from Western countries generally have a positive fiscal impact, whereas immigrants from non-Western countries have a strongly negative fiscal impact. The negative fiscal impact can be mainly attributed to weak labour market performance and early exit from the labour market. Finally, the comparative analysis of Berger et al. (2016) shows a high heterogeneity in the results on the contribution of future immigration up to 2060, which is largely dependent on the volume of immigration and the institutional system of the host country.[22]

2.2 | Immigration in Europe: recent trends and characteristics

In recent years, most European countries have seen an increase in foreign-born individuals as a share of the total population. In 2019, Eurostat recorded 40 million people born outside the EU and residing in one of the 27 MSs plus the UK, and 22.4 million people born in an MS other than their country of residence. Figure 1 shows the share of the foreign-born population over the total population for each MS, distinguishing between intra-EU and extra-EU migrants. Evidently, the aggregate data hide considerable heterogeneity between MSs. Luxembourg is the country with the highest share of population born elsewhere, as it hosts an exceptionally high number of foreign-born population, corresponding to a share of 47 per cent of the total population. In this ranking, Luxembourg is followed by Cyprus, where 21 per cent of the resident population are born abroad, and Malta and Austria, whose shares of foreign-born populations are 20 per cent and 19.2 per cent, respectively. We observe the lowest share of foreign population in countries in Central and Eastern Europe: in Slovakia, Poland, Bulgaria and Romania, less than 4 per cent of the population is born abroad. Ireland, Cyprus, Luxembourg, Hungary and Slovakia are the only MSs where the number of intra-EU migrants is more than extra-EU migrants.

Regarding the main indicators of labour market performance, the three groups differ substantially. According to Eurostat, in 2019, 80 per cent of intra-EU migrants were active in the labour market, while this percentage dropped to 74 per cent for natives and to 71.5 per cent for extra-EU migrants. The unemployment rates tell a partially different story, according to which natives show the lowest rate (6.1 per cent), followed by intra-EU migrants (7.5 per cent) and extra-EU migrants, whose unemployment rate across the EU is as high as 12.5 per cent, twice that of natives.

Both the unemployment rate and the activity rate are heavily influenced by the demographic structure of the three groups. In fact, only 62.6 per cent of the natives are of working age, compared to 71.4 per cent of the intra-EU migrants and up to 81.7 per cent of the extra-EU migrants. The different demographic structure directly influences the activity rates of the three groups and will

[20] See, for example, Collado, Iturbe-Ormaetxe and Valera (2004), Mayr (2005), Chojnicki, Docquier and Ragot (2011), Chojnicki (2013) or Chojnicki and Ragot (2016).

[21] Other analyses that take into account the life cycle of immigrants show that greater fiscal gains can come from increasing the education levels of new immigrants, as suggested in Chojnicki (2013) for France. Hinte and Zimmermann (2014) show how the fiscal impact of immigration is positive when labour migrants represent the largest share of the migrant population.

[22] In addition to the evidence described above, there is an expanding body of evidence on how public policy design changes in response to migrant inflows. This is an effect that is not captured by our microsimulation models. According to this evidence, immigration may reduce welfare spending and redistribution (Tabellini, 2020) or, conversely, it can increase welfare spending if migrant groups are highly skilled (Böheim and Mayr, 2005). For a full discussion of this issue, see Elsner and Concannon (2020).

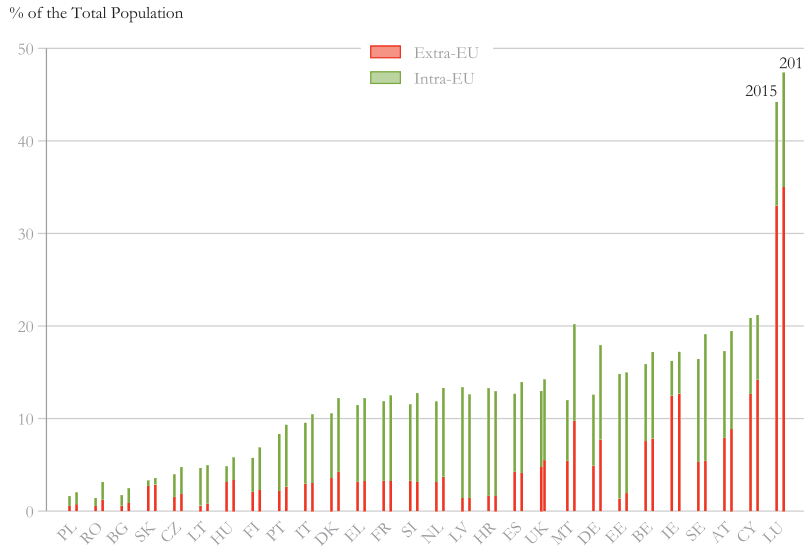


FIGURE 1 Foreign-born population by country of birth, 2015–19

Source: Own elaboration based on Eurostat data (online data code: migr_pop3ctb).

affect the type of social security benefits on which the three populations will rely. We can expect that retirement benefits will accrue mostly to natives, while a comparatively high share of extra-EU migrants will receive unemployment benefits, with intra-EU migrants being the group less reliant on social assistance due to their high activity rate and low unemployment rate.

3 | DATA AND METHODOLOGY

3.1 | Tax–benefit modelling

Similarly to Fiorio et al. (2022), we evaluate the fiscal impact of immigration using EUROMOD, the tax–benefit microsimulation model for the EU[23] based on individual and household data from the EU-SILC for 2015. We define migrants by country of birth and distinguish between intra-EU and extra-EU (born) migrants.[24] EUROMOD simulates individual and household tax liabilities and benefit entitlements based on the policy rules in place in each EU MS.[25] EUROMOD is a unique tool for comparative research on the effects of taxes and benefits at the EU level as it calculates, in a comparable manner, the static effects of the tax–benefit system on household and individual incomes for each EU MS and for the EU as a whole. The data source used in EUROMOD is individual microdata based on EU-SILC for 2015.[26]

For the purpose of this analysis, we rely on the EUROMOD migration extension, developed by Fiorio, Frattini and Riganti (2018) and used in Fiorio et al. (2022), which integrates with EUROMOD information on citizenship and the length of stay of migrants. This information is key in at least two respects. First, the duration of stay in the host country is an important indicator of the integration

[23] See Sutherland (2007).

[24] Please note that given this definition of migrants, the second generation is not counted as migrants.

[25] See also Sutherland and Figari (2013).

[26] Please also note that we use data for 2015, meaning that more recent migration flows to Europe are not covered in our data.

of newcomers.[27] Second, several legislatures require minimum residence or contributory periods for eligibility to several benefits.This allows us to include restrictions imposed by tax–benefit policies based on residence or the citizenship status.

EUROMOD is used to simulate direct taxes and cash benefits. However, a good part of income redistribution occurs through in-kind benefits, which represent a fiscal cost for the public purse. The highest share of public in-kind transfers is related to health care, followed by education, childcare, housing, and active labour market policies.[28] According to OECD Health Statistics 2020,[29] on average, the OECD countries dedicated 8.8 per cent of their GDP to health expenditures in 2018. However, indirect or consumption taxes are a substantial component of a country's tax system. As shown in the 2020 OECD revenue statistics for 2018, the total share of government revenue raised through consumption is about one-third, which is higher than direct income tax.

Despite their significance for public budgets, in-kind benefits and indirect taxes are not simulated in EUROMOD due to the lack of direct information on expenditures and non-cash income in the underlying EU-SILC data. Therefore, we calculate indirect taxes following Christl, Papini and Tumino (2022) and in-kind benefits using the EUROMOD migration extension, developed by Fiorio, Frattini and Riganti (2018). More details on the modelling of in-kind benefits as well as indirect taxation can be found in the online Appendix.

3.2 | Aggregated concepts of the net fiscal impact

We add in-kind benefits and indirect taxation to individual income, following Figari and Paulus (2015), who use indirect taxes, imputed rent and in-kind benefits to replace the standard disposable income (DI) concept by an extended income (EI) concept.

The extended income concept uses the original income of an individual i ($ORIGY_i$) and subtracts direct taxes ($SSC_i + TIN_i$) and indirect taxes ($+VAT_i$) while adding all the cash benefits received ($BUN_i + BPEN_i + BREST_i$) and the in-kind benefits ($BINK_i$). Equations (1) and (2) highlight the differences between both approaches:

$$DI = ORIGY_i - (SSC_i + TIN_i) + (BUN_i + BPEN_i + BREST_i); \tag{1}$$

$$EI = ORIGY_i - (SSC_i + TIN_i + VAT_i) + (BUN_i + BPEN_i + BREST_i + BINK_i). \tag{2}$$

Here, SSC_i, TIN_i and VAT_i denote the social security contributions, income taxes and value-added tax (VAT), respectively, paid by individual i. On the contribution side, we subtract cash benefits BUN_i (such as unemployment benefits), pension benefits $BPEN_i$, other cash benefits $BREST_i$ (such as family benefits) and in-kind benefits $BINK_i$.

We define the net fiscal impact (NFI) for an individual i as the difference between the taxes paid and the transfers received:

$$NFI_i = (SSC_i + TIN_i + VAT_i) - (BUN_i + BPEN_i + BREST_i + BINK_i). \tag{3}$$

We introduce two concepts to estimate the net fiscal impact of migration at the national and aggregate EU level. First, to estimate a snapshot of the current net fiscal impact, we calculate $ANFI^j$ by migration

[27] See, for example, Sinn and Werding (2001).

[28] See https://www.oecd.org/tax/revenue-statistics-2522770x.htm.

[29] See https://www.oecd.org/health/health-expenditure.htm.

status j, which we define as the average NFI_i^j of all individuals i with migration status j:

$$ANFI^j = \frac{\sum_{i=1}^{N} NFI_i^j}{n} \tag{4}$$

Second, to quantify the life-cycle impact, we calculate the life-cycle deficit (LCD) according to migration status j, and assume that an individual has the ANFI of the specific age group during their life cycle (0–80 years). We define the LCD by migration status j as

$$LCD^j = \sum_{age=1}^{80} \frac{\sum_{i=1}^{N} NFI_i^{age,j}}{n}, \tag{5}$$

where

$$\frac{\sum_{i=1}^{N} NFI_i^{age,j}}{n}$$

is the ANFI of each age group (i.e. *age*) and migration status (j). We then sum up the age groups from 0 to 80 (in five-year bands), to obtain an estimate of the life-cycle impact by migration status. In other words, we assume that each demographic group has an ANFI at each age, and we calculate the life-cycle contributions of the three migration states. In our model, the age-specific NFI is calculated and summed up by migration status. This approach ignores possible age effects resulting from differences in the age structure.

3.3 | Demographic microsimulation modelling

We use the CEPAM-Mic microsimulation model to project both cross-sectional (population-based) and life-course (cohort-based) estimates of the future net fiscal impact in the EU countries. This microsimulation model, developed by Bélanger et al. (2019), is designed to provide forward-looking analyses of the socio-economic and cultural consequences of population changes in high-immigration countries. In addition to the age and gender dimensions of a classical cohort component demographic projection model, the CEPAM-Mic model includes information on education, labour force participation and employment status, as well as immigrant-related variables such as region of birth, age at immigration, and duration of residency in the host country. These additional dimensions are useful for assessing the future economic impact of immigrants.

Unlike the traditional cohort component projection method,[30] which uses aggregated population estimates as inputs and outputs, the CEPAM-Mic microsimulation model operates at the individual level. The main advantage of microsimulation is that it allows for the simultaneous projection of a large number of dimensions, going beyond the limits of conventional projection models based on aggregated data. CEPAM-Mic projects the population of EU-27 MSs under several socio-economic and ethnocultural dimensions. Its base population counts 13 variables: age, sex, country of residence, education level, student status, education of the mother, participation in the labour force, employment, region of birth (11 clusters of world countries), age at immigration, duration of residence in the host country for migrants, religion, and language. The base population was created from the microdata from the EU Labour Force Survey (LFS) and other surveys, including the European Social Survey, to impute characteristics not available in the EU-LFS. CEPAM-Mic projects demographic and socio-

[30] For an overview, see Smith, Tayman and Swanson (2002).

TABLE 1 Baseline assumption in the CEPAM-Mic model

Assumption	Baseline
Volume of immigration	10 million every 5 years
Education of future immigrants	Same as recent immigration
Integration of immigrants	Average of 2010–15
Labour force participation	Constant entry and exit rates
Net fiscal impact	Estimation based on EUROMOD, 15 years and beyond by age
Fertility	Slight increase from 1.6 to 1.8
Emigration	Constant country-specific emigration rates by age and sex
Mortality	Continuous improvements in life expectancy
Educational attainment	Past trends continue, constant social characteristics
EU internal migration	Average of 2013–16

economic events that shape the future characteristics of individuals and their future offspring, using a series of inter-related multivariate prediction models.

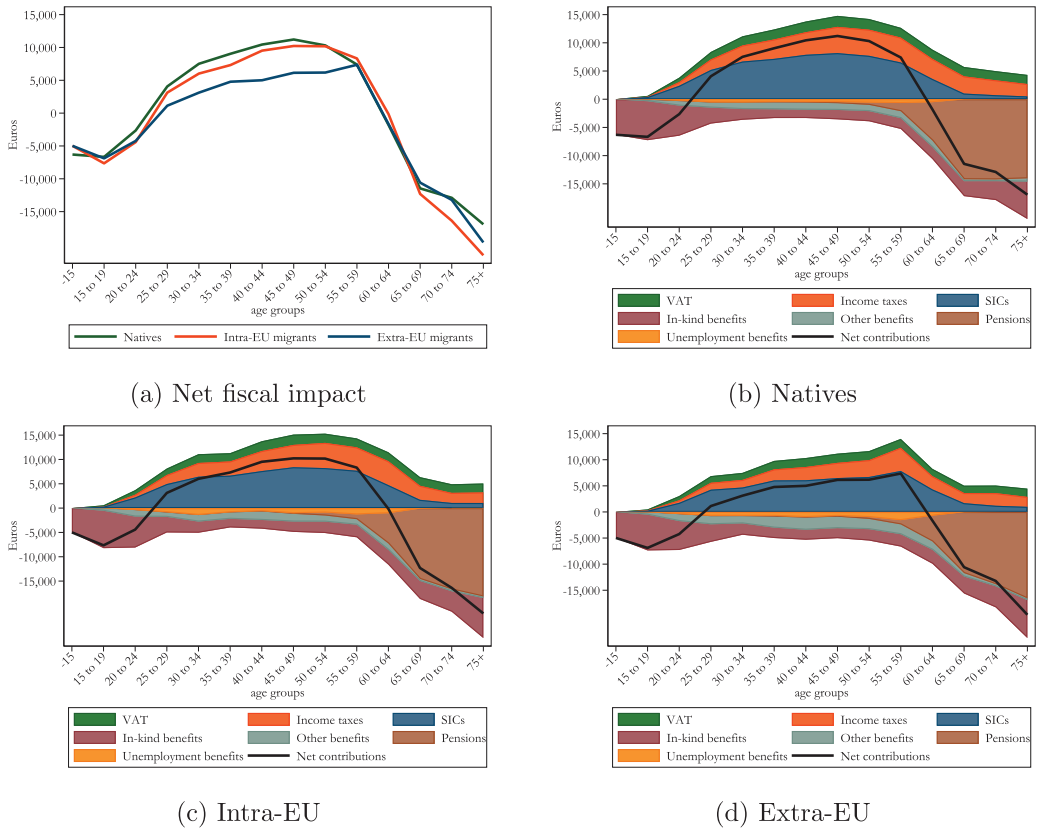
The model is time- and event-based, dynamic, continuous-time, open to international migration, and stochastic. Therefore, the characteristics of individuals are modified in real time, allowing easier treatment of competing events. For each potential event that may occur during the simulated actor's lifetime (birth, migration, graduation, entry into the labour force, death, etc.), we estimate the probability of its occurrence and derive its waiting time via regression. The individual waiting times of all events are then ordered, and the shortest waiting time becomes the next event. When an event occurs, the characteristic of the simulated actor specific to this event (e.g., increasing age, changing education level or changing country of residence, etc.) is changed, the waiting times are re-estimated accordingly, and the projection continues to the next event until death, emigration, or the horizon of the projection.[31] It is important to note that each event can have its own set of determinants. The parameters of the different modules deriving the waiting time of each event are estimated from different microdata sources. Bélanger et al. (2019) provide an overview of the parameters driving all the modules that generate events. Marois, Sabourin and Bélanger (2019a) provide a detailed description of the labour force module and Marois, Sabourin and Bélanger (2019b) describe the education module, while Potančoková and Marois (2020) describe the fertility module.

Our baseline scenario describes a continuation of the status quo, as observed for the years 2008–14: (a) a constant flow of two million third-country nationals per year admitted to the EU with a dominance of humanitarian admission (asylum, humanitarian protection, marriage, and family reunion as main pathways) and about 30 per cent third-country nationals admitted as labour migrants; (b) employment rates of the admitted third-county nationals lower than those of natives during the first 20 years after arrival.

We then estimate the ANFI for the population over 15 years of age[32] by age group and immigrant status in 2015 to calibrate our model and project the future impact of migration in the baseline scenario. We estimate the net fiscal impact for different educational groups, labour market status, as well as migrant status. For Eastern European countries and Baltic countries, we estimate the NFI jointly due to the lack of data for immigrants, accounting for country-specific differences. The general assumptions are described in Table 1.

[31] See Bélanger et al. (2019).

[32] We present the results for the population aged 15 and older because the main objective of this projection is to compare the net contributions of immigrants and natives. Before the age of 15, there are little or no fiscal contributions, and the benefits are mainly related to the cost of education. These costs are mainly age-dependent and do not necessarily vary by the place of birth of the child. Furthermore, the costs of educating children born in Europe from foreign-born parents are the result of the immigration of the latter and should be attributed to immigration.



(a) Net fiscal impact

(b) Natives

(c) Intra-EU

(d) Extra-EU

FIGURE 2 Disaggregation of the ANFI by age and migration status in the EU

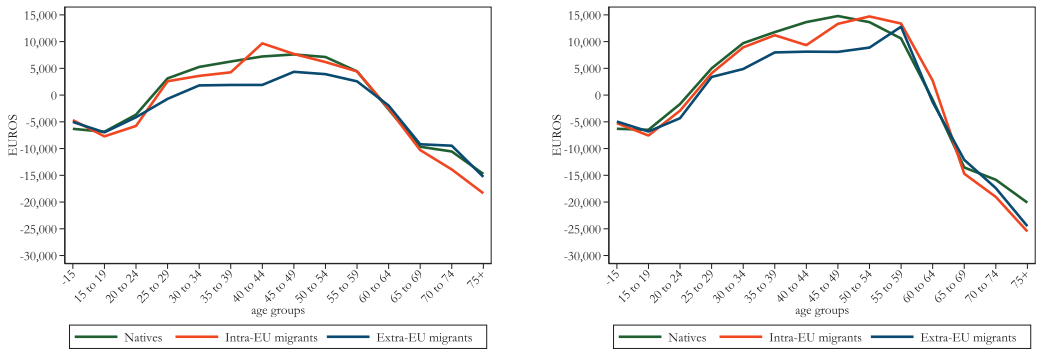
Note: 'SICs' and 'VAT' denote social insurance contributions and value-added taxes, respectively.

4 | RESULTS

In this section, we discuss the pattern of the individual NFI simulated as explained above. First, we discuss the results at the EU level and, more specifically, show how the estimated ANFI varies by cohort (age), gender and educational level. Next, we adopt a life-cycle approach based on several simplifying assumptions and perform a comparative analysis with the ANFI at the country level. After discussing this concept on the EU level, we also provide an analysis by different welfare-state regimes (and on country level).

4.1 | The European perspective

Here, we describe the patterns of the net fiscal impact and the tax–benefit components by cohort, gender and education level, separately, for natives, extra-EU migrants and intra-EU migrants, at the EU level. Although these calculations share similarities with Fiorio et al. (2022), they differ because they cover the entire EU area and not EU-14. Additionally, we distinguish between EU and extra-EU migrants. Figure 2(a) shows a large variation in the net fiscal impact between cohorts, as well as between natives and migrants. Overall, the net fiscal impact is positive and monotonically increases with age until a person's late 50s, and becomes negative and decreases thereafter. The positive peak in



(a) Females (b) Males

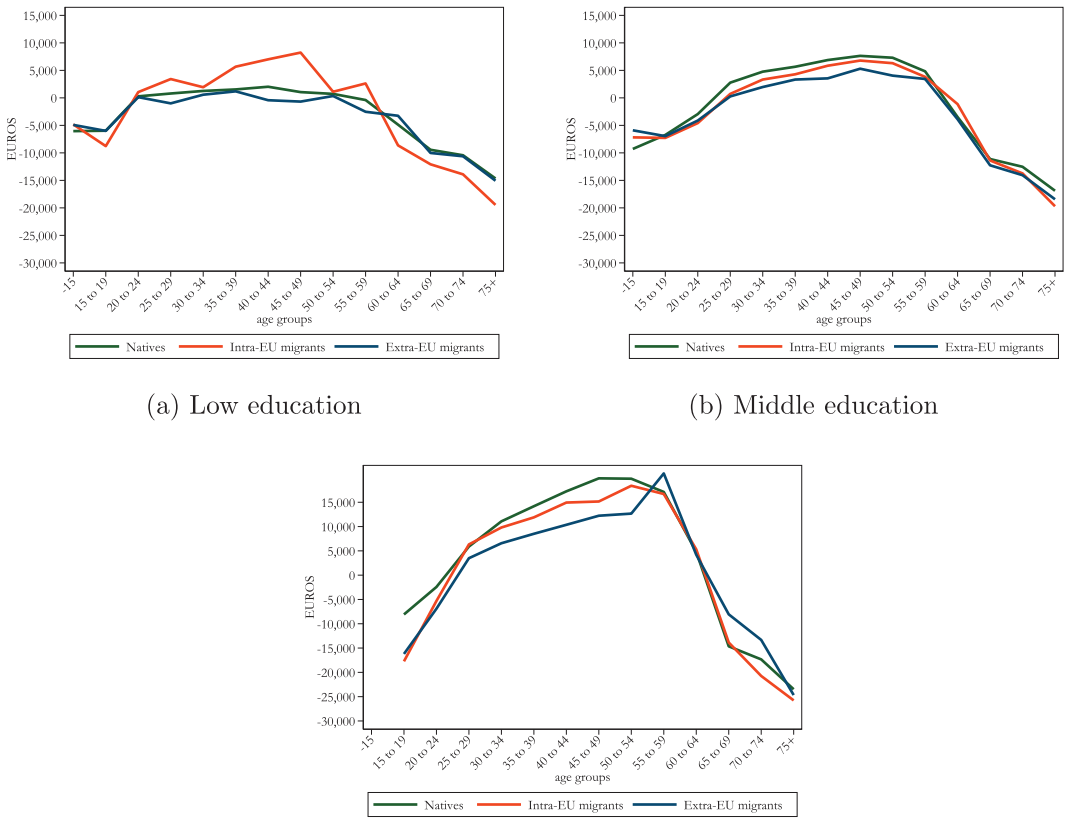
FIGURE 3 Average net fiscal impact by migration status and gender in the EU

net contributions is reached faster for natives compared with migrants and coincides with the general retirement age. For most of the working life span, the per capita contributions of natives are higher than those of intra-EU and extra-EU migrants. This pattern reflects the earnings differences between natives and migrants, which, in turn, is related to differences in their participation in the labour market and wages.

The decomposition of the net fiscal impact by its main components and by migration status, as shown in Figures 2(b)–(d), reveals that pensions and other benefits related to old age account for a very high share of social expenditures. Conversely, social security contributions (including the social security contributions for pensions) account for the highest share of fiscal contributions, followed by taxes on income and taxes on consumption. When comparing natives with extra-EU migrants, three noticeable facts emerge: (1) natives contribute more than extra-EU migrants in income taxes; (2) pension amounts are higher for natives than extra-EU migrants; (3) social transfers are higher for extra-EU migrants than natives. The first and second facts can be readily explained by natives' higher current wages and past social security contributions, respectively. The third fact is mostly explained by differences in socio-demographic characteristics, such as the number of children or people employed within a family.

Looking at gender differences (see Figure 3), we can see that women generally have a lower net fiscal impact during their working-age period, most likely due to the unequal share of unpaid work in most European countries and a persistent gender gap in participation in the labour force. This also results in lower pension entitlements and therefore a less negative impact of net fiscal impact on average. Again, natives and intra-EU migrants tend to have a similar NFI for both genders over the life cycle. However, the NFI of extra-EU migrants is found to be lower, but the gender gap between natives and extra-EU migrants is almost null.

Finally, we decompose the net fiscal impact by three levels of education. As shown in Figure 4(b), there are no significant differences in the net fiscal impact between middle-educated migrants and natives. In fact, the shape of the net fiscal impact is very similar, where middle-educated natives tend to have a slightly higher ANFI during working time than migrants. The picture looks very different for lower-educated individuals, shown in Figure 4(a): natives and extra-EU migrants behave very similarly, while intra-EU migrants do not. Indeed, lower-educated intra-EU migrants contribute more than the rest of population, and consequently are entitled to higher pensions. Looking at highly educated individuals, Figure 4(c) highlights especially high differences during working age, where natives have a higher ANFI compared with intra-EU migrants, who in turn have a higher ANFI than extra-EU migrants.



(a) Low education

(b) Middle education

(c) High education

FIGURE 4 Average net fiscal impact by migration status and education in the EU

TABLE 2 ANFI and LCD in the EU in euros, 2015

	ANFI	LCD (0–80)	LCD (0–75)	LCD (0–85)	DLCD
Natives	−476	−753	208	−1,855	−583
Intra-EU migrants	−208	−1,223	−70	−2,526	−773
Extra-EU migrants	−219	−2,594	−1,612	−3,791	−1,477

4.2 | The net fiscal impact over the life cycle

An analysis of the ANFI of migrants can reveal useful information on the current impact of migrants on the public budget. However, it does not help reveal any element on their contribution over their lifetimes. As argued by Hinte and Zimmermann (2014), only analysing the net fiscal impact of immigration for one fiscal year alone leaves out an important part of the picture. A life-cycle perspective approach could help to add additional information on the long-term impact of migration.

When comparing the results attained under both concepts in Table 2, the ANFI and the LCD, it can be seen that at the EU level migrants have a negative ANFI (−208 euros for intra-EU migrants and −219 euros for extra-EU migrants), although higher than natives (−476 euros). This means that, in 2015, migrants are less of a burden on the EU public budget than natives. However, when looking at the aggregate LCD estimate (controlling for age structure), it can be seen that the fiscal impact

is less negative for natives (−753 euros) than for intra-EU migrants (−1,223 euros) and extra-EU migrants (−2,594 euros). These numbers suggest that the negative fiscal impact of migrants during the life cycle is expected to be stronger than that of natives. Furthermore, to account for potential differences between migration statuses over the lifetime, we also estimate the discounted life-cycle deficit (DLCD), using a discount rate of 2 per cent per year. This allows us to calculate the NPV of the LCD at birth for each migrant status. While the relative results across the migration groups stay the same (natives and intra-EU migrants show similar DLCD, while extra-EU migrants show substantially lower ones), the DLCD is substantially lower than the LCD, simply because the biggest expenditures (pensions) occur late in the life cycle and are valued less than, for example, the contributions during the working age.

There are several reasons for the higher magnitude of the negative life-cycle impact compared with ANFI. First, the life-cycle impact is estimated by selecting a sample from the age of 0 to the age of 80 (80.6 years was the official average life expectancy in 2015 in the EU). However, migrants may have different mortality rates than natives. As a robustness check, we also add LCD estimates for different age limits (75 years and 85 years). We can see that if we assume a lower age limit, the LCD turns positive for natives, while for intra-EU and extra-EU migrants, the LCD remains negative. When an age limit of 85 is assumed, the LCD turns substantially more negative.

Second, this approach controls for different population weights. Currently, in most countries, more people are of working age (15–64) and thus, on average, net contributors, while fewer people are young (0–15) and older (65 and older), who are usually net recipients. When using an average indicator, such as the ANFI, this obviously has an impact on the fiscal outcome. However, for the LCD, these differences do not matter.

The differences between the ANFI and LCD indicators are clearly visible. When we look at the ANFI, migrants tend to have a better NFI for the state than natives. However, when we focus on the LCD, migrants, and especially extra-EU migrants, exhibit a substantially higher deficit than natives, which stems from their more favourable age structure, which the ANFI estimates do not control for. When focusing on the long-run fiscal impact of migration, the LCD might be the more interesting concept, while when looking at the immediate effects on the welfare state, the ANFI might be the indicator of interest.

4.3 | Welfare-regime-specific differences in ANFI and LCD

In this section, we discuss the current ANFI of migrants for different welfare-state regimes in Europe. Furthermore, we compare these static impacts with welfare-regime-specific estimates derived from the LCD approach. In online Appendix D, we additionally provide country-specific results for both measures.

We group countries on their welfare regimes based on social protection systems (such as social insurance, family benefits, and health insurance), labour market regulations, and differences in tax systems, following Österman, Palme and Ruhs (2019). Classifying countries according to their welfare regime allows an assessment of whether more generous regimes act as welfare magnets for migrants.[33]

We distinguish between five different regimes in Europe:

1. **basic security** – Ireland, Malta and the UK;
2. **continental corporatist regimes** – Austria, Belgium, France, Germany and the Netherlands;
3. **Mediterranean corporatist models** – Cyprus, Greece, Spain, Italy and Portugal;
4. **universal regimes** – Denmark, Finland and Sweden;
5. **state insurance regimes** – Eastern EU countries and Baltics.

[33] Borjas, 1999; Levine and Zimmerman, 1999; Razin and Wahba, 2015.

One of the difficulties in estimating the net fiscal impact by place of birth is the attribution of costs associated with the children of immigrants born in the host country. Before the age of entry into the labour market, children are important net recipients of in-kind transfers for health care or education. From a cohort perspective, as most immigrants land as adults, a good part of these costs, especially in education, have been incurred in the country of origin and it can be concluded that the host country benefits from a gain in human capital.

However, from a cross-sectional perspective, the costs of education should be seen as an investment by the state in the human capital of the next generation of workers. If the state did not pay the costs of education or health care, parents would have to pay for the education or health care of their children. These costs should therefore rather be seen as an intergenerational transfer, and attributing the net benefits received by children born in the host country from foreign-born parents to the natives increases the cost of services for natives and reduces the cost for migrants, distorting the results in favour of foreign-born.

As illustrated in the two panels of Figure 5, allocating these costs according to the place of birth of the child (Figure 5(a)) or its parents (Figure 5(b)) generates important differences in the ANFIs according to migration status and welfare regime. These differences are even more important the higher the level of immigration, because a larger share of the cost associated with childhood is reallocated when the second generation of immigrants is larger. While in Figure 5(a) the ANFI of natives is lower than that of migrants (intra-EU and extra-EU) in all welfare regimes except those of the state insurance regime, the picture is diametrically opposed in Figure 5(b), which shows the ANFI when attributing the cost of benefits received by second-generation children to their immigrant parents. Under this condition, only the countries of the Mediterranean corporatist model show a higher ANFI for intra-EU migrants than for natives. Moreover, on average, countries in the most generous regimes (universal and continental corporatist) show larger negative differentials in favour of migrants, especially with respect to extra-EU migrants. In the case of countries belonging to the state insurance regime, the difference between the two ways of allocation is of little importance, as migration flows are generally in favour of other EU countries.

However, these results can be driven by differences in the age structure or other characteristics (such as the level of education) of the three subgroups. As shown in Table E.2, the ANFI is substantially different between skill levels, where the ANFI of the low-skilled is substantially lower than that of the high-skilled. Furthermore, Figure D.3(a) in the online Appendix highlights the strong correlation, especially between the share of people of working age and the ANFI.

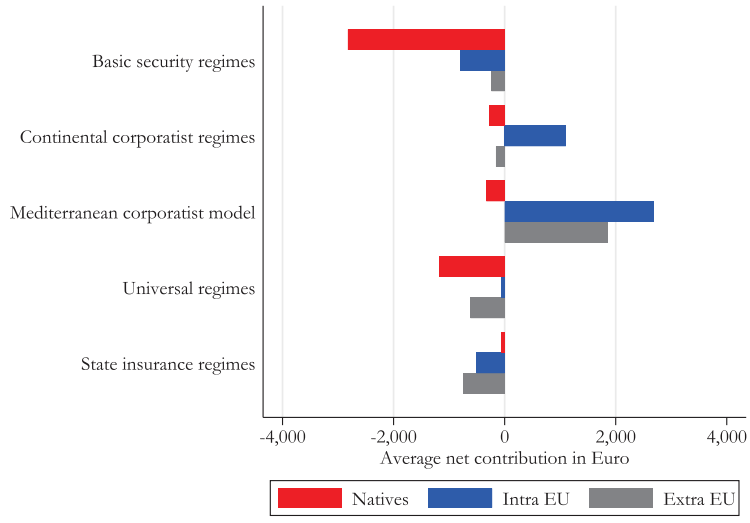
Therefore, we also analyse the LCD related to our three groups of interest. As expected, these results are substantially different from the ANFI. Again, results by welfare regime show very different patterns. Figure 6 highlights substantial differences among the different migration statuses when looking at the LCD.

We can see a pattern in which the LCD of natives tends to be higher (and less negative) than the one of intra-EU migrants, with not very large differences. However, when comparing natives with extra-EU migrants, this difference increases substantially across all welfare-state regimes. This result does not hold for all countries, as can be seen in the country-specific results in online Appendix D.

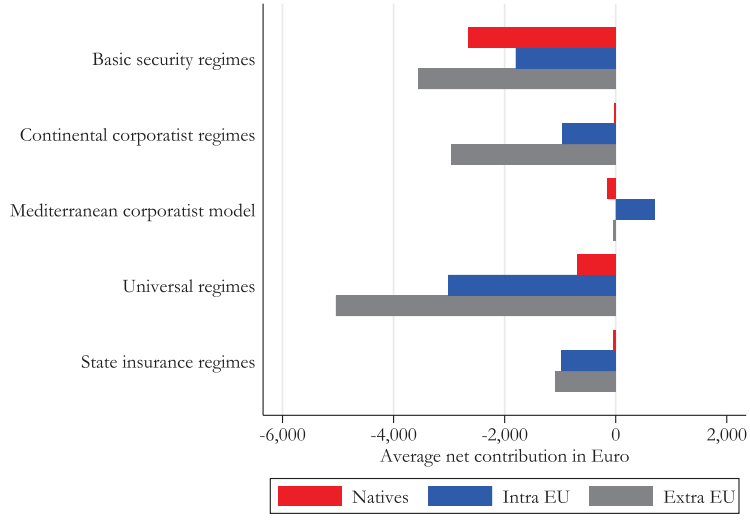
Looking at the data in more depth, we can see that this result is mostly related to the lower labour market participation of extra-EU migrants. Especially in continental corporatist regimes, as well as in universal regimes, differences in the NFI between natives and extra-EU migrants (but also differences between intra-EU and extra-EU migrants) over the life cycle are substantial.[34]

One has to be careful when interpreting these results. The LCD approach does not account for the fact that many first-generation migrants have already attained their educational level in their country of origin. This means that the educational costs of migrants are often not paid for by the host country. Therefore, ignoring them would lead to an overestimation of the average costs in young ages of migrants and an increase in the estimated LCD for migrants.

[34] Please note that in most of the state insurance regimes extra-EU migrants are a very small group, which leads to substantial uncertainty in our results.



(a) Children included by country of birth



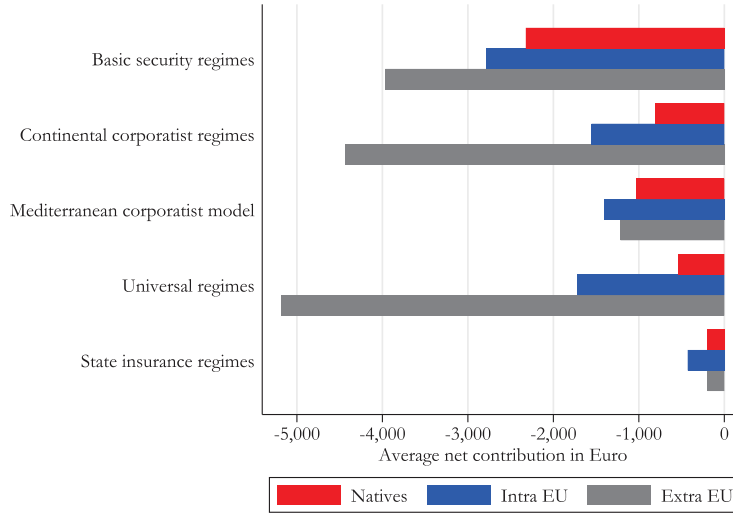
(b) Children included by country of birth of parents

FIGURE 5 Average net fiscal impact (ANFI) by welfare state regime and migration status

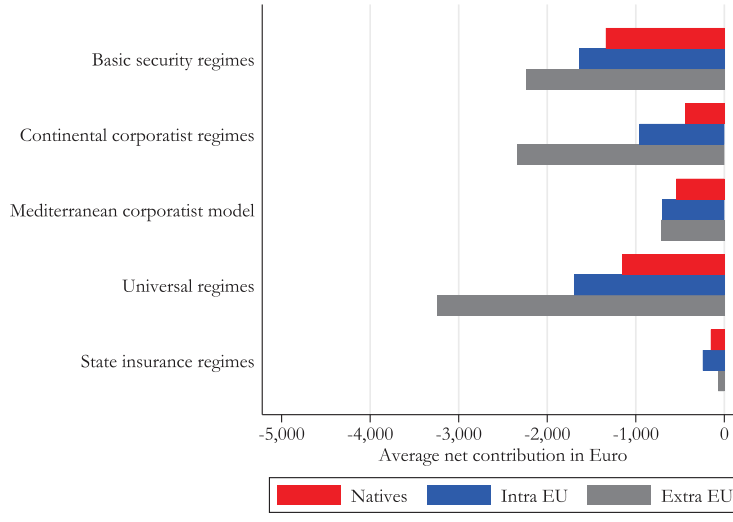
Note: Exact values, as well as confidence intervals, are presented in Table E.1 in the online Appendix.

Figure E.1 in the online Appendix highlights the differences in the net contribution by migrant status in all EU MSs over the life cycle. Furthermore, to account for potential differences between migration status over the lifetime, we also estimate the discounted LCD, using a discount rate of 2 per cent per year. This allows us to calculate the NPV of the LCD at birth for each migrant status in each welfare regime.

Figure 6(b) highlights that the NPV of the LCD is substantially lower than that of the general LCD, mainly driven by the fact that pension benefits, the highest benefits received over the life cycle, are achieved at a very late stage in life. Overall, there seems to be little difference in the relative results. However, applying time discounting, which assigns less value to future occurrences than to current



(a) Life-cycle deficit



(b) Discounted life-cycle deficit

FIGURE 6 NPV of the LCD by welfare state regime and migration status

Note: A discount rate of 2 per cent per year was used to calculate the NPV.

ones, results in less pronounced differences between both natives and intra-EU migrants, as well as natives and extra-EU migrants.

4.4 | Projecting the net fiscal impact

Figure 7 illustrates the results of our dynamic microsimulation model. It shows the projected annual net fiscal impact over the period 2015–35, by migration status of the population groups, and under the baseline scenario's assumptions. As we assume a constant net fiscal impact over the long term,

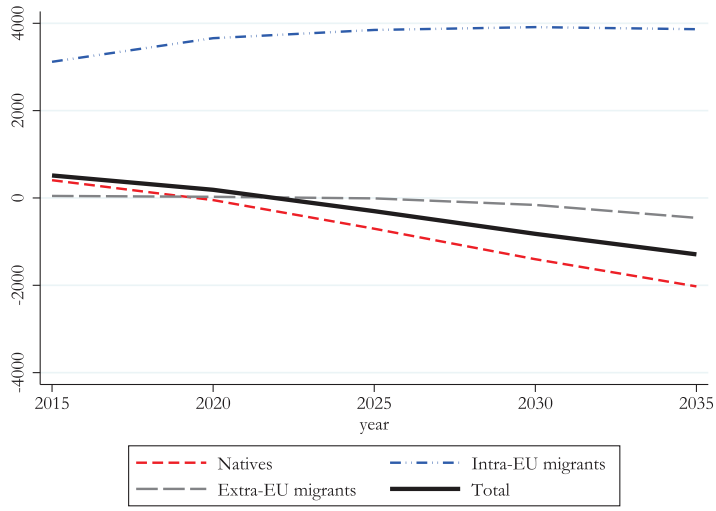


FIGURE 7 Projected ANFI (beyond the age of 15) by migration status, EU, 2015–35

Source: Own elaboration based on CEPAM-MIC and EUROMOD.

the projected evolution over time results only from changes in the demographic composition of the population groups. The most important demographic trend is certainly the ageing of the population, which would have a considerable impact on the future financial situation, particularly for those countries with the fastest ageing populations.

Population ageing is more prominent for natives than for immigrants because, by definition, the native population is not rejuvenated by the arrival of younger than average immigrants. This explains the negative slope of the native curve. On the contrary, the curve for extra-EU migrants is flatter, and the projection shows that the current slightly higher net contributions of natives compared with extra-EU migrants would reverse in 2020 under the baseline scenario assumptions. In 2035, although both ANFIs turn out to be negative, the average annual net fiscal impact of extra-EU immigrants could exceed the contributions of natives by about 1,570 euros per capita. Finally, intra-EU migrants present the largest annual net fiscal impact of the three population groups, and their fiscal contribution is likely to increase over time. This is certainly due to the favourable age and education composition of intra-EU migrants.

Our projections are based on the central assumption that welfare policies, the selection of migrants, and their integration into European labour markets will follow the trends of recent years. Our results suggest that given the expected flows of migrants in the near future, the impact of migration on the overall sustainability of European welfare states would be limited. Under any realistic migration scenario, natives will make up the vast majority of the resident population in the EU. This group will pay most of the taxes and receive most of the benefits. Therefore, the sustainability of the European welfare states depends mainly on them.

Future research could focus on alternative scenarios that could differ on the assumptions regarding labour market participation, unemployment, the educational composition of future immigrants, the tax contributions and social benefits gaps between immigrants and natives, as well as on the integration assumptions.

5 | CONCLUSION AND DISCUSSION

There is a long-lasting discussion on the ANFI of migration. For decades, economists, and especially policymakers, have been asking whether a more favourable account balance is expected from

migration. In other words, how could expenditures on benefits, pensions and other social security services be more or less balanced by revenues collected in the form of taxes and social security contributions? Our paper tackles this question by using the NFI in the EU for natives and migrants following a microsimulation modelling approach and projecting this net fiscal impact in the future, using the dynamic microsimulation model CEPAM-Mic.

Following the approach of Fiorio et al. (2022), we compute the NFI of migration and extend the EU-SILC data in several ways. First, we take into account in-kind benefits by using the EUROMOD migration extension developed by Fiorio, Frattini and Riganti (2018). The extension enriches the EU-SILC with information on in-kind benefits, based on OECD statistics that allow us to apportion the cost of education, social housing and health care provisions among individuals. Second, we add VAT taxes by simulating VAT rules using the Household Budget Survey (HBS) 2010 to take into account the different consumption patterns of migrants and natives.

In this paper, we combine static microsimulation modelling with a life-cycle approach to estimate long-term implications of migration. To this end, we calculate two concepts of NFI: the ANFI, which reveals the current impact of migrants on state budgets, following Fiorio et al. (2022); and the LCD, following Hinte and Zimmermann (2014) to obtain an estimate of the long-term implications. Our results suggest that when considering the ANFI, both intra-EU and extra-EU migrants have a negative but higher NFI than natives. This means that, currently, the average immigrant is less of a burden on the public budget than the average native. However, this result could be influenced by the difference in the demographic composition of each group. To account for the impact of demographic composition of the three groups, we control for age structure and obtain an estimate of NFI over the life cycle (LCD). The estimates indicate that the net fiscal impact appears to be even more negative over the life cycle, although natives show a higher contribution than intra-EU migrants, who in turn exhibit a higher (less negative) NFI than extra-EU migrants.

Additionally, we find that there are substantial differences between different welfare regimes in the EU regarding the net fiscal impact of migration in both concepts. This potentially reflects the differences in types and history of migration that characterise EU MSs. Especially in continental corporatist regimes (Austria, Belgium, France, Germany and the Netherlands), as well as in universal regimes (Denmark, Finland and Sweden), the differences in the NFI between natives and extra-EU migrants over the life cycle are substantial, while the differences between natives and intra-EU migrants seem to be less pronounced. This divergent picture attracts attention to the ongoing challenges of integration (especially of labour market integration) related to extra-EU migration and suggests that better (labour market) integration is needed to improve the NFI of migrants.

When projecting the net fiscal impact for the period until 2035, we find that population ageing is more prominent for natives than for immigrants. We find a further decline in the net fiscal impact for natives. On the contrary, currently the impact for extra-EU migrants is lower than that of natives. However, a much slower decrease in net fiscal impact of extra-EU migrants leads to a higher net fiscal impact of extra-EU migrants after 2025 compared to natives. Finally, intra-EU migrants present the largest annual net fiscal impact of the three population groups, and their fiscal contribution is bound to increase over time. This is certainly due to the favourable age and education composition of intra-EU migrants. The higher contributions of migrants compared to natives for 2015, as well as the higher contributions of intra-EU and extra-EU migrants (whether positive or negative) for 2035, counter the narrative that migrants drain the welfare state resources. However, these results are crucially dependent on how we treat second-generation migrants. Identifying the net fiscal contribution of migration is important to develop policies that promote positive attitudes toward immigration and reduce the economic and fiscal concerns associated with new immigration flows.

We also show that the ANFI (per capita) on EU level is expected to decline in the future, indicating that migration is not able to offset the strong pressure of the population ageing on the state budgets in the EU.

It is worth mentioning some caveats in our analysis. Our analysis provides evidence on the direct fiscal effects attributable to immigrants and natives for Europe, for groups of countries clustered by welfare regimes as well as for individual MSs. A limitation of microsimulation models is that they do not include the characteristics of general equilibrium models,[35] which consider both direct and indirect effects of immigration when assessing its impact on the public finances of host countries.[36] However, the dynamic microsimulation projection model allows for the age structure of the different populations and their evolution to be explicitly taken into account.

Our analysis uses a partial equilibrium approach, as in the NPV and GA approaches, where some factors, such as consumption, labour productivity, wages, job opportunities and housing market conditions, are assumed to be not affected by the arrival of new immigrants. In focusing exclusively on demographic changes among populations, we overlook the indirect (or general equilibrium) effects of immigration, which nevertheless affect public finances over time and through tax changes. For example, as discussed in Colas and Sachs (2020), immigration-induced population growth can indirectly affect public finances through an effect on native wages and labour supply in the case of low-skilled immigrants.[37]

Although the indirect effects of immigration are quantified as minor relative to overall economic activity and are overlooked due to the difficulty of operationalising a general equilibrium approach, evidence suggests that they could nonetheless be substantial for some market sectors and geographic regions. To better inform immigration policies and improve national fiscal planning, a more comprehensive analysis must consider both the direct and indirect effects of immigration on the economy.

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[35] Chojnicki, Docquier and Ragot, 2011.

[36] Chojnicki and Ragot, 2016.

[37] The authors find that the indirect fiscal benefit of a low-skilled immigrant is between 770 and 2,100 dollars per year. The indirect fiscal benefit may exceed the negative direct fiscal effect, thus counteracting public opinion according to which low-skilled immigration represents a fiscal burden (Colas and Sachs, 2020).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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