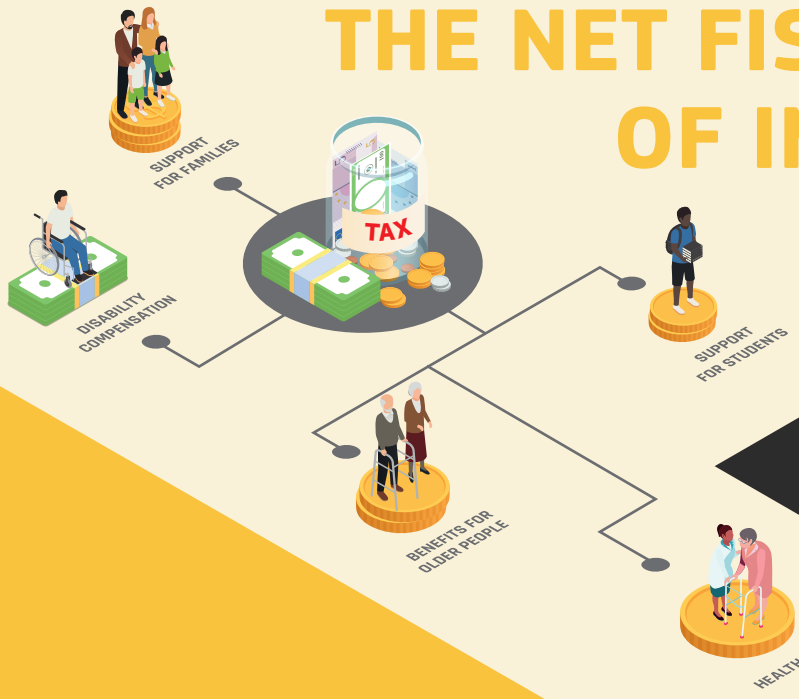
European Commission

PROJECTING THE NET FISCAL IMPACT OF IMMIGRATION IN THE EU



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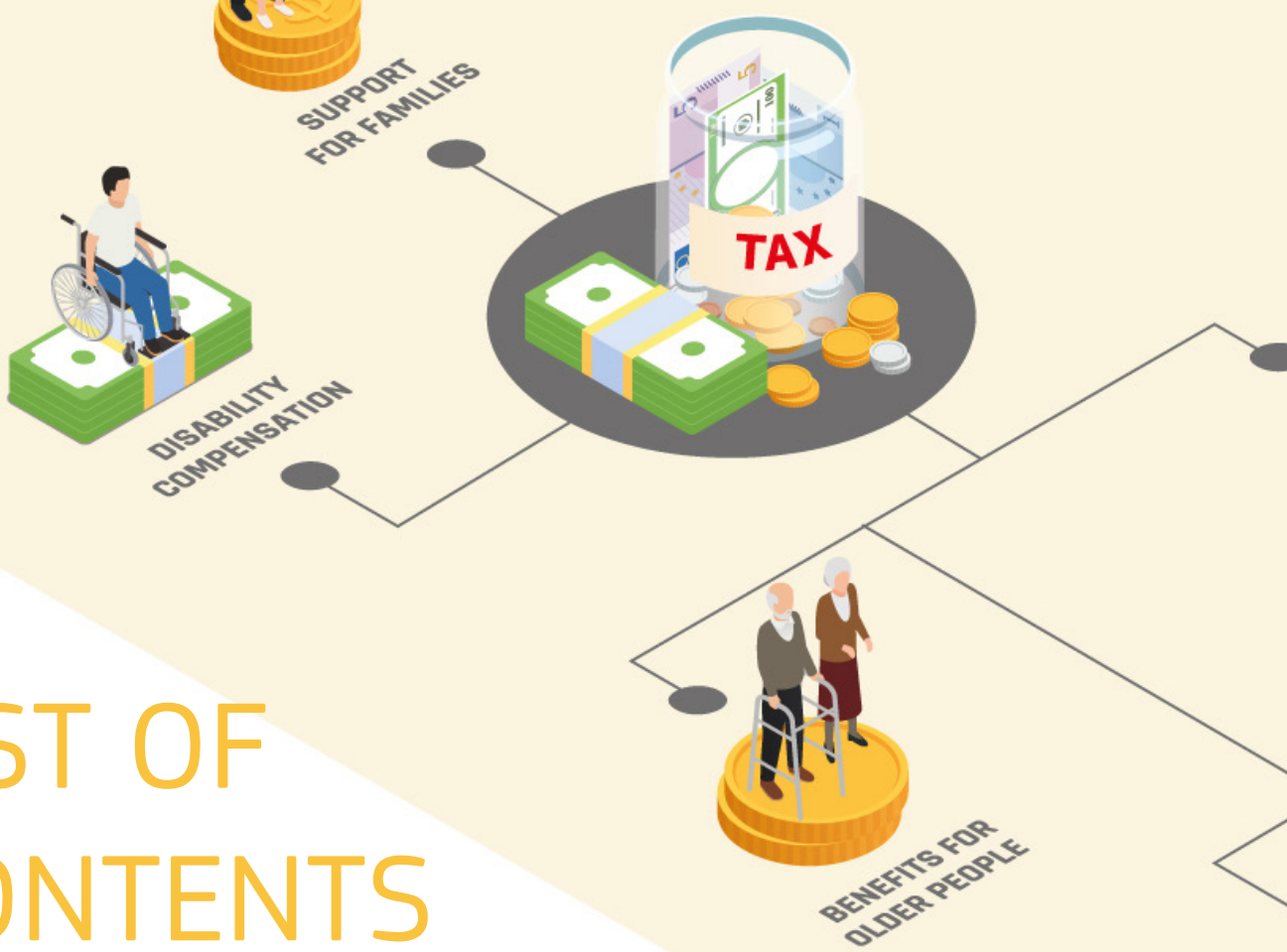

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ABSTRACT

This report provides an analysis of the fiscal impact of migration in the European Union in the past and the future. It highlights that currently natives generally show a higher net fiscal contribution than extra-EU migrants and a similar contribution to intra-EU migrants. However, due to ageing of the native population, this relationship is bound to reverse in the near future. The report calculates that by 2035 an average extra-EU migrant would be a net beneficiary of public transfers, but to a lesser extent than the average native would, while intra-EU mobile citizens would continue being net contributors.

The report also analyses six possible policy scenarios and their implications for the fiscal contributions of extra-EU migrants. These simulations highlight how acting on the size of the flows of new migrants without removing the obstacles to their full labour market integration would yield small fiscal benefits for the hosting country. Labour market policies targeted at increasing labour participation of migrants could generate large fiscal gains.

To evaluate the static net fiscal impact of migration based on micro-data the analysis uses EUROMOD, a tax-benefit microsimulation model for the European Union enriched with data on in-kind benefits. This is based on OECD data for apportioning the cost of education social housing and health care provision. For projecting the long-run fiscal effect of migration, the simulations use CEPAM-Mic, a dynamic microsimulation projection model.

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EXECUTIVE SUMMARY

Over the last few decades the economies of many EU Member States have faced slowing growth rates, increasing inequality and ageing populations. An ageing population, in particular, raises concerns for the sustainability of many European welfare systems that were designed in a historical period under different demographic dynamics. The current demographic transformation towards an older population imposes the burden of providing the fiscal resources needed to sustain European standards of social protection on a smaller body of active workers. Among the frequently envisaged solutions, some believe that European countries must consider cutting their extensive social protection scheme and activate all segments of the potentially active populations in trying to reverse the adverse demographic trend. To this end, migration can be considered an important element of a complex policy mix. In fact, as migrants generally move at the beginning of their working life, they can partially compensate for the demographic deficit, expand the tax base and contribute to economic growth. Yet immigration also raise challenges. For instance, the net fiscal effect of immigration could be negative if immigrants have inconsistent career paths and low earnings but at the same time benefit from large social benefit payments.

To date, few comprehensive, EU-wide analysis on the net fiscal impact of immigration have provided an answer to how immigration impacts on the resources needed for social welfare systems. Most importantly, no analysis has specifically addressed this question in dynamic terms considering how the impact is likely to evolve in the coming decades. This report aims at filling this gap by analysing **the present and future net fiscal impact of immigration in the EU** through a combination of fiscal and demographic models. In particular, we aim to answer the following questions: Can an inflow of foreign young immigrants compensate for the dwindling active native population? Can this inflow balance the negative effect of ageing on the public purse by expanding the tax base on which European welfare systems are based? Should EU countries attract more immigrants and/or should they offer better labour market opportunities to migrants to render EU welfare system sustainable in the future?

The report accounts for current tax and benefit structures in different EU Member States to give a snapshot of the current net fiscal position for natives, intra-EU and extra-EU migrants and it projects how these contributions and benefits could evolve in the next 20 years based on six immigration scenarios. The scenarios illustrate the consequences of changes in the overall size of immigration, integration, selective immigration, labour force participation and employment. Rather than representing plausible futures these scenarios should be read as what if projections on immigration to explore the net fiscal effects also under extreme assumptions.

The findings in the report show that there are large **differences in net fiscal contributions over the life cycle** for all categories considered i.e. natives, intra-EU immigrants and extra-EU immigrants. Overall, net fiscal contributions are negative until about age 30, positive and increasing during working life and until retirement and negative and decreasing afterwards. Comparing the fiscal contributions of the three groups reveals that, for the majority of their working lives, natives contribute more than extra-EU immigrants. The higher net contribution of natives is a consequence of their higher average income, which in turn is related to higher wages, labour market participation and lower unemployment. The differences between Member States depend on their fiscal and socio-economic policies and on their past success in attracting high-skilled immigrants and integrating them in the labour market.

When **decomposing the structure of social expenditures** and tax schemes, we find that pensions and other old-age related benefits account for a very high share of social expenditures while the majority of contributions are paid as social security contributions and taxes on income. By comparing the per-capita contributions and benefits of natives and immigrants, we have three key findings: natives contribute more than immigrants in personal income taxes, they receive higher pensions, and social transfers targeted to them (e.g. family benefits, health benefits, housing benefits and social assistance benefits) are lower. The first and second findings relate to the higher labour earnings and past social security contributions of natives compared to immigrants. The third finding is explained by differences in socio-economic and demographic characteristics and in particular, by differences in family structures between natives and immigrants.

In terms of **future evolution of the current scenario**, assuming that fiscal policies will remain unchanged for the next two decades, the report calculates that by 2035 both natives and, to a smaller extent, extra-EU immigrants will be net beneficiaries of public transfers. On the contrary, intra-EU migrants will remain net contributors thanks to their favourable age and education composition.
The **simulations of different immigration scenarios** highlight how acting on the size of the flows of new migrants without removing the obstacles to their full labour market integration will yield small fiscal benefits for the hosting country.

Labour market policies targeted at increasing the participation of immigrants in the labour market, instead, could generate higher fiscal gains. Compared to fiscal contributions under the current scenario, if immigrants were to have the same labour intensity of natives – defined as participation in the labour market - their per capita net fiscal contributions in 2035 would increase by more than 1,000 euros. Combining both favourable assumptions, in a scenario of perfect integration would generate up to 3,500 euros in per-capita gains for the average extra-EU immigrant. Although the fiscal benefits of policies favouring the integration of immigrants in hosting labour markets are evident, the report estimates that no immigration and integration scenario can entirely offset the heavy burden that an ageing population imposes on the public finances of many Member States. The perfect integration scenario predicts that in 2035 the per-capita per year fiscal contributions of the average European resident would be 569 euros higher than in the current scenario. Nonetheless, the expected fiscal contribution of the typical EU resident would remain negative.

The report findings stress that **policies aimed at promoting the full integration of immigrants into the labour markets of their host countries can generate considerable fiscal gains for all Member States**. But they also suggest that **immigration alone will not be sufficient for ensuring the sustainability of European welfare states** for two main reasons. First, although most immigrants arrive while still young and productive, they will eventually age becoming more reliant on public transfers. Second, migrants represent only a minor fraction of the total population residing in the Union and will continue to be a minority under any plausible migration scenario. **Although an integrated migrant workforce can contribute its fair share to the Member States public purses, the real challenges to the European welfare states sustainability are posed by the steadily ageing European population**.

UNDERSTANDING THE EVIDENCE

To evaluate the static net fiscal impact of migration based on micro-data, we use EUROMOD, the tax-benefit microsimulation model for the European Union. EUROMOD is a unique tool for international comparative research on the effects of taxes and benefits, using individual and household data from the European Union Survey of Income and Living Conditions (EU-SILC). For this project, we complemented the EUROMOD output with information on value added taxes (VAT) by simulating VAT rules using the Household Budget Survey (HBS) to take into account the different consumption patterns of migrants and natives. We extend EUROMOD to include restrictions imposed by tax-benefit policies based on residence length or the citizenship status. Finally, we supplement the EUROMOD output with imputed information on in-kind benefits related to education, health care provision and social housing, based on the OECD data and observed education status and age.

For projecting the long-run fiscal effect of migration, we use CEPAM-Mic a dynamic microsimulation projection model. CEPAM-Mic microsimulation model operates at the individual level. It projects the occurrence and timing of demographic and socio-economic events that shape future characteristics of individuals and their future offspring based on a series of interrelated prediction models. The base population is created from the EU-Labour Force Survey (EU-LFS) microdata files and supplemented by other surveys such as the European Social Survey to impute those individual characteristics not available in the EU-LFS.

In this report, we adopt the country of birth criteria for defining immigrant following the United Nation definition (IOM, 2019).[1] Accordingly, an immigrant is a person who has moved across a boundary regardless of that person legal status. This implies that, in our definition, some European citizens are defined as immigrants if they were born outside of the Union. Among immigrants, we distinguish two groups: intra-EU immigrants, defined as anyone born in one of the 27 EU Member States plus the United Kingdom, but residing in a Member State other than the country of birth; and extra-EU immigrants as anyone born outside of the Union and currently residing in one of its members. As the model was developed before the United Kingdom left the European Union, U.K. citizens residing in one of the remaining 27 Members are still

1 https://publications.iom.int/system/files/pdf/iml_34_glossary.pdf

classified as intra-EU migrants, even though the report does not produce specific figures for the U.K.
Our estimates and simulations are liable to bias. They rely on a number of assumptions, and therefore should be interpreted with care. Most of the possible source of bias and assumptions are detailed in the main body of the report. For reasons that are made clear in the report, cross-country comparisons should be exercised with caution.

The report focuses on the fiscal benefits of immigration for the receiving countries only. Some Eastern and Southern Member States are experiencing a considerable outflow towards Western and Northern Member States. The consequences of emigration for the sending countries are potentially substantial, but are not considered in this report.

Lastly, we want to clarify that our projections are based on data predating the large inflow of asylum seekers into the Union fleeing the civil war in Syria in 2015 and the economic shock induced by the COVID-19 pandemic. Especially the second of these two shocks is likely to have deep and lasting repercussions both for the inflow of new immigrants in the Union and their chances of integration. It will be critical to re-examine if and how our conclusions will be modified by the two events once the right data become available

1. INTRODUCTION

According to the most recent figures by Eurostat for 2019[2] there are almost 40 million people born outside of the European Union (EU) residing in one of its 27 Member States (MS) plus the United Kingdom and almost 22 million EU citizens living in a different Member State from the one of birth. This is up from 33.4 million and 18 million, respectively, in 2014 – the first available year for this series - corresponding to a 21% and 22% increase in five years.

While irregular arrivals to the EU have reduced to pre-crisis level, the number of immigrants legally living within the Union is growing and for many Member States this is a new phenomenon that generates a range of social, political and economic considerations. One of the main considerations for policy makers and public opinions alike is whether immigrants contribute their fair share to their host country tax and welfare system. Fears of welfare abuses are common among European citizens (Boeri, 2010) as well as worries that the generous European welfare systems might act as a magnet for welfare-dependent migrants (De Giorgi and Pellizzari, 2009). Concerns about fiscal fairness surpass those about labour market effects of immigration in public opinion's assessment and are hard to ignore for governments (Dustmann and Preston, 2007).

Apart from public attitudes on migration and questions of perceived fairness, the fiscal implications of immigration are especially salient for the EU Member States considering how extensive and comparably expensive their social protection systems are.[3]

Migration can have both positive and negative consequences for the economies and public budgets in the receiving countries. Focusing on the fiscal aspect only, a growing immigrant population can help alleviate the financial burden that an ageing population imposes on pension systems. Immigrants often move during their most productive years while they are still active and before they require frequent and costly medical care or before maturing the rights to pension transfers. At the same time, migrants generate a number of expenses specifically targeted at their cultural and economic integration and they tend to earn lower wages and fall into unemployment more frequently than natives (Conte and Mazza, 2019). In general, the age structure of the immigrant population is expected to contribute to a positive net fiscal effect, as they are overrepresented in age groups where contributions exceed benefits. Conversely, based on the current record of their integration in the European labour markets, we can expect their labour market performance, which tends to be lower than that of natives, to weight negatively on their net fiscal contribution.

Understanding how these differences affects public budgets becomes central as the migrant population in the EU keeps growing.

A second reason why the fiscal impact of immigration has gained the attention of policy makers in recent years is the observation that an ageing population threatens the sustainability of the most generous European welfare states. The inflow of a young and active population seems to offer an at least partial solution to this issue.

In this report, we tackle these central questions by calculating the net fiscal contribution of natives, intra-EU and extra-EU migrants for the 27 Member States based on the EUROMOD micro simulation model. The model is able to simulate individual and household tax liabilities and benefit entitlements following the policy rules in place in each EU Member State starting from individual microdata. These simulations are also the basis for the dynamic simulation provided in the following sections of the report. The simulations allow us to gain some understanding of how demographic dynamics – especially ageing – would potentially interact with labour market dynamics and fiscal policies.

The methodological questions raised by the calculation of the fiscal impacts of immigration are complex. The two general approaches that have been taken in the literature is to either compare current tax/benefit balances or adopt a forward-looking approach and project the evolution of migrants' contributions over their life-cycles. No approach is free of limitations though. Concentrating on the current tax/benefit balance has the advantage of precisely quantifying the status quo without recurring to arbitrary assumptions, but it cannot offer any indication on how the balance will evolve in the future. The static approach also provides a cross-sectional view that might reflect more the differences in age structure of the native and immigrant populations rather than the intrinsic effects of the contributions and benefits of each population category. In the context of fiscal balances where current commitments have long lasting consequences for governments´ coffers, a static accounting could limit the policy indications that one

2 See database migr_pop5ctz taken from https://ec.europa.eu/eurostat/data/database, last accessed 13/07/2019.

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

can derive from it. On the other hand, dynamic, forward-looking approaches have the advantage of projecting how current policies could affect long-term fiscal budget sustainability. Such foresight exercise comes at a cost though. Future projections are only possible when imposing stringent assumptions on demographic and social evolutions, technological innovations and human behaviours, phenomena that are often unpredictable by nature. It is, however, possible and quite common to use scenarios to compare different possible futures that would result from a plausible continuation of recent trends or policy-induced changes.

Researchers in these areas are then confronted with a clear trade-off and it is probably safe to say that no approach can claim undisputed superiority over the other. Yet, most of the available research has focused on the quantification of current tax/benefit balance (Chojnicki et al., 2018; OECD, 2013). To the best of our knowledge, this Report represents the first attempt to provide an EU-wide projection of the net fiscal contributions of natives and immigrants.[4]

We find that typically residents in the EU are net contributors during their working life and net beneficiaries in retirement. The overall net current fiscal contribution over the life course is positive for all three groups if we consider the cross-country average.[5] Intra-EU immigrants are the largest net contributors, while extra-EU are the smallest. When we project the average fiscal contribution of each of the three groups for the next two decades several results emerge. First, if unchanged, the demographic evolution of the native population, in particular their ageing, would render the average native a net beneficiary of state transfers. Second, intra-EU migrants are the only group projected to be net contributors on average. Third, if the current labour market integration of extra-EU migrants is not improving, their net fiscal contribution would become negative as well. Fourth, policies aimed at promoting the labour market integration of migrants could pay substantial fiscal dividends for the hosting country. Fifth, even in the most favourable scenarios of an extra-EU migrant population highly integrated and selected, by 2035, the average EU resident would be a net beneficiary of state transfers, mostly due to the negative influence of the predominant native population.

We believe that the evidence presented here which supplements the indications emerging from static accounting exercises, will help providing a more complete picture of the implications of immigration for the European welfare states.

The report unfolds as follows. In Section 2, we discuss the recent trends and characteristics of immigration phenomenon in Europe. Section 3 and 4 present the microsimulations models used to evaluate the static and dynamic fiscal impact of immigration. Section 5 reports and explains the population-based projections. Section 6 concludes by summarising the main findings and discussing the main limitations of the data and microsimulations models involved in this research.

BOX 1 Definitions of group of origin

- **Native**: a person born in the current EU Member State of residence;
- **Intra-EU migrant**: a person born in a Member State (EU28) other than the EU Member State of residence;
- **Extra-EU migrant**: a person born outside of the European Union (EU28).

A person can be defined as an immigrant either because the country of birth differs from the current country of residence (birth criteria) or because the citizenship differs (citizenship criteria). In this study, we follow the country of birth criteria. We believe this to be the most appropriate criteria in the context of this report where we present cross-country estimations as procedures and requirements for obtaining citizenships vary between Member States. From this definition, it follows that we classify some citizens of the Member States as immigrants. These people are more likely to be well integrated in their country; therefore, our classification might enhance the net contribution of immigrants compared to studies adopting the citizenship criteria.

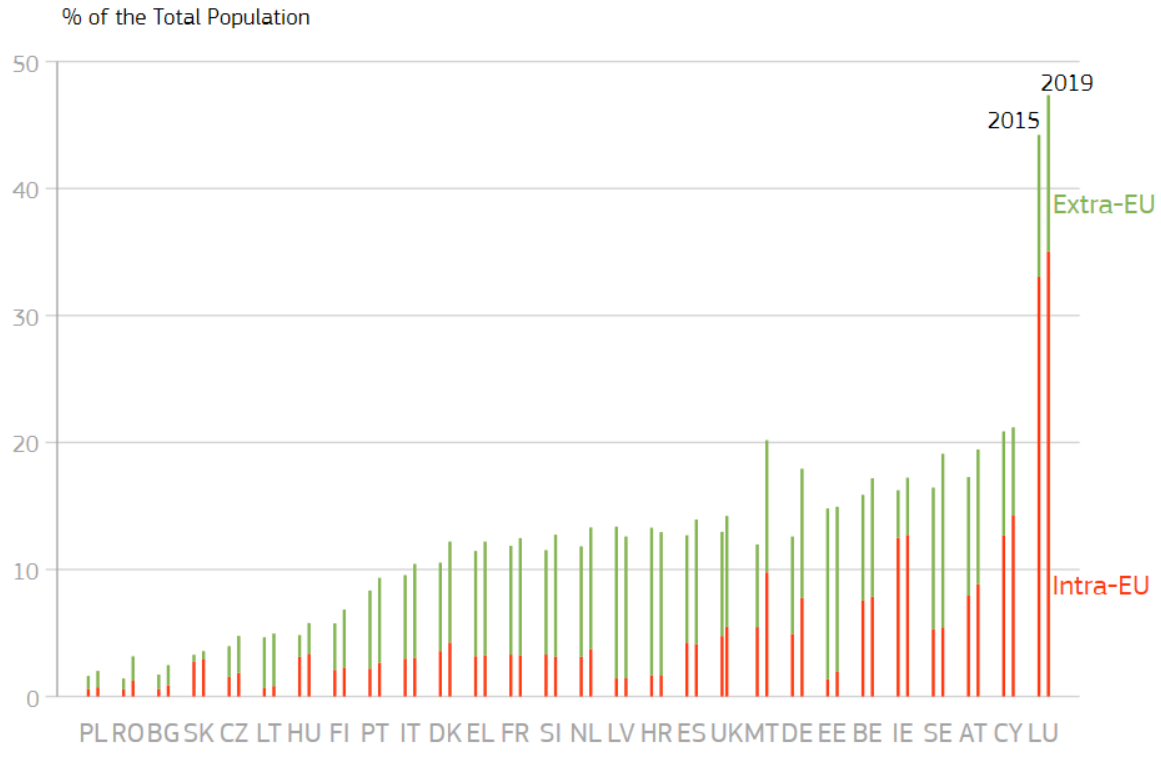
4 In this report, we adopt the birth criteria to define a migrant. We use the term migrant only when referring to both intra and extra EU migrants.

5 This report calculates the net fiscal contribution as the difference between contributions payed and benefits received. A net contributor is someone whose contributions exceed benefits and net beneficiary if benefits exceed contributions.

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 Member States (MSs) plus the UK, and 22.4 million people born in a MS other than their country of residence.[6] The aggregate data hides a considerable heterogeneity between MS. 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% of the total population. In this ranking, Luxembourg is followed by Cyprus, with 21% of the resident population born abroad, and Malta and Austria whose share of foreign-born population were 20% and 19.2% respectively **(Figure 1)**.[7] We observe the lowest shares of foreign population in Central and

FIGURE 1. FOREIGN BORN POPULATION BY COUNTRY OF BIRTH, 2015 - 2019
SOURCE: OUR ELABORATION BASED ON EUROSTAT DATA (ONLINE DATA CODE: MIGR_POP3CTB)



6 https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=migr_pop3ctb&lang=en
7 For each country in Figure 1, the first bar corresponds to the year 2015 and the second to the year 2019

Eastern European countries: in Slovakia, Poland, Bulgaria, and Romania the share of the total foreign-born population is below 4%. Ireland, Cyprus, Luxembourg, Hungary, and Slovakia are the only MSs with the number of individuals born in other MS exceeding the number of non-EU born.

The activity rate of the EU working age population varies according to the country of birth. In 2019, the highest activity rate was among people born in another EU country (80%), while for people born outside the EU it was 71.5%, and for natives 74%. The largest differences between the activity rates of the native and extra-EU population were recorded in the Netherlands, where the native population had an activity rate 14.8 percentage points higher than the equivalent non-EU born population rate, followed by Denmark (13 points). Compared to the population born in another MS, Latvia and Lithuania show the most pronounced differences with activity rates for natives that are 10.8 and 4.9 points higher. In 2019, the employment rate in the EU-28 for the native working age population was 69.6%, slightly above the 67% observed among the foreign-born population. However, if the latter figure is disaggregated by place of birth, the employment rate for people born in another MS was 74.6%, while the employment rate for the population born outside the EU was 63.3%. Greece, Belgium and France had the lowest employment rates among the non-EU population in 2019.[8] Youth employment rates (15-24 years) ranged from 33.7% among those born outside the EU, to 35.6% for the native population, to 42% for those born in another MS. In 2019, the highest employment rates were among those with tertiary education, while the lowest among those with lower secondary education. These trends are common for the female and male population and for natives, those born outside the EU or in another MS. All national statistics are summarised in the Table 1 in the appendix.

Turning to migration flows (defined by the country of birth), Eurostat records 3.9 million immigrants to the EU27 in 2018, and around 2.6 million emigrants in the same year. Among them, 2.4 million immigrants to the EU27 were from non-EU countries, 1.1 million people emigrated from the EU27 to a country outside the EU, and 1.4 million people residing in one Member State emigrated to another State. In the latest years, the number of extra-EU migrants has been higher than intra-EU migrants and reached its peak in 2015 with about 2.5 million new migrants, followed by a slight decrease according to Eurostat data. In absolute numbers, Germany, the UK, Spain, France and Italy recorded the highest number of immigrants. But, in relation to the total population, Malta and Luxembourg display the highest immigration rates.[9] The aggregated gender distribution of the total immigrant population as recorded in 2018 is skewed towards men who comprise 57% of the total population. In Spain, France, Cyprus and Portugal the proportion of women is higher. Croatia, Latvia, and Lithuania have the highest proportion of male immigrants in Europe. In 2018, more than three-quarters of the total immigrant population in Europe were of working age (15-64 years). Specifically, the percentage of immigrants aged 15-64 was 81% of the immigrant population, that of the under-15s was 16% and that of the over-65s 2.5%. In relation to the total immigrant population, Cyprus, Czechia and Croatia have the highest rate of migrant population of working age (over 90% of the total migrant population). The 25-29 age group is the largest among the immigrated population flows.

2.1 EMPIRICAL EVIDENCE ON THE FISCAL IMPACT OF IMMIGRATION IN EUROPE

While most of the empirical evidence on the effects of immigration has focused on the employment and wage impacts of low-skilled workers in receiving countries (Dustmann et al., 2013; Nickell and Saleheen, 2015), the evidence on the fiscal impact is relatively recent, particularly for Europe. The relevance of this topic gained traction with the rising immigrant population and concerns regarding the sustainability of welfare states, in a context of major demographic changes (Lutz et al., 2019) and an ageing European society.[10]

The results of the empirical evidence are mixed; however, in most cases they suggest a modest impact - on average less than +/- 1% of GDP. Empirical investigation on this topic can take two approaches: static accounting or dynamic approaches. The static accounting approach takes a snapshot of public finances in a given year (or more years) and apportions contributions paid and benefits received to natives and immigrants. The difference between contributions and benefits forms the net fiscal impact for each group. The dynamic approach instead focuses on estimating the Net Present Value (NPV) of immigrants and their descendants from their life-cycle perspective. These models provide projection results integrated into alternative policy scenarios. Results, therefore, depend mainly on the set of assumptions about future population trends, labour force participation, and government taxes and expenditures. Both approaches have a number of advantages and disadvantages (Nannestad, 2007; Vargas-Silva, 2014; Kaczmarczyk, 2013). One important advantage offered by dynamic models is that they offer a forward-looking perspective within a life-cycle framework that is considered key to inform policy-making (Kaczmarczyk, 2013).

8 https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=lfsa_ergacob&lang=en

9 https://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=migr_imm3ctb&lang=en

10 The fiscal impact of ageing populations is expected to be a challenge in almost all MSs over the coming decades. According to Eurostat and to a constant scenario, the total cost of the ageing population is projected to increase by 1.7 percentage points to 26.7% of GDP between 2016 and 2070. See https://ec.europa.eu/info/sites/info/files/economy-finance/ip079_en.pdf.

2.2 STATIC ACCOUNTING MODELS

The growing literature on recent immigration experiences in Europe tries to identify the static fiscal effects of immigration, through country-specific and cross-country analyses. For Dustmann et al. (2010), the fiscal impact of immigration from Central and Eastern European countries to the UK has been positive. Immigrants from the A8[11] are on average highly educated and young, however, in the period following their entry in UK they receive low wages, which gradually increase in subsequent years. Immigrants in the UK have higher employment rates than natives. Therefore, the socio-demographic characteristics of immigrants and the favourable labour market performance have determined their positive contribution to the UK's finances. For Chojnicki (2013), the total net contribution from immigration to France in 2005 was 3.9 billion euros, with an average contribution per immigrant of 800 euros, compared to -220 euros from a native. According to this analysis, the age structure of the immigrant population and the high concentration of immigrants in the active age groups drive these results. In a later study on French public finances, Chojnicki et al. (2018) analyse the net contribution of immigrants defined as any person born abroad and without French nationality at birth. The results show a low and negative contribution, in the order of about ± 0.5% of French GDP for the years 1979-2011. The age and education of the migrant population strongly influence the results. However, the demographic component seems insufficient to produce a positive fiscal contribution in the years after the financial crisis of 2008 that led to a deterioration in individual economic performance.

Martinsen and Rotger (2017) also suggest that the different age structure between immigrants and natives is the key factor explaining the positive fiscal effect of immigration in Denmark. The authors assess the evolution of the fiscal contribution according to different degrees of mobility in the EU and the accessibility of Danish welfare. Through the analysis of repeated cross-sections of the entire population of EU citizens in Denmark, they show the net positive contribution of EU immigrants between 2002 and 2013.[12]

Bratsberg et al. (2014) and Ruist (2014) find that the fiscal effect depend largely on the performance of migrants in the labour market of the host country. Bratsberg et al. (2014) show higher welfare dependency rates for immigrants in Norway than for natives during the years 1970-2014.[13] Moreover, immigrants from high-income countries perform better in the Norwegian labour market than immigrants from developing countries, with lower employment rates and higher participation in disability programmes. In addition, refugees and immigrant families require more social insurance. Ruist (2014) conducts an analysis for 2011 on the net fiscal contribution of Bulgarian and Romanian immigrants in Sweden. Immigrants contributed positively with about 3,000 euros per person and year, and with immigrants' contributions exceeding the associated public costs by about 30%. For the author, the lack of language skills is the main obstacle to access to the Swedish labour market, with a potential negative impact on the net contribution of the migrant.[14]

Dustmann and Frattini (2014) examine the fiscal impact of immigrants in the UK during the period 1995-2011. Immigrants from EEA countries have contributed positively to the UK's public finances, while the net fiscal impact of non-EEA immigrants was negative. The results are partly explained by the higher number of children of non-EEA immigrants. The authors also explore the fiscal impact of immigrants arriving in the UK after 2000. This group of immigrants has made a positive contribution to British finances, regardless of origin.

For the OECD (2013), immigrant families in 27 OECD countries contributed on average 0.3% of GDP to national budgets between 2007 and 2009. Immigrants tend to have a less favourable net fiscal position than natives, but their net contribution is generally positive. The highest values are observed in Luxembourg (2.02%) and Switzerland (0.95%), while negative values are observed in Germany (-1.13%), France (-0.52%), and in some Eastern European countries - Czech Republic, Poland and Slovak Republic - with a rather small immigrant population compared to the total population. The socio-economic and demographic profile of the taxpayer once again explains the national results. The negative fiscal effect in Germany is explained by the age of the relatively old immigrant population and therefore over-represented among those receiving age-related benefits. For Ireland, on the other hand, it is the impact of the economic crisis that explains the deterioration in the economic profile of taxpaying households and the resulting in negative fiscal effects. In Switzerland and Luxembourg, immigration is a quite recent phenomenon with these countries attracting numerous and highly skilled individuals, resulting in a positive effect. Overall, the most important explanatory factors for the results on the net fiscal position are employment and age. The differences between immigrants and natives with regard to the likelihood of employment - particularly among immigrant women - explain about half of the less

11 A8 refers to immigrants from Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia

12 The net positive balance was maintained during the years of the economic crisis, during which contributions from the migrant population decreased and expenditure on benefits increased.

13 This analysis does not undertake a complete accounting of the fiscal implications of immigration.

14 In addition, migrants with a high earning potential have stronger incentives to select a destination country that redistributes less income, thus maintaining a higher share of their earnings; migrants with a lower earning potential could instead select a country with a more generous welfare system.

favourable fiscal position of immigrant families than that of native families (OECD, 2013).

Bogdanov et al. (2014) analyse a specific set of benefits - pensions, health care and disability benefits - and show that EU migrants have contributed positively to public finances in Austria, Germany and the UK; in the Netherlands, the contribution of EU migrants is negative when the impact of pensions is excluded. Migrants are mostly young and concentrated in the 20-44 age group and therefore receive fewer benefits associated with age and health. Although they have higher employment rates than nationals, EU migrants receive lower wages than natives, which results in in lower level of taxes from labour. In addition, immigrants are more likely to be at risk of poverty and thus to claim more means tested-benefits.

The net fiscal effects of intra-EU migrants are positive for the years 2004-2015 and for most EEA host countries, according to Nyman and Ahlskog (2018). EU migrant households have generated a net effect of around ± €5,000 per year - about 0.5% of GDP - in 23 of the 29 countries analysed. Norway shows the most positive net balance in favour of EU migrant households, while Poland, Slovakia and Estonia show negative fiscal effects from the EU migrant population, mostly composed of a high proportion of older people.

The results of the static analyses discussed in this section are strongly dependent on the demographic unit of analysis (i.e. individuals or families), age structure, education and labour market performance of the different population groups, as well as the budget items and years analysed. The estimated impact is either positive or negative depending on the case considered but it is generally moderate. This approach has been used mainly because of its methodological simplicity, as it does not require assumptions about future demographic trends or public spending. However, the results lack a forward-looking perspective, which is increasingly required to inform public policies on fiscal issues, and which is instead incorporated in the dynamic approach described in the next section.

2.3 EVIDENCE FROM DYNAMIC MODELLING

The category of dynamic models includes a number of approaches that share the objective of capturing the life cycle impact of immigrants, projecting their contributions and the costs of public finances into the future. With this approach it is possible, for example, to evaluate the contribution of immigrants to the long-term financial sustainability of the pension system, thus increasing the adjustment capacity on the public expenditure side of national governments. These approaches, however, require relevant theoretical assumptions about the future concerning population growth and migration trends, changes in employment, public spending and the tax system.

There are three main dynamic approaches used by the empirical literature: Net Present Value Approach (NPV), Generational Accounting analysis (GA) and Dynamic Applied General Equilibrium Models (DAGEM). The NPV approach projects the evolution of the net fiscal impact of immigrants during their life in the host country. Results are sensitive to assumptions about uncertain future variables, including the amount of taxes that immigrants will pay or the tax impact of immigrants' children. The robustness of results based on different assumptions is commonly examined through alternative scenarios. One example of such studies is the report produced by the Migration Advisory Committee (2018). This report focuses on the cohort of immigrants who arrived in the UK in 2016, and with a life-cycle approach, concludes that both EEA and non-EEA immigrants should make a positive contribution to public finances in the coming decades. The net positive contribution to public finances is larger for EU13 migrants than for extra-EU migrants, and mainly related to income and age. Those of working age will have a positive net fiscal contribution, which becomes negative as they age. Those arriving as children will potentially have a negative net contribution at the beginning, which becomes positive when they start working. The report quantifies the contribution of the 515,000 immigrants who arrived in the UK in 2016 at around £26.9 billion during their lifetime.[15]

Other studies conducted in different European countries show a negative contribution from new immigrants. According to Storesletten (2003), immigration in Sweden presents a negative contribution and results are sensitive to the assimilation into the job market. With a NPV approach for France, Monso (2008) also finds a generally negative contribution of immigrants, but a positive one from younger and educated immigrants.[16]

The GA approach extends the NPV approach by considering the intertemporal distribution of public debt. The tax burden on future generations is the difference between planned public spending and tax payments of all living generations (OECD, 2013). For the application of these models, it is necessary to make assumptions about the intertemporal budget constraint of the government and

15 It is also estimated that non-EEA immigrants, with a negative tax contribution in the static analysis, will contribute around £28,000 each in the future.

16 Using the VAR technique and looking specifically at asylum seekers, d'Albis et al. (2018) provide dynamic estimates of short and medium-term fiscal effects in some European Member States. Asylum seekers do not deteriorate the fiscal balance of host countries, as the increase in public expenditure driven by asylum seekers is offset by an increase in tax revenues. When asylum seekers become permanent residents, their impact becomes positive in both the short and medium term

the tax burden between generations. Collado et al. (2004) apply this approach to examine the fiscal impact of immigration in Spain. With 1998 as the reference year, and by considering three future scenarios based on different levels of immigration,[17] for the authors the increase in the number of new immigrants would significantly reduce the fiscal pressure on future native generations. For Austria, Mayr (2005) finds a positive fiscal effect for the future, mainly due to the age composition of the immigrant population and a lower net tax revenue per capita during the retirement age. However, increased immigration and a skills-based immigration system do not guarantee the achievement of an intertemporal fiscal balance. Also for Bonin et al. (2000), immigration generates a positive fiscal effect and reduces the fiscal burden of future generations in Germany.[18] However, this effect is not sufficient to eliminate the inter-temporal fiscal imbalance resulting from the ageing of the German population.

Some studies that take into account the life cycle of immigrants in the host country confirm the finding that larger fiscal gains may result from an increase in educational levels of new immigrants. For Chojnicki (2013), the average life-cycle contribution of immigrants present in France in 2005 is negative and lower than that of natives. However, the impact of immigration on public finances is positive in the long-term, reflecting the arrival of young and working-age immigrants and the net contribution of the immigrants' offspring. The effects of this impact may increase with the expansion of future migratory flows and the level of education of immigrants. For Germany, Bonin (2017) estimates the potential economic benefits of migrant education, finding high effects of skills in both the present and the future. While a young low-skilled immigrant creates a net cost to the government of 11,000 euros, a skilled immigrant may generate a net gain of 154,000 euros, and a highly skilled immigrant creates a gain of 440,000 euros. Education plays a crucial role in promoting the integration of immigrants and shaping their contribution to public finances.

The DAGEM approach addresses the direct and indirect effects of immigration simultaneously. Unlike the other methodologies, general equilibrium models aim at addressing more comprehensively the impact of immigration on the public finances of host countries.[19] For Ekberg (2011), the expected net contribution of new immigrants in Sweden until 2050 is less than 1% of GDP. In an optimistic scenario, new immigrants have the same employment rates and income as the existing population and generate a positive contribution to public finances. In a pessimistic scenario, immigrants have worse working and income conditions than the native population generating a negative net contribution. According to this author, increasing integration and the employment rate among immigrants already residing in Sweden is essential to achieve a positive fiscal effect. Chojnicki and Ragot (2016) show that immigration has a positive impact in France, and according to a scenario without immigration, the need to finance social welfare would increase by one point of GDP by mid-century. The benefits of immigration are linked to their age distribution, on average younger than the French population. With a cross-country analysis, Berger et al. (2016) conclude that the contribution of future immigration varies from country to country and depends largely on the volume of immigration and the institutional set-up.[20]

Empirical evidence using dynamic methodologies for the analysis of immigrants' entire lives shows mixed results. The results are generally influenced by the concentration of new immigrants of working age and by characteristics such as age, skills, qualifications and therefore their contribution to the coffers of the State. The results from alternative scenarios for the future - commonly defined on the basis of the volume of migration flows and their competences - have revealed that some selective migration policies have been effective in reducing a certain tax burden in the short term, but may not be sufficient to fully counteract it in the long run.

A general message of this literature is that, while the link between the percentage of migrants in total population and the fiscal impact is not clear, the demographic and socioeconomic profile of migrants has a strong influence on this effect in the host country. In particular, the age structure of the migrant population is a key factor in understanding this effect (Chojnicki, 2013; Martinsen and Pons Rotger, 2017). As evidenced in the previous section through Eurostat data, immigrants are on average younger than natives and are more concentrated in the working age groups, often resulting as net contributors to the public purse. On the other hand, extra-EU migrants show on average lower employment rates than natives, while EU migrants have higher rates, leading to a negative impact on net fiscal contributions generated by extra-EU migrants and a positive one for intra-EU migrants. Also, immigrants tend to have more children (Dustmann and Frattini, 2014)[21]

17 The reference scenario assumes a net immigration of 30,000 people per year, similar to the rates observed in Spain. The second scenario assumes a future net immigration of zero, while the third scenario considers a net immigration of 100,000 people per year.

18 The positive fiscal contribution of immigration is significantly reduced if the assimilation of future immigrants is low.

19 The dynamic methodologies described before are partial equilibrium analyses as they do not take into account the indirect impact of immigration on factors such as wages, savings and consumption.

20 Estimates show a positive contribution of future immigration equivalent to 2.1% labour income tax in the UK, 5.7 points in Austria and 7.3 points in Germany in 2060.

21 Immigrants have more children because of their age and because they come from countries with higher fertility rates than those in European countries. Fertility in most European countries is currently below the replacement level.

and they tend to be poorer than natives, and therefore more likely to claim means tested-benefits (Bogdanov et al., 2014). Finally, we should take into account that migrants bring with them their human capital while the host country did not face their training and education cost. The fiscal effect of immigration and natives also evolves throughout the life cycle. Generally speaking, individuals tend to have a negative net fiscal balance when young or old, while their net contribution is high during their working life. Compared to the natives, the fiscal effect of immigrants follows a different pattern throughout their lives, often becoming positive later and negative earlier, and generally remaining at a lower level. The net fiscal effect is also linked to immigrants' performance in the job market, which in turn is linked to the age, skills and economic conditions (Bratsberg et al., 2014; Ruist, 2014; Chojnicki et al., 2018). Unskilled migrants are more likely than natives or skilled migrants to lose their jobs during an economic crisis. Family members and those who come as asylum seekers may not work and tend to claim more benefits (Bratsberg et al., 2014). Finally, in relation to the country of origin, migrants from developing countries are more likely to ask for benefits than immigrants from richer countries, thus showing different impacts on public finances of the host country (Bratsberg et al., 2014).

TABLE 1. SUMMARY OF RESULTS

Source	Country	Results
Static Approach – Country Analysis		
Bratsberg et al. (2014)	Norway	Higher welfare dependency rates for immigrants compared to natives during their life cycle and for the period 1970-2014
Chojnicki (2013)	France	Static analysis: positive impact for 2005; age of migrants is an important explanatory variable. Dynamic analysis: immigration impact on public finances is positive in the long term
Chojnicki et al. (2018)	France	Low and negative net contribution of immigrants. Important role of age and education
Dustmann et al. (2010)	UK	Fiscal position of A8 immigrants assessed as very positive as compared to natives
Dustmann and Frattini (2014)	UK	Immigrants from EEA countries have contributed positively to the UK's public finances. The net fiscal impact of non-EEA immigrants has been negative. Recent immigrants have made a positive tax contribution
Martinsen & Rotger (2017)	Denmark	Net positive contribution to the welfare state by EU immigrants. Age distribution is the key factor
Ruist (2014)	Sweden	Migrants from Bulgaria and Romania make a positive contribution of around €3,000 per person and year
Static Approach – Cross-Country Analysis		
Bogdanov et al. (2014)	Austria, Germany, UK, the Netherlands	Positive contribution from EU migrants. Demographic profile of migrants and employment status main explanatory variables
Nyman and Ahlskog (2018)	EEA countries	The net fiscal effects of EU migrants are positive for the years 2004-2015 for most countries
OECD (2013)	OECD	Mixed results for OECD countries and for the years 2007-2009; net fiscal position is generally small in terms of GDP; employment and age are the most important explanatory variables
Dynamic Approach – Country Analysis		
Bonin (2017)	Germany	Education and skills are key factors. The contribution to public finances increases as the education of the immigrant increases
Bonin et al. (2000),	Germany	Immigration generates a positive effect and reduces the fiscal burden on future generations
Chojnicki and Ragot (2016)	France	Positive impact. Under the zero immigration scenario, the need to finance social welfare would increase by one point of GDP by mid-century
Collado et al. 2004	Spain	Positive impact and immigration is a significant factor improving fiscal position of Spain

Ekber (2011)	Sweden	Net contribution until 2050 is less than 1% of GDP. Positive contribution under optimistic scenario. Employment and integration are main explanatory variables
MAC (2018)	UK	EEA and non-EEA immigrants may contribute positively to public finances. This effect is correlated to earnings and age
Mayr (2005)	Austria	Positive fiscal effect in the future. Favourable age composition is an important explanatory factor
Monso (2008)	France	General negative contribution of immigrants. Younger and educated immigrants may generate a positive contribution
Storesletten (2003)	Sweden	Negative contribution of immigration. Results are sensitive to the assimilation of immigrants into the job market.
Dynamic Approach – Cross-Country Analysis		
Berger et al. (2016)	Cross-country analysis	Contribution of future immigration varies from country to country. It depends on the volume of immigration and the institutional set-up

3. MICROSIMULATION MODELLING

3.1 DATA AND METHODOLOGY

3.1.1 EUROMOD

We evaluate the fiscal impact of migration using EUROMOD, the tax-benefit microsimulation model for the European Union (Sutherland, 2007). EUROMOD simulates individual and household tax liabilities and benefit entitlements based on the policy rules in place in each EU member state (Sutherland and Figari, 2013). EUROMOD is a unique tool for comparative research on the effects of taxes and benefits at 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 member state and for the EU as a whole. The data source used in EUROMOD is individual micro-data based on EU-SILC.

The advantage of EUROMOD is that it allows to assess policy changes over time, for example to show the extent to which changes in policies limiting the requisites for benefit entitlement only to natives or to Intra-EU immigrants contribute to reducing the net fiscal effects of extra-EU migrants but at the same time increasing income inequality and poverty. Additionally, EUROMOD allows to aggregate benefits in a harmonized way across all EU countries. Baseline systems in EUROMOD are micro validated, which means the results of the simulations are close to the observed individual and household information of the EU-SILC. Additionally, the baseline systems of EUROMOD are macro-validated based on information from external sources on expenditures and the number of benefit recipients.

For the purpose of this research, EUROMOD 2015 tax-benefit systems (data from EU-SILC, 2015) have been adapted by adding additional available resources in terms of data and policies for migrants who reside in the EU area to improve the analysis of the fiscal cost of migrants. For example, EUROMOD input data lacks information on the year of immigration in the country which is necessary for calculating the duration of stay in one country, an important indicator of the integration of newcomers. Therefore, we merge the EUROMOD input data with the original EU-SILC data to recover this key information for the purpose of the study.[22] Additionally, the foreign population is underrepresented in EU-SILC data and therefore a reweighting of observations is needed to make the data consistent with each country's underlying population. Most important, the coding of some policies is further modified in EUROMOD to account for the fact that some benefits are conditional on permanent residence or a minimum amount of years spent in the country.[23]

The simulation of mean-tested and non-mean tested benefits in EUROMOD for foreigners is developed by complementing existing country-specific policies with additional conditionality assumptions on benefit entitlements. These additional conditionality assumptions consist in the legal requirements related to the years of residence in the EU hosting country, more specifically "the year of immigration in the country". This variable is needed for the assessment of the relevant income period for some policy simulation in EUROMOD, such as unemployment or old age pensions that require a period spent in the country before becoming eligible for the benefit. Furthermore, using the information on arrival year in the country, we assume that a migrant is entitled to one or more benefits depending on their length of stay in the country.

One of the main non-mean tested benefits is the unemployment benefit, which in most of the countries can be claimed only if someone has worked longer than a minimum mandated period: if the years of stay in the country is lower than the legal threshold required to claim the benefit we assume no claim on the benefit. One example might help clarify our procedure. Let us consider the change in the coding of unemployment benefit in one EU country. In Italy, for example, eligible individuals for ordinary unemployment benefits are employees who

22 The match between EUROMOD input data and UDB-SILC data is exact for most countries by using personal and household IDs. However, for eleven out of the 28 EU countries, this matching procedure does not work as household and individual IDs are not the same in the two surveys. Therefore, we perform the match based on age, gender and sampling weights for Austria, Bulgaria, Denmark, Finland, Germany, Hungary, Italy, Latvia, Portugal, Slovak Republic and Spain.

23 In case there is no clear evidence on which household member is taking up a benefit, the benefit is assigned to the household head. On average, this leads to an underestimation (overestimation) of net fiscal effects for men (women).

have paid (i) contribution against unemployment for at least two years or (ii) 52 weeks of contribution in the two-year period before the date of work suspension. We reflect this eligibility condition in EUROMOD by allowing only immigrants who on top of being eligible for ordinary unemployment benefits, are living in Italy for more than two years to claim this unemployment benefit.

In addition, there might be other types of non-mean tested benefits that cannot be given to immigrants. For example, child benefit for Student Parent in Denmark that is given to parents in tertiary education. Extra-EU immigrants are not eligible for this benefit and this eligibility condition is reflected in EUROMOD for Denmark.
On the other hand, there is a substantial variety of mean-tested benefits policies that need modifications for incorporating a specific migrant component in EUROMOD. One of them is represented by family benefits. For example, for receiving the family bonus in Vienna, the parents have to live in the same house with the child. Furthermore, at least one parent has to be Austrian citizen and at the time of the birth needs to have his principal residence in Vienna for at least 1 year. Parents without Austrian citizenship need to have their principal residence in Vienna for at least 3 years. EEA-citizens are equated to Austrian citizens.

Another example of mean-tested benefit is the new born bonus in Italy. The bonus corresponds to 80 Euro per month for a maximum of three years given to "children of Italian citizens or of a Member State of the European Union and non-EU citizens with residence permits" per each child born before December 2015. It is subject to a means-test verified by using the ISEE (Indicator of Equivalent Economic Situation) which cannot be higher than 25.000 euro per year. If the ISEE is below 7.000 euro per year, the amount of the bonus is 160 euro per month. As we cannot observe in the data whether an immigrant holds a residence permit, we assume that immigrants who entered in Italy in the last five years are eligible for this child-related benefit.

The simulation of benefits in EUROMOD is needed to estimate the intended effects of tax-benefit system and to correct for the misreporting of benefits, in particular in the bottom of the distribution (Figari et al., 2012). Take up rates are not modified in the model. Importantly, due to the lack of information on eligibility requirements, not all benefits are simulated in EUROMOD. For example, contributory benefits are taken from the data due to lack of pertinent information needed to simulate them.

3.2 IMPUTATION OF IN-KIND BENEFITS AND INDIRECT TAXES

Similarly to standard micro-simulation models, we use EUROMOD for simulating direct taxes and cash benefits. Yet, two important components of taxes and social benefits, namely in-kind benefits and consumption taxes, are missing in the standard EUROMOD model which need to be considered.

First, a good part of income redistribution occurs through in-kind benefits that represent a fiscal cost for the public purse. The largest share of public in-kind transfers in OECD countries is related to health care, followed by education, childcare, housing and active labour market policies. According to the OECD Health Statistics 2019, on average, OECD countries spent 8.8% of their GDP on health in 2018. Second, consumption taxes are a substantial component in the country tax system. As shown by OECD statistics for 2018, the total share of government revenue raised via consumption is about one third, which is much higher than the direct income tax (Decoster et al., 2010). Despite the importance attached to in-kind benefits and indirect taxes, these components of tax-transfer system are not simulated in EUROMOD due to the lack of direct information on expenditures and non-cash income in the underlying EU-SILC data. However, to have a broad picture of the fiscal effects of immigration, a full comprehension of the welfare system is needed. Therefore, we separately calculate indirect taxes and in-kind benefits and further merge them with the EUROMOD output data. The approach is similar to the one followed by Figari and Paulus (2015) where the three "I" - indirect taxes, imputed rent and in-kind benefits – were used to extend the standard disposable income.

3.2.1 IMPUTATION OF IN-KIND BENEFITS

Below, we describe the imputed in-kind benefits and the method of imputation. In-kind benefits are non-cash benefits (such as the cost for health care covered by the state). We calculated those benefits based on EUROSTAT aggregate statistics on expenditures on health, education and social housing and then apportioned based on observed information. We identify recipients of in-kind benefits related to social housing (at household level) and education (at individual level) in the micro-data.

For in-kind health benefits, we assign them according to age groups in the micro data based on the OECD statistics on the distribution of total cost for public health care. Nevertheless, this imputation method does not account for the potential difference in use between natives and intra-EU migrants and extra-EU migrants. In fact, there is a wide range of literature dedicated to "health immigrant effect" from a time path perspective.[24] It says that the health of immigrants is substantially better than that of

24 See Jasso et al. (2004), Antecol and Bedard (2006) for studies in the US and Donovan et al. (1992), Chiswick et al. (2008), and Powles (1990) for studies in Australia.

comparable natives just at arrival at the host country but deteriorates with the duration of migration. The "healthy immigrant effect" is attributed to a number of factors. For example, healthier people are more likely to immigrate. On top of that, an important factor may be the underutilization of health care services by immigrants. There are studies showing that migrants are often unaware of the health care opportunities at their disposal and due to language barriers might miss appropriate information on health care in the hosting country. Migrants are also more likely to mistrust the medical system due to cultural and economic barriers or discrimination reasons.[25] While the "healthy immigrant effect" might lead us to overstating the in-kind benefit in the form of health assistance that migrants receive in the hosting country, it has to be noted that the sorting of immigrants into more dangerous occupations will bias our imputation in the other direction. Taken together, we believe that the first effect dominates and our imputation overstated the health benefits that migrants enjoy.

In this study, we include three types of in-kind benefits: 1) health related benefits, 2) education related benefits and 3) social housing benefits.

1) **Health related benefits** are calculated based on EUROSTAT information on general government expenditure in 2014. Such expenditures include medical products, appliances and equipment (01), outpatient services (02), hospital services (03), public health services (04), R&D in Health (05), Health for non-specified categories (06). The average per capita expenditure on health are apportioned by age groups based on the OECD statistics on the distribution of total cost for public health care by age class for the Netherlands in year 2011 (OECD, 2017).[26] Our assumption is that this is representative of distribution of health care expenditure across the EU countries by age classes, and that this distribution does not change over time. These assumptions are strong, but this is the only information available on general health costs by age classes in the EU area.

2) **Education related benefits** are calculated based on EUROSTAT statistics on the total public expenditure on education per full-time equivalent student by education level and type of program (EUROSTAT database), which is available for most EU countries for year 2014. The total education expenditures are apportioned based on the observed information on the current education level in the micro data and are then assigned to the person in education. For some countries (Czech Republic, France, Ireland), the dataset for 2013 is used (as the 2014 dataset is missing), and updated to 2014 equivalent by using the country-specific consumer price index, assuming no expenditure change in real terms. For countries with missing information (such as Croatia for all levels of education and Denmark for primary and secondary education), other available sources are used[27] and per capita expenditure are computed as the ratio between total expenditures over the number of students/pupils by educational level. For countries without any information on education expenditure, such as Croatia and Greece, we calculate the per capita expenditure as a weighted average of similar countries normalized by per capita GDP. For example, for Greece, the average of education expenditures of three southern European countries (Italy, Spain and Portugal) is used to proxy the per capita educational expenditure while for Croatia, the information on Romania, Bulgaria and Slovenia is considered.

3) **Social housing benefits** are calculated based on COFOG database on the total amount spent by public authorities or public institutions for housing and community amenities, which include housing development, community development, water supply, street lighting, R&D housing and communities amenities. We then use SILC-provided information regarding the tenure status of households to obtain an estimate of the number of individuals living in social housing, which is used to compute an estimate of the average cost of social housing in each EU country. Again, the in-kind benefits for social housing are further assigned to the household head.
It is important to note that because of the lack of reliable information in the EU-SILC data, we don't impute in-kind benefits related to child-care and elderly care or public transportation although many EU countries spend relatively large amounts on the public provision and subsidization of these goods (Kleven, 2014).

3.2.2 MODELLING OF INDIRECT TAXES

To account for indirect taxation, we include information on household expenditures from the HBS (Household Budget Survey) from 2010 (latest available data). The HBS data set contains detailed information on household expenditures for several EU countries. The HBS is a sample survey where the statistical units of interest are private households. It is carried out regularly under the responsibility of the National Statistical Offices (NSIs) in each EU Member State. The countries provide information about household final consumption expenditure on goods and services with considerable detail in the categories used, plus information on income and some additional demographic and socio-economic characteristics. One should note that there is a great freedom for each Member State to decide on the objectives, methodology, programming

25 For a review of factors driving the health deterioration see Neuman (2014) and Constant et al. (2014)

26 https://stats.oecd.org/index.aspx?queryid=30117

27 EUROSTAT educ-uoe-enra02 database, namely Pupils and students enrolled by education level, sex and age, and EUROSTAT educ-uoe-fine02 database, namely Public educational expenditure by education level, programme orientation, type of source and expenditure category

and resource allocation for their respective HBS.[28] The value-added tax (VAT) is a consumption tax that aims to tax the sale of goods and services to the final consumer along the whole supply chain. It is defined as a percent of the purchase price, including potential other taxes or excises. Theoretically, the tax burden is borne by the end consumer but there are several reasons, why businesses sometimes bear some of it. For example, some services are exempted from VAT, which means that the service provider cannot recover the VAT paid on the inputs needed to provide exempted services (e.g. health care). Additionally, businesses are restricted to deduct certain inputs (e.g. corporate gifts or inputs not used for business activity). Consistently with the literature and for simplicity, we assume that the end consumer (the households) are bearing the whole VAT burden.[29]

In most countries, goods can be taxed at the standard rate, the reduced rates, the zero VAT-rate or can be VAT-exempted. We take information on the types of goods that are taxed together with their rate in each MS from the 'Worldwide VAT, GST and Sales Tax Guide 2015' of Earnest and Young that reports detailed information on indirect taxes around the world. This guide summarizes the value-added tax, goods and services tax and sales tax systems in 122 jurisdictions. We use for our simulations the information on tax laws for 2015. Our result should be interpreted as a rough approximation for the VAT tax burden, keeping in mind that the information on detailed consumption of goods and services, as well as information on the taxation of certain goods and services, are not complete.

The general framework for the VAT systems of the EU member states is based on the EU VAT Directive, which obliges member states to have a VAT rate of at least 15 percent standard rate and allows for reduced rates for certain categories of goods and services. Member states have therefore a wide flexibility in setting the VAT rates, leading to substantial differences in the national VAT systems. Most of the consumption in the EU countries is taxed by a standard value added tax rate. This standard VAT rate varies substantially across EU countries in 2015, from 17 percent in Luxembourg to 27 percent in Hungary. Additionally, on certain products, a reduced VAT rate applies. For example, food is taxed at a reduced rate. Some countries have even more than one reduced VAT rate. Luxembourg and France had in total four different VAT rates in 2015. Additionally, to those rates, many countries have exempted some goods and services from VAT. Typically, this are financial services, health services and education.

Additional taxes, so called excises, are typically added on some goods, such as alcohol, gasoline, diesel, oil or cigarettes. In our model, we focus purely on the value-added taxes, leaving excises out of the model. This is mainly due to the fact, that excises are often based on the amount rather than on the price of a certain good (such as tobacco). In our data, we can only observe the expenditures related to the goods. Therefore calculating the excises in a proper way is not possible.

In general, the value-added taxes on products vary substantial across the member states, as Table 1 in Annex 1 depicts. Also the group of goods and services are taxed on a reduced rate or that are exempted from VAT differs substantially between countries. Quite detailed information on the consumption behaviour is needed to estimate the VAT paid by households. Even though the HBS data is quite detailed, there are some limitations in identifying the expenses that are taxed on a reduced rate or exempted from VAT. We try to cover those categories as good as possible, but obviously there are some limitations in our approach that might lead to slight over or under-estimation in the VAT.

Based on HBS data, indirect taxes are simulated for all European countries and covers all the applicable VAT rates - the standard VAT rates and the main reduced rates for the year 2015. Excises (applicable to goods consumed by households) are not included in the analysis. The calculations of the VAT covers the standard rate, the reduced rates, the zero VAT rate and the VAT exempted goods. Since we assume full pass through of indirect taxes on to the consumer, the model does not distinguish between a zero rate and VAT exemption.

In a first step, we analyse consumption patterns of natives and migrants. The HBS, similar to the EU-SILC data set, contains information on citizenship as well as country of birth, split in three groups: National, Non-National but EU-National, Non-National and Non-EU-National for most of the countries. For consistency, we again define migrants by country of birth. By simulating the indirect taxation, we can see not only that migrants and natives show different consumption patterns, but also different indirect tax burden. On the one hand, migrants tend to save more, therefore consuming less and paying less VAT. On the other hand, migrants have often lower incomes and those groups typically bear a higher share of indirect taxes. Therefore it is important to distinguish between migrant and native households, when implementing the indirect taxation in our data set.

We assume that the VAT burden of the household is split according to the individual income share of the household. Therefore, we are able to calculate the individual VAT

28 Note, that for some countries information on country of birth and citizenship is missing in the HBS, namely in Greece, Finland, Italy, Lithuania, Latvia, Romania, Slovenia and the UK. For Germany and Spain, we have to use the information of citizenship instead

29 Even though this is a standard assumption in indirect tax modelling, it is a strong assumption. See e.g. Abramovsky et al. (2011) for a discussion on the pass-through

burden. By using simple regression methods, we estimate the VAT burden of households, depending on the overall income of the household, as well as on socio-demographic characteristics, such as migration status, household type, number of children and so on.[30] We use the estimated parameters, to impute the VAT burden of household in the EU-SILC data.[31] There are different methods to impute the VAT burden in the EU-SILC data , but since the main interest in this research falls on the average VAT burden by age groups and immigration status, we argue that implementing VAT rates in this way is the most convenient. In the literature, VAT rates are often implemented on an aggregated level by income deciles (see e.g. Dustmann and Frattini, 2014). The method used in this research has an advantage over standard approaches as we don't lose in heterogeneity and maintain the micro-level structure. This allows distinguishing between different expenditure and saving behaviour between migrants and natives.

We face several data issues when imputing the VAT behaviour from the HBS in EU-SILC. First, countries like Austria and the Netherlands are not included in the HBS 2010 wave. Therefore, the imputation of VAT is done based on other data sources or imputation methods. For example, for Austria we use the national HBS of Statistics Austria for 2009/2010 and the Indirect Tax Tool of the Commission to calculate VAT taxes for all households. On the other hand, for Netherlands, we follow the approach used by Dustmann and Frattini (2014) using information on effective VAT rates by income quintile (Bettendorf and Cnossen, 2014) to impute the VAT tax burden of households. Both these imputations do not permit to distinguish between migrant and native consumption patterns, as no information is available on the country of origin. Second, for Italy, information on income are missing in the HBS. Therefore, we impute the VAT assuming a constant saving rate of 10.52 as reported by EUROSTAT for the year 2015. Lastly, due to problems with the income data in the HBS for Luxembourg, Luxembourg is not considered in this research.

3.2.3 SIMULATION OF CASH BENEFITS AND DIRECT TAXES USING EUROMOD

Tax and benefit systems differ substantially across EU member states. Nevertheless, EUROMOD allows aggregating all the benefits and taxes in each country in a comprehensive way. By taking advantage of this aggregation feature of EUROMOD (see a detailed description in Annex 1) we aggregate the calculated outcome variables into several categories according to the nature of the variables themselves.

On government expenditures side, we have information about the following cash benefits received by every individual in the survey (EU-SILC):

- family and child benefits, which include child care and child education, family, maternity and parental leave benefits;
- health and health related benefits and pensions, which include accident, receiving care, caring, disability and health benefits, disability and health pensions;
- housing benefits and pensions, which include housing, heating and municipality benefits;
- old age and age related benefits and pensions, which include old age, survivors and early retirement benefits, civil servant, minimum, old age, survivors and early retirement pensions;
- work related benefits, which include unemployment and work related benefits;
- social assistance benefits and pensions, which include social assistance and military benefits;

In terms of direct benefits received, we therefore aggregate the benefits to the following categories:

- **"BENEFITS: unemployment"**: Covers all unemployment benefits (contributory, as well as non-contributory) as well as work-related benefits.
- **"BENEFITS: pension"**: Covers all pension benefits (survivor pensions, old-age pensions)
- **"BENEFITS: rest"**: Covers all the additional benefits, such as family benefits, health benefits, housing benefits and social assistance benefits

On the government revenue side, we have information on income and other type of taxes as well as on social security contributions. We aggregate them as follows:

- **"TAXES: on income"**: Covers all taxes on income (labour income, capital income, property income and other specific taxes such as church, health, municipal, pension insurance, wealth and early retirement tax) that are simulated in EUROMOD.
- **"TAXES: social insurance contributions"**: Covers all social security contributions paid by the employer, the employee and the self-employed.

To calculate the final net contribution of individuals we subtract the sum of all benefits received from the individual from the contributions (income taxes and social insurance contributions) made:

- "NET Contributions (contributions - benefits)": Covers all individual contributions net of benefits received.

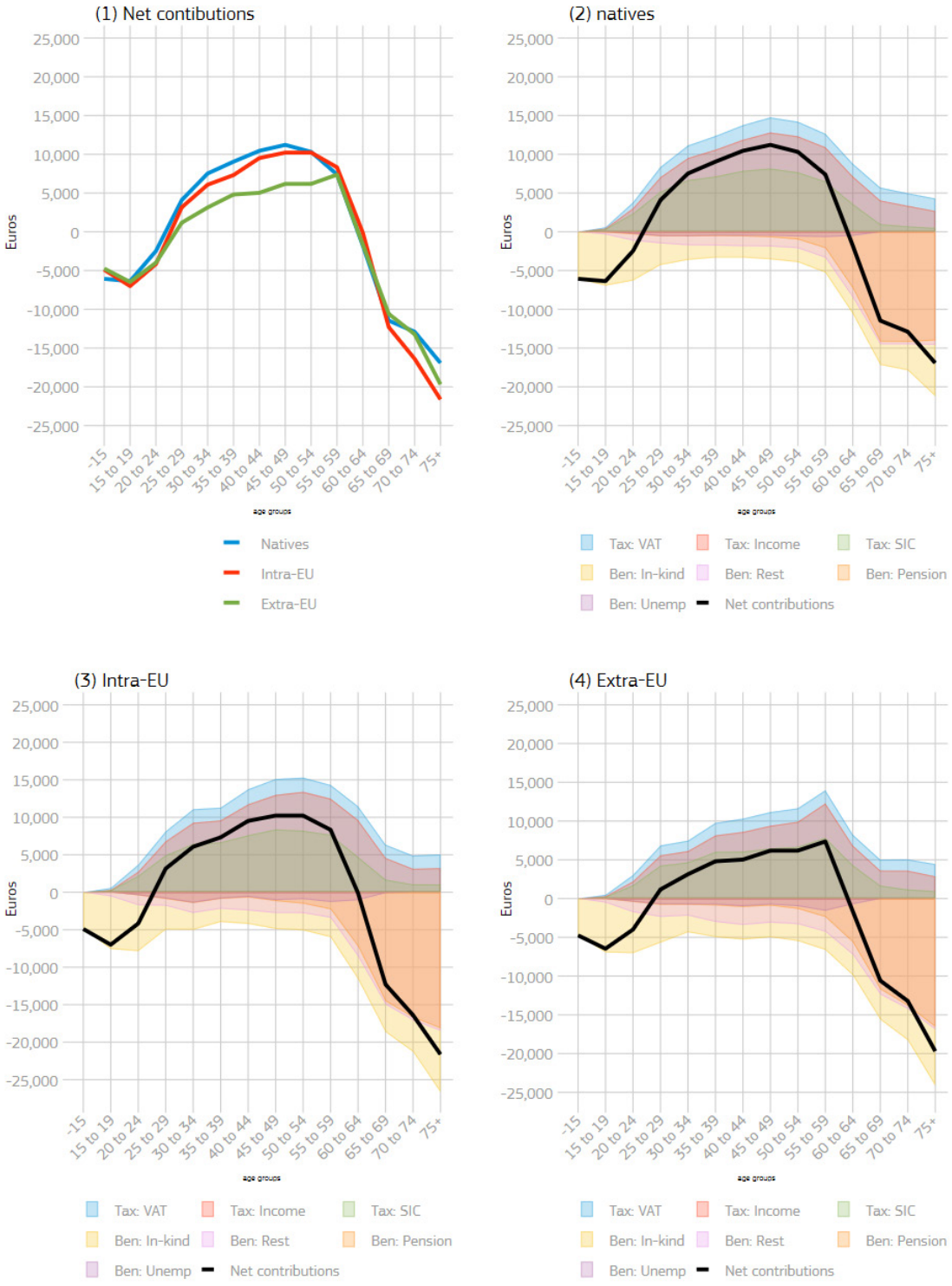
30 Age is not included among the explanatory variables because appears to be collinear with other variables such as activity status. In fact, the age group 30-60 is captured by activity/inactivity dummy variable, while the age group older than 60 by retirement dummy

31 See, among others, De Agostini et al. (2017), who use an Engle's curve approach, but also other methods are discussed in the literature

3.3 DESCRIPTIVE STATISTICS

In this section, we describe the evolution of net fiscal contributions and tax benefit components by cohorts, gender and education level, separately for natives, extra-EU migrants and intra-EU migrants, at EU level.[32] Figure 2 shows a large variation across cohorts as well as between natives and migrants in terms of net fiscal contributions. Overall, the net fiscal effects are positive and monotonically increasing until a certain age and they become negative and decreasing thereafter. The positive peak in net contributions is reached faster for natives compared to

FIGURE 2. NET FISCAL EFFECT BY ITS MAIN COMPONENTS AND MIGRATION STATUS EU-27 – TOTAL POPULATION
SOURCE: JRC OWN CALCULATIONS BASED ON EUROMOD.



32 Luxembourg is excluded because of lack of information on migration status

migrants and it coincides with their retirement age. Overall, for most of working life, per capita contributions of natives are higher than those of intra-EU migrants. Even more so than for the non-EU born migrants. This reflects earnings' differences between Natives and migrants, which, in turn, is related to differences in their labour market participation and differences in wages. Nevertheless, it is important to note that around the age of fifty, per capita contributions of intra-EU migrants exceed those of natives.

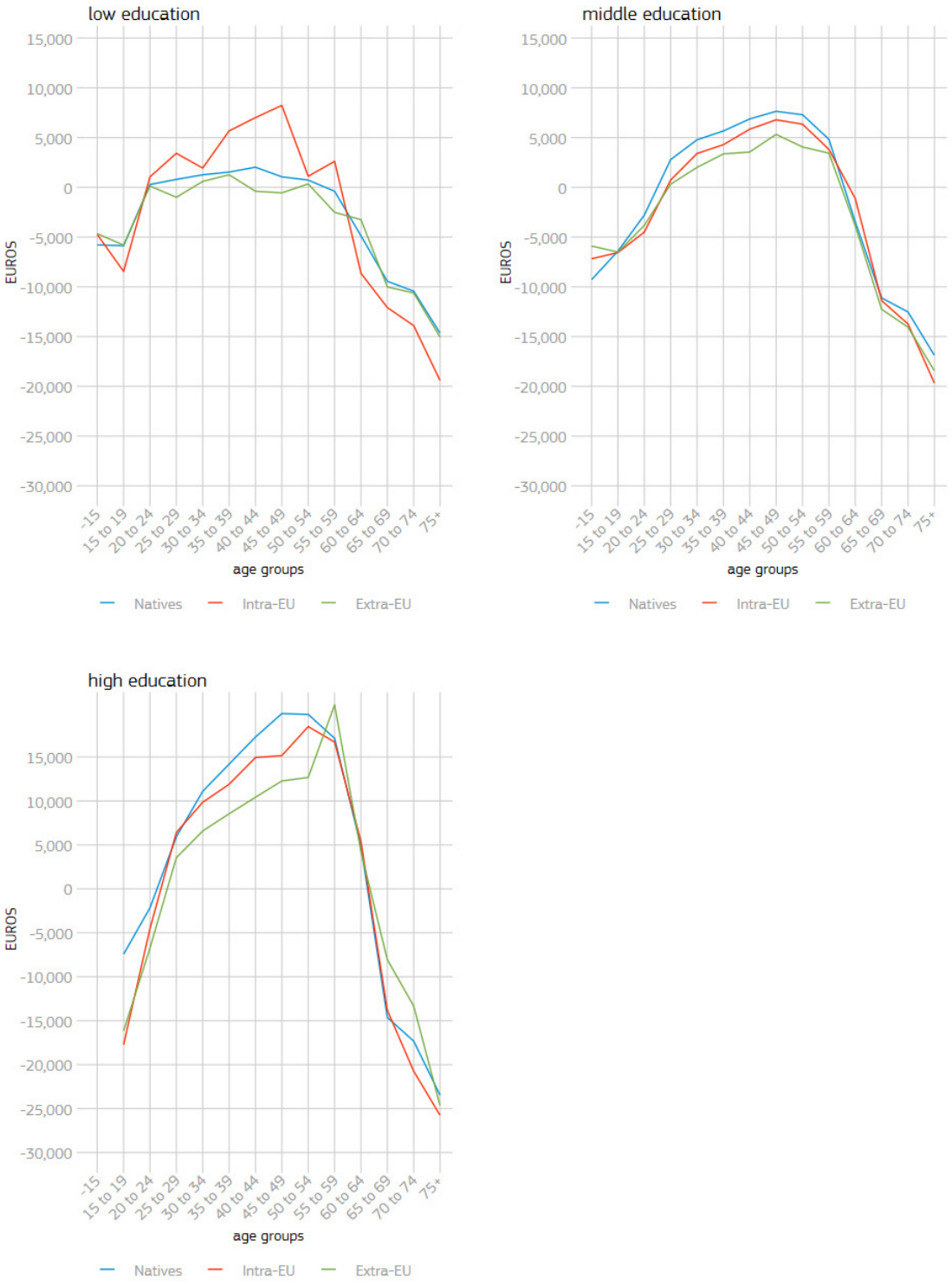
Decomposing the net fiscal effect by its main components as shown in Figure 2 reveals that expenditures for pensions and other old-age related benefits account for a very high share of social expenditures. Conversely, social security contributions account for the highest share of fiscal contributions, followed by taxes on income, and taxes on consumption. When comparing natives with non-EU born migrants, three noticeable facts emerge: 1) natives contribute more than non-EU born migrants in income taxes; 2) pensions amounts are higher for natives than non-EU born migrants; 3) social transfer are higher for non-EU born migrants than natives. The first and second fact can be readily explained with natives' higher current wages and past social security contributions respectively. The third fact is mostly explained by differences in socio-demographic characteristics, such as family composition, number of children, number of people employed within a family and so on.

Gender differences seem to be also important for shaping net fiscal effects. Figure 3 shows how men contribute more than women in public finance and similarly receive more in pensions. This is to be expected once considering gender pay and participation gap present in most EU countries. Non-EU born migrant women contribute less than the rest of women, due to their low participation rate in labour market, but, at the same time, they take back less in pension entitlements.

Lastly, we look at the differences by education level. As indicated by Figure 4, there are no striking differences in net fiscal effects between highly educated migrants and natives. In fact, the shape of the net fiscal contributions is very similar. The picture looks very different for low educated population: natives and non-EU born migrants behave very similarly while Intra-EU migrants do not. Indeed, Intra-EU migrants contribute significantly more than the rest of population and as a result receive more in pensions.

FIGURE 3. NET FISCAL EFFECT BY GENDER AND MIGRATION STATUS, EU-27 (WITHOUT LU)
SOURCE: JRC OWN CALCULATIONS BASED ON EUROMOD.

FIGURE 4. NET FISCAL EFFECT BY EDUCATION AND MIGRATION STATUS, EU-27 (WITHOUT LU)
SOURCE: JRC OWN CALCULATIONS BASED ON EUROMOD.



3.4 ESTIMATING LIFE-CYCLE CONTRIBUTIONS

The goal of our research is to feed a demographic model with parameters capturing net fiscal effect differences as derived from the micro data (described in the previous chapter). To estimate the parameters on fiscal impact over the life cycles, we run simple regressions that explain the net contributions for the three sub-groups - natives, intra-EU migrants and extra-EU migrants - in separate models. We additionally estimate separate regression models for the working age and the old-age population sub-samples. The predictions of those models allows us to account for differences in net fiscal contributions between the three categories considered.

In a first step, we estimate at the country level the net fiscal contributions in the working age population, depending on the specific age group (five-year groups), the labour market status (employed, unemployed or inactive), the education level[33] (low, middle or high educated), gender as well as the interaction between gender and age groups. The interaction term allows for different age patterns by gender, which we detected in the micro data. Additionally, for the regressions run on intra-EU migrants and extra-EU migrants, the duration of stay (in five year groups) is included as an explanatory variable, since longer duration of stay might reflect a better integration and impact the net fiscal contributions. The information on labour-market status is not used when estimating old-age net fiscal contributions (65 years and older).

While for most countries we have sufficient observations on both intra-EU migrants and extra-EU migrants, for many Eastern European and Baltic countries,[34] we do not. Nevertheless, we assume that they share certain similarities, such as low immigration flows, and run a joint regression model for those countries but accounting for country specific differences captured by country dummies. In other words, we assume similar age/net-contribution profiles in those countries, but allow them to be higher or lower, depending on the country. The estimated coefficients are used to feed the demographic model.

For some countries, such as Malta and Latvia, we do not have sufficient information for Intra-EU migrants and extra-EU migrants. Therefore, we only distinguish between Natives and Migrants in those countries. Similarly, for Germany, EUROMOD does not distinguish between intra-EU migrants and extra-EU migrants. Since Germany is an important country regarding both intra-EU migrants and extra-EU migrants, we use a probabilistic approach based on the LFS 2018 where this information is collected. To be more specific, we estimate the probability of being an EU mobile citizen in the LFS based on certain characteristics of migrants such as education, number of children, duration of stay, age, education. Next, we use these estimated probabilities[35] to split non-natives in the original SILC data into intra-EU migrants and extra-EU migrants, in such a way that immigrants with highest probability of being an EU mobile citizen based on their socio-demographic characteristics are considered as EU mobile. It is important to note that this is a probabilistic assignment and therefore the estimates for Germany should be interpreted with caution.

The estimated coefficients of the regressions show that women contribute less than men during working age, but also receive less in the old age in most countries, due to lower wages, more part-time work arrangements, child care responsibilities and other factors. This also leads to lower benefit entitlements (e.g. pensions) in the old age. As expected, the lower is the educational level, the lower are the contributions during working age, which is mainly driven by lower wages and scarcer job opportunities. Not surprisingly, being unemployed or inactive leads to a strong reduction in net contributions, compared to employed individuals. This effect is even stronger for unemployed, because they receive higher benefits than inactive people do. The impact of duration of stay on net fiscal contributions depends highly on the country and may reflect differences in migration patterns and the level of integration across the European states. We report the prediction for each country regression model in the country fiches in Annex 2.

To assess the external validity of our approach, we compare the estimated net fiscal impact (natives, Intra-EU migrants and extra-EU migrants) based on our micro data to the European National Transfer Accounts (NTA) 2010.[36] The NTA approach measures net contributions in a slightly different way. Net contributions, called net public transfers in the NTA framework, are defined as the difference between public transfer inflows and outflows. Inflows of the public sector (from a household perspective) include both, in-kind transfers and cash transfers. Public transfer inflows in kind consist of individual public consumption (e.g. public health care) as well as collective consumption expenditure. Cash transfer are benefits received from the state. Public transfer outflows measure the flows of economic resources from the private sectors to the public sector. They include taxes (on asset income, labour income and consumption), social contributions and other revenues paid by the private sector to the government.

There are two main reasons why our approach

33 The education levels are defined by the corresponding ISCED-levels (low: ISCED 1+2, middle: ISCED 3+4, high: ISCED 5+6).

34 We pool Bulgaria, Czechia, Estonia, Hungary, Lithuania, Poland, Slovakia, Slovenia and Romania, together.

35 We add also a random error term that follows the distribution of the residuals in the original estimation, to increase heterogeneity in the results.

36 See Istenic et al. (2016).

and the NTA approach can lead to different results:

- We are using data based on EU-SILC, 2015, while the NTA approach is based on 2010 data. Wage growth, changes in the population structure, as well as policy changes in this period can significantly affect the revenues related to both benefit and contribution side in our model. Additionally, inflation should potentially lead to higher monetary values in general.
- Our approach covers only in-kind benefits for health, education and housing, while the NTA approach is able to cover all in-kind benefits. This implies that net-fiscal impacts might be overestimated in our approach. Furthermore, we apportion in-kind benefits on education to children while the NTA to parents.

Therefore, the validity of our approach versus the NTA approach should be assessed by keeping in mind these caveats as well as those differences in methods and data used. Nonetheless, as the figures in the country fiches (see Annex 2) show, our model predictions are fairly close to the results obtained by the NTA approach. For all countries, the life-cycle perspective of natives has the same shape as the one suggested for the whole population by the NTA. Nevertheless, and in line with our expectations, we can typically see an upward-shift of the curve, due to the reasons mentioned above.

4. DEMOGRAPHIC MICROSIMULATION

We use CEPAM-Mic to project both the cross-sectional (population-based) and the life course (cohort-based) estimates of future net fiscal contributions in the EU countries.[37] This microsimulation model, developed by Bélanger et al. (2019), is designed to provide prospective 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, CEPAM-Mic includes information on education, labour force participation and employment status and immigration-related variables such as the region of birth, age at immigration and duration of residency in host country. Those additional dimensions prove useful in assessing the future economic integration of immigrants.[38]

The next subsection presents the main characteristics of the CEPAM-Mic microsimulation model used to generate the projected results. Then, a subsection explains the main differences between the population-based and the cohort based estimates and the section concludes with a presentation of the assumptions supporting each alternative scenario.

4.1 CEPAM-MIC MICROSIMULATION MODEL

Unlike the traditional cohort-component projection method, which uses aggregated population estimates as inputs and outputs, CEPAM-Mic microsimulation model operates at the individual level. The main advantage of microsimulation is that it allows 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 EU27 member states under several socioeconomic and ethno cultural dimensions. Its base population counts 13 variables: age, sex, country of residence, education level, student status, education of the mother, labour force participation, 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 EU-Labour Force Survey microdata files and other surveys such as the European Social Survey to impute some characteristics not available in the EU-LFS.[39]

CEPAM-Mic projects the occurrence and timing of demographic and socio-economic events that shape future characteristics of individuals and their future offspring based on a series of interrelated multivariate prediction models. The model is time-based and event-based, dynamic, in continuous time, open to international migration, and stochastic. The model is dynamic and in continuous time, meaning that characteristics of individuals are modified continuously in “real time”, which allows for an easier treatment of competing events. For each potential event (giving birth, aging, migrating to another country, graduating, entering the labour force, dying, etc.) that can occur to a simulated actor, regression or other estimation models were constructed to estimate the parameters for each individual characteristics taken into account to determine the probability of its occurrence and derive its waiting time. Then, the individual waiting times of all events are 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 and waiting times are re-estimated accordingly and the projection continues with the next event until death, emigration or the horizon of the projection (Belanger et al., 2019).

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 micro-data sources. Belanger et al. (2019) provide an overview of the parameters driving all the modules generating events. Marois et al. (2019) provide

37 CEPAM-Mic is a dynamic microsimulation projection model developed by the Centre of Expertise on Population and Migration (CEPAM), a partnership between the Joint Research Centre (JRC) of the European Commission and the International Institute for Applied Systems Analysis (IIASA). https://bluehub.jrc.ec.europa.eu/catalogues/info/dataset/pj00207

38 CEPAM-Mic also projects religion and language spoken at home, which are important dimensions of the cultural aspects of immigration, but these ethno cultural variables are not used in this analysis.

39 The two most recent waves of the EU-LFS Survey (2014 and 2015) available at the time the project started were merged to increase the sample size, with the total base population numbering near 8.3 million cases

a detailed description of the labour force module and Marois et al., (2019b) describe the education module while Potančoková and Marois (forthcoming) describe the fertility module. The methodology for estimating the parameters of the fiscal contributions and social benefits of each individual taking into account his or her characteristics is explained in the subsections 3.1-3.4 of this report. The following subsections present the base population and a short description of the other modules.

4.2 SCENARIOS AND ASSUMPTIONS

The main objective of this Section is to assess the fiscal impact of immigration in the EU member states using a multidimensional demographic approach. More specifically, we seek to measure and compare the net fiscal contributions of immigrants and the native-born under alternative scenarios, defined mainly by the volume of immigration flows, their skills or their integration into the host country's labour market. CEPAM-Mic allows for the simulation of scenarios that combine different assumptions on the future evolution of the parameters that drive population changes. To achieve this objective, we have created seven hypothetical scenarios which, when compared to the results of the Baseline scenario, will allow us to estimate the potential gains of various immigration composition flows and immigrant integration policies on their net fiscal contribution.

Before describing what differentiates the scenarios, it is useful to describe the components of demographic change that are common to all scenarios. All scenarios share the same demographic assumptions for fertility, mortality and internal migration. In all scenarios, age, education and country-specific fertility rates are assumed to increase slightly so that the total fertility rate (TRF) for the EU as a whole rises from 1.6 children per woman to 1.8 children, a level reached in 2055-59 (Lutz et al. 2017). These fertility rates are then modified to account for fertility differentials by region of birth using relative risks estimated from multivariate models. These relative risks are held constant in the projection model. TFR is higher for recent immigrants and for immigrants from certain regions such as Sub-Saharan countries, Middle East and North Africa. The model is dynamic and instantaneously takes into account changes in the composition of the population. Accordingly, the scenario that assumes a higher (lower) immigration rate also translates into a scenario with a slightly higher (lower) TFR than the baseline scenario even if the fertility parameters are the same in all scenarios. Mortality rates by age, sex and education level are also taken from (Lutz et al., 2017). In brief, life expectancy is assumed to exceed 90 years in most European countries by 2060. While a long-term convergence is assumed at a regional level, differentials in life expectancy between low and high educated individuals are kept constant at about 4 years for females and 6 years for males.

While people moving from one EU country to another are definitively international migrants, when we take an European perspective, these movements are alike internal migrations. Accordingly, the CEPAM-Mic model treats migration between EU countries as internal migration, while international migration (immigration and emigration) corresponds to the movements of people entering or leaving the EU. Internal migration and emigration are based on country specific rates by age and sex. In all scenarios, the assumption is that both the propensity to emigrate and the distribution of migrants between destination countries reflect the recent patterns.[40]

Immigration is dealt with separately. Since CEPAM-Mic does not project the population of source countries, it is not possible to use rates (based on the population of origin) and therefore the immigration parameters are exogenous to the projection model. Specifically, the projected number of immigrants by country is an input to the model that is specified for each scenario and the characteristics of immigrants are randomly assigned among a specified distribution. Generally, this distribution is based on the observed distribution of recent immigrants by country, but it is also possible to specify other distributions by age, sex, education, place of birth, religion, and language in each country through reweighting. This approach allows for great flexibility on assumptions about the future number and characteristics of immigrants.

In Box 2 we present the different scenarios, emphasizing the four dimensions in which they vary: 1) the level of immigration flows, 2) the level of net fiscal contributions, 3) the degree of integration process based on labour participation rates, and 4) the level of education of immigrants.

In the scenarios related to integration process as well as in the baseline, we assume that the volume and the geographic distribution of immigrants are the same as those observed between 2013 and 2016. Their characteristics (age, sex, education, etc.), however, replicate those of recent immigrants in the base population, that is, approximately immigrants who landed in 2008 or 2009. As such, the immigration level is assumed to be of 2 million immigrants per year across Europe. In the low migration scenario, the volume of immigration is set to 240,000 per year, which corresponds roughly to the immigration rate of Japan. Conversely, in the High immigration scenario, the volume is doubled to 4 million per year, which

40 The country specific out-migration probability by age and sex is derived from the average number of migrants between 2013 and 2016. The destination country choice is based on origin-destination matrices derived using updated estimates for the period 2009-2016 of Raymer et al., (2013) Bayesian estimates of intra-EU mobility. International emigration is treated as a vector in the origin-destination matrices and emigrants are simply removed from the simulation rather than being assigned a new country of residence.

represents an immigration rate similar to the Canadian one. The Canadian immigration selection scenario also assumes the same volume of immigrants as the High immigration scenario, but assumes a different distribution of immigrants in terms of education. It replicates the higher educational attainment of immigrants aged 25-44 in Canada and arrived between 2011 and 2016 as observed in the Canadian 2016 Census where about two third of immigrants are economic migrants selected according to their human capital.

Scenarios also differ on the assumptions regarding labour market participation, unemployment, tax contributions and social benefits gaps between immigrants and natives. All the scenarios with the exception of the Equal contribution and the Perfect integration ones use the parameters estimated as described above to assess the net fiscal contributions. The Equal contribution and the Perfect integration scenarios, instead, assign to migrants the same, more favourable, native-born parameters. Similarly, the Equal labour intensity and Perfect integration scenarios assume that more favourable employment rates of natives also apply to immigrants. Comparing the results from the Equal labour intensity scenario to the Baseline scenario allows measuring the potential gain in terms of net fiscal impact that could result from reducing the gap between immigrants and natives in terms of labour intensity. Similarly, the Equal contribution scenario measures the potential gain that could results from reducing the gap in the net fiscal contributions. The Perfect integration scenario cumulates both types of potential gains, plus any interactions or synergy coming from changing the parameters of both the labour force and the net fiscal contribution modules.

We can summarize the scenarios as follows:

0. Baseline: The Baseline scenario assumes no change in recent trends in the components of population changes as well as in labour force participation and net fiscal contributions. The number of immigrants is assumed constant at the level of two million per year.

1. Level of Immigration
- High immigration: Same assumptions as in the baseline scenario, except for a doubling of the annual immigration flows (four million per year) similarly to the Canadian rate.
- Low immigration: Same assumptions as in the baseline scenario, except immigration levels are reduced to 240,000 extra-EU immigrants coming each year, which corresponds approximately to the Japanese rate.

2. Level of NFC
- Equal Contribution: Same assumptions as in the baseline scenario, except for the parameters of the migrants in the net fiscal impact module, which are set equal to those of natives.

3. Level of integration
- Equal labour intensity: Same assumptions as in the baseline scenario, except for the parameters of the migrants in the labour force and employment module, which are set to converge to the native's parameters by 2020.
- Perfect integration of immigrants: This scenario adds the advantage of the equal contribution and equal labour intensity scenarios as it assumes that immigrants achieve the same labour force participation and employment rates as the natives and the same net fiscal contribution.

4. Level of education
- Canadian immigration selection: Same assumptions as in the Baseline scenario except for the volume of international immigration that is set equal to the high immigration scenario and for the educational composition of future immigrants, which reflects the educational distribution of Canadian immigrants.

TABLE 2. SCENARIOS' ASSUMPTIONS

Component	Baseline	Low immigration	High immigration	Equal contribution	Equal labor intensity	Perfect economic integration	Canadian immigration selection
Volume of immigration	10M/5 years	1.2 M/5 years	20M/5 years	10M/5 years	10M/5 years	10M/5 years	20M/5 years
Educational composition of future immigrants	Same as recent immigrants						Same as immigrants in Canada
Integration of immigration	Average of 2010-2015	Average of 2010-2015	Average of 2010-2015	Average of 2010-2015	Rates reach those of EU born		Average of 2010-2015
Labor force participation trends	Constant entry and exits rates						

Net fiscal impact (Contributions and benefits)	As estimated from EUROMOD 2015 tax-benefit system	As estimated from EUROMOD 2015 tax-benefit system	As estimated from EUROMOD 2015 tax-benefit system	Parameters of foreign born reach those of EU born	As estimated from EUROMOD 2015 tax-benefit system	Parameters of foreign born reach those of EU born	As estimated from EUROMOD 2015 tax-benefit system
Fertility	Slight increase in the TFR 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 parameters for social characteristics						
EU internal migrations	Average of 2013-2016						
Language and religion shift	Baseline rates						

BOX 2 The scenarios and their underlying political assumptions and implications (by Rainer Munz)

The scenarios analysed and discussed in this report are defined mainly by:

- the volume of future immigration flows,
- their degree of migrants' integration into the host country's labour market
- the pathways of admission and resulting skills composition of future migrants,
- and the degree to which all this translates into fiscal contributions.

Each scenario can be interpreted as the result of a different mix of migration and integration policies – both at the Member States and at EU level. The focus of the scenarios is only on migrants arriving or admitted from third countries while intra-EU migration and mobility of EU citizens is kept constant in all scenarios. The base years for the scenario are 2008-2014, which means that the effects of the refugee crisis of 2015-2017 are not taken into account.

The baseline scenario assumes a continuation of the status quo 2008-2014 prior to the refugee crisis of 2015-2017 both in terms of inflows and in terms of labour market integration gaps. These assumptions set the benchmark.

The assumptions of the other scenarios are not intended to represent a plausible future, but rather serve to illustrate what could result from policy changes by comparing the results of each of the alternative scenarios with those of the baseline scenario. They should be read as „what if" projections showing the aggregate effects of certain – partly extreme – assumptions on socio-economic and fiscal outcomes.

Thus:

The **"baseline scenario"** describes a continuation of the status quo (2008-2014): (a) in terms of quantity, age and skills distribution of 2 million 3rd country nationals admitted to EU MS annually with a dominance of humanitarian admission (asylum, humanitarian protection, marriage and family reunion as main pathways) and only about 30% of 3rd country nationals admitted as labour migrants; (b) in terms of labour market integration, deficits (employment rates of admitted 3rd county nationals – including asylum seekers – lower than those of natives during the first 20 years after arrival).

The **"low immigration scenario"** assumes that immigration to the EU would have dropped after 2015 to 240,000 people per year and continue at that level until 2035. That would most likely require changes in Europe's humanitarian law as both the number of asylum seekers and the number of migrants admitted as brides/grooms and dependent family members (family reunion) would have to go down significantly. To achieve low immigration at Member State level the scenario would imply: (a) a dramatic reduction in long-term residence permits issued by EU Member States for period beyond 12 months), (b) strict border controls at external Schengen borders effectively denying a considerable number of potential asylum seekers access to EU territory, (c) substantial restrictions to, or a revocation of, the right to family reunion. In this scenario integration policies would not play a major role due to the dwindling numbers of newcomers.

The **"high immigration scenario"** assumes a doubling of immigration to 4 million admitted 3rd country nationals per year starting in 2015 and staying at that level until 2035, but no substantial change in the mix of migrants. Humanitarian admission would remain dominant while labour market integration gaps would increase due to unchanged integration policies and an increasing number of immigrants from 3rd countries present in EU Member States.

The **"equal contribution scenario"** assumes continuing immigration at the level of 2 million admitted 3rd country nationals between 2015 and 2035, a continuation of the current situation in which immigrants from 3rd countries have lower labour force participation and higher unemployment than natives, but an upward economic mobility increasing the fiscal contributions of immigrants from 3rd countries equalling those of natives. The latter would have to be achieved through higher wage income reaching the average of natives. The scenario assumes that this would already have been achieved in 2015. Basic requirements would have been (a) the removal of barriers that prevent migrants from working according to their skill levels and/or (b) massive investments in education, training and reskilling of migrants. To assure that migrants arriving during the projection would perform in a better way the scenario would also require (c) a certain change in the mix of migrants (reducing the spontaneous arrival of asylum seekers and the amount of people admitted as brides/grooms, dependent family members while increasing the number of labour migrants), (d) continuing efforts to train arriving migrants.

The **"equal labour intensity scenario"** also assumes continuing immigration at the level of 2 million admitted 3rd country nationals between 2015 and 2035, but higher labour force participation and lower unemployment rates equalling those of natives. The scenario equally assumes that this would already have been achieved in 2015. Basic requirements would have been (a) the removal of barriers that prevent migrants from working according to their skill levels and/or (b) massive investments in education, training and reskilling of migrants. To assure that migrants arriving during the projection would perform in a better way the scenario would also require This would either require (a) a clear change in the mix of migrants (reducing the spontaneous arrival of asylum seekers and the amount of people admitted as brides/grooms, dependent family members; while increasing the number of skilled labour migrants).

The **"perfect integration scenario"** assumes keeping immigration at the level of 2 million admitted 3rd country nationals between 2015 and 2035 and combines the assumptions of the two previous scenarios (equal contribution and equal labour intensity): immigrants from non-EU countries and natives having the same labour force participation and unemployment rates and making the same fiscal contribution. This would require a similar mix of policy measures as described above (scenarios 4 and 5).

The **"Canadian style selection scenario"** assumes both a doubling of immigration to 4 million 3rd country nationals per year that would have started in 2015 while continuing at this level until 2035 as well as an age and skills mix of 3rd country nationals admitted after 2015 similar to the one achieved by the Canadian selection. While the labour market performance of those who had arrived before 2015 remains unchanged, the described selection introduced in 2015 would allow for better labour market integration and higher fiscal contribution. This would require a substantial deviation from current European migration policies: (a) a selection of newly admitted 3rd country nationals according to age, formal education and skills based on a points system uniformly applied by all EU Member States; (b) changes in humanitarian law (applied by all EU Member States) allowing for a drastic reduction in the number of spontaneous asylum seekers as Canada also selects refugees according to certain criteria (including skills) before admission; (c) stricter selection criteria when admitting brides/grooms or dependent family members (applied by all EU Member States). (d) At the same time wage levels and employment opportunities in the labour markets of the EU MSs would have to converge to the ones offered by traditional immigration countries (Australia Canada and the US) to be able competing with them globally for talent and skills. In this scenario all EU Member States and the UK combined would have to recruit about 13 times more skilled migrants than Canada does every year.

The scenarios present a wide range of possible approaches to immigration and integration ranging:

- from very small to very high numbers of admitted regular migrants and asylum seekers;
- from a continuation of the status quo with a dominance of humanitarian admission (including marriage and family migration) to a much higher degree of selection based on age and skills;
- from a continuation of the status quo with persisting integration gaps to massive integration and/or selection efforts leading to better labour market and fiscal outcomes.

Many of these scenarios (in particular: the low migration scenario, the perfect integration scenario and the Canadian style selection scenario) would require:

- improved labour market access for regular migrants and refugees and significantly more investment in education and training (in particular: the equal contribution scenario, the equal labour intensity and the perfect integration scenario);
- considerable changes in European and national migration, asylum and humanitarian law paving the way for fundamental reforms of European migration and asylum policies both at EU and Member States level reducing the flow of spontaneous asylum seekers arriving on EU territory as well as of family members uniting with EU residents (in particular: the low migration scenario, the perfect integration scenario and the Canadian style selection scenario);
- a high degree of coordination between all EU Member States harmonising criteria and policies governing the admission of future labour migrants and dependent family members as well as the granting of asylum (in particular: the low migration scenario, the perfect integration scenario and the Canadian style selection scenario);

In the absence of a high degree of EU-wide co-ordination of migration and asylum policies the scenarios can be interpreted country by country as potential trajectories of individual EU Member States. The required changes in migration and asylum law as well as migration, asylum and integration policies (as indicated for each scenario) would remain similar.

We concede that most scenarios do not directly address the current policy debate:

- In some scenarios (high immigration scenario, Canadian style selection scenario) parts of the European electorates would meet a doubling of annual immigration from 3rd countries, probably with opposition.
- Considerably reducing the right to asylum and to family reunion/marriage migration (low immigration scenario, perfect integration scenario, Canadian style selection scenario) would require constitutional changes for which – in a majority of EU Member States – there is most likely not enough political support.
- A situation in which immigrants from 3rd countries continue to have lower labour force participation than natives, but an upward economic mobility increasing their fiscal contributions matching those of natives and EU-born migrants (equal contribution scenario) is not easy to imagine.

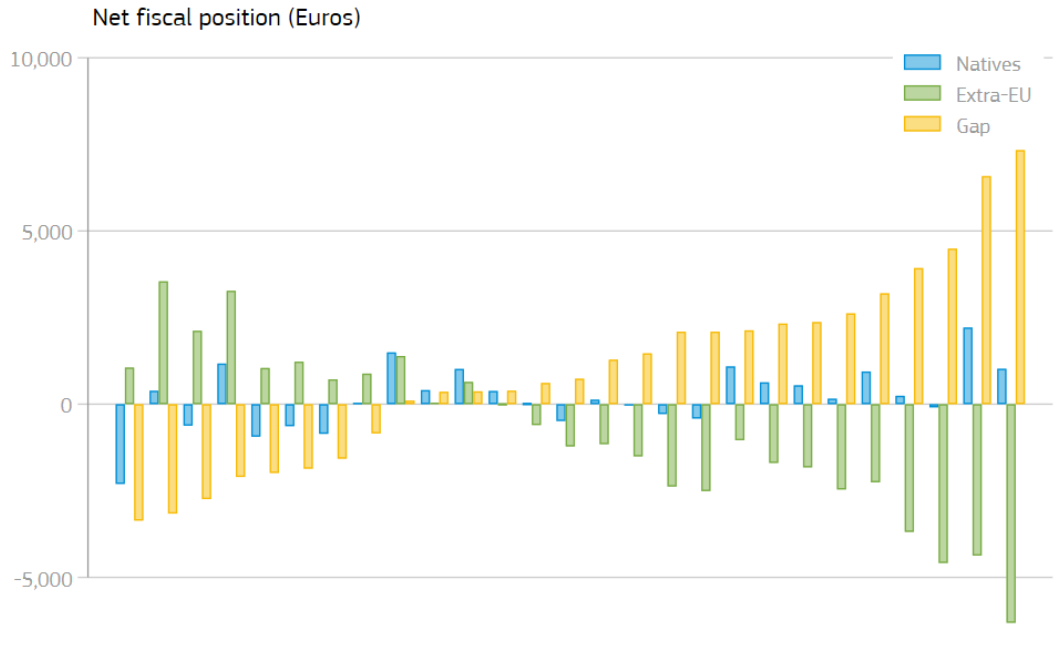
5. POPULATION-BASED PROJECTION 2015-2035

5.1.1 BASELINE SCENARIO

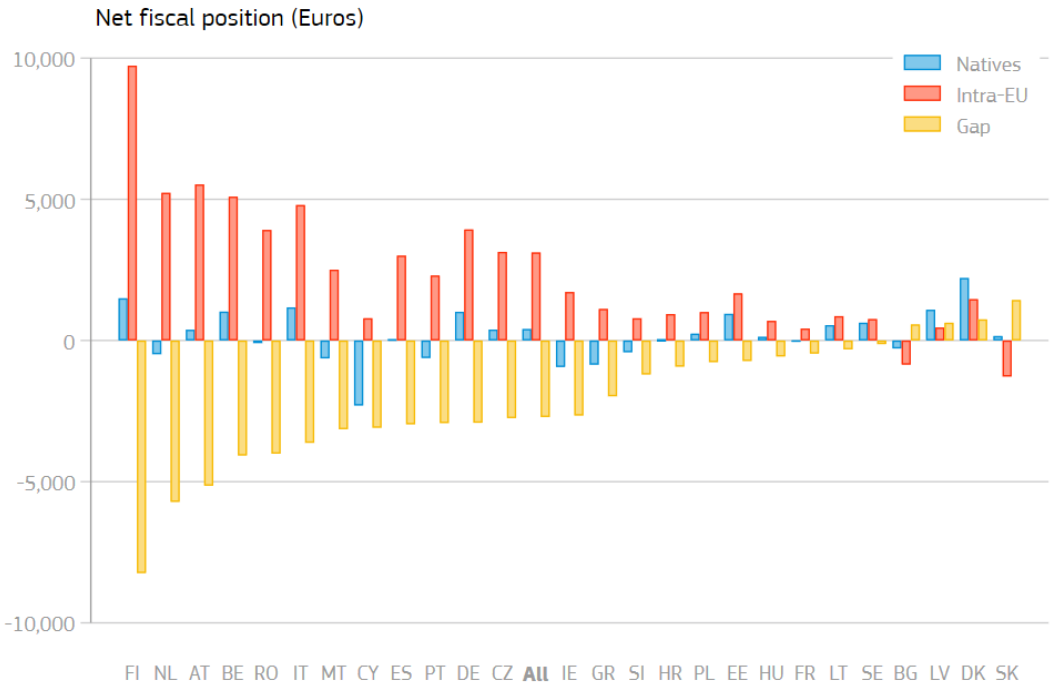
We find large variations both in annual net fiscal contribution between countries and in differences between natives and migrants in a given country. These differences are illustrated in Figure 6 for the first period 2015-2019. In this figure, countries are ranked by the size of the gap between annual net fiscal contributions of natives versus extra-EU migrants. For the EU as a whole, the annual net fiscal contributions are positive across all population groups: 407 euros per capita for natives, 47 euros for extra-EU migrants and 3,118 euros for intra-EU migrants. However, natives show negative values in 10 countries and the extra-EU migrants in 16 out of the 26 EU countries. Thus, a majority of countries presents positive annual net contributions for natives and a majority of them present negative annual net contributions for extra-EU migrants. There is, however, a small number of countries like Cyprus, Czechia, Portugal, Italy, Ireland, Malta, Greece and Spain where non-EU migrants show better results compared to natives.

On average for the EU as a whole, the gap between annual net fiscal contributions of natives and extra-EU migrants is small (360 euros) in favour of natives. This is in part due the more favourable age structure of immigrants. In some countries, however, the gap between natives and immigrants can be much larger than the EU average. Extra-EU immigrants' negative impacts exceed 1,000 euros per capita in 14 countries, a level reached only by the natives of Cyprus. Two countries present gaps larger than 5,000

FIGURE 5. AVERAGE ANNUAL NET FISCAL CONTRIBUTIONS BEYOND AGE 15 PER CAPITA BY IMMIGRANT STATUS, EU MEMBER STATES, 2015-2019
NOTE: COUNTRIES ARE RANKED FROM THE LOWEST TO THE HIGHEST GAP BETWEEN NET FISCAL CONTRIBUTIONS OF NATIVES AND MIGRANTS.



A) NATIVE AND EXTRA-EU MIGRANTS



B) NATIVE AND INTRA-EU MIGRANTS

euros per capita between the annual net contributions of natives and extra-EU migrants Belgium (7,335 euros per capita) and Denmark (6,586 euros per capita).

In most countries, the annual net fiscal contributions (per capita) of EU migrants exceed that of natives and the annual net fiscal contributions of natives exceeds that of extra-EU immigrants (Table A1). Intra-EU migrants, on the other hand, present the most favourable annual net fiscal impact and show negative net contributions in only in two countries (Slovakia and Bulgaria).

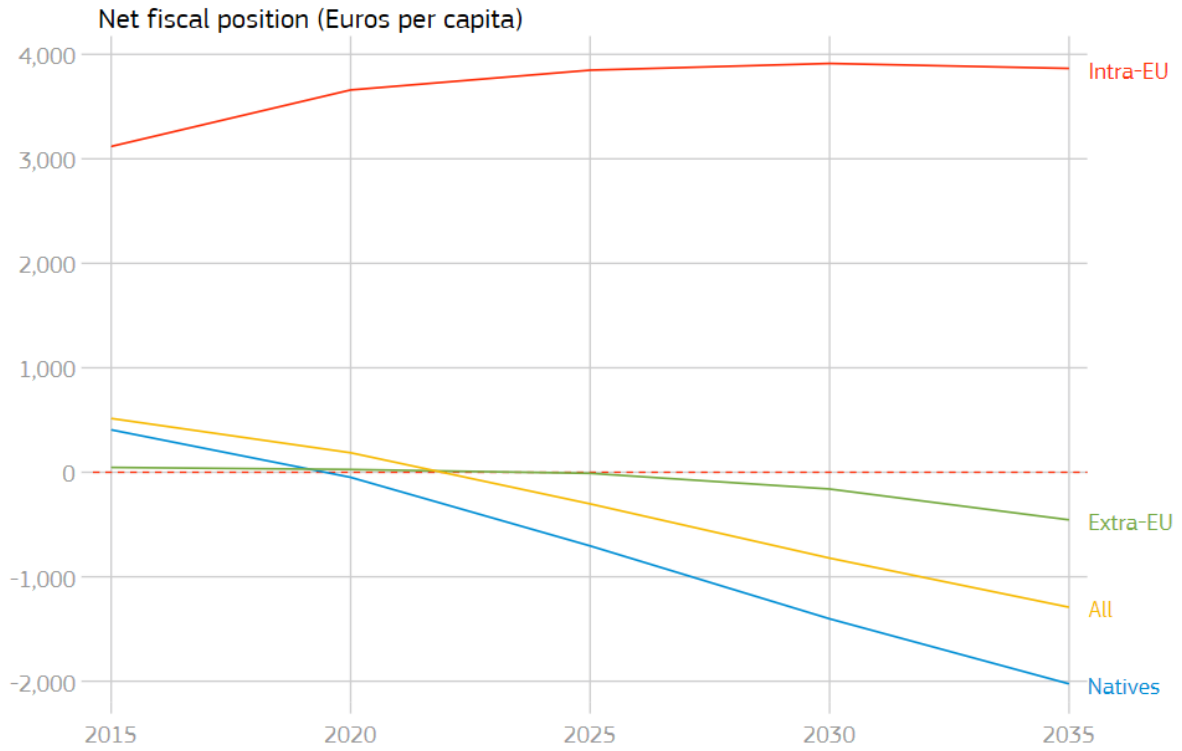
5.1.2 PROJECTED TRENDS IN NET FISCAL CONTRIBUTIONS FOR DIFFERENT POPULATION GROUPS

Figure 7 contrasts the annual net fiscal contributions projected over the period 2015 to 2035 by place of birth under the baseline scenario's assumptions. Since we assume constant net fiscal contributions, the evolution over time projected here results only from the changes in the demographic composition of the population groups. The most important of these trends is certainly population ageing which would have considerable impact on the future financial situation of the ageing countries. Population ageing is more salient for natives than for immigrants since, by definition, native population is not rejuvenated by the arrival of younger than average immigrants. This certainly explains the negative slope in the native curve. On the opposite, the curve for extra-EU migrants is much flatter and consequently, the projection shows that the current slightly higher net contributions of natives compared to non-EU migrants would reverse under the baseline scenario assumptions as early as by 2020. In 2035, although both NFC would be negative, the average annual net fiscal contribution of extra-EU immigrants would exceed the contributions of natives by about 1,570 euros per capita. Finally, intra-EU migrants present the largest annual net fiscal contributions (in their country of residence) 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.

5.1.3 ALTERNATIVE SCENARIOS

Table 3 contrasts the impact on the average annual net fiscal contribution per capita of the total population over the projection period for the EU as a whole for the seven alternative scenarios described above. Compared to the baseline scenario, all scenarios, with the exception of the high immigration scenario, generate figures that are more favourable. Changing the levels of extra-EU migrants entering each year, however, does not change much the future trend of the annual net fiscal contribution per capita. Compared to the baseline situation, increasing immigration levels to the EU at the Canadian level or decreasing it to the Japanese level, only changes the net fiscal contribution per capita by about 50 to 60 euros per capita. This is, however, a negligible difference when compared to the expected decline of about 1,800 euros per capita between 2015 and 2035 that results from changes in the demographic characteristics of the population, according to our baseline scenario. The finding that increasing or decreasing immigration flows to the EU doesn't change much the projected annual net fiscal contribution per capita of the total population can be explained by the fact that the future number of immigrants represent only a small

FIGURE 6. PROJECTED NET FISCAL CONTRIBUTIONS BEYOND AGE 15 BY IMMIGRANT STATUS, EU BASELINE SCENARIO, 2015-2035.
SOURCE: OWN ELABORATION WITH CEPAM-MIC ON EU SILC-DATA



share of the projected total European population.
Increasing immigration while maintaining the same level of economic integration for future extra-EU immigrants could have an adverse impact on the annual net fiscal contribution per capita of European countries, while the opposite is true for the low immigration scenario. The negative impact of high immigration can be attributed to the lower level of education of extra-EU immigrants compared to the natives. Indeed, as shown in the Canadian immigration scenario, a higher immigration scenario associated with a selection based on education, can have a slight positive impact. Even more, this impact is similar to the one observed in the low immigration scenario which assumes decreasing the number of immigrants to a level comparable to the Japanese immigration rate. In any cases, merely increasing or decreasing the future number of immigrants to the EU doesn't change much the projected annual net fiscal contribution per capita of the total population because even in the high immigration scenario the number of future immigrants represents only a small share of the projected total European population. However, a fairly large number of immigrants are already residing in EU countries. Therefore, assuming a better economic integration for them and the future comers can create a much larger impact. Assuming that immigrants have the same labour intensity as natives would generate an increase in net fiscal contributions of 188 euros per capita in 2035. Similarly, assuming that their fiscal contributions are the same as natives would generate an increase of 393 euros per capita. Combining both the favourable assumptions about labour intensity and fiscal contributions in the perfect integration scenario would generate up to 569 euros in gains in the per capita net fiscal contributions of immigrants and thus reduce by almost half the negative level of this indicator projected in the baseline scenario.

TABLE 3. PROJECTED ANNUAL NET FISCAL CONTRIBUTIONS (15+) PER CAPITA ACCORDING TO SEVEN SCENARIOS, EU MEMBER STATES, 2015-2035

	Baseline	Low immigration	High immigration	Equal contribution	Equal labour intensity	Perfect integration	Canadian immigration selection
2015	516	516	516	516	516	516	516
2020	187	243	108	496	339	638	145
2025	-302	-245	-363	45	-130	207	-283
2030	-821	-756	-888	-443	-643	-275	-764
2035	-1291	-1234	-1347	-898	-1104	-722	-1181

Figure 8 displays the differences between the per-capita net fiscal contribution of extra-EU immigrants in the seven scenarios considered compared to the baseline. Only in the low immigration scenario extra-EU immigrants would contribute less than in our baseline. In the Perfect Integration scenario the per capita NFI of the average extra-EU immigrants would be 3,500 euros higher than our baseline.

5.1.4 COUNTRY COMPARISON IN 2035

As stated above, there are large variations in terms of annual net fiscal contribution between countries and in terms of differences between natives and migrants in each given country. The analysis presented above for the EU as a whole may well differ from country to country. Figure 9 presents the projected gains from extra-EU migrants in net fiscal contribution per capita in 2035 generated by each alternative scenario compared to the baseline scenario of extra-EU migrants by country. The numbers can be interpreted as the additional gain or loss that different policies can have in different countries compared to current policies. In this figure, countries are ranked from lowest (left) to highest (right) according to the net fiscal contributions of extra-EU migrants in the baseline scenario.

The first striking result is that for all countries, the gains or losses in terms of NFI of extra-EU immigrants related to increased or decreased immigration levels produce very little effect compared to the other scenarios. This is not surprising given that these two scenarios assume that nothing else is changing. Under these circumstances, increasing or decreasing immigration would only change the characteristics of the immigrants in terms of age structure or duration of stay in the country of residence, with only minor effect compared to the other drivers of economic integration. For all but seven countries, the scenario assuming perfect integration of immigrants produces the largest gain in NFI of extra-EU migrants compared to the Baseline scenario. The seven countries where it is not the case, are Portugal, Hungary, Greece, Cyprus, Poland, Bulgaria and Czechia. For these countries, the Canadian scenario (better educational composition of future immigrants) produces instead the largest gains. This means that for these countries, what would make a real difference is the education level of the immigrants. Belgium, Denmark, Sweden and Finland stand out for the size of the potential gains in NFI that their extra-EU migrants could make under scenarios proposing better integration of immigrants. The Netherlands, France, Austria, Germany, Italy and Ireland follow them.

FIGURE 7. PROJECTED GAINS IN NET FISCAL CONTRIBUTIONS (15+) PER CAPITA OF EXTRA-EU MIGRANTS (COMPARED TO BASELINE SCENARIO) ACCORDING TO SEVEN SCENARIOS, EU MEMBER STATES, 2015-2035.
SOURCE: OWN ELABORATION WITH CEPAM-MIC ON EU SILC-DATA

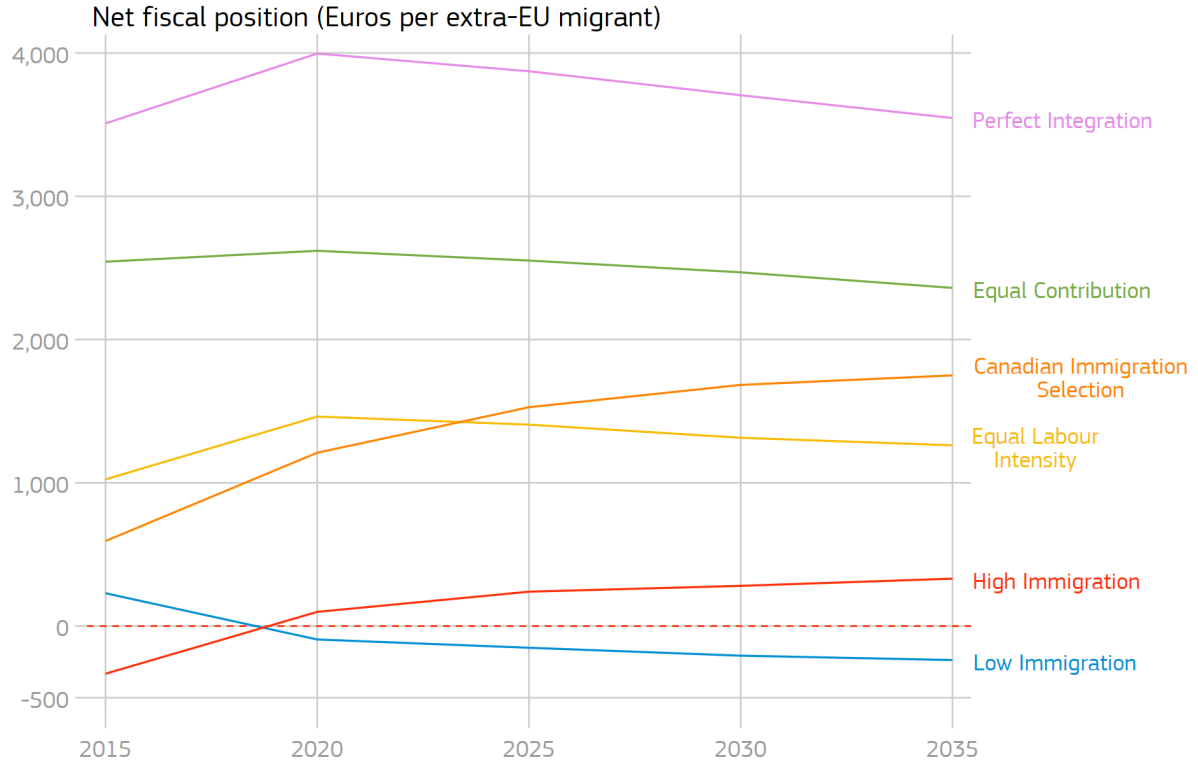
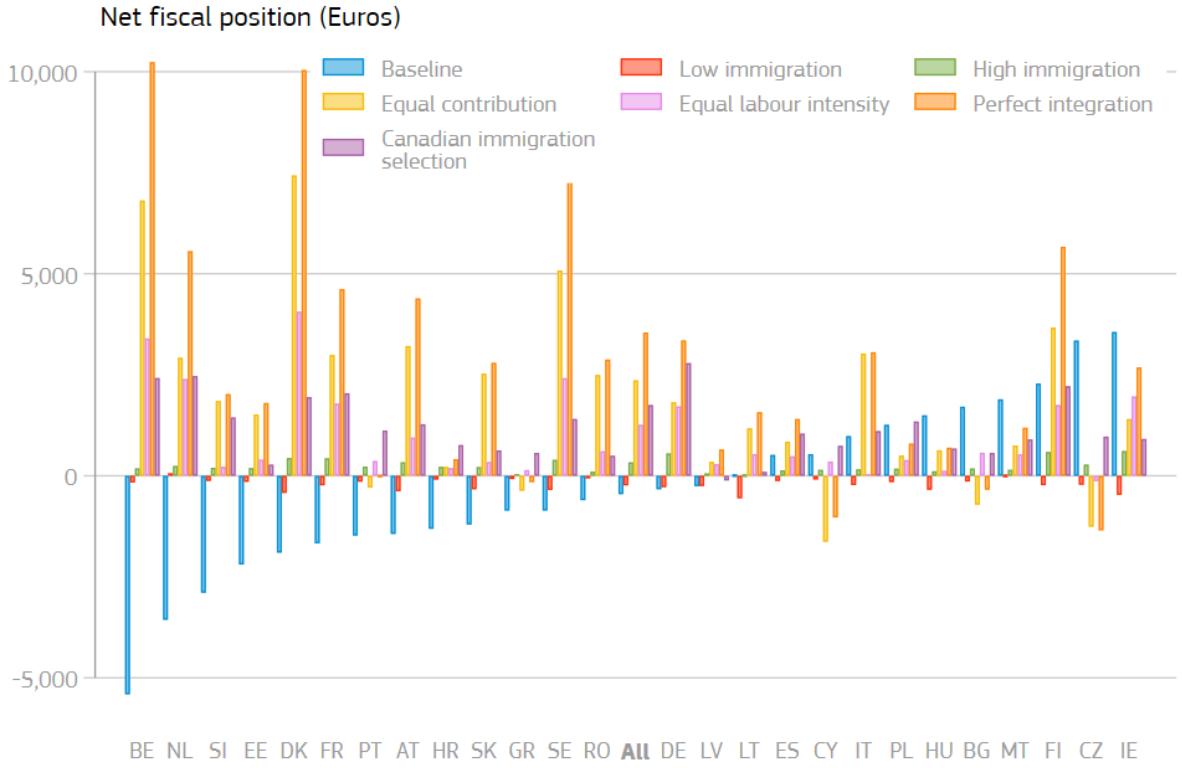


FIGURE 8. PROJECTED GAINS IN ANNUAL NET FISCAL CONTRIBUTIONS (PER CAPITA) OF EXTRA-EU MIGRANTS IN 2035 COMPARED TO THE BASELINE SCENARIO ACCORDING TO DIFFERENT SCENARIOS BY COUNTRY.
NOTE: COUNTRIES ARE RANKED FROM THE LOWEST TO THE HIGHEST NET FISCAL CONTRIBUTIONS OF EXTRA-EU MIGRANTS IN THE BASELINE SCENARIO.



5.2 LIFE COURSE PERSPECTIVE ON NET FISCAL CONTRIBUTIONS BY IMMIGRANT STATUS

5.2.1 POPULATION-BASED AND COHORT BASED ESTIMATES

We use CEPAM-Mic to project net fiscal contributions of individuals beyond the age of 15 taking both a population and a cohort perspective. In the previous section, the results were based on the population perspective. Here we propose an analysis taking the cohort perspective. The main distinction between the population-based and the cohort-based projections is that the first one is affected by the age structure of the population while the second is not. In the population-based projections, a sample of individuals observed in 2015 is projected over a period of 20 years and a snapshot of the average net fiscal contributions of different population groups is taken every 5 years. Population-based projection gives a cross-sectional view of the net fiscal contributions, which is mainly determined by the distribution of the population characteristics at the start of the projection period, notably in terms of age structure. On the other hand, the cohort-based projection compares the cumulated net fiscal contributions of population groups over their life course. To achieve that, a cohort of births born in 2015 and a cohort of immigrants landed in 2015 are projected for their entire lifetime and their net contributions are cumulated and averaged over the full life cycle.

In a sense, the population-based estimate is alike the crude death rate, which doesn't control for the age structure of the population, and the cohort-based estimate is alike the life expectancy. A population with a very young age structure can show a relatively low crude death rate even if its life expectancy is low. To illustrate this, compares Nigeria, which is a very young population, and Italy, which is much older. Nigeria crude death rate is 11.6 per thousand just a bit higher than that of Italy (10.6 per thousand). Yet, Nigerians have a much lower life expectancy at birth (53.9 years) compared to Italians (83.2 years). To assure an adequate funding of many social programs, taking into account the age structure of the population is important. The benefits paid by funded pension programs, for example, depend on the total contributions made by participants during their working lives. When the population is young, the number of contributors is large relative to the number of beneficiaries, and contributions may be sufficient to pay for the benefits of few beneficiaries, even if the contribution rate is too low to sustain the program over the long term. To ensure that the aging population will be able to enjoy the same benefits, it is necessary to ensure that the contribution rate is sufficient not only to pay the annual contributions for the current year, but also to capitalize the fund for the future.

Figure 10 contrasts the cohort-based and the population-based estimates of net fiscal contributions per capita by population groups. When the net fiscal contributions are cumulated over the life course, the picture changes drastically because the difference in age structure between the native and immigrant populations doesn't play its role anymore. The estimated net fiscal contribution of natives for the period 2015-2020 in the population-based projection is slightly positive but turns negative in the cohort-based estimate. However, the drop of about 1,600 euros per capita between the two indicators is much smaller than what is projected for the two immigrant groups. Although the net fiscal contribution of intra-EU migrants remains positive in the cohort-based model (344 euros per capita), it is shrunken drastically when compared to the estimate from the population-based model (3,118 euros per capita), a decline of 2,775 euros.

For the extra-EU migrants, the differences between population-based and cohort-based estimates are even larger than for the two other population groups. In the population-based model, their net fiscal contribution is slightly positive (47 euros per capita), but close to null. Under the cohort-based perspective, their net fiscal impact drops by 4,353 euros per capita. In a few words, a cohort of natives born in 2015 and a cohort of extra-EU migrants landed on the same year are, over their life course and under the assumptions of the baseline scenario, both net beneficiaries of fiscal transfers, but these fiscal transfers are 2.7 times larger for extra-EU migrants than for natives over their life course.

Figure 11 presents the cohort-based estimates of the net fiscal impact by country and immigrant status under the baseline scenario. Net fiscal contributions are negative for almost all countries both for natives and extra-EU migrants. Only three countries show positive values for natives: Italy, Denmark and Latvia. The same number of countries have positive values for extra-EU migrants: Czechia, Bulgaria and Latvia. However, in 18 out of 26 countries, net fiscal contributions of natives, although negative, are larger than net fiscal contributions of extra-EU migrants. On average, net fiscal contributions of natives of these countries are 2,782 euros per capita larger than the comparable value for extra-EU migrants. The largest gaps between natives and extra-EU migrant's net fiscal contributions per capita are generally found in the countries that formed the former EU15 like Denmark (-7,470 euros per capita), Italy (-5,547 euros per capita) and Sweden (-5,324 euros per capita). Only 8 countries (Portugal, Spain, Ireland, Cyprus, Czechia, Bulgaria, Poland and Hungary) are presenting more favourable net fiscal contributions over the life course for extra-EU migrants compared to natives, but on average, the gap with natives is smaller among these countries (885 euros per capita) than what is observed in the former group of countries. Note that for eastern European countries these results should be taken with care given the very low number of extra-EU migrants.

Under the life course perspective, increasing or decreasing the number of immigrants does not change their net fiscal contribution per capita. Therefore the analysis of the different scenarios are limited here to only the scenarios

FIGURE 9. COMPARISON OF POPULATION-BASED AND COHORT-BASED ESTIMATES OF PROJECTED GAINS IN ANNUAL NET FISCAL CONTRIBUTIONS (PER CAPITA) BY PLACE OF BIRTH.

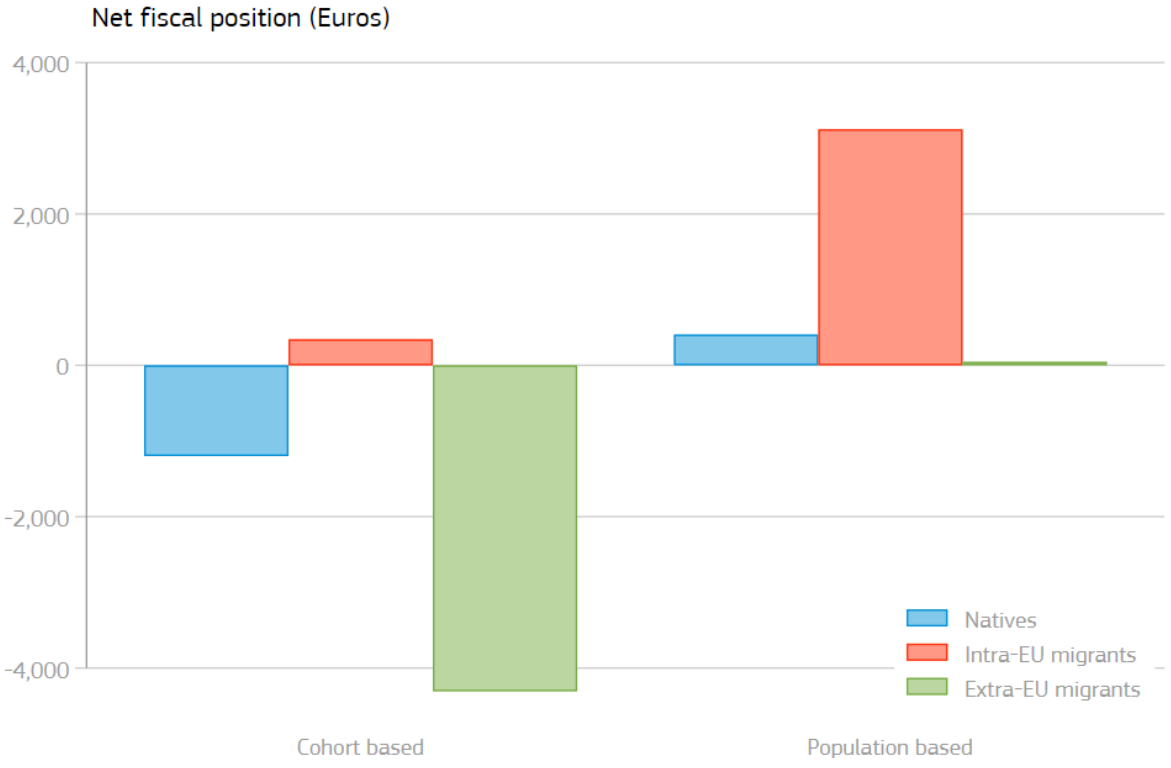
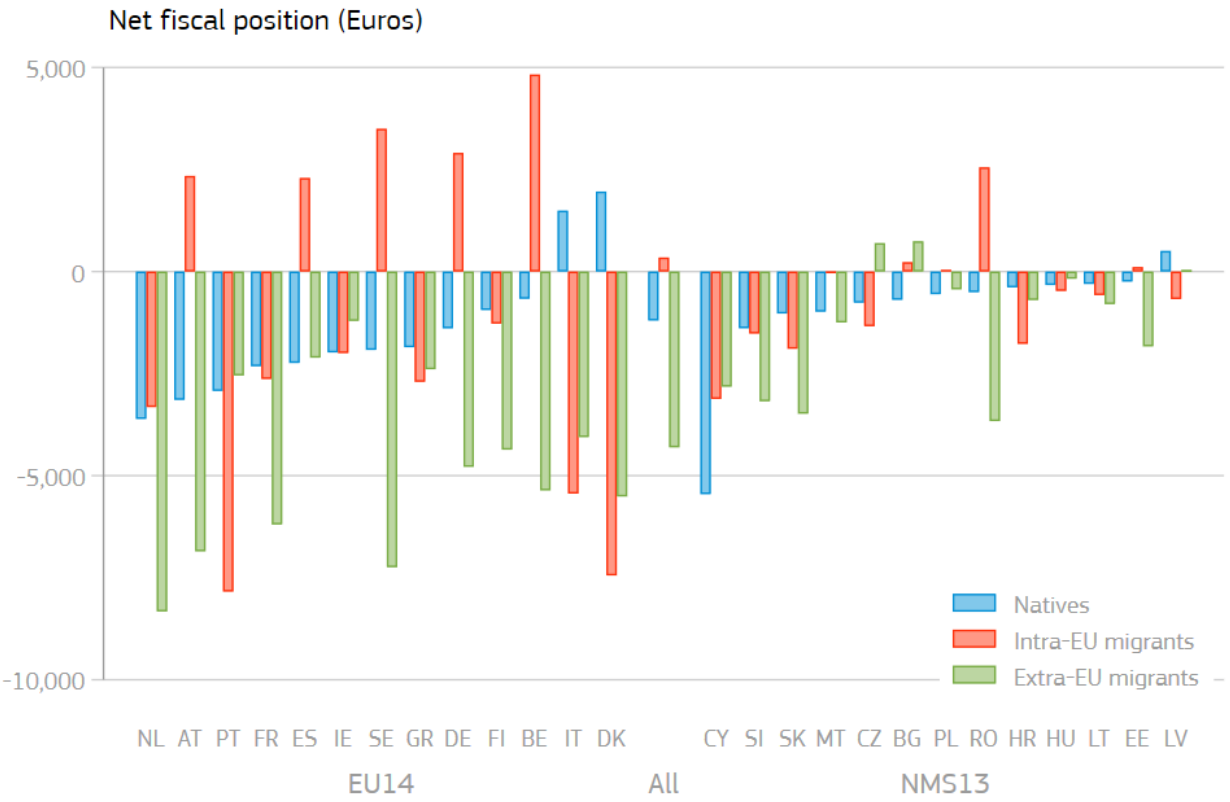
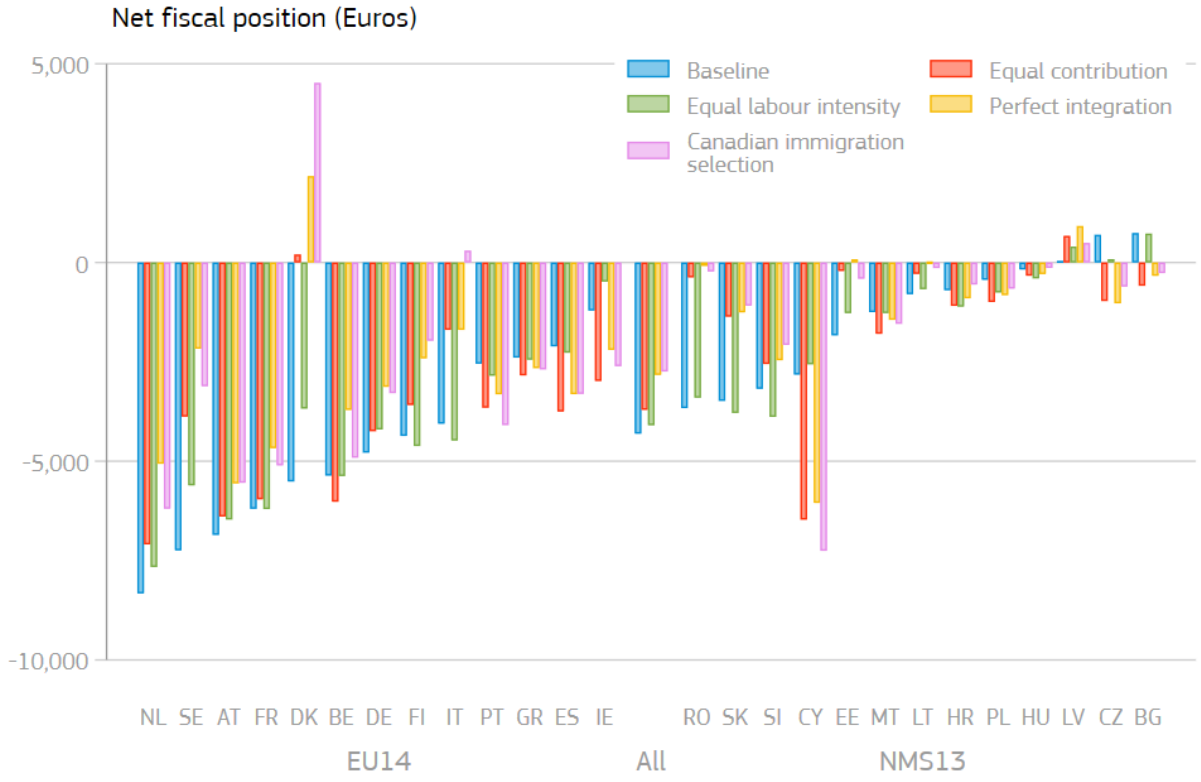


FIGURE 10. COHORT-BASED ESTIMATES OF THE NET FISCAL IMPACT BY COUNTRY AND IMMIGRANT STATUS, BASELINE SCENARIO.
NOTE: COUNTRIES ARE RANKED FROM THE LOWEST TO THE HIGHEST NET FISCAL CONTRIBUTIONS OF NATIVES AMONG THE EU15 AND NMS13 GROUPS.



assuming different trends in labour force integration or immigrant selection. Figure 12 displays the estimate of life course net fiscal benefits of extra-EU migrants under these five scenarios. Interestingly, for a few countries, none of the alternative scenarios produces larger net fiscal contributions per capita compared to the baseline scenario. These countries are: Bulgaria, Czechia, Spain, Greece, Malta, Poland and Portugal. Denmark stands out for the large positive net fiscal impact under scenarios assuming perfect integration or better selection of extra-EU migrants in terms of education. In Cyprus and Ireland, the equal labour intensity produces the largest net fiscal impact of all scenarios. In Belgium, Germany, France, Nederland, Sweden, Estonia, Lithuania, Latvia and Romania the perfect integration scenario (equalizing labour force intensity and fiscal contributions of extra-EU migrants to natives) would generate the largest gain in net fiscal contributions of migrants. Finally, the scenario assuming a better selection of immigrants in terms of education level would be the most favourable to Austria, Denmark, Finland, Italy, Croatia, Hungary, Slovenia and Slovakia.

FIGURE 11. COHORT-BASED NET FISCAL CONTRIBUTIONS PER CAPITA OF EXTRA-EU MIGRANTS ACCORDING TO DIFFERENT SCENARIOS BY COUNTRY.



6. DISCUSSION

6.1 SUMMARY

Our results underscore the crucial role played by demography for the sustainability of the European welfare states. They show that the average immigrant has net contributions either in line with those of natives for extra EU migrants, or higher than natives for intra-EU migrants. To understand this result, it is important to bear in mind the evolution of net contributions through the life cycle that we describe in Section 3.4. In that section, we illustrate a clear pattern: contribution are negative until age 30, they raise during working life, peak in the early to mid-fifties and drop sharply after that when pension costs and health care costs kick in. This general pattern holds irrespective of origin, but natives tend to contribute more in the active stages of their life and receive more in the later stages. The consensus among demographers is that the severe ageing process that European native populations have gone through is not halting, if anything it might intensify. The increase in the average age implies that more natives and migrants alike would be among the net recipients of fiscal transfers, but the native population is aging faster. As a result, this report shows that, in the near future, the net contribution of the average extra-EU migrant could surpass that of the average native. Yet, in our projections, both groups would be, on average, net recipients of fiscal transfers for the next two decades while the average intra-EU migrant would be a clear net contributor. The large net contribution of intra-EU migrants is explained by their age structure that is similar to that of extra-EU migrants, and by their labour market performance, that resembles that of natives.

These results are influenced by the different demographic composition of each group. The average native would receive more transfers than the average extra-EU migrant due to the higher age, but this does not tell us what the expected fiscal contribution of natives and migrants through the life cycle is. In other words, how much should we expect a migrant arriving in 2015 to contribute to the fiscal balance of the host country from that moment until old age? And how much should we expect a native entering adulthood in the same year to contribute? Our demographic microsimulation model can provide an answer to this question by simulating the life course of each EU resident. Our evidence is that, again, only the average intra-EU migrant would be a net contributor through the life cycle. Both natives and extra-EU migrants would be net beneficiaries and the benefit would be much larger for extra-EU migrants than natives. In particular, in countries with generous welfare states such as the Nordic countries, France and Belgium, extra-EU migrants would receive on average 5,000 euros more than they contribute to the public purse per capita and per year. The drain will be lower in eastern and southern Member States, but on average, across the Union, it will be just shy of 5,000 while the native drain would be around 1,000 euros per capita.

Our baseline projections are predicated on the central assumption that welfare policies, migrants' selection and migrants' integration in the European labour markets will retrace those of recent years. We explore how changes in one of these three factors would change our projections in seven different scenarios. Under the necessary assumptions, our scenarios can offer some guidance to policy makers who wish to maximise the fiscal payoffs of migration. This exercise clarifies that promoting the integration of extra-EU migrants in the European labour markets could pay large dividends, while policies that address only the sizes of the flows are unlikely to affect the fiscal impacts of migration.

It is important to stress though that given the expected flows of migrants in the near future, the impact of migration on the overall sustainability of the 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 the majority of benefits. Therefore, the sustainability of the European welfare states depends mostly on them.

6.2 BIAS AND SENSITIVITY

This report set an ambitious goal: projecting the fiscal impact of migration to the European Union for the next two decades. To render this goal achievable it had to rely on several assumptions and simplifications that we discuss here and should be kept in mind when reading our results. Some of the possible biases concern the imputation of the net fiscal benefits, other are related to the demographic projections.

6.2.1 LIMITATIONS OF NFI IMPUTATIONS

While many monetary benefits received by the individual are directly observable in our micro data, in-kind benefits are not. In-kind benefits account for a large share of public expenditures. Ignoring these benefits altogether would have rendered our imputations severely incomplete. For this reason, we have decided to resort to additional data sources even when these sources contained only partial

information. In particular, data on health expenditures are only available by age group without distinction by origin. We assign in-kind health benefits based on age. Consequently, we are assuming that migrants and natives of the same age will benefit from public health care in the same manner. There is ample evidence that this might not be the case as migrants tend to underuse this type of public services. Our imputation for this item will overestimate public expenditure on migrants. Nevertheless, in-kind benefits on health, education and social housing account for about two third of total expenditures. Additionally, we do not consider expenditures for public goods and services related to child care and elderly care although in some EU countries they account for a large share of total expenditures. Ignoring these items will lead us to overstate the benefits received by migrant as there are evidences that they tend to use less public care services than natives.[41] Other public good expenditure such as those related to public transportation are not considered, but they are likely to be equally provided to migrants and natives. A second important issue is the imputation of indirect taxes. We impute taxes based on HBS data accounting for differences in savings and consumption rates between natives and migrants. However, in countries where information of country of birth is missing, - Finland, Greece, Latvia, Lithuania and Slovenia - saving rates and consumption patterns are assumed to be equal between natives and migrants as long as the disposable income and household structure is the same. This is unlikely to be true in practice. There are indications that migrants save more and it is reasonable to assume that they will spend at least a share of their disposable income in their country of origin and send part of their income to their original country. If this is the case, we are overestimating the VAT payed by migrants in the destination country.

6.2.2 LIMITATIONS OF THE DEMOGRAPHIC PROJECTIONS

In the demographic projections, we are assuming that migrants have the same emigration rate by age, sex and education level than the natives because no data on emigration differential by place of birth are available. This assumption is not neutral for our results as majority of the benefits, either related to pension entitlements, or to in-kind benefits, are received after retirement. Evidence on return migration (Dustmann and Görlach, 2016) suggests that more than half of migrants to Europe will leave the host country within 10 years.

By assuming that emigration rates are the same for all population groups, we underestimate return migration and we are probably overstating the public expenditures targeted to migrants, as most of them will spend the later year of their lives in their country of origin. Furthermore, our simulations assume full portability of pension rights, which might not be possible in some pension systems or for some migrants with irregular carriers or short stay in the hosting country. On the other hand, this assumption will lead us to overstate also the taxes paid by migrants to the host country both in terms of direct and indirect taxation. The net effect is probably an underestimation of the net fiscal contribution of the average migrant as pension rights bear heavily on the fiscal burden of the older population, but this is hard to assess with the data at hand.

The report simulates several policy changes, but it is silent on the costs that would be required by such changes. The gains presented here are then to be interpreted not as net gains. Accounting for the costs of integration policies would probably depress the net fiscal position of extra-EU immigrants under the analysed scenarios, but we do not believe that the inclusion of these costs would change the indications of our simulations substantially.

41 For example, Boll and Lagemann (2018) find an underrepresentation in day-care centres of children under age of 3 years whose both parents have a migrant background. Figari and Narazani (2020) estimate that foreign women use less childcare services when compared to natives in Italy.

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ANNEXES

ANNEX 1. EUROMOD TAX AND BENEFIT AGGREGATION

EUROMOD uses several income list concepts to harmonize the model across all European countries. For detailed information, see also the EUROMOD modelling conventions. For social security contributions, EUROMOD aggregates:

- Employer social insurance contributions (ils_sicer) – including (employer) payroll taxes.
- Credited social insurance contributions (ils_sicct) – contributions paid by government or social security institution on benefits (if these are simulated)
- Employee social insurance contributions (ils_sicee)
- Self-employed social insurance contributions (ils_sicse)
- Other social insurance contributions (ils_sicot) – contributions paid by individuals but not directly linked to employment or self-employment (e.g. SIC due on benefits and paid by the benefit recipients, health contributions paid by general population)

Benefits aggregation follows the Eurostat definitions (ESSPROS & SILC):

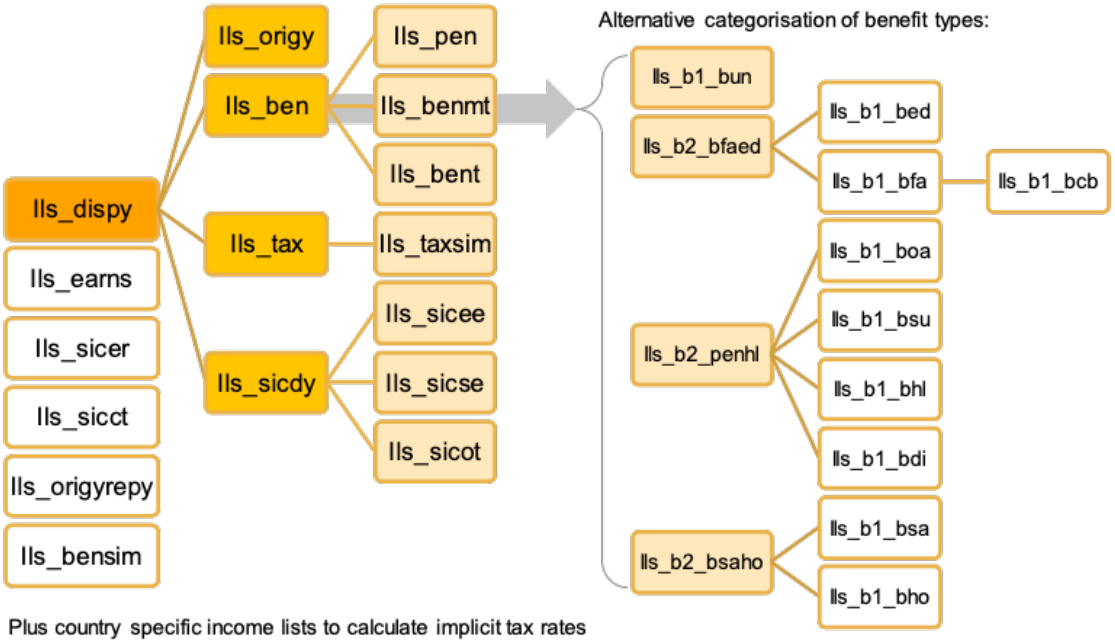
- Child-birth related benefits (ils_b1_bcb) – benefits related to the cost of pregnancy, childbirth and adoption.
- Family benefits (ils_b1_bfa) – benefits related to the cost of pregnancy, childbirth and adoption (i.e. ils_b1_bcb), bringing up children and caring for other family members (classification corresponding to SILC variable HY050G);
- Education benefits (ils_b1_bed) - grants, scholarships and other education help received by students (classification corresponding to SILC variable PY140G);
- Old-age benefits (ils_b1_boa) – income maintenance and support in connection with old age (classification corresponding to SILC variable PY100G);
- Survivor benefits (ils_b1_bsu) – income maintenance and support in connection with the death of a family member (classification corresponding to SILC variable PY110G);
- Disability benefits (ils_b1_bdi) – income maintenance and support (except health care) in connection with the inability of physically or mentally disabled people to engage in economic and social activities (classification corresponding to SILC variable PY130G);
- Unemployment benefits (ils_b1_bun) – income maintenance and support in cash or kind in connection with unemployment (classification corresponding to SILC variable PY090G);
- Health/sickness benefits (ils_b1_bhl) – income maintenance and support in connection with physical or mental illness, excluding disability; health care intended to maintain, restore or improve the health of the people protected irrespective of the origin of the disorder (classification corresponding to SILC variable PY120G);
- Housing benefits (ils_b1_bho) – help towards the cost of housing (classification corresponding to SILC variable HY070G);
- Social assistance/exclusion benefits (ils_b1_bsa) – benefits (except health care) specifically intended to combat social exclusion where they are not covered by one of the other functions (classification corresponding to SILC variable HY060G).

Regarding taxes, we can distinguish in EUROMOD between several income taxes:

- General income tax
- Tax on investment income, capital income tax
- Property tax
- Other taxes (such as health, municipal, pension insurance, wealth or early retirement tax)

Figure 4 visualizes the aggregation rules used in EUROMOD. As already mentioned, we aggregate the benefits to three categories: Unemployment benefits (ils_b1_bun), Pension benefits (ils_b1_boa and ils_b1_bsu) and the rest of the benefits.

FIGURE 12. CSTRUCTURE OF STANDARD INCOME LISTS.
SOURCE: EUROMOD (2018)



ANNEX 2. COUNTRY FICHES

AUSTRIA

FIGURE 13. DECOMPOSITION OF NET FISCAL IMPACT - AUSTRIA.

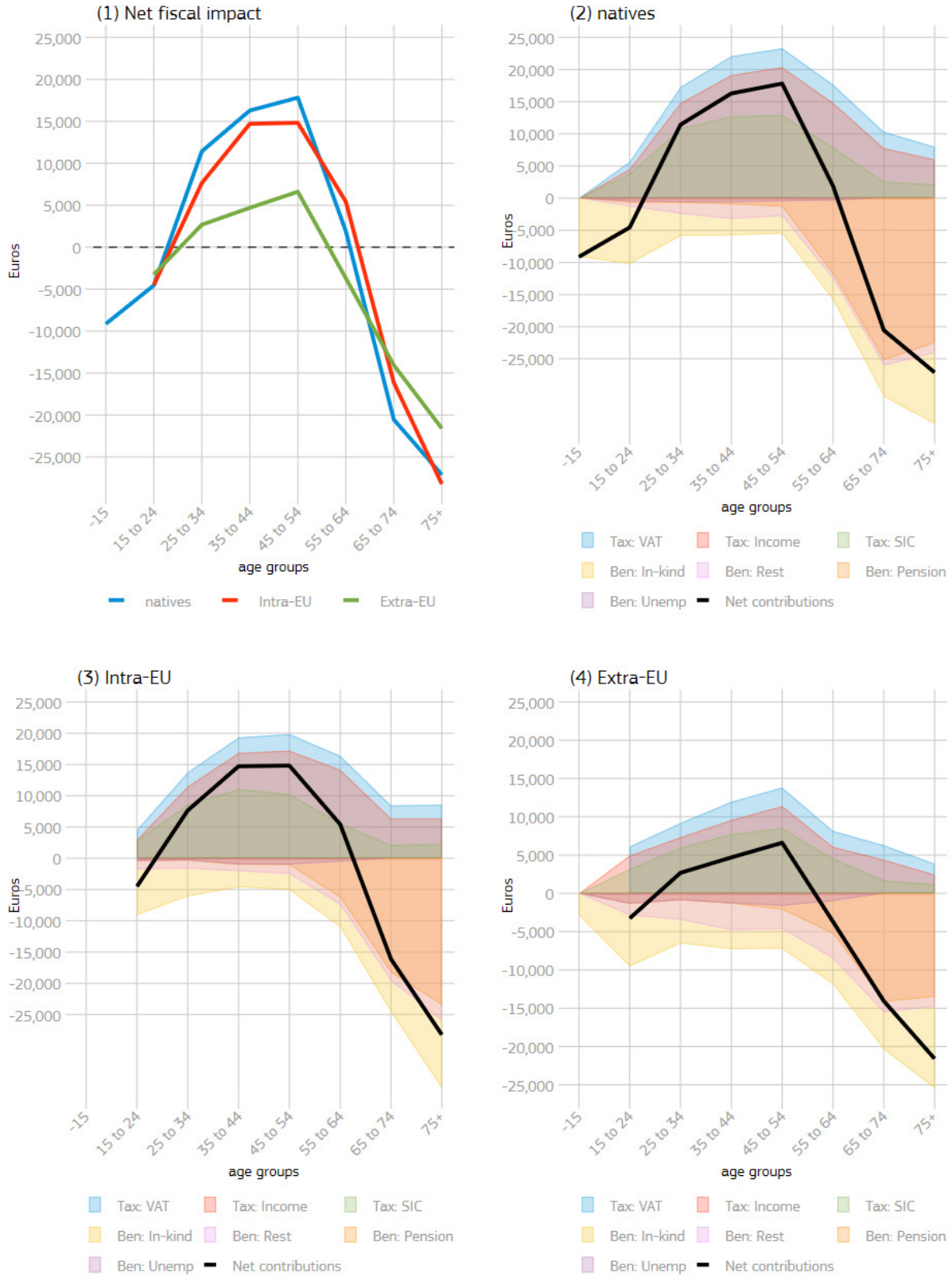
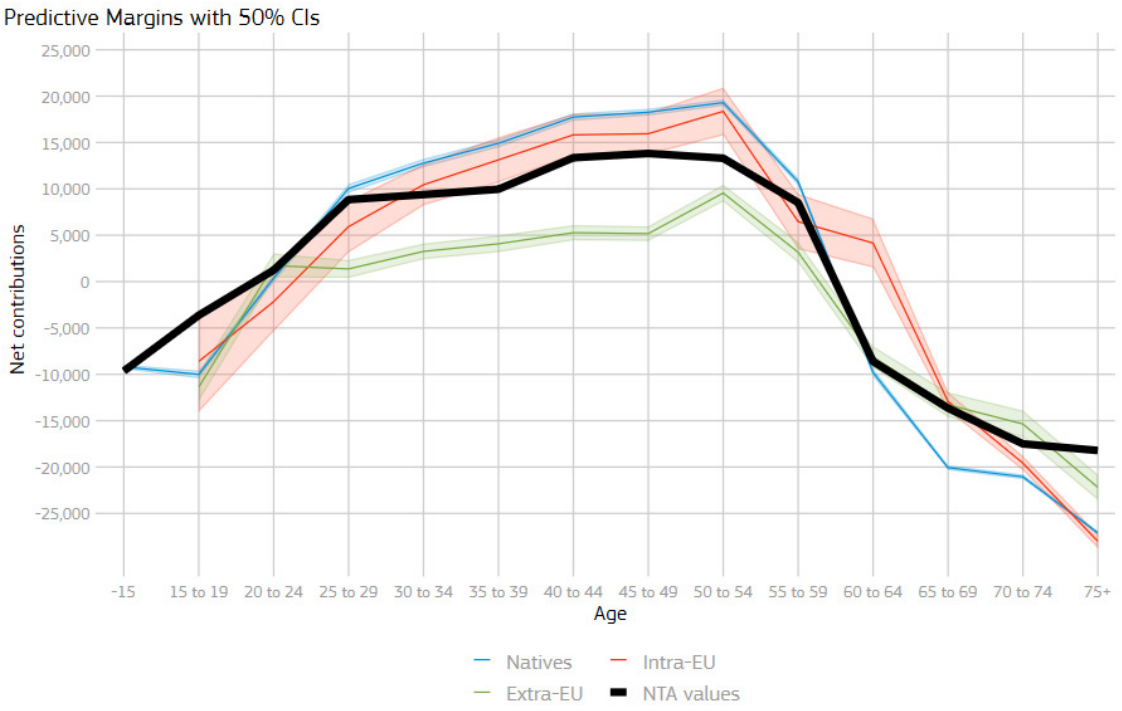


FIGURE 14. MODEL PREDICTIONS AND VALIDATION - AUSTRIA.



BELGIUM

FIGURE 15. DECOMPOSITION OF NET FISCAL IMPACT - BELGIUM.

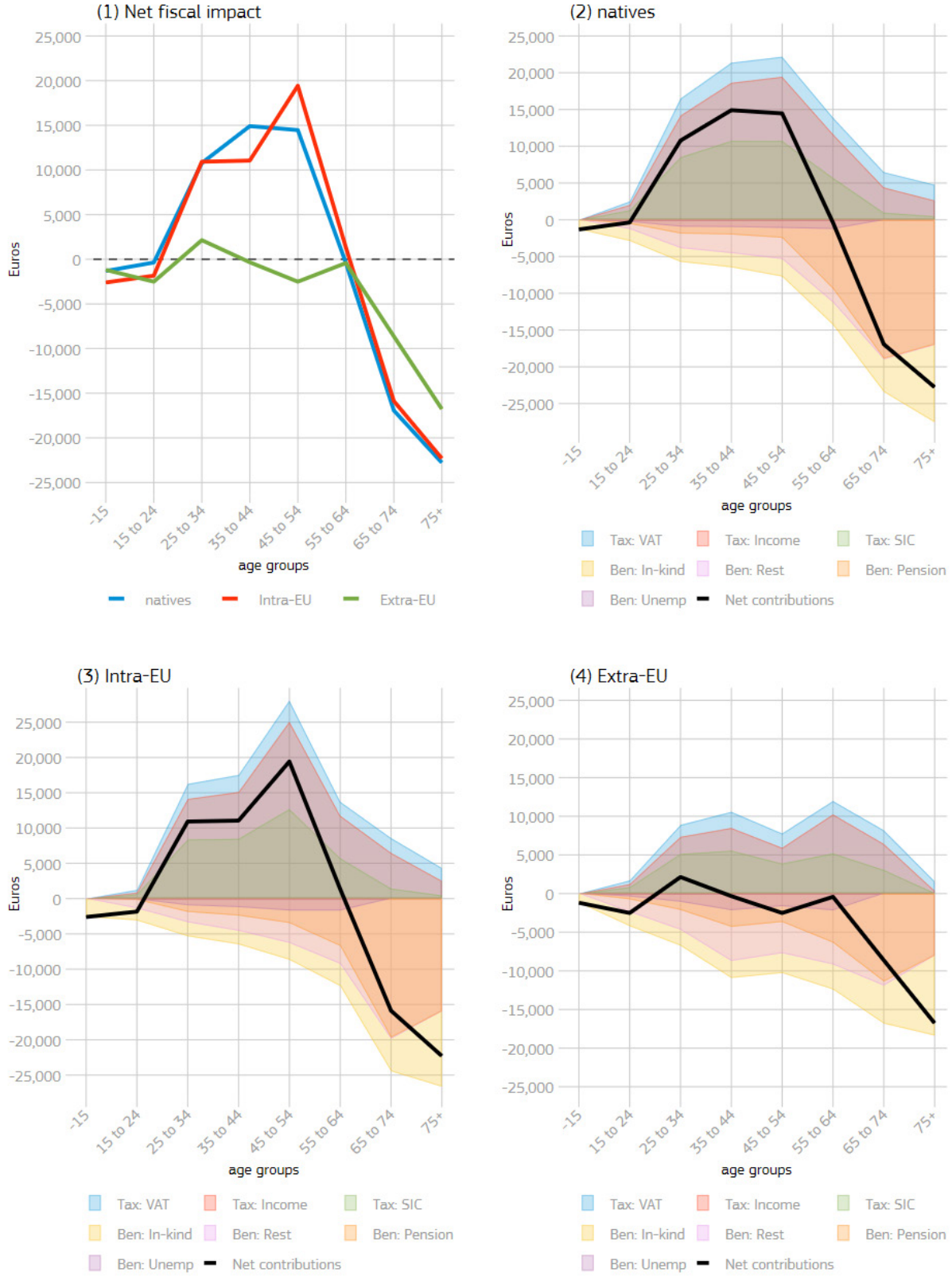
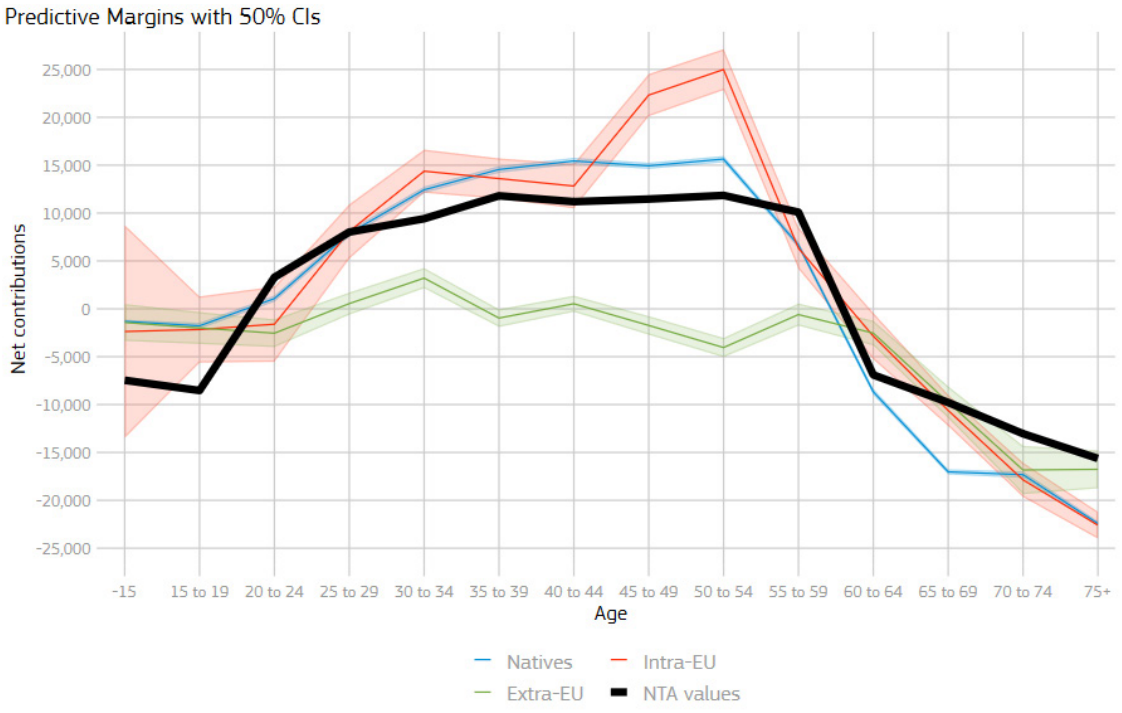


FIGURE 16. MODEL PREDICTIONS AND VALIDATION - BELGIUM.



FINLAND

FIGURE 17. DECOMPOSITION OF NET FISCAL IMPACT - FINLAND.

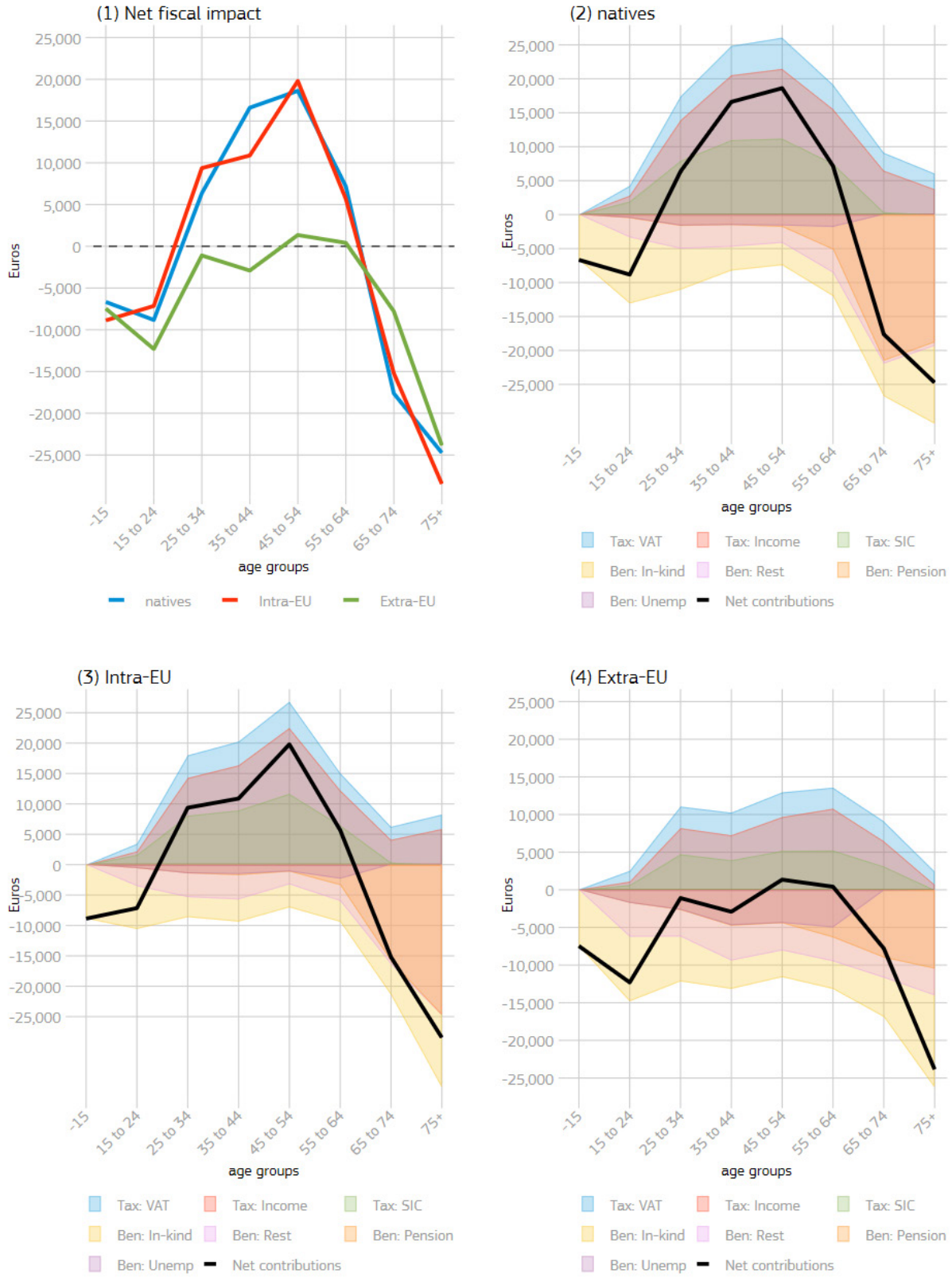
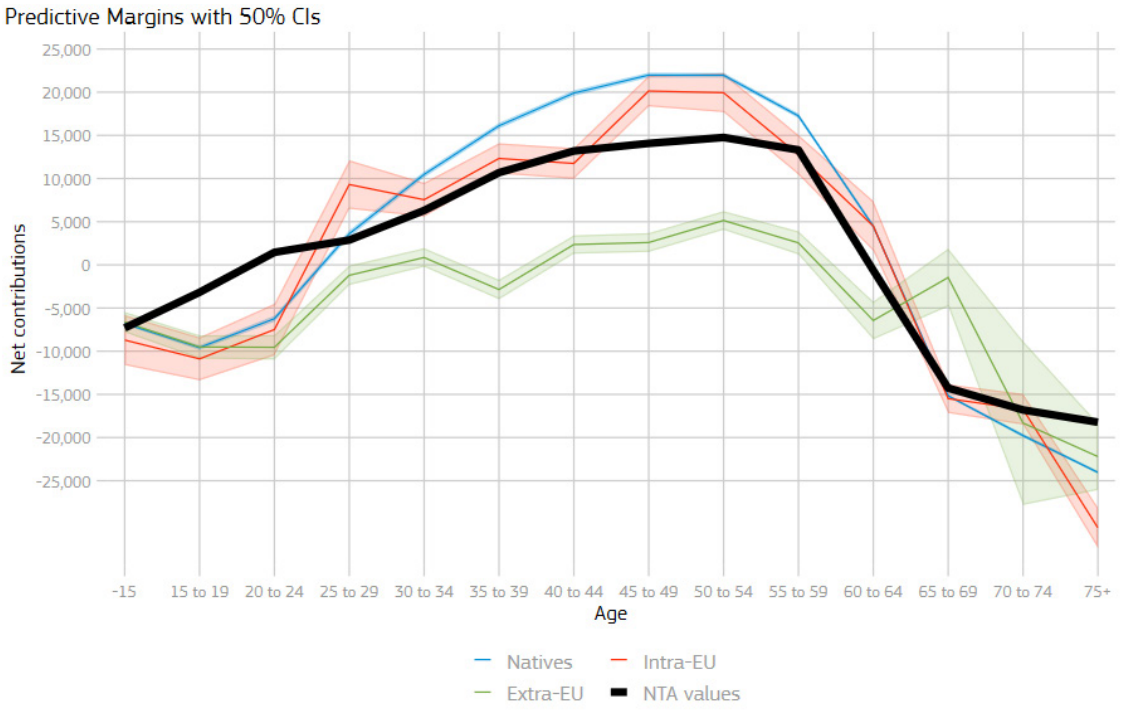


FIGURE 18. MODEL PREDICTIONS AND VALIDATION - FINLAND.



FRANCE

FIGURE 19. DECOMPOSITION OF NET FISCAL IMPACT - FRANCE.

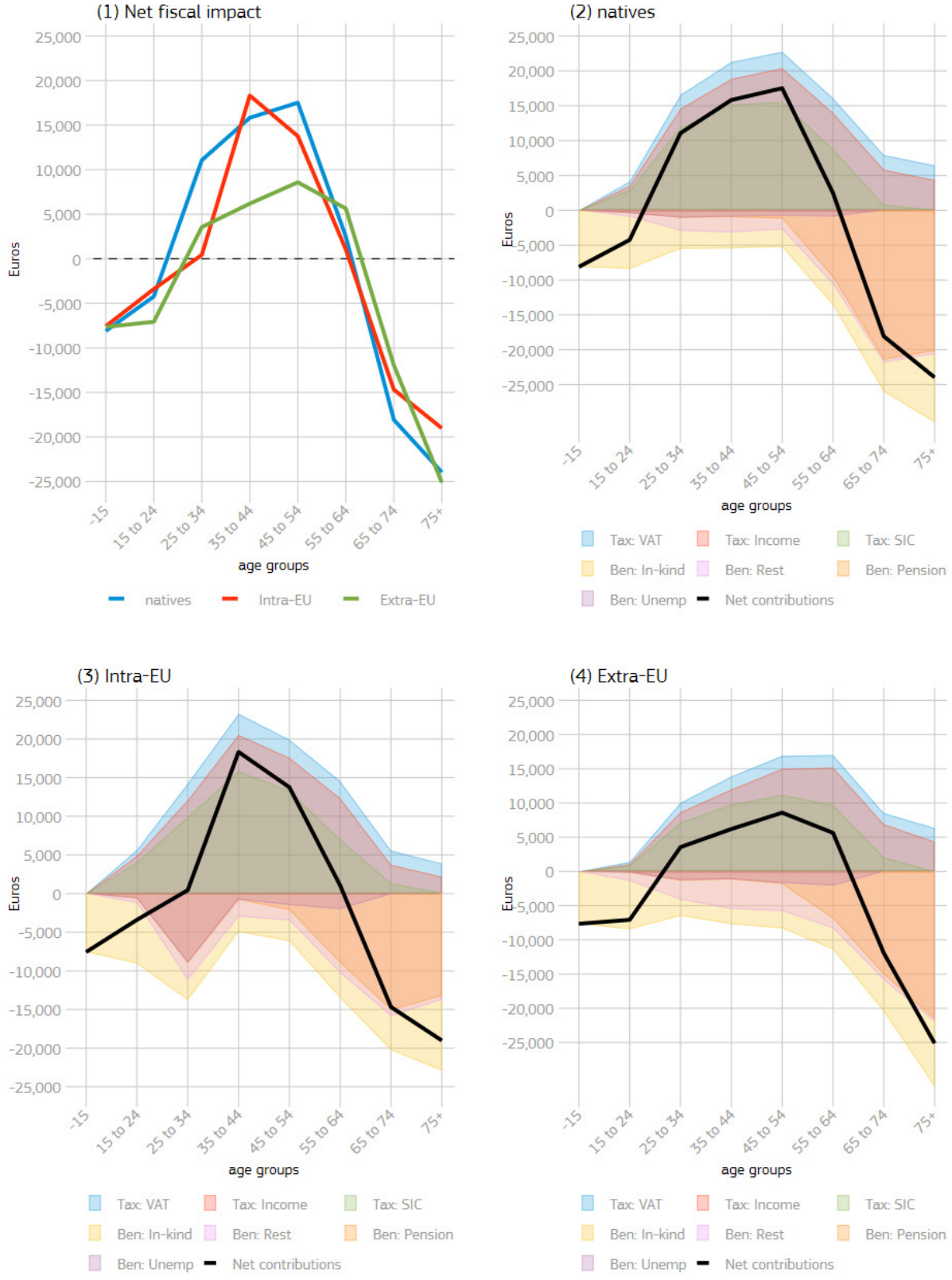
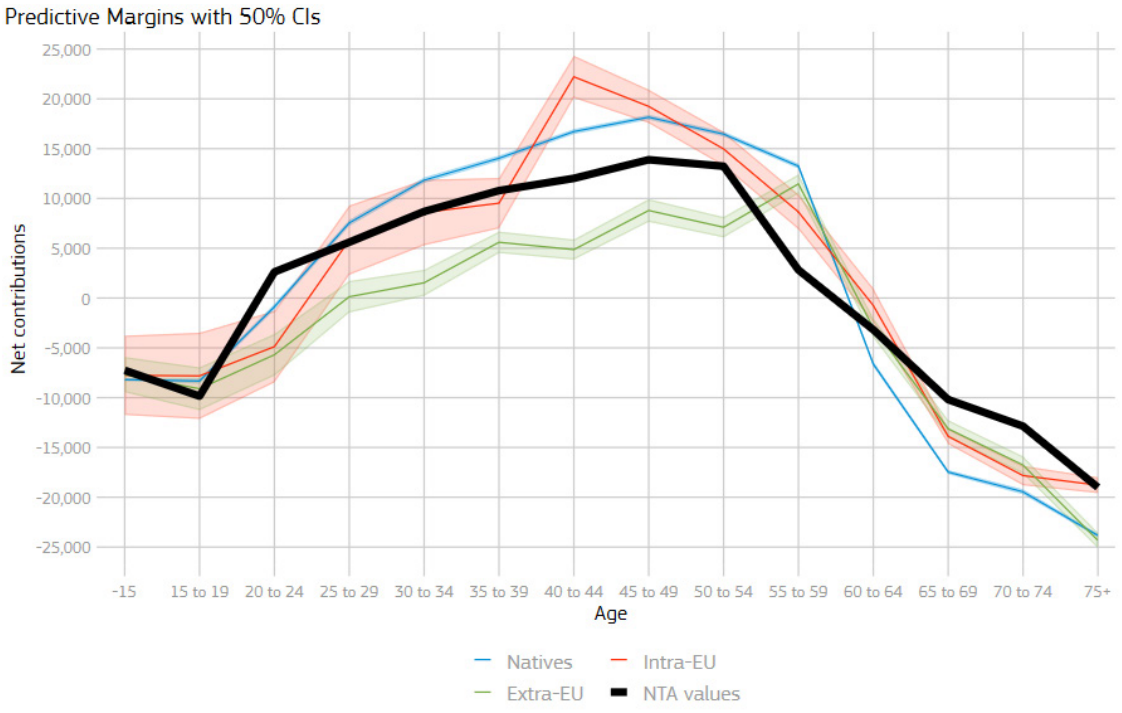


FIGURE 20. MODEL PREDICTIONS AND VALIDATION - FRANCE.



SWEDEN

FIGURE 21. DECOMPOSITION OF NET FISCAL IMPACT - SWEDEN.

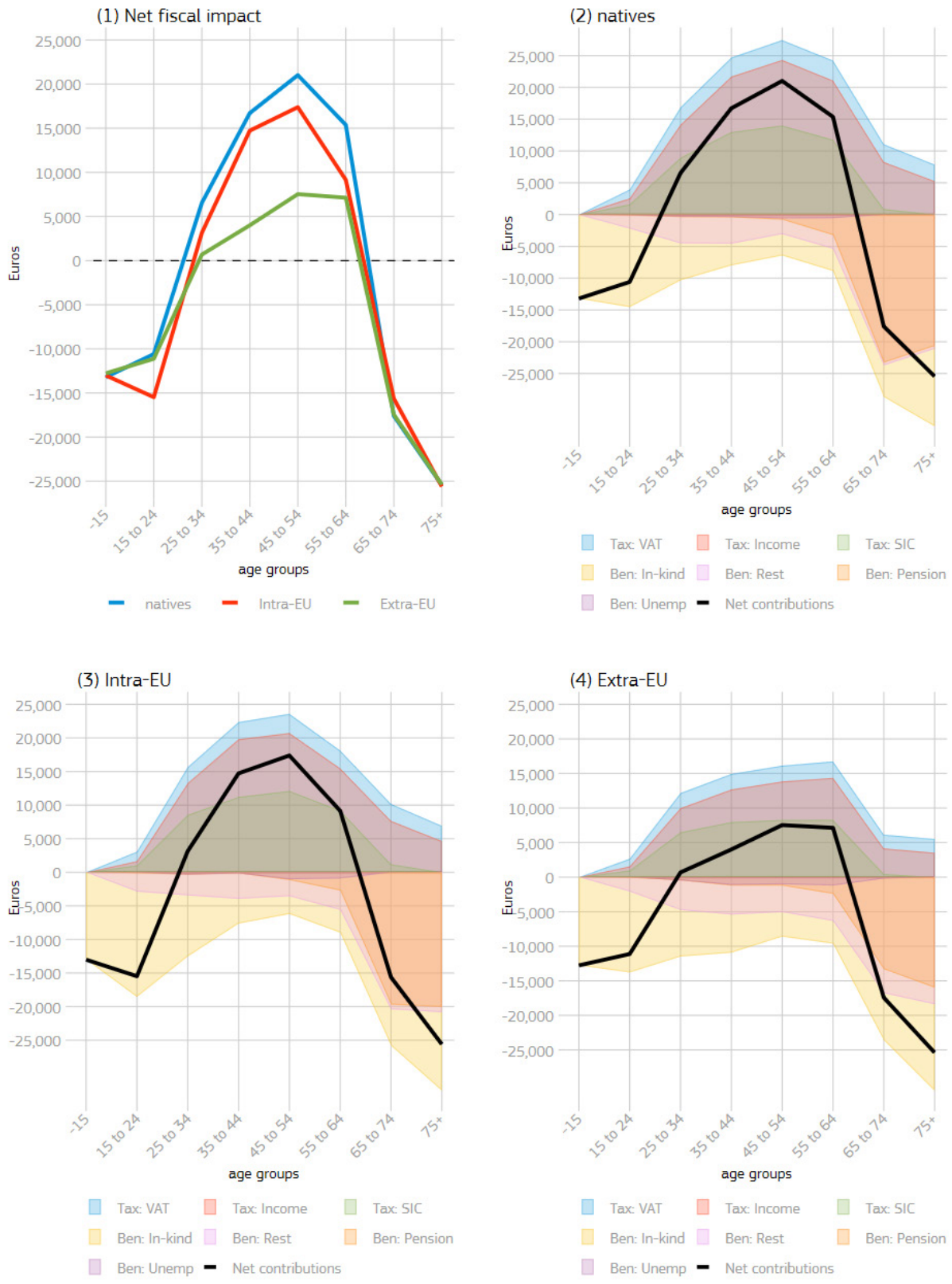
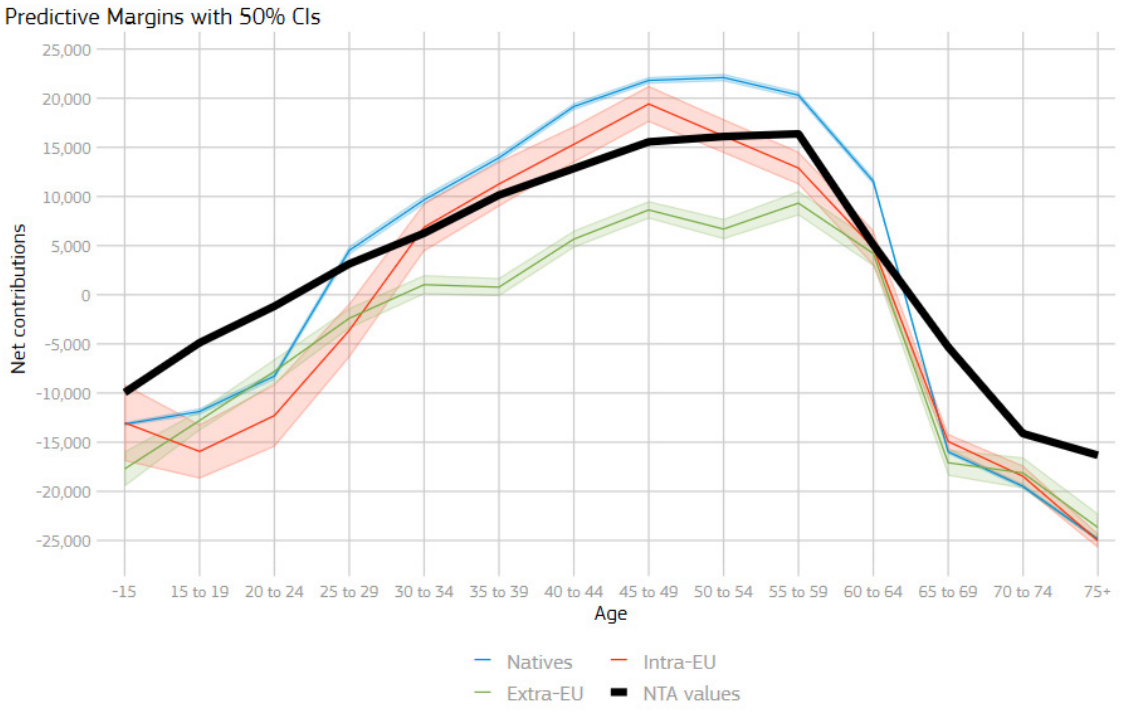


FIGURE 22. MODEL PREDICTIONS AND VALIDATION - SWEDEN.



GERMANY

FIGURE 23. DECOMPOSITION OF NET FISCAL IMPACT - GERMANY.

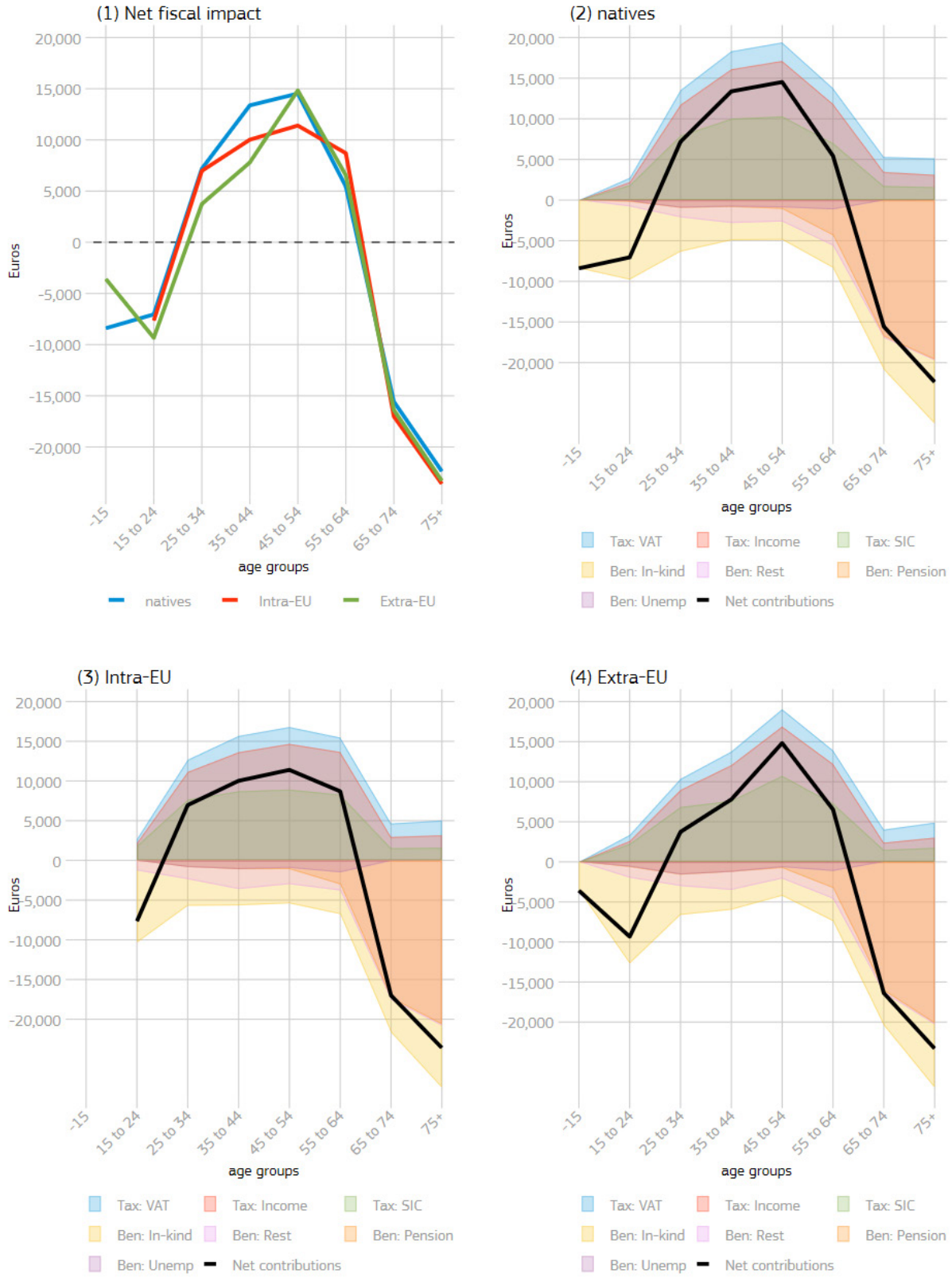
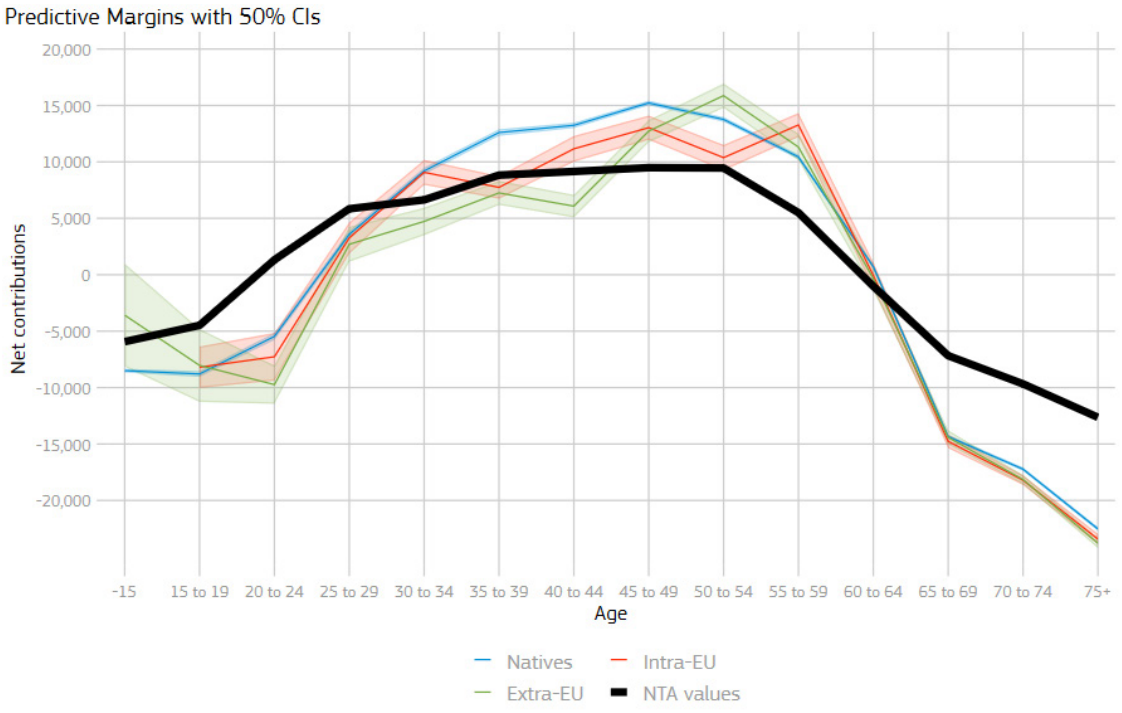


FIGURE 24. MODEL PREDICTIONS AND VALIDATION - GERMANY.



IRELAND

FIGURE 25. DECOMPOSITION OF NET FISCAL IMPACT - IRELAND.

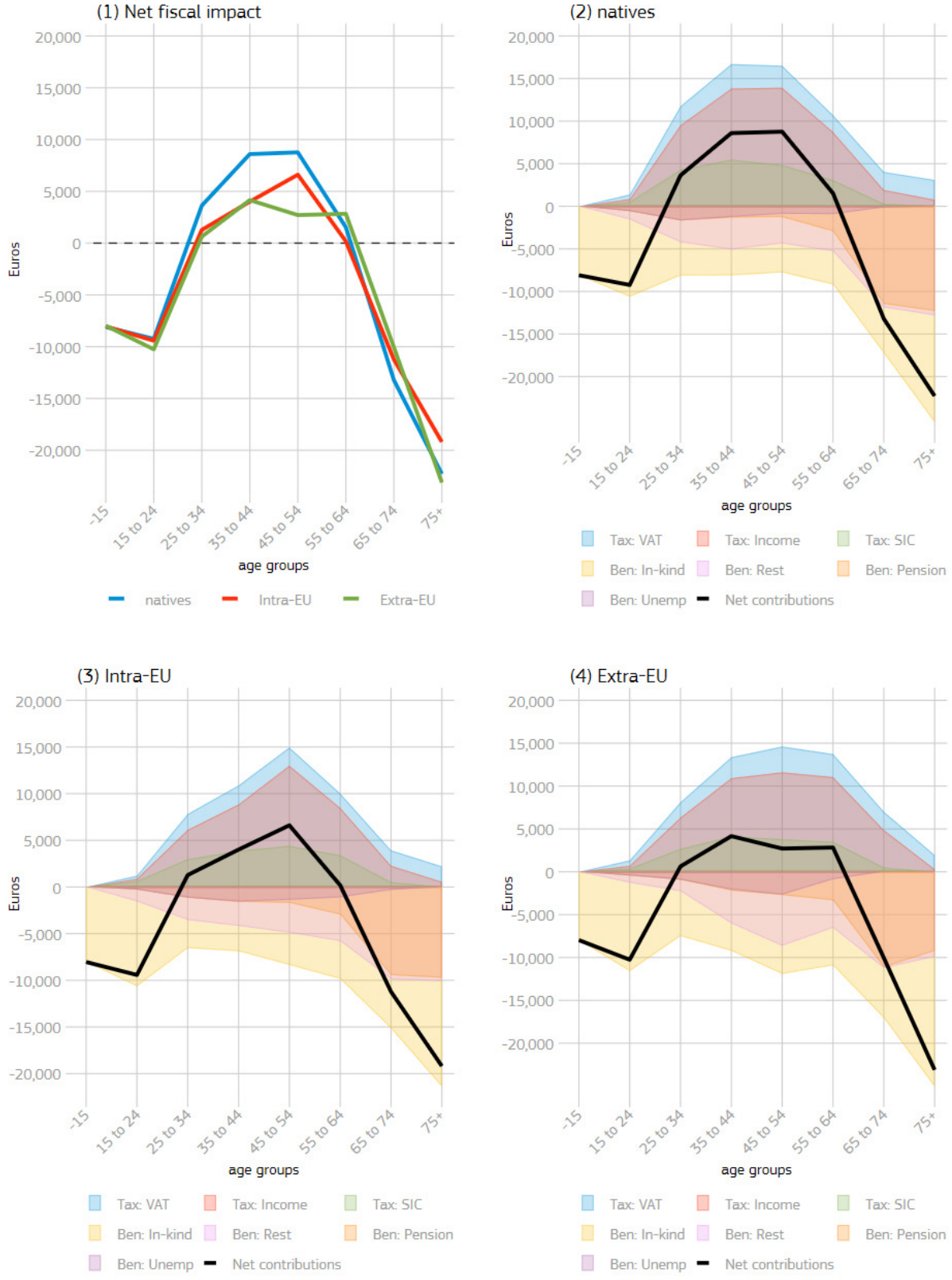
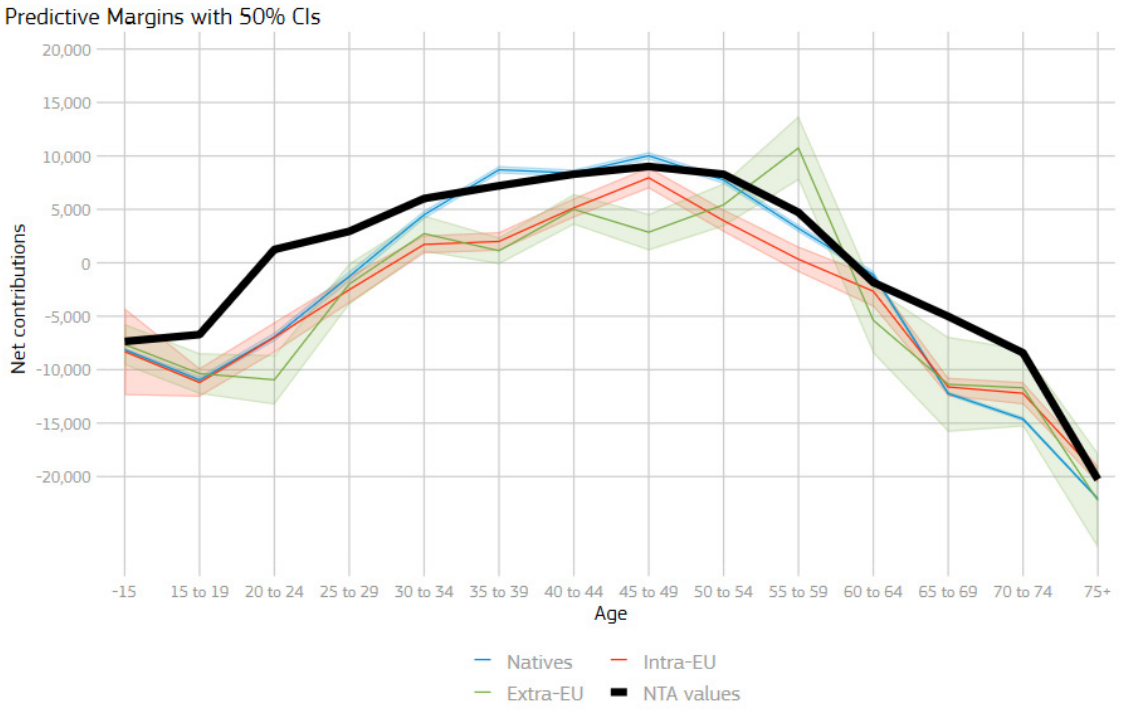


FIGURE 26. MODEL PREDICTIONS AND VALIDATION - IRELAND.



ITALY

FIGURE 27. DECOMPOSITION OF NET FISCAL IMPACT - ITALY.

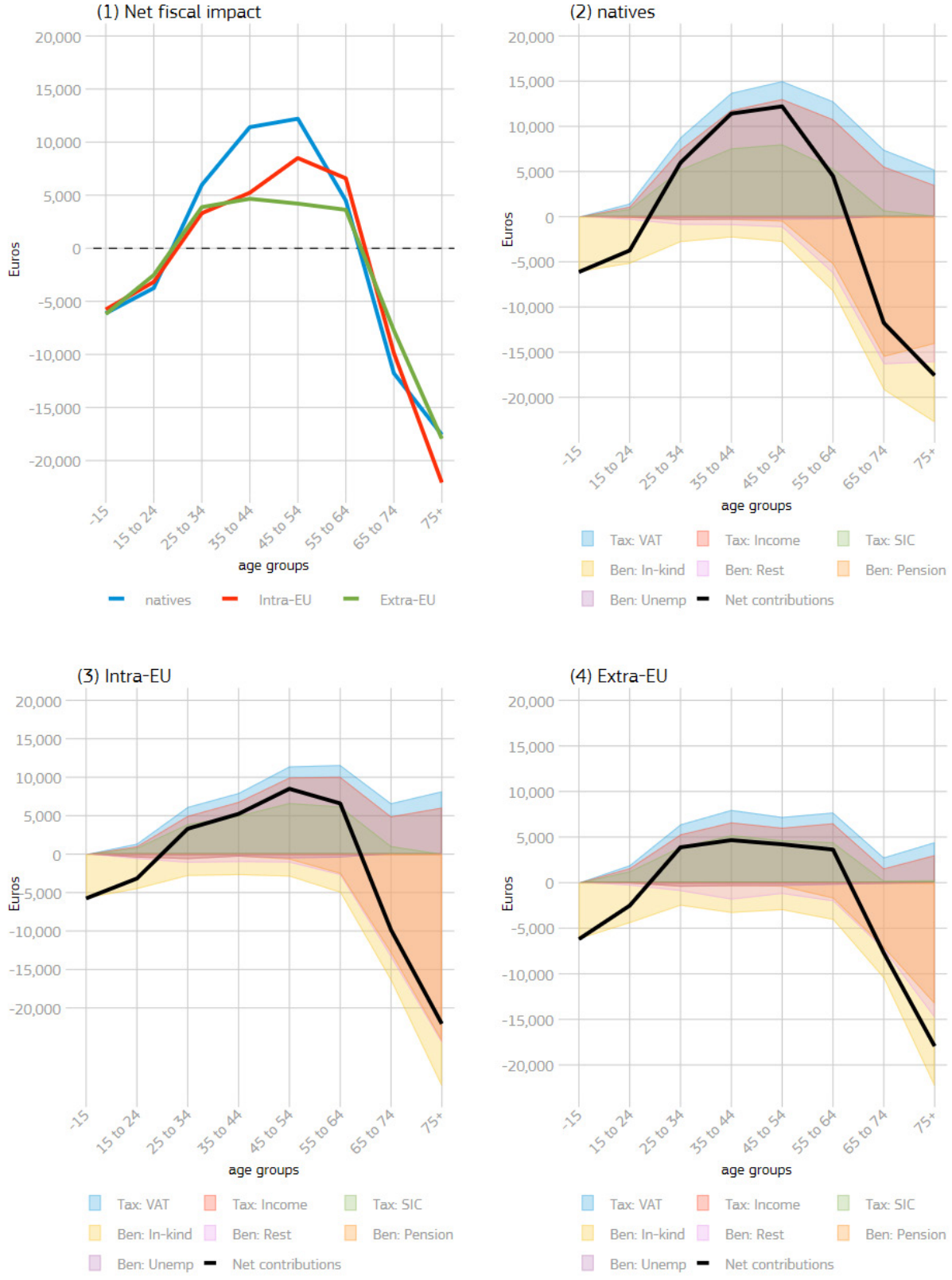
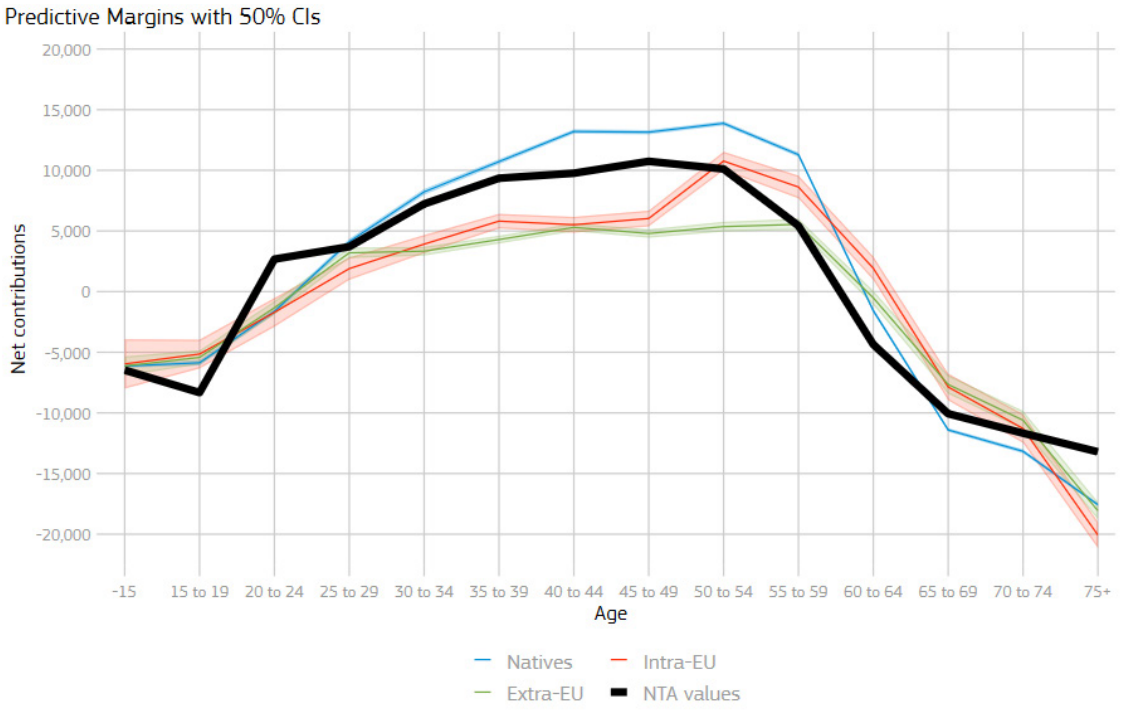


FIGURE 28. MODEL PREDICTIONS AND VALIDATION - ITALY.



NETHERLANDS

FIGURE 29. DECOMPOSITION OF NET FISCAL IMPACT - NETHERLANDS.

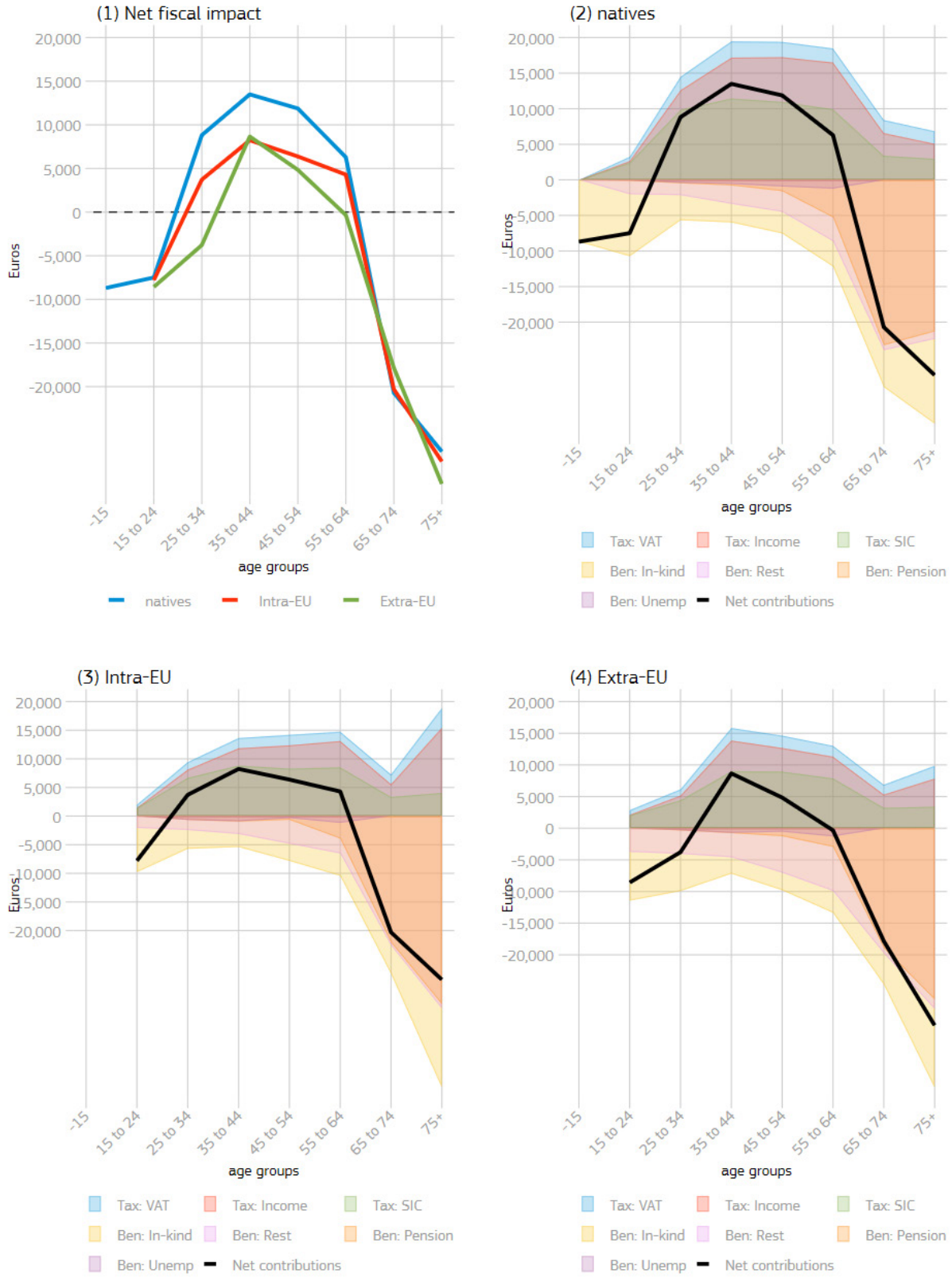
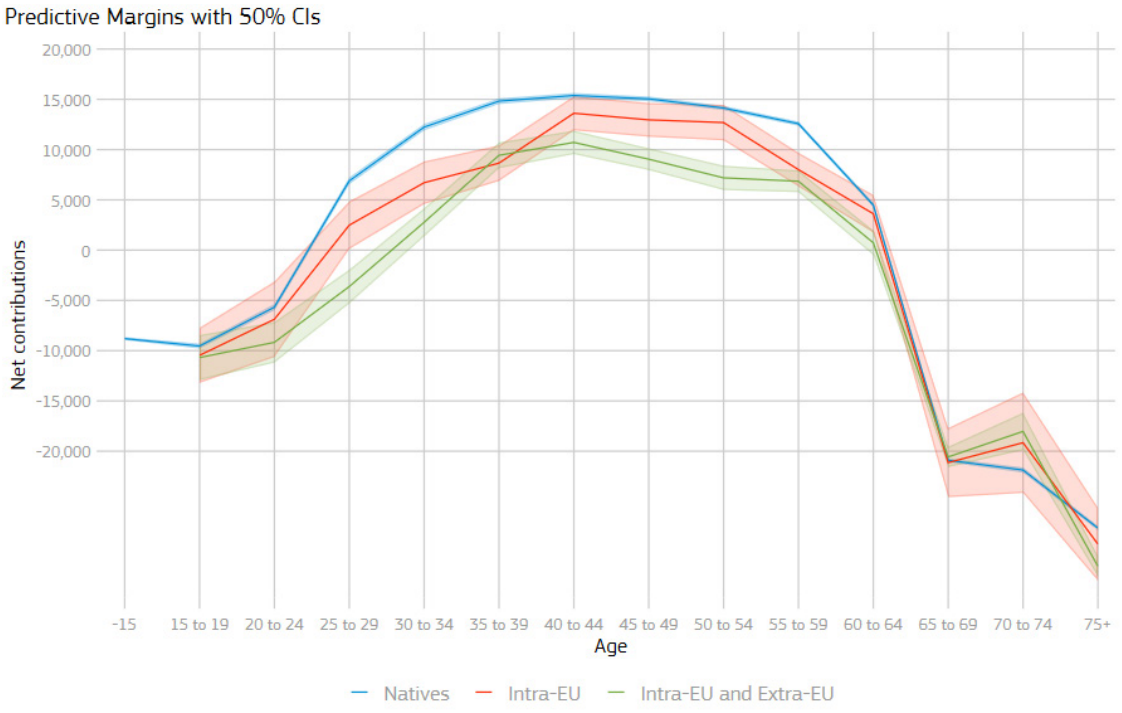


FIGURE 30. MODEL PREDICTIONS AND VALIDATION - NETHERLANDS.



CYPRUS

FIGURE 31. DECOMPOSITION OF NET FISCAL IMPACT - CYPRUS.

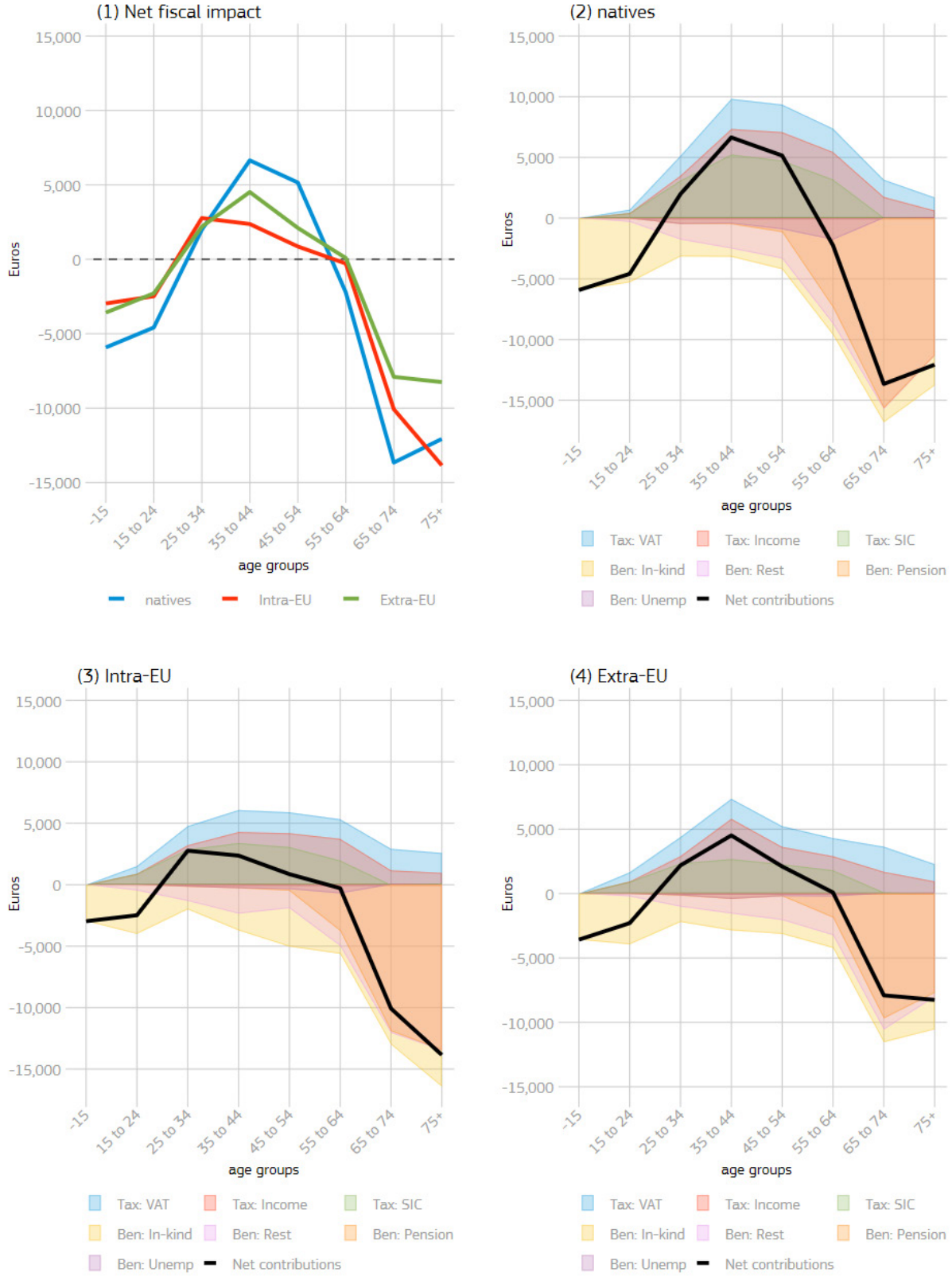
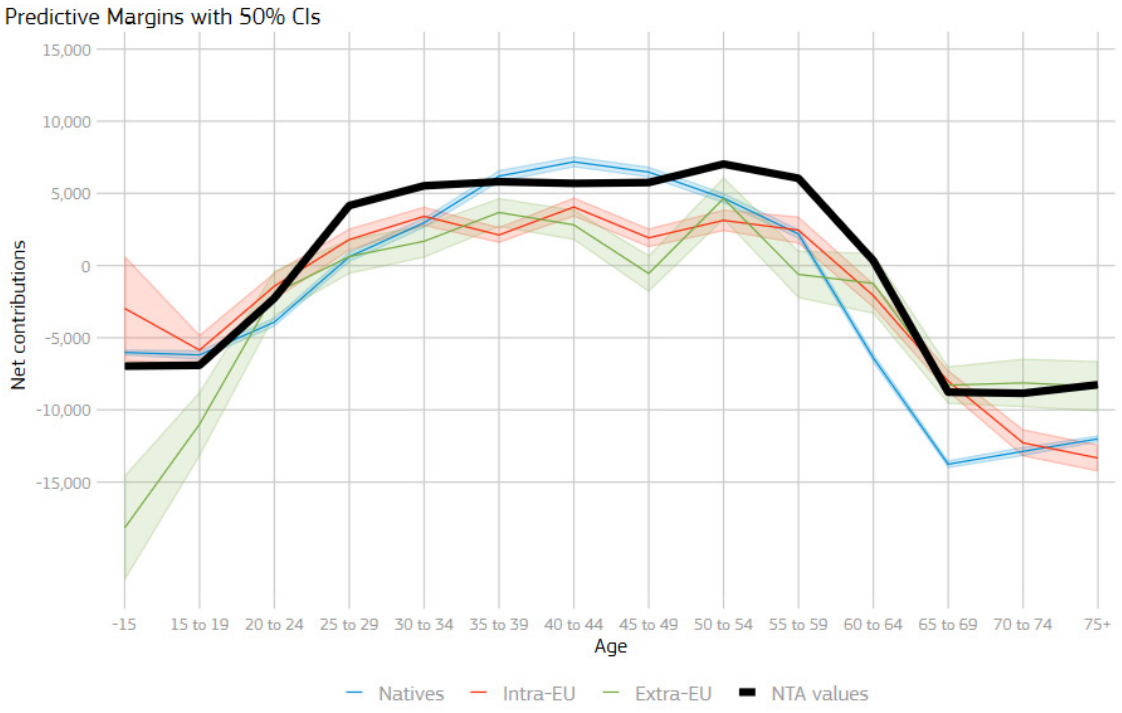


FIGURE 32. MODEL PREDICTIONS AND VALIDATION - CYPRUS.



SPAIN

FIGURE 33. DECOMPOSITION OF NET FISCAL IMPACT - SPAIN.

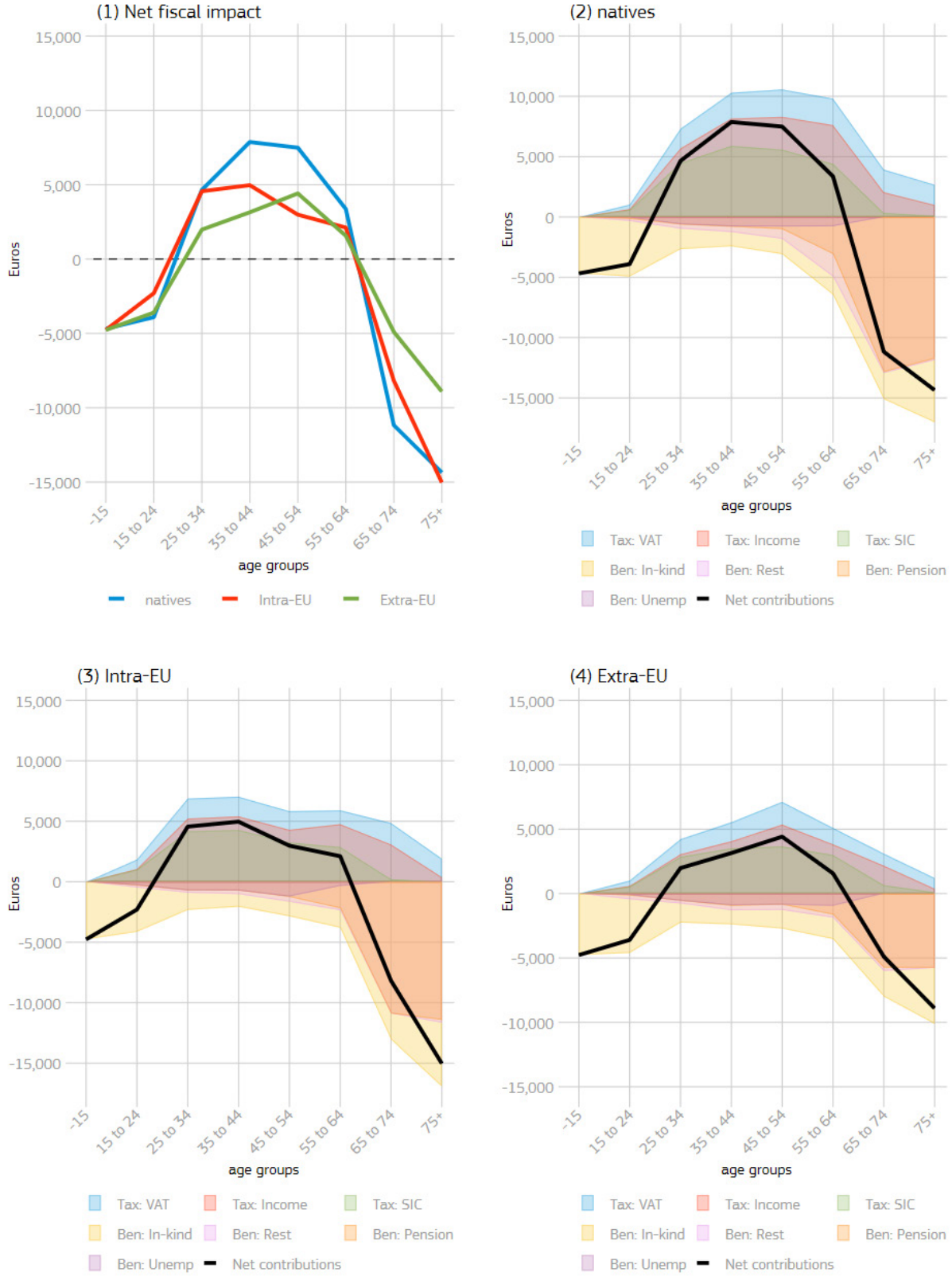
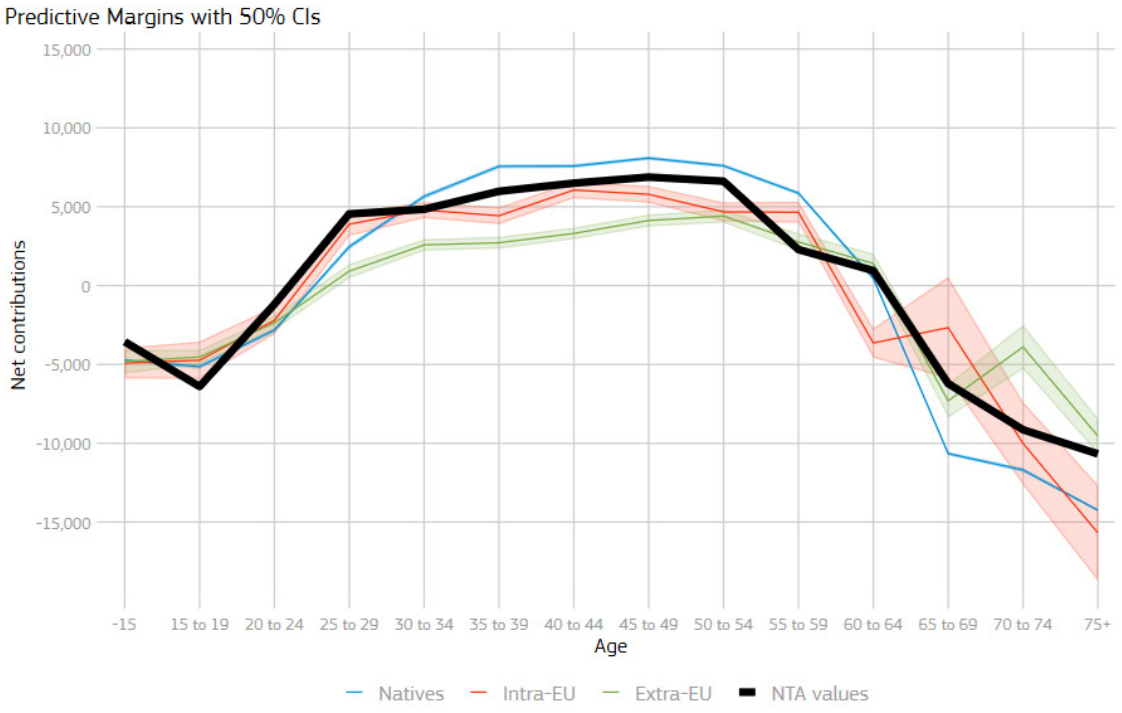


FIGURE 34. MODEL PREDICTIONS AND VALIDATION - SPAIN.



SLOVENIA

FIGURE 35. DECOMPOSITION OF NET FISCAL IMPACT - SLOVENIA.

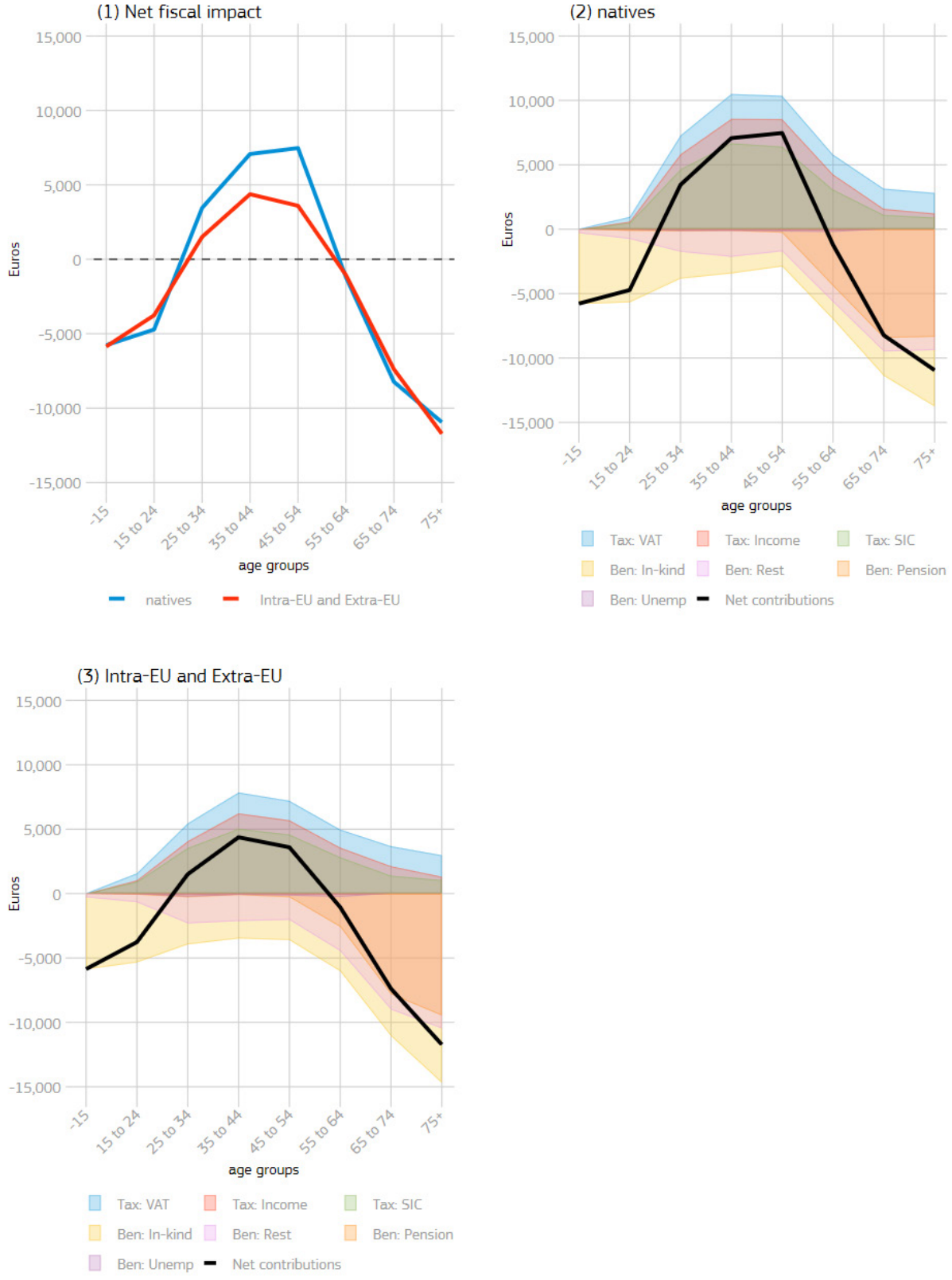
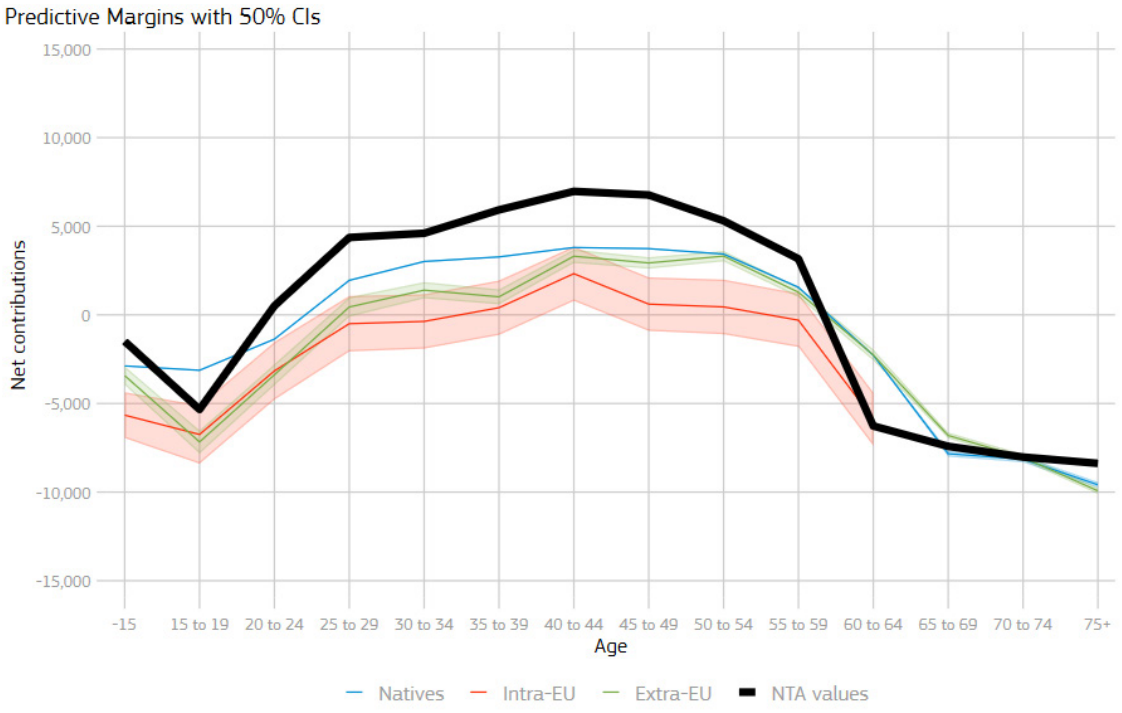


FIGURE 36. MODEL PREDICTIONS AND VALIDATION - SLOVENIA.



CZECHIA

FIGURE 37. DECOMPOSITION OF NET FISCAL IMPACT - CZECHIA.

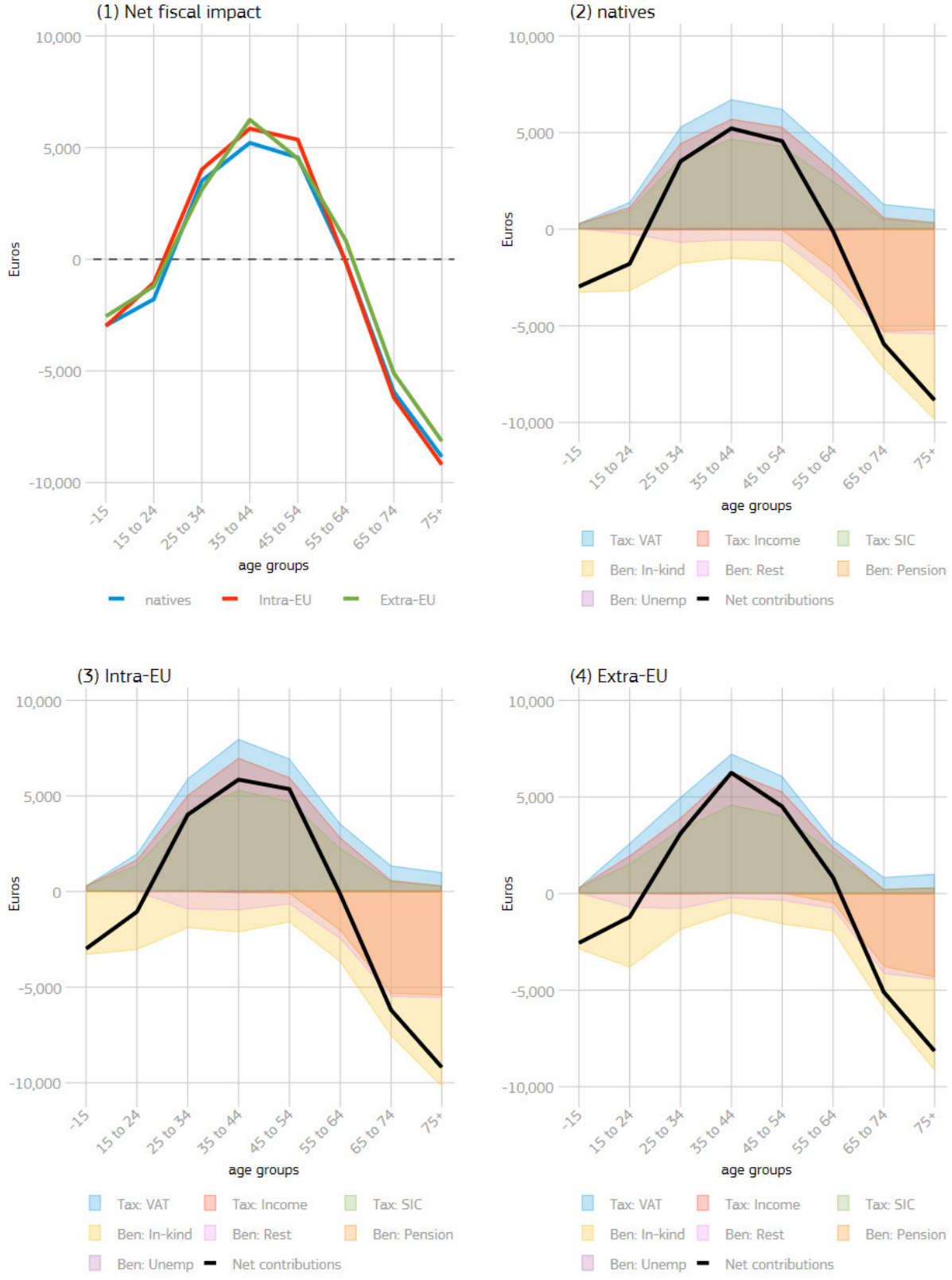
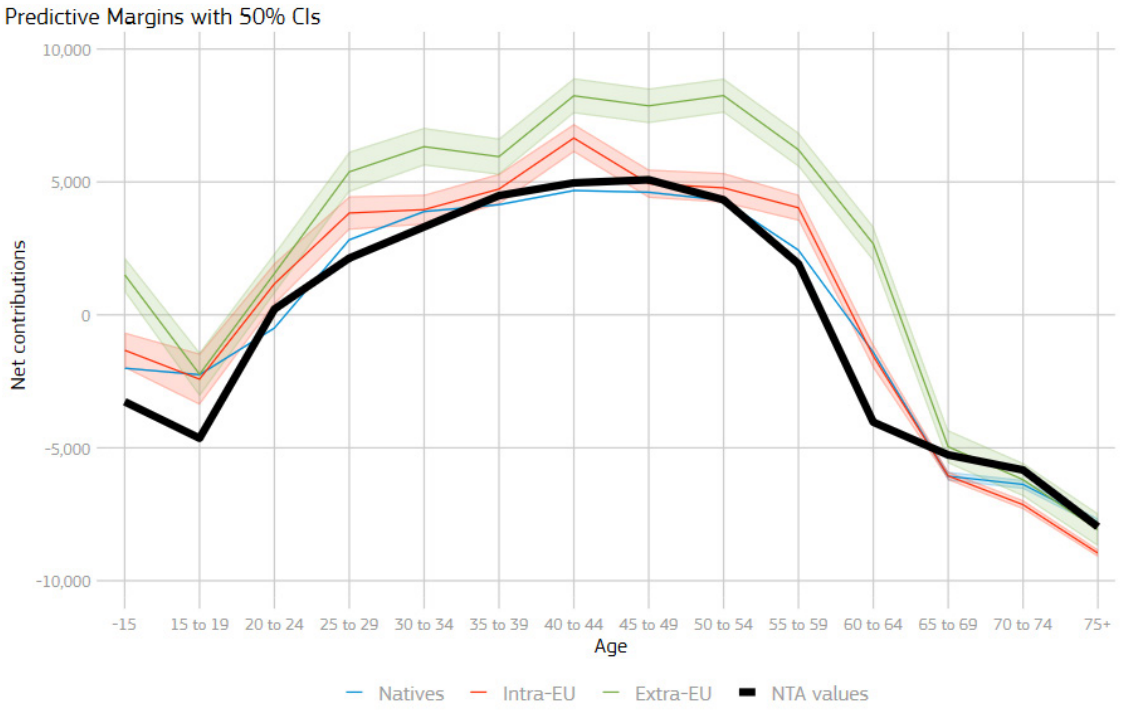


FIGURE 38. MODEL PREDICTIONS AND VALIDATION - CZECHIA.



ESTONIA

FIGURE 39. DECOMPOSITION OF NET FISCAL IMPACT - ESTONIA.

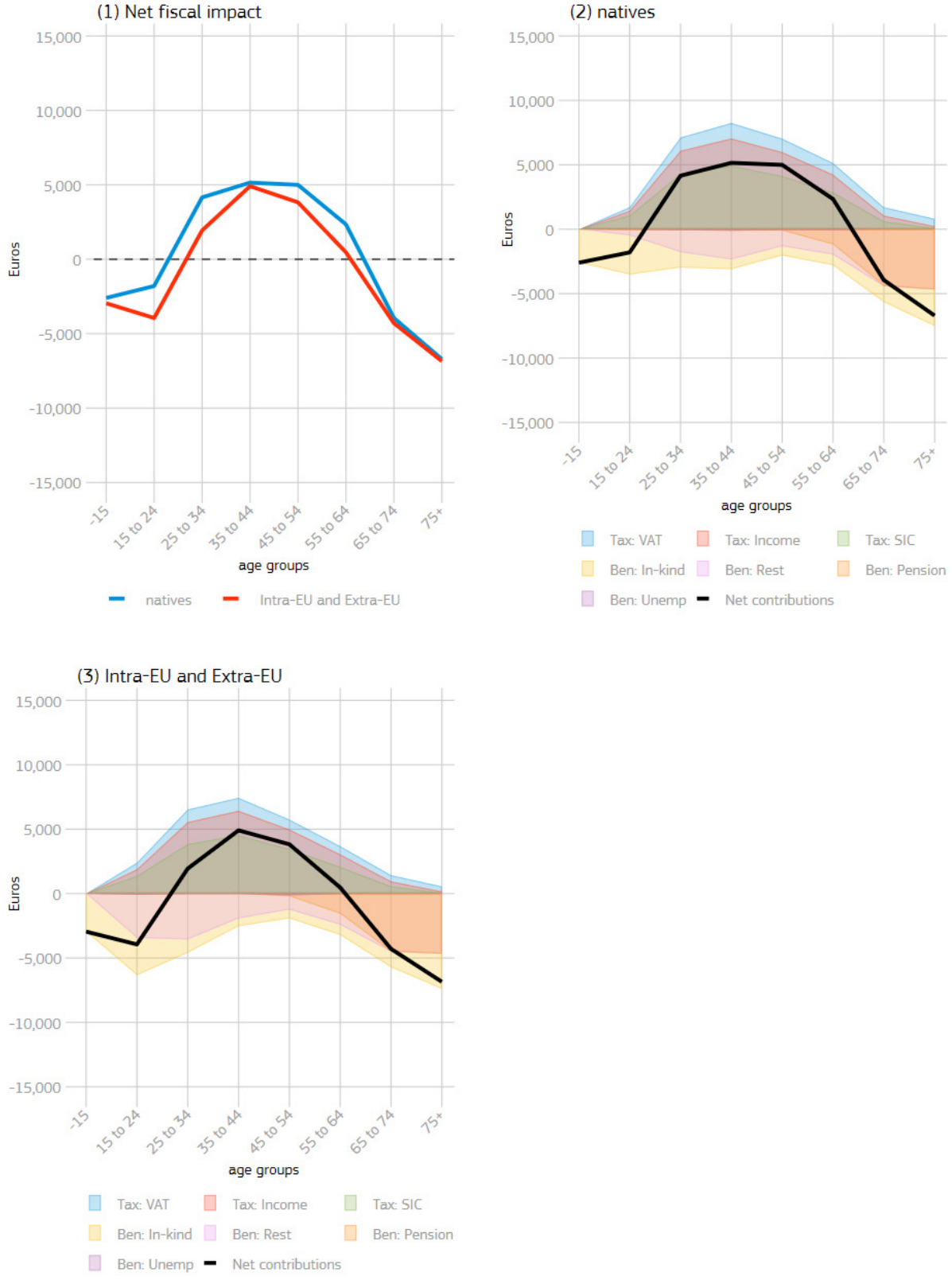
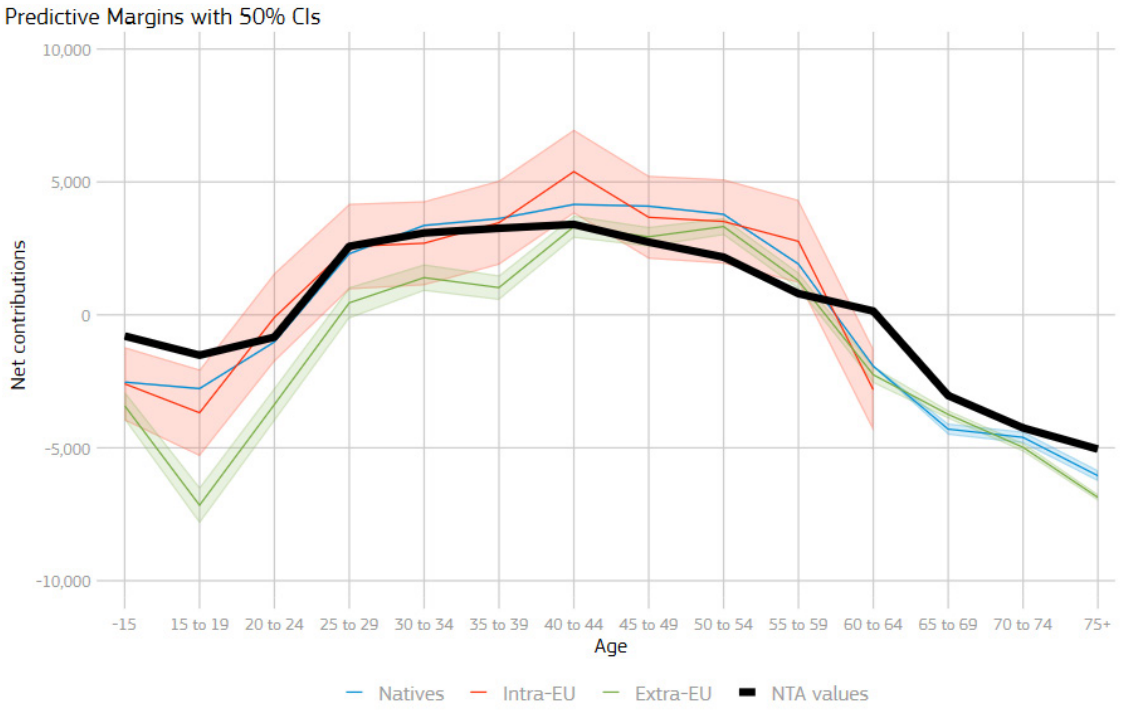


FIGURE 40. MODEL PREDICTIONS AND VALIDATION - ESTONIA.



GREECE

FIGURE 41. DECOMPOSITION OF NET FISCAL IMPACT - GREECE.

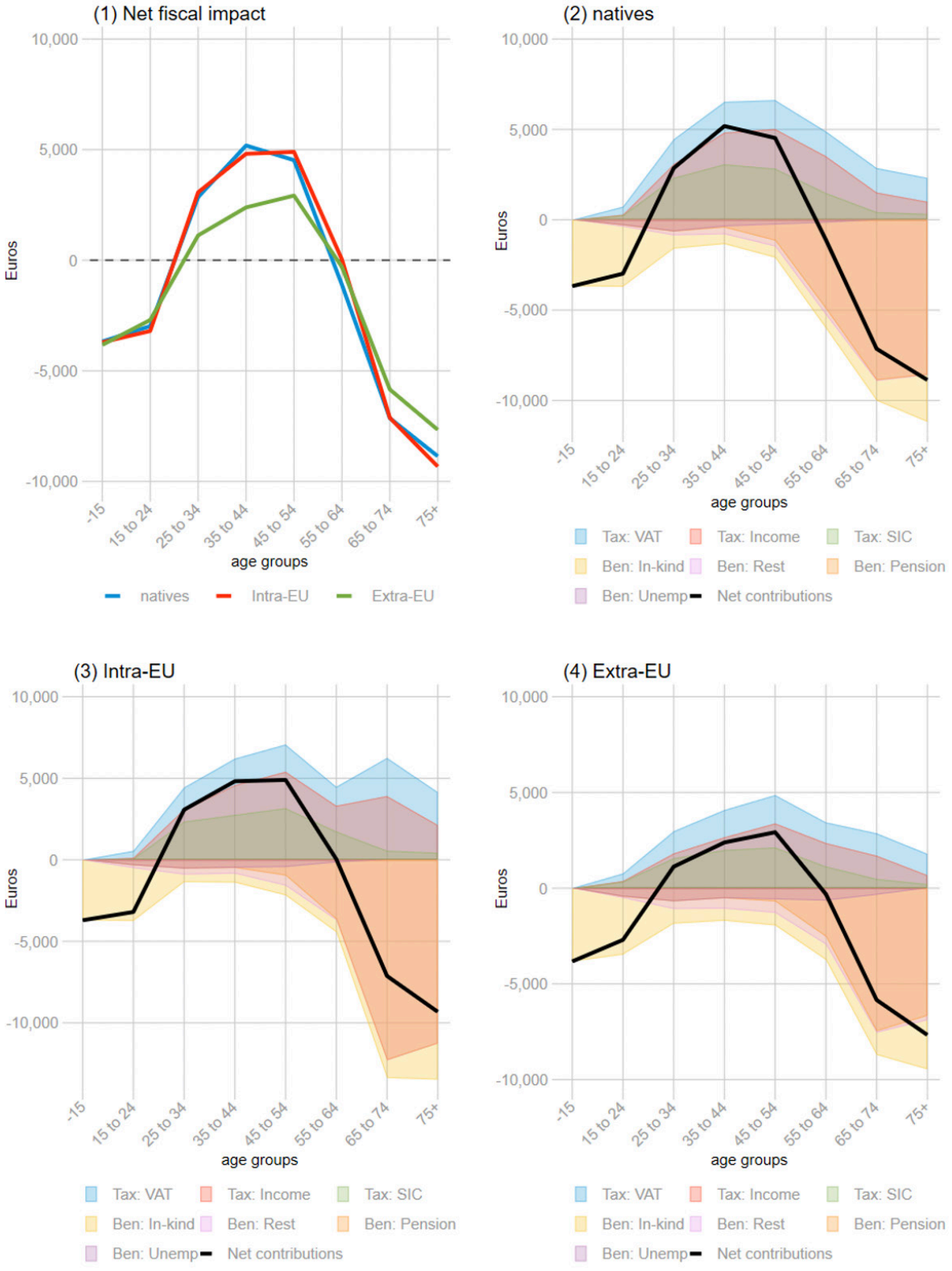
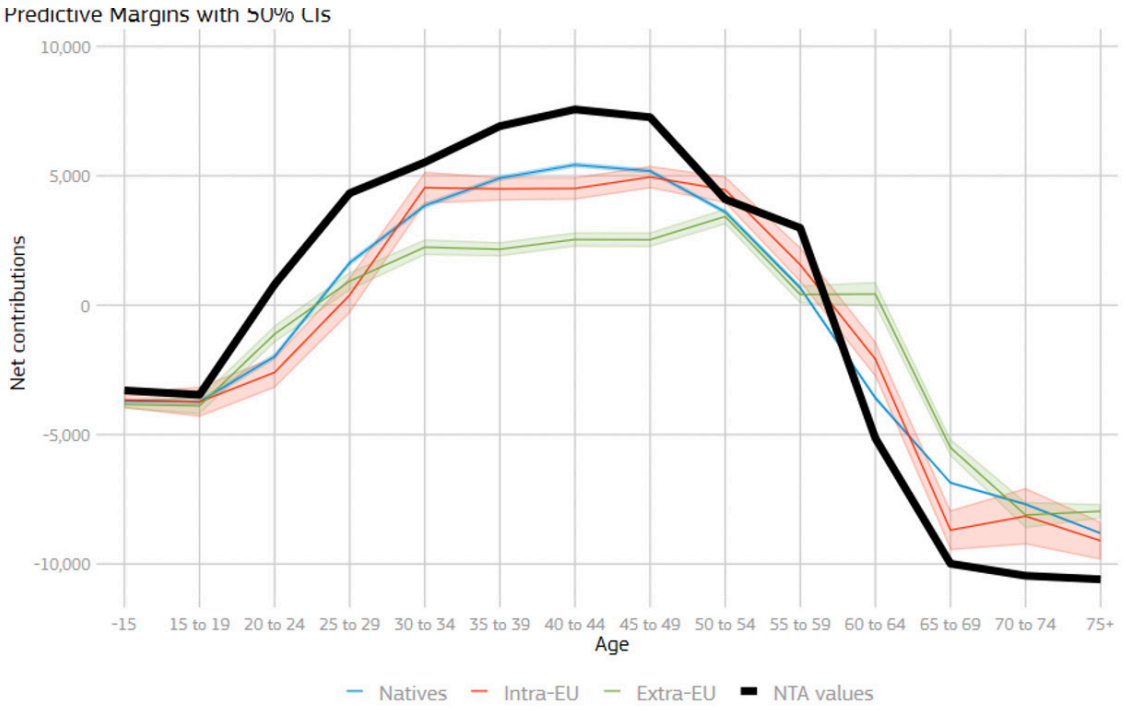


FIGURE 42. MODEL PREDICTIONS AND VALIDATION - GREECE.



HUNGARY

FIGURE 43. DECOMPOSITION OF NET FISCAL IMPACT - HUNGARY.

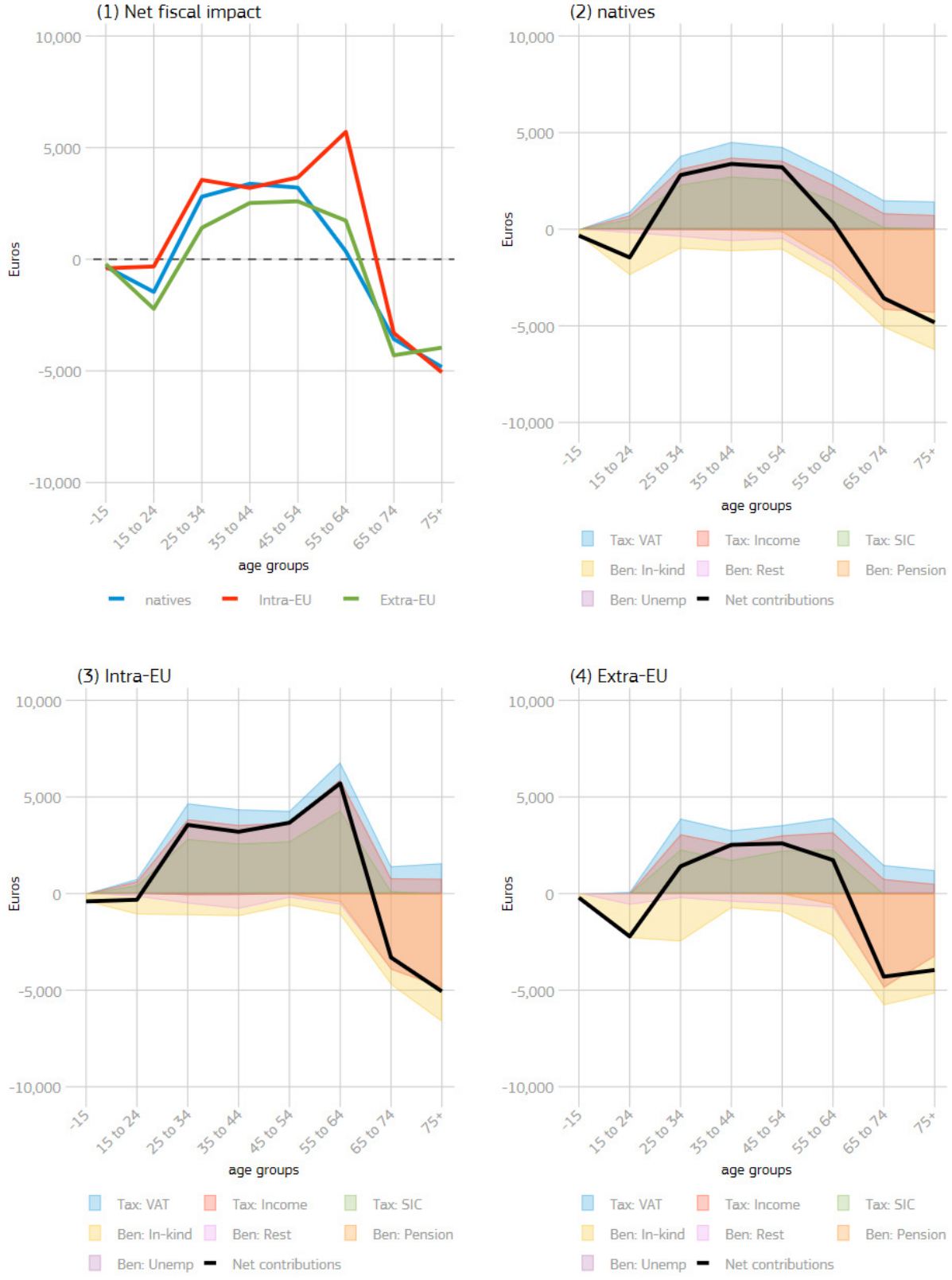
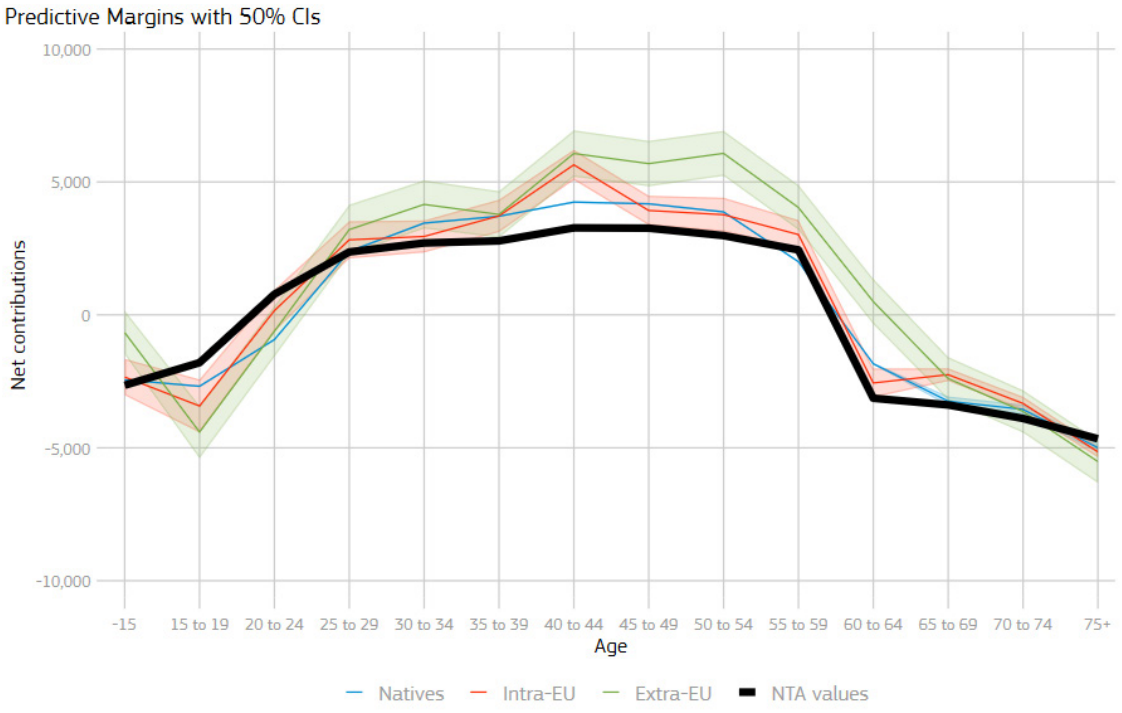


FIGURE 44. MODEL PREDICTIONS AND VALIDATION - HUNGARY.



LITHUANIA

FIGURE 45. DECOMPOSITION OF NET FISCAL IMPACT - LITHUANIA.

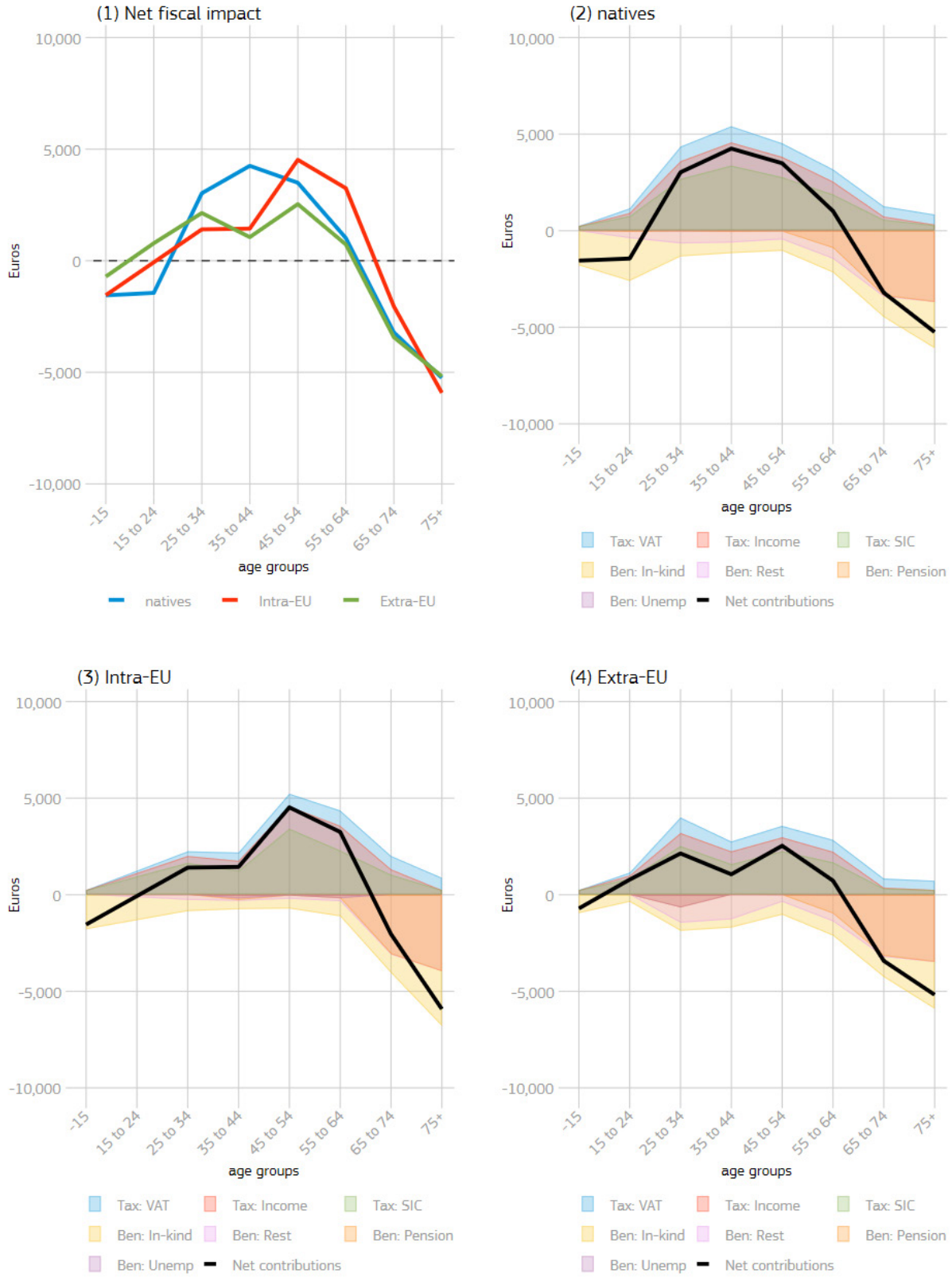
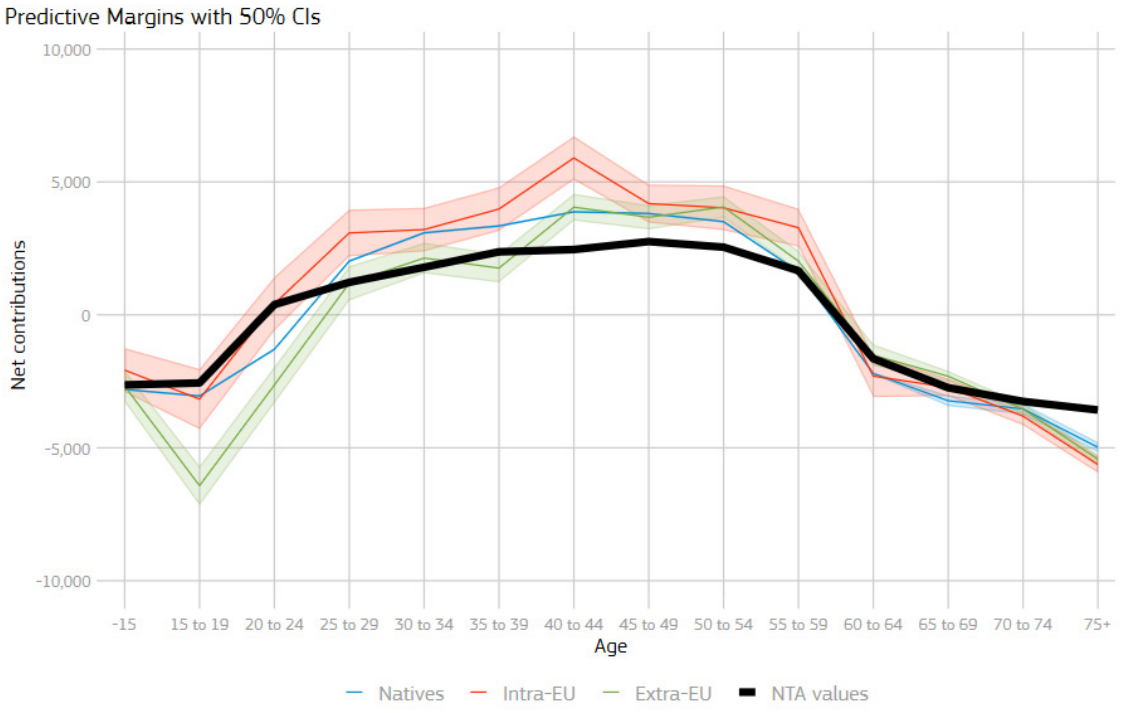


FIGURE 46. MODEL PREDICTIONS AND VALIDATION - LITHUANIA.



POLAND

FIGURE 47. DECOMPOSITION OF NET FISCAL IMPACT - POLAND.

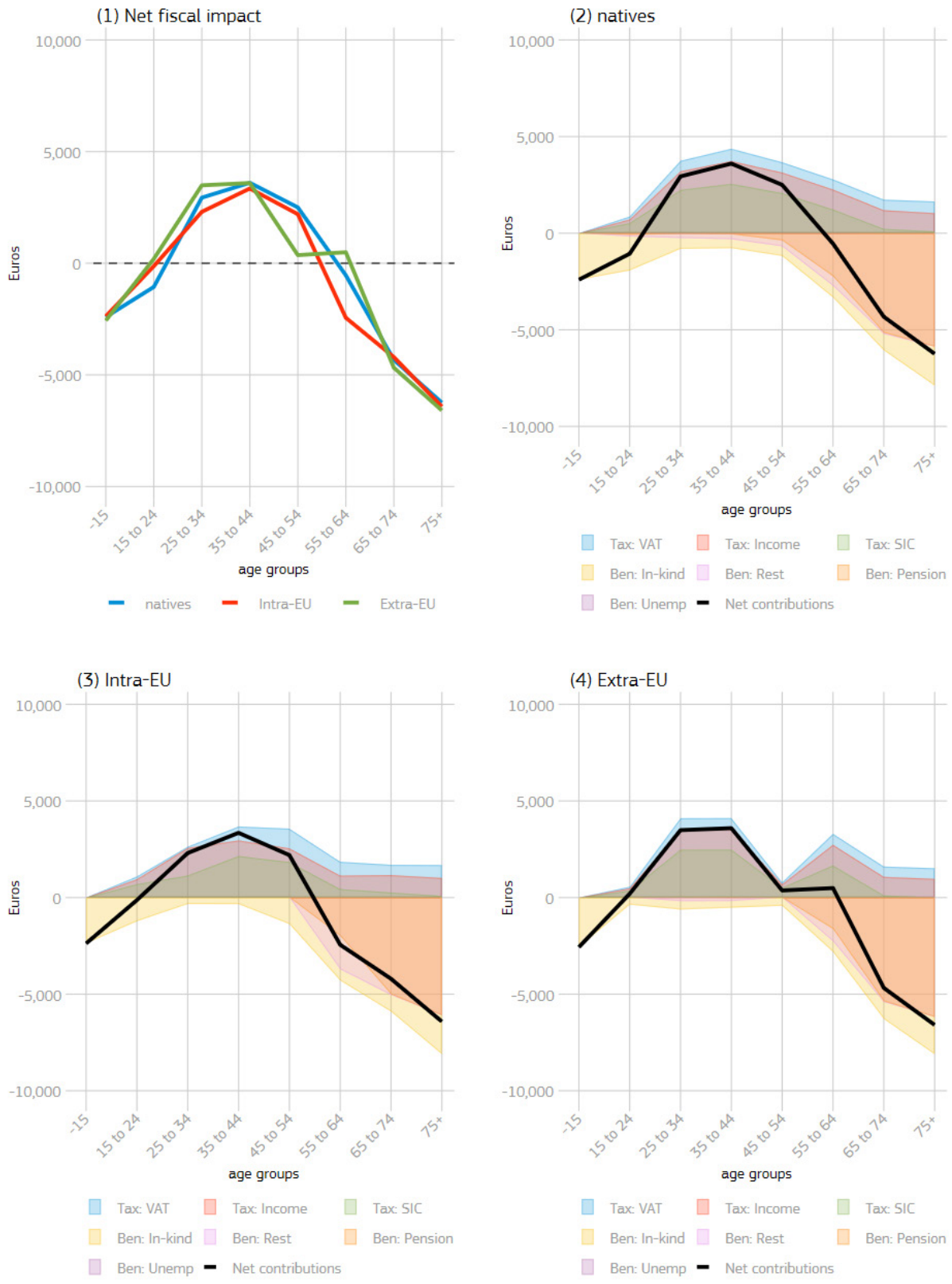
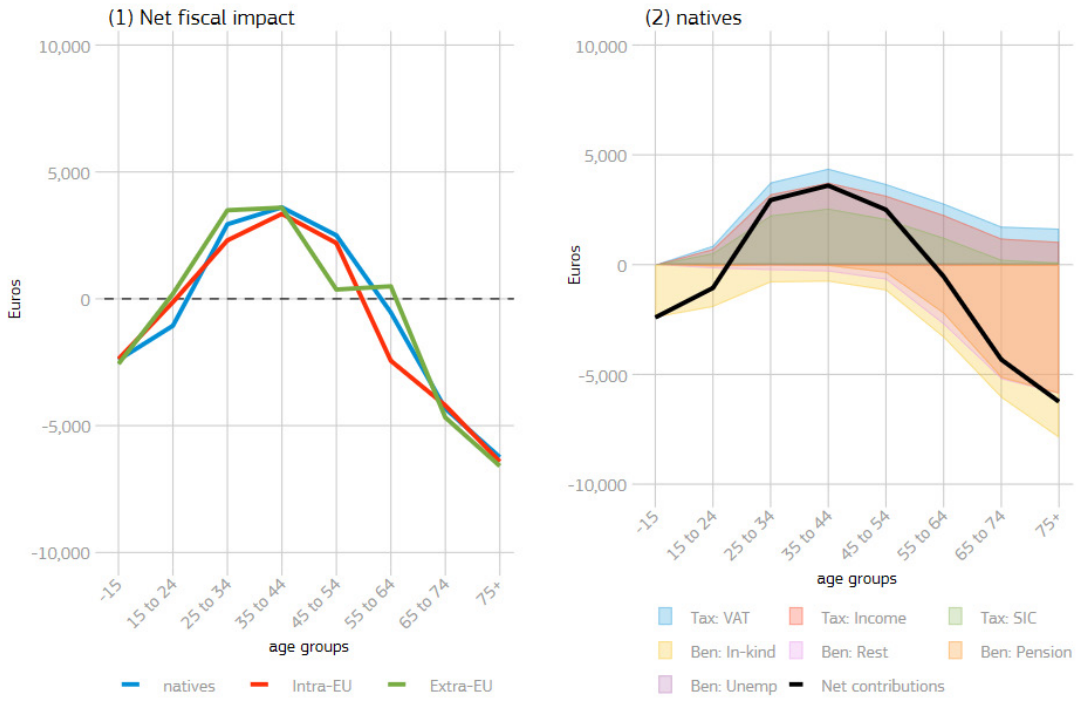


FIGURE 48. MODEL PREDICTIONS AND VALIDATION - POLAND.



PORTUGAL

FIGURE 49. DECOMPOSITION OF NET FISCAL IMPACT - PORTUGAL.

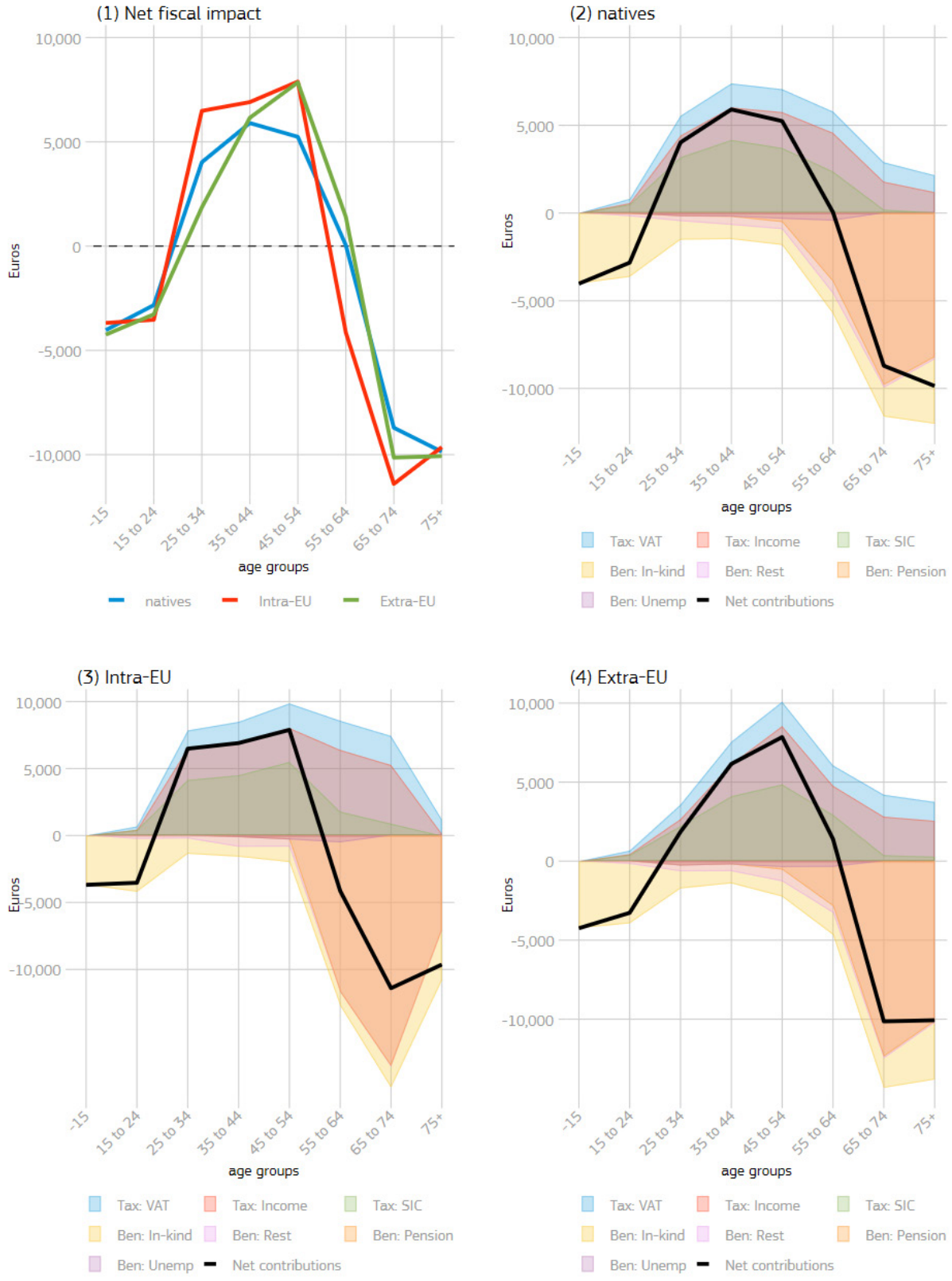
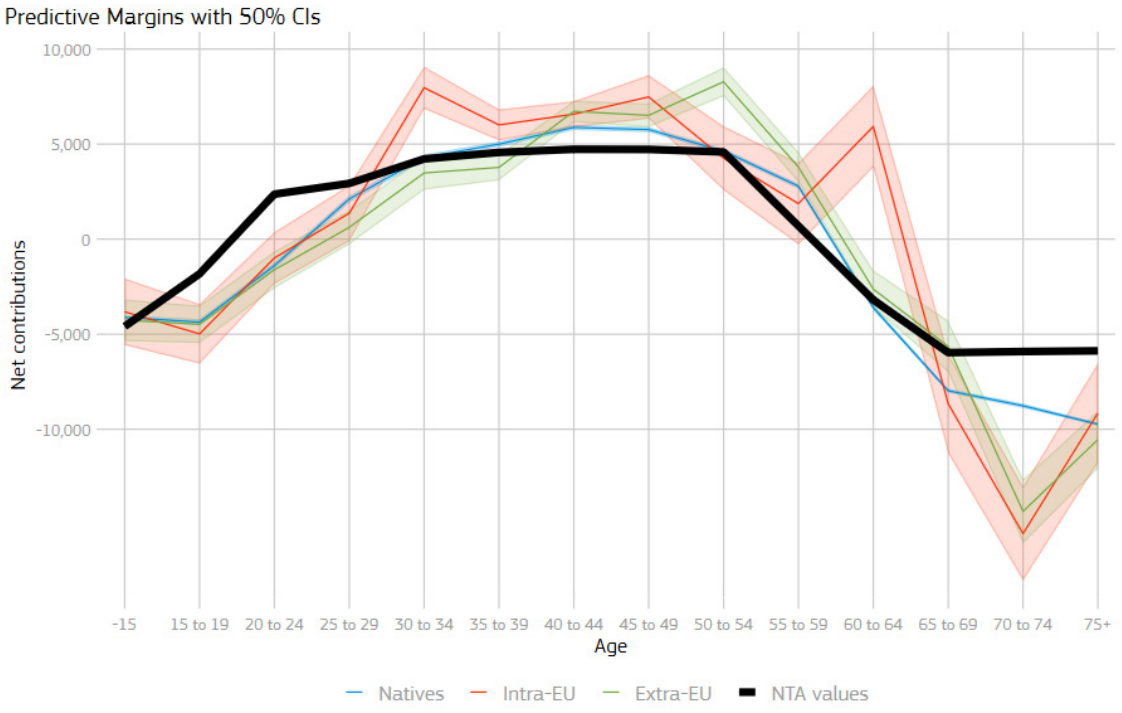


FIGURE 50. MODEL PREDICTIONS AND VALIDATION - PORTUGAL.



SLOVAKIA

FIGURE 51. DECOMPOSITION OF NET FISCAL IMPACT - SLOVAKIA.

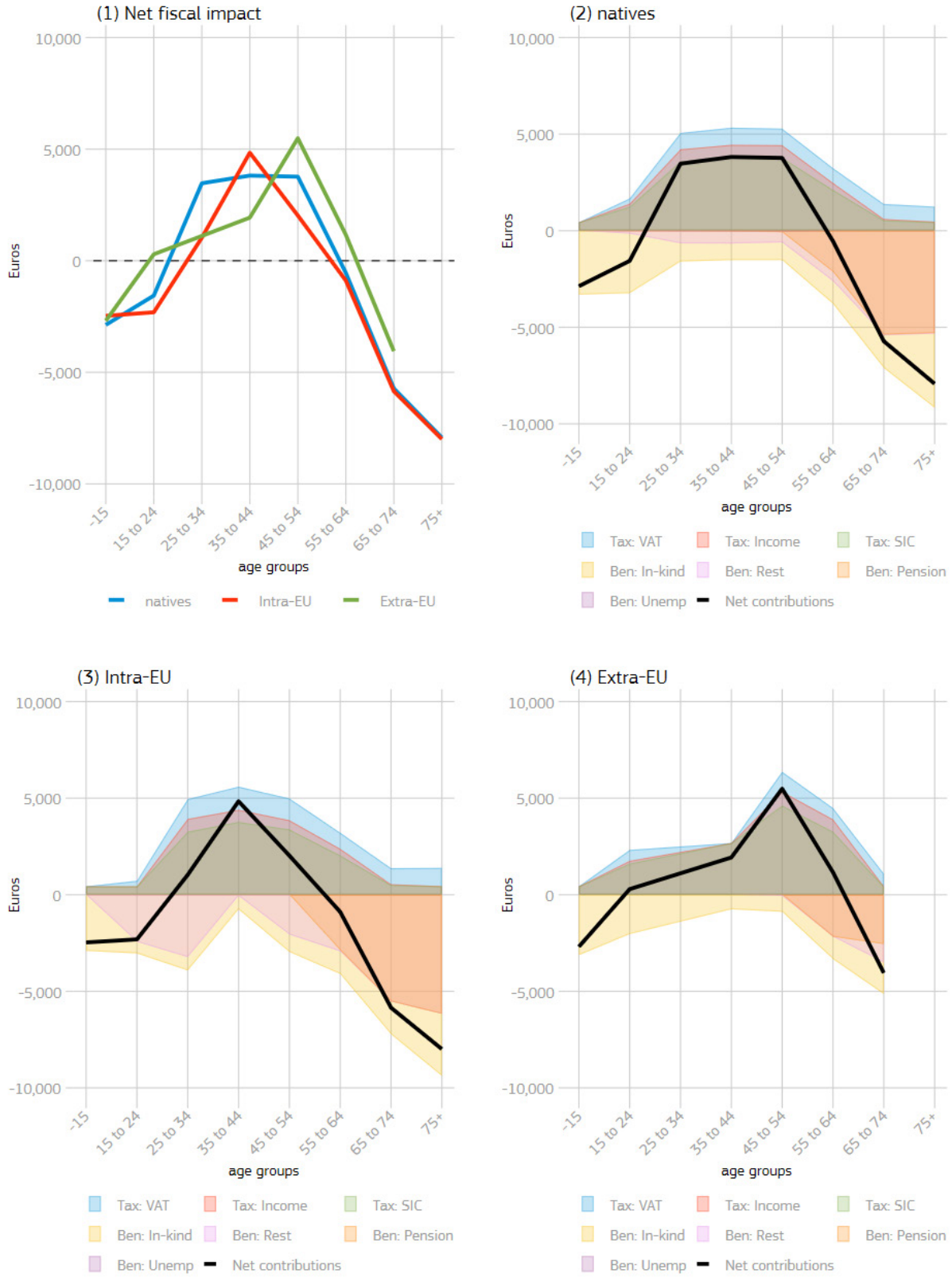
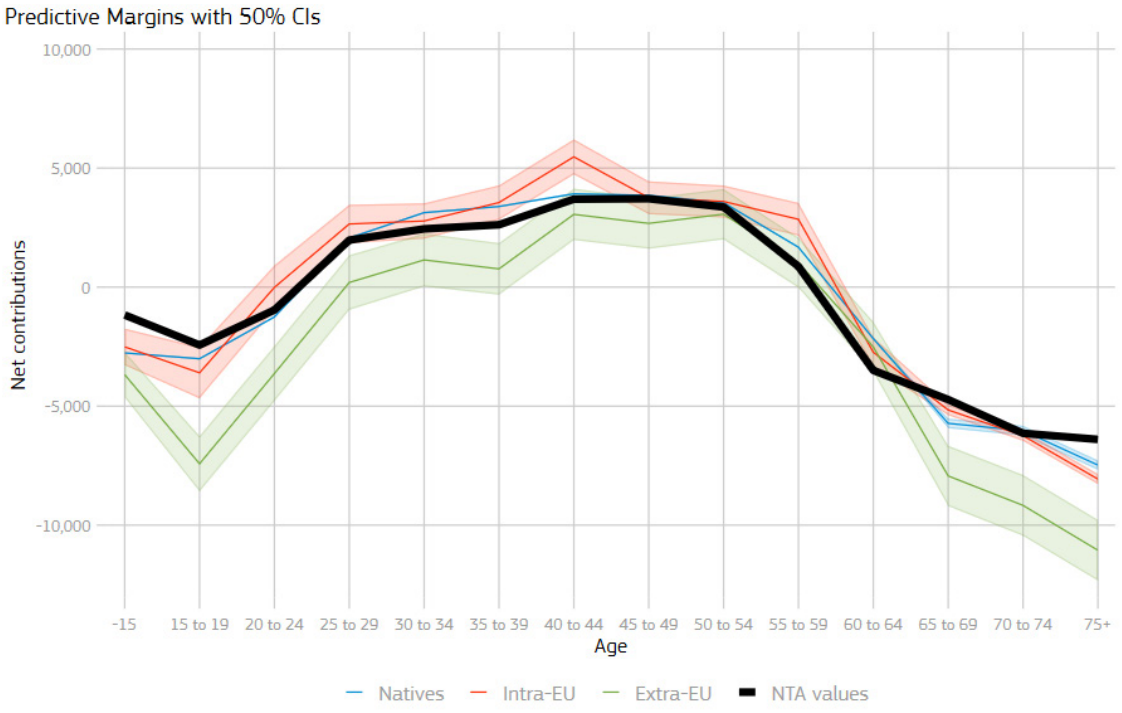


FIGURE 52. MODEL PREDICTIONS AND VALIDATION - SLOVAKIA.



BULGARIA

FIGURE 53. DECOMPOSITION OF NET FISCAL IMPACT - PORTUGAL.

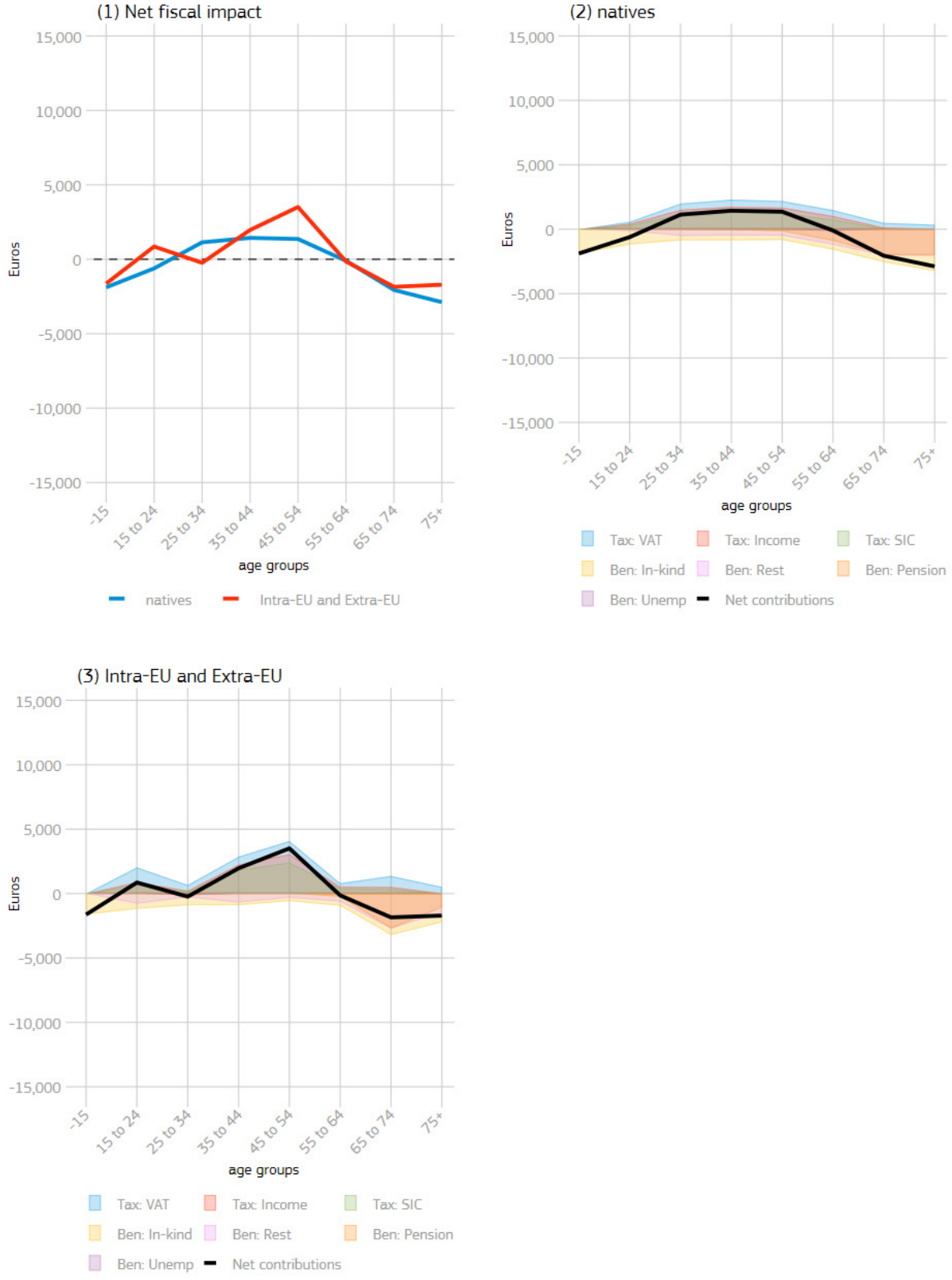
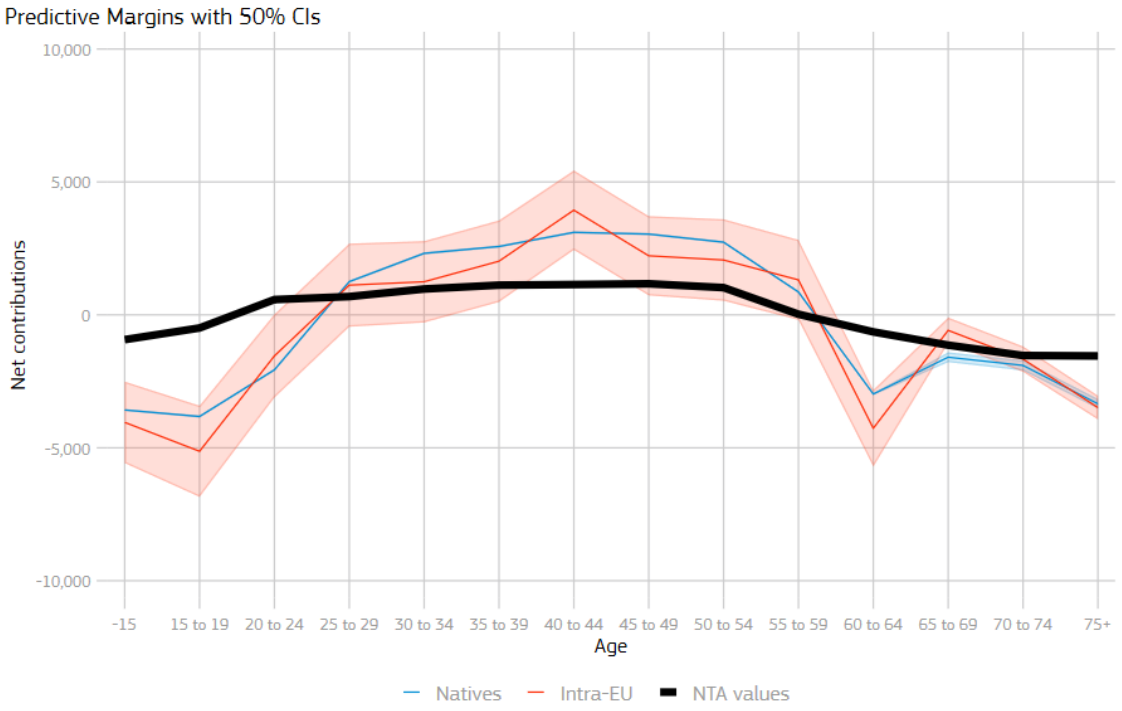


FIGURE 54. MODEL PREDICTIONS AND VALIDATION - BULGARIA.



CROATIA

FIGURE 55. DECOMPOSITION OF NET FISCAL IMPACT - CROATIA.

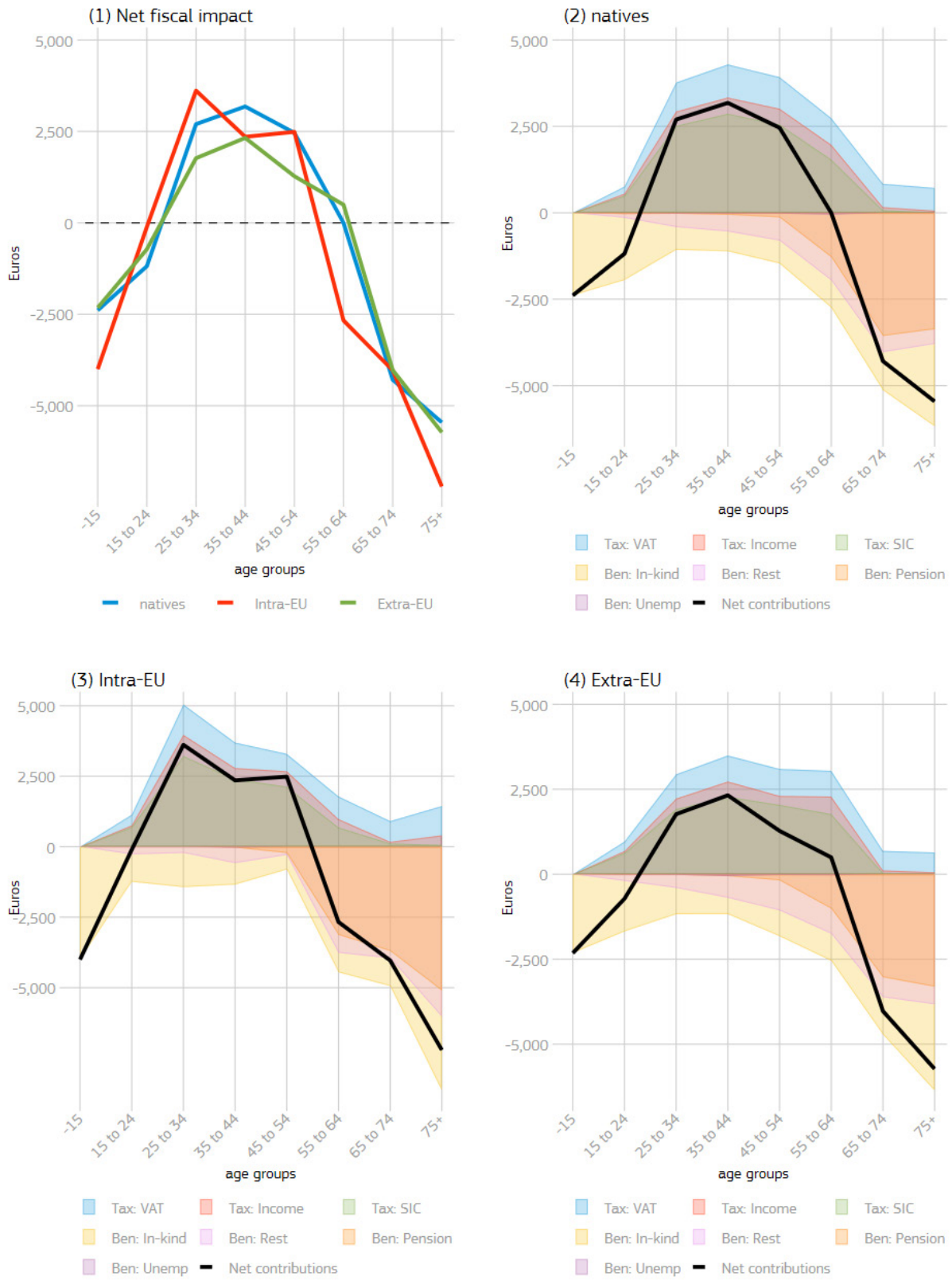
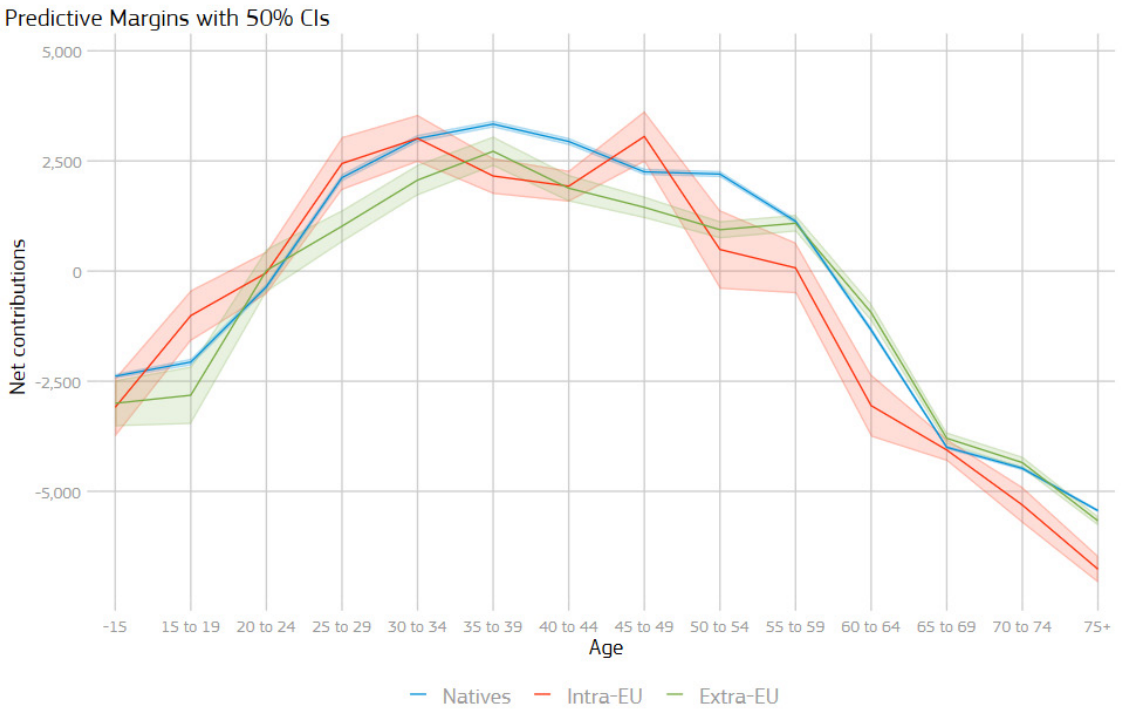


FIGURE 56. MODEL PREDICTIONS AND VALIDATION - CROATIA.



ROMANIA

FIGURE 57. DECOMPOSITION OF NET FISCAL IMPACT - ROMANIA.

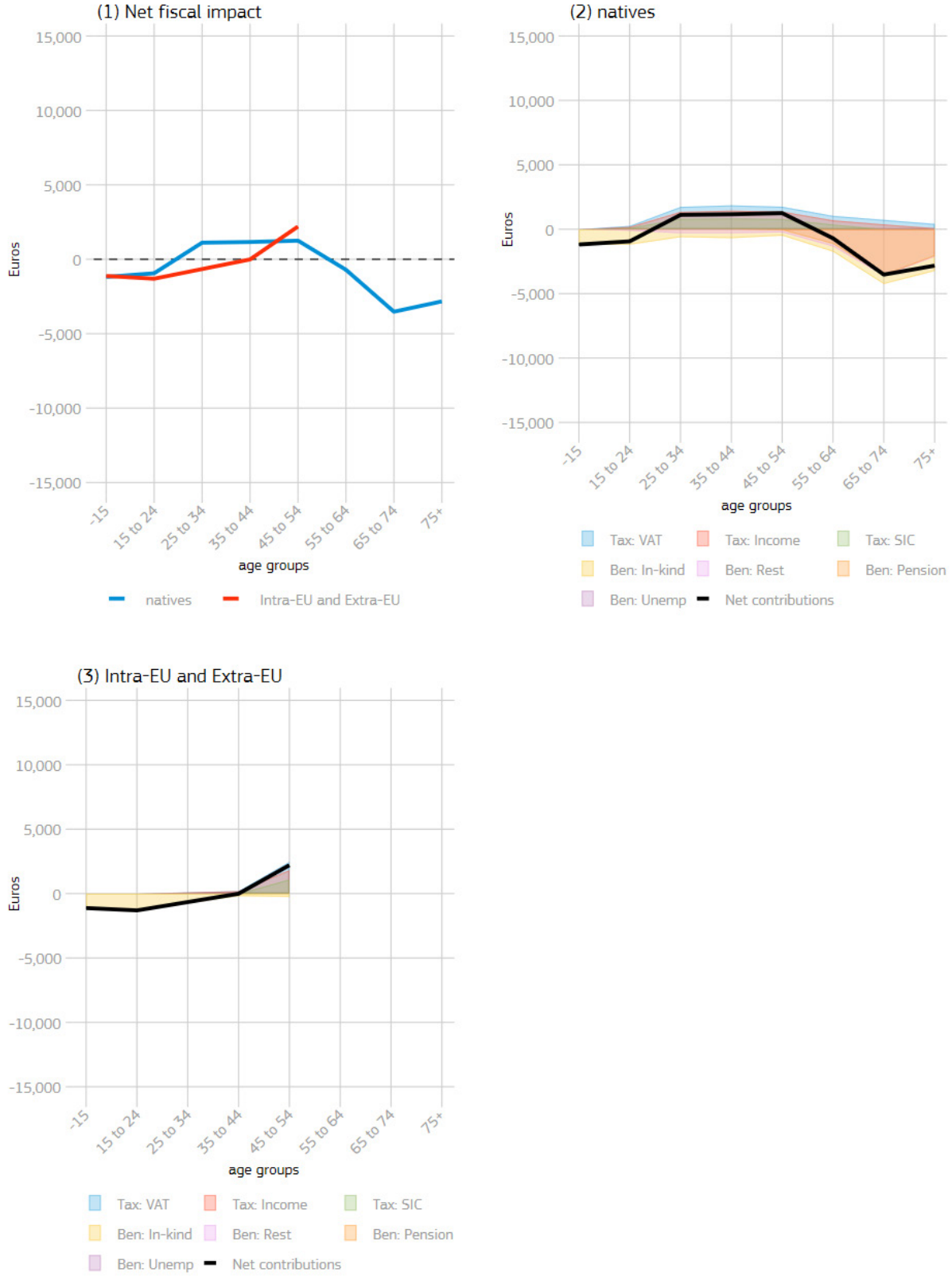
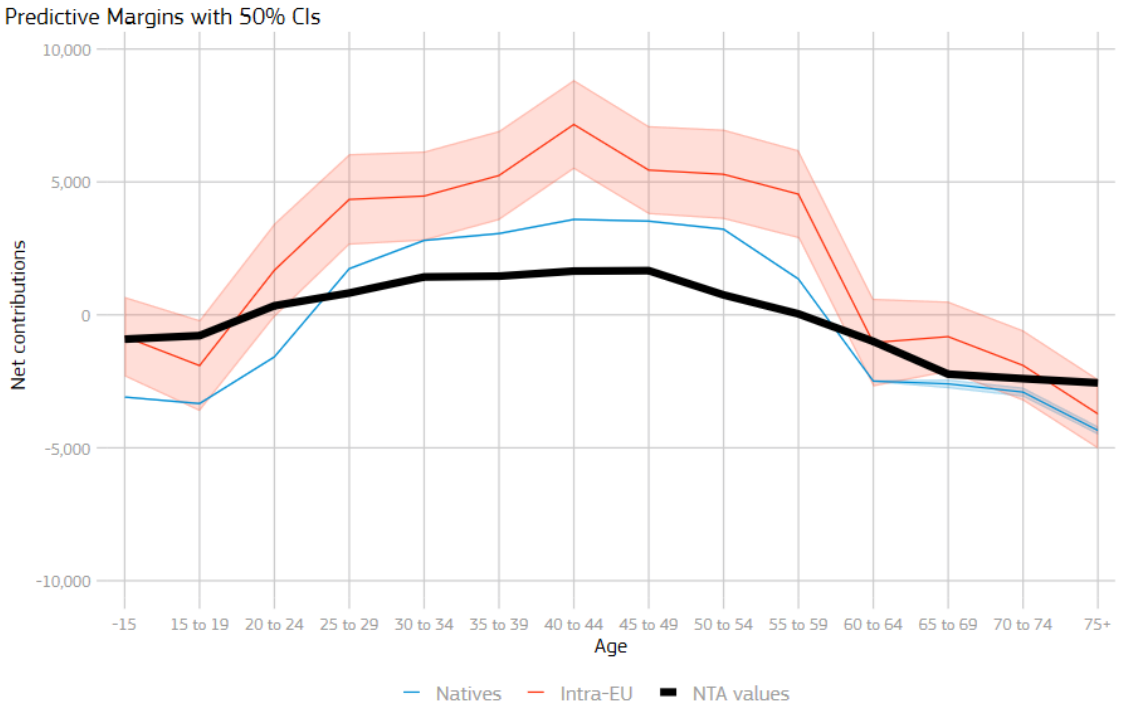


FIGURE 58. MODEL PREDICTIONS AND VALIDATION - ROMANIA.



MALTA

FIGURE 59. DECOMPOSITION OF NET FISCAL IMPACT - MALTA.

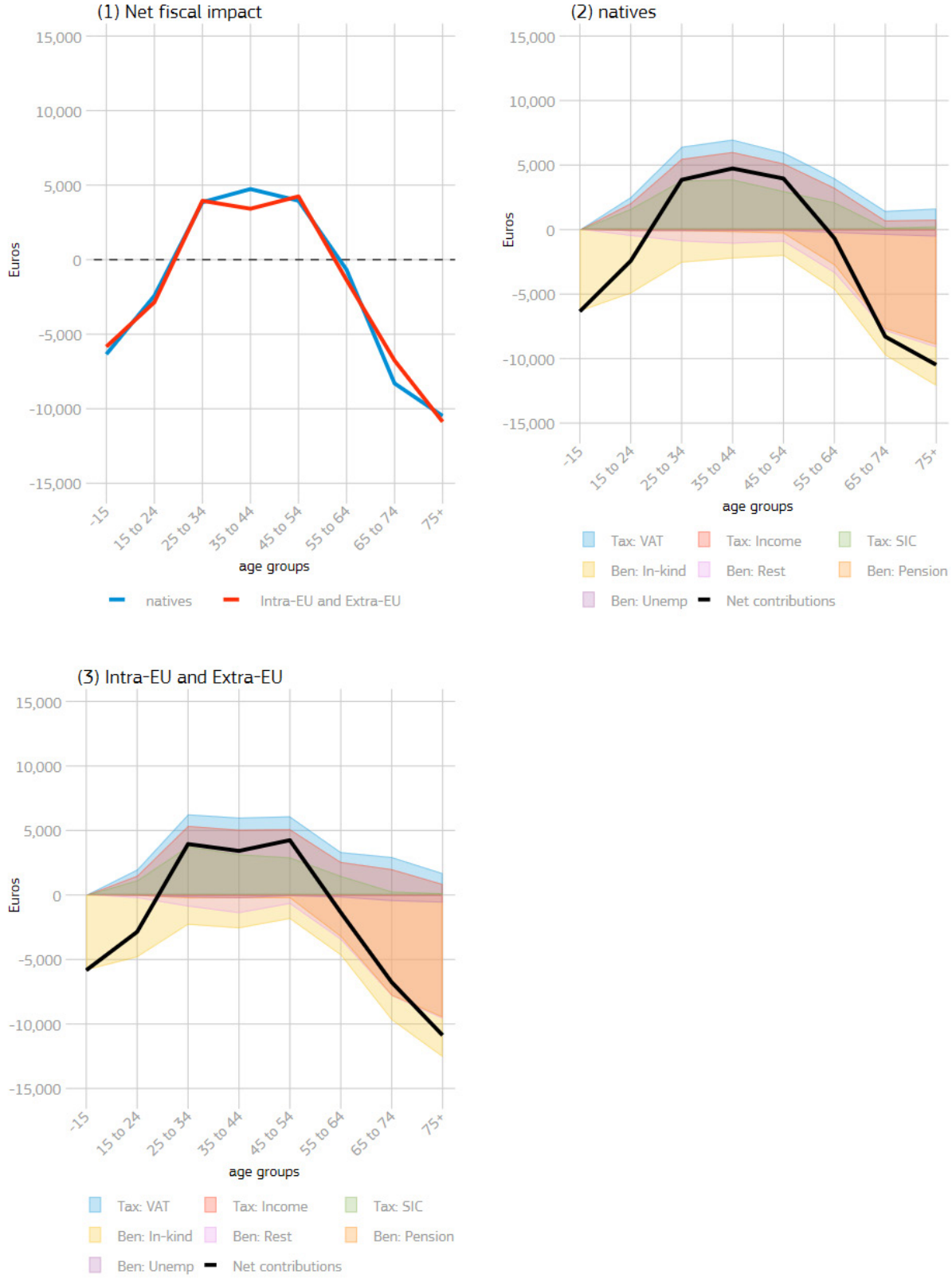
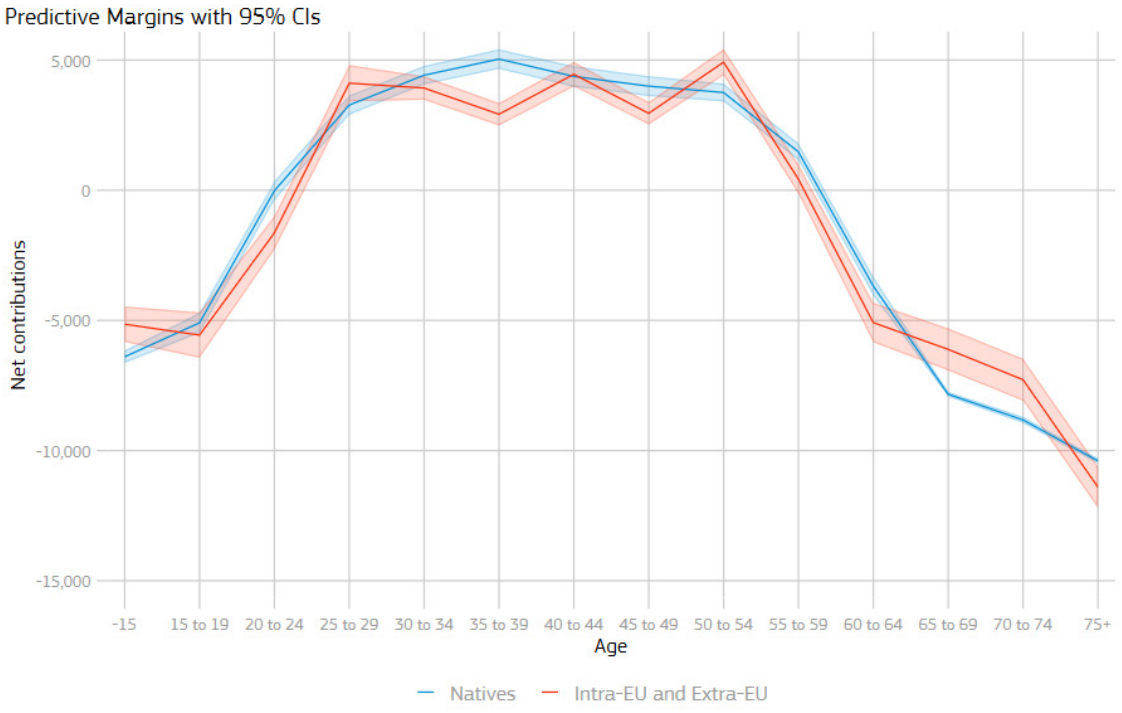


FIGURE 60. MODEL PREDICTIONS AND VALIDATION - MALTA.



LATVIA

FIGURE 61. DECOMPOSITION OF NET FISCAL IMPACT - LATVIA.

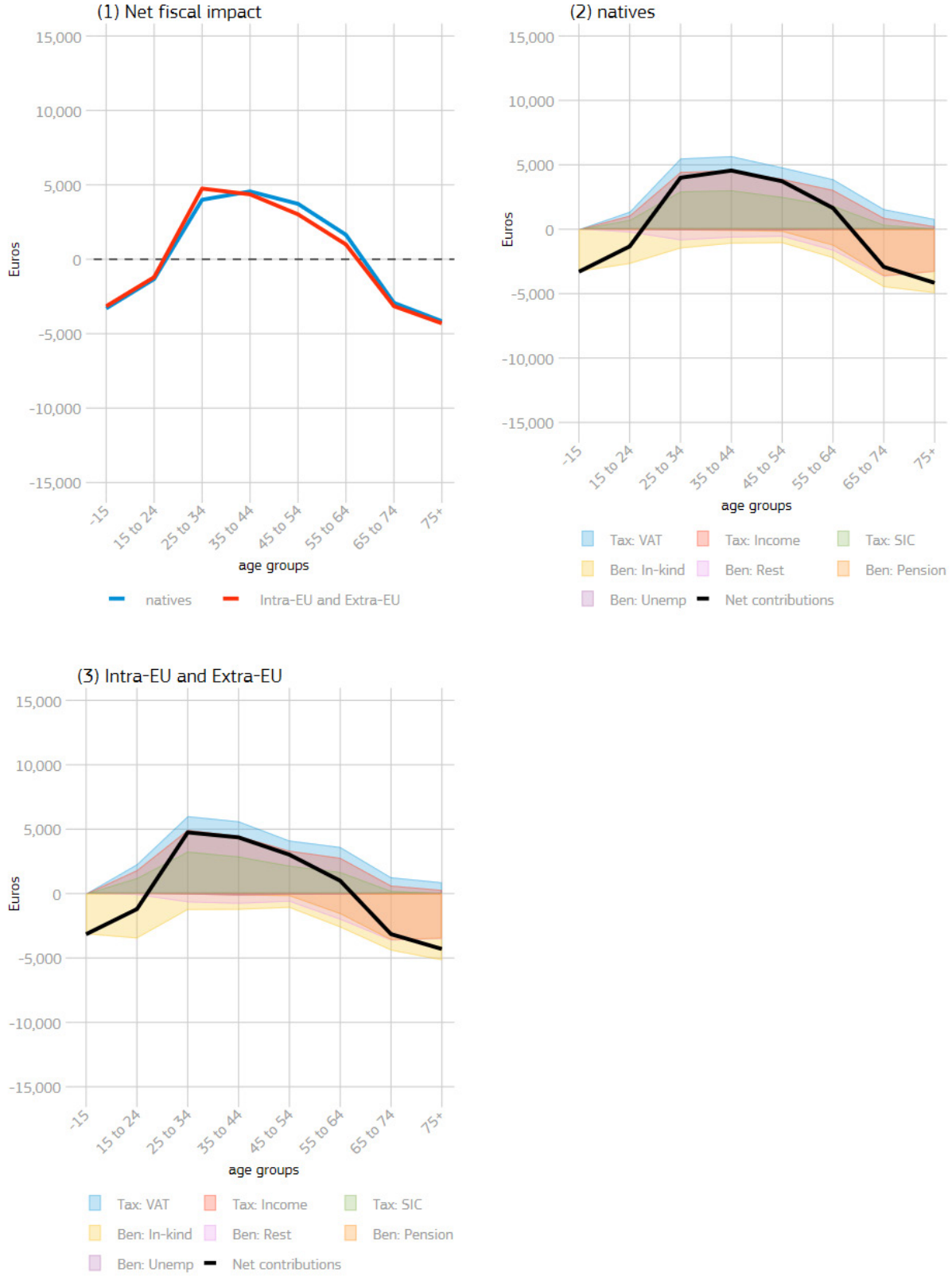
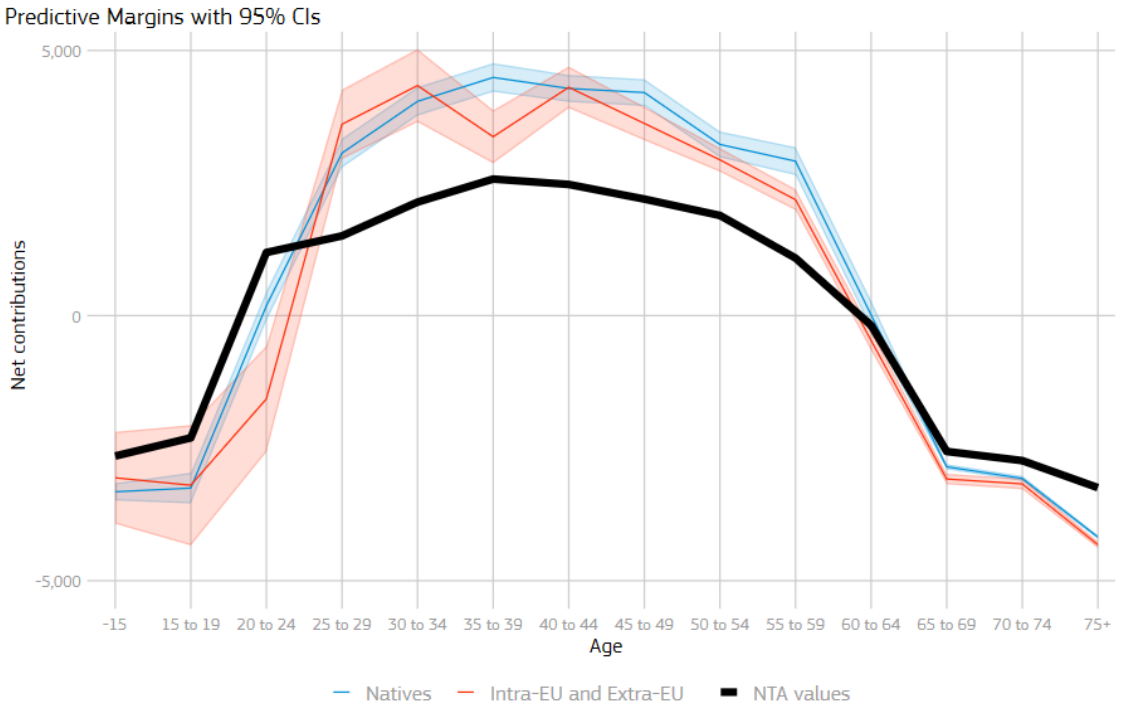


FIGURE 62. MODEL PREDICTIONS AND VALIDATION - LATVIA.



ANNEX 3. VAT RATES IN THE EU 2015

SOURCE: EC (2019). NOTES: RATES GIVEN IN THE TABLE ARE RATES APPLICABLE (FOR MORE THAN 6 MONTH IN THE YEAR CONSIDERED, OR) ON THE 1ST JULY OF THAT YEAR. WHEN CHANGE OF RATES OCCURRED DURING THE YEAR (NOT ON 1ST JANUARY) THE EXACT DATE IS AVAILABLE IN THE NOTES. SUPER-REDUCED RATES (BELOW 5%) ARE SHOWN IN BRACKETS. NOTE THAT 'PARKING RATES' ARE NOT INCLUDED IN THIS TABLE, AS THEY ARE "HISTORIC RATES" BELOW 15% NEGOTIATED BY MEMBER STATES, AND AN EXCEPTION TO THE EU DIRECTIVE (ONLY 5 MEMBER STATES RETAIN THEM).

	VAT rate	In %	
Belgium	Standard	21	
	Reduced	6/12	
Bulgaria	Standard	20	
	Reduced	9	
Czech Republic	Standard	21	
	Reduced	10/15	
Denmark	Standard	25	
	Reduced	-	
Germany	Standard	19	
	Reduced	7	
Estonia	Standard	20	
	Reduced	9	
Ireland	Standard	23	
	Reduced	9/13.5	(4.8)
Greece	Standard	23	
	Reduced	6.5/13	
Spain	Standard	21	
	Reduced	10	(4)
France	Standard	20.0	
	Reduced	5.5/10	(2.1)
Croatia	Standard	25	
	Reduced	5/13	
Italy	Standard	22	
	Reduced	10	(4)
Cyprus	Standard	19	
	Reduced	5/9	
Latvia	Standard	21	
	Reduced	12	
Lithuania	Standard	21	
	Reduced	5/9	
Luxembourg	Standard	17	
	Reduced	8/14	(3)
Hungary	Standard	27	
	Reduced	5/18	
Malta	Standard	18	
	Reduced	5/7	
Netherlands	Standard	21	
	Reduced	6	
Austria	Standard	20	
	Reduced	10	

Poland	Standard	23	
	Reduced	5/8	
Portugal	Standard	23	
	Reduced	6/13	
Romania	Standard	24	
	Reduced	5/9	
Slovenia	Standard	22	
	Reduced	9.5	
Slovakia	Standard	20	
	Reduced	10	
Finland	Standard	24	
	Reduced	10/14	
Sweden	Standard	25	
	Reduced	6/12	
United Kingdom	Standard	20	
	Reduced	5	
Simple averages			
EU-28	Standard	21.6	
EA-19	Standard	20.8	

ANNEX 4. IN-KIND BENEFITS

TABLE 4. IN-KIND BENEFITS FOR HEALTH IN EURO (YEARLY PER PERSON)

age group	AT	BE	BG	CY	CZ	DE	DK	EE	EL
0 to 5	1262	1190	132	254	489	1008	1732	320	298
5 to 10	1001	944	105	201	388	800	1374	254	236
10 to 15	1407	1327	148	283	545	1124	1932	356	332
15 to 20	1492	1406	156	300	578	1192	2048	378	352
20 to 25	1650	1556	173	332	639	1318	2265	418	390
25 to 30	1861	1755	195	375	721	1487	2555	471	440
30 to 35	1927	1817	202	388	747	1539	2645	488	455
35 to 40	1905	1796	200	383	738	1521	2614	482	450
40 to 45	1970	1858	207	397	763	1574	2705	499	465
45 to 50	2250	2122	236	453	872	1798	3089	570	531
50 to 55	2583	2435	271	520	1001	2063	3545	654	610
55 t0 60	2962	2793	311	596	1148	2366	4066	750	700
60 to65	3303	3114	346	665	1280	2639	4534	837	780
65 to 70	4191	3951	439	843	1623	3348	5752	1062	990
70 to 75	5209	4911	546	1049	2018	4161	7151	1320	1230
75 to 80	7095	6689	744	1428	2749	5667	9739	1797	1675
80+	14211	13398	1490	2860	5505	11352	19507	3600	3356
	ES	FI	FR	HR	HU	IE	IT	LT	LU
0 to 5	553	1281	1090	279	219	1389	726	280	2030
5 to 10	438	1016	864	221	174	1101	576	222	1610
10 to 15	616	1428	1215	311	244	1548	810	312	2264
15 to 20	653	1514	1288	330	259	1641	858	331	2400
20 to 25	723	1675	1425	365	286	1816	950	366	2655
25 to 30	815	1889	1607	412	323	2048	1071	413	2994
30 to 35	844	1956	1664	426	334	2120	1109	428	3100
35 to 40	834	1933	1645	421	330	2096	1096	423	3064
40 to 45	863	2000	1702	436	342	2168	1134	437	3170
45 to 50	985	2284	1943	498	390	2476	1295	499	3621
50 to 55	1131	2621	2230	571	448	2842	1486	573	4155
55 t0 60	1297	3007	2558	655	514	3260	1704	657	4766
60 to65	1446	3352	2852	731	573	3634	1900	733	5314
65 to 70	1835	4253	3619	927	726	4611	2411	930	6742
70 to 75	2281	5287	4498	1152	903	5732	2997	1156	8381
75 to 80	3106	7200	6127	1569	1230	7806	4082	1574	11414
80+	6222	14423	12272	3143	2463	15636	8177	3153	22863
	LV	MT	NL	PL	PT	RO	SE	SI	SK
0 to 5	183	486	1377	221	409	130	1293	492	458
5 to 10	145	385	1092	176	324	103	1026	390	363
10 to 15	204	542	1535	247	456	145	1442	549	511
15 to 20	217	574	1627	262	483	154	1529	581	542
20 to 25	240	635	1800	289	535	170	1691	643	599
25 to 30	270	717	2030	326	603	192	1908	726	676
30 to 35	280	742	2102	338	624	199	1975	751	700

35 to 40	276	733	2078	334	617	197	1952	742	692
40 to 45	286	759	2149	346	638	203	2020	768	716
45 to 50	327	866	2455	395	729	232	2307	877	817
50 to 55	375	994	2817	453	837	267	2647	1007	938
55 t0 60	430	1140	3231	520	960	306	3036	1155	1076
60 to65	479	1272	3603	579	1070	341	3385	1288	1199
65 to 70	608	1613	4571	735	1358	433	4295	1634	1522
70 to 75	756	2005	5682	914	1688	538	5339	2031	1892
75 to 80	1030	2731	7739	1244	2299	732	7272	2766	2576
80+	2063	5471	15501	2492	4604	1467	14566	5540	5160

TABLE 5. IN-KIND BENEFITS FOR EDUCATION IN EURO (YEARLY PER ON CURRENT EDUCATION LEVEL)

Education level	1	2	3	4	5	6
AT	6894	8808	11928	11426	11426	13960
BE	6101	7976	9898	10823	10823	13825
BG	1868	1370	1537	1314	1314	1275
CY	2715	6630	8017	8134	8134	7420
CZ	2316	2249	3728	3260	3260	3154
DE	6662	6412	7898	8693	8693	14090
DK	10079	11798	13412	16185	16185	34809
EE	2666	3052	3254	3396	3396	5283
EL	2572	3432	4249	4130	4130	4470
ES	3427	3996	5071	5430	5430	6319
FI	9897	7952	12511	8543	8543	18236
FR	5841	5734	7870	10250	10250	11151
HR	2027	2095	2095	1950	1950	2318
HU	2675	1557	1610	3465	3465	2938
IE	5358	6418	8308	10292	10292	10329
IT	4082	5694	6276	6278	6278	7009
LT	1905	2304	2214	2611	2611	3563
LU	17526	17422	18625	17649	17649	25670
LV	2607	3237	3227	3432	3432	3580
MT	4900	5306	7849	5953	5953	10344
NL	6221	6751	9553	9128	9128	15194
PL	2028	2750	2829	2376	2376	3367
PT	2769	3972	5306	4674	4674	4594
RO	927	681	1233	1153	1153	1965
SE	13267	10390	11221	12449	12449	26975
SI	4433	4985	5570	4349	4349	5621
SK	2355	2792	2880	3088	3088	4942

TABLE 6. DESCRIPTIVE STATISTICS, 2019
SOURCE: EUROSTAT

Country	Population of 15-64 (on the Total Population)			Population of 65 and over (on the Total Population)			Proportion on the Immigrant Population (aged 15-64)		Proportion on the Immigrant Population (aged 65 over)	
	Natives	Intra EU	Extra EU	Natives	Intra EU	Extra EU	Intra-EU	Extra-EU	Intra-EU	Extra-EU
Austria	51.01	6.77	8.91	16.25	1.53	1.06				
Belgium	50.58	5.64	7.91	16.56	1.51	0.83	45.97	54.03	58.42	41.58
Bulgaria	62.98	0.18	1.12	21.00	0.12	0.21	8.39	91.61	15.36	84.64
Croatia	55.78	1.28	7.88	16.87	0.31	3.36	9.93	90.07	37.42	62.58
Cyprus	49.32	12.12	5.85	14.33	1.14	0.58	40.07	59.93	73.49	26.51
Czechia	60.19	1.66	2.66	19.33	0.15	0.11	22.62	77.38	58.29	41.71
Denmark	53.71	3.52	6.70	18.51	0.43	0.62	50.80	49.20	42.99	57.01
Estonia	55.46	1.42	6.93	13.68	0.27	5.82	39.81	60.19	36.22	63.78
Finland	56.21	1.95	3.90	21.44	0.12	0.26	29.35	70.65	46.82	53.18
France	53.04	1.98	6.90	17.29	1.02	1.80	24.27	75.73	52.62	47.38
Germany	51.84	4.77	8.25	17.71	2.55	1.29	46.19	53.81	52.74	47.26
Greece	53.42	2.86	7.35	20.70	0.28	1.05				
Hungary	61.82	2.34	1.96	18.48	0.60	0.25	23.54	76.46	62.31	37.69
Ireland	52.05	9.62	3.63	12.60	1.23	0.27				
Italy	54.75	2.66	6.56	22.09	0.25	0.50	15.87	84.13	24.52	75.48
Latvia	57.70	0.59	5.55	14.28	0.51	5.47	9.55	90.45	15.75	84.25
Lithuania	62.19	0.35	2.60	18.34	0.09	1.35	5.93	94.07	20.97	79.03
Luxembourg	30.87	27.92	10.68	8.92	4.76	0.70	60.50	39.50	67.55	32.45
Malta	50.13	8.15	9.37	17.19	1.18	0.31				
Netherlands	54.23	3.05	7.70	17.47	0.41	1.30	47.61	52.39	30.98	69.02
Poland	66.20	0.21	0.57	16.84	0.28	0.53	21.12	78.88	62.00	38.00
Portugal	56.52	2.17	5.76	20.88	0.33	0.63	26.70	73.30	56.68	43.32
Romania	64.10	0.22	1.45	18.28	0.08	0.16				
Slovakia	66.11	1.64	0.47	15.11	0.84	0.10	66.79	33.21	78.95	21.05
Slovenia	55.30	1.92	7.85	17.50	1.14	1.22				
Spain	53.93	3.33	8.58	18.15	0.61	0.64	19.40	80.60	41.99	58.01
Sweden	47.49	3.58	11.23	17.28	1.55	1.07	24.32	75.68	35.12	64.88
United Kingdom	52.04	4.41	7.19	16.84	0.56	1.00				

TABLE 7. DESCRIPTIVE STATISTICS, 2019
SOURCE: EUROSTAT

Country	Activity rate (aged 15-64)			Employment rate (aged 15-64)			Less than primary, primary and lower secondary education (aged 15-64)			Upper secondary and post-secondary non-tertiary education (aged 15-64)			Tertiary education (aged 15-64)		
	Natives	Intra EU migrants	Extra-EU migrants	Natives	Intra EU migrants	Extra-EU migrants	Natives	Intra EU migrants	Extra-EU migrants	Natives	Intra EU migrants	Extra-EU migrants	Natives	Intra EU migrants	Extra-EU migrants
Austria	77.6	79.1	72.0	74.9	74.9	64.5	16.0	13.8	38.8	52.7	46.5	37.7	31.3	39.7	23.5
Belgium	69.9	71.8	60.9	66.9	67.0	52.3	23.4	28.1	41.5	39.6	31.9	31.9	36.9	40.0	26.6
Bulgaria	73.3	:	64.8	70.1	70.1	63.1	21.9	:	:	53.5	:	50.6	24.6	:	44.7
Croatia	66.7	72.3	64.0	62.2	62.3	59.9	17.8	7.5	22.6	59.8	63.6	60.0	22.4	28.9	17.4
Cyprus	75.6	78.8	75.9	70.0	70.5	71.0	21.4	19.2	23.8	38.1	42.3	37.4	40.5	38.5	38.7
Czechia	76.5	80.8	82.4	75.0	75.0	80.3	12.2	15.5	15.4	66.6	54.2	52.0	21.1	30.3	32.6
Denmark	80.1	82.7	67.1	76.3	76.3	61.2	25.8	14.9	35.1	41.8	32.5	32.6	32.4	52.6	32.4
Estonia	78.8	75.1	80.0	75.4	75.3	75.2	16.9	14.3	6.0	47.8	32.0	48.3	35.2	53.7	45.8
Finland	78.7	81.6	68.7	73.6	73.7	59.0	15.9	24.2	31.7	44.8	43.4	40.7	39.3	32.4	27.5
France	72.3	74.3	65.9	66.6	66.7	56.2	21.4	32.4	37.5	44.4	34.0	32.2	34.1	33.6	30.3
Germany	80.3	82.6	70.6	78.2	78.3	65.8	15.8	26.5	38.7	57.7	47.9	38.9	26.5	25.5	22.4
Greece	67.9	69.5	75.6	56.8	56.7	53.6	24.6	22.9	42.8	46.4	50.4	44.7	29.0	26.8	12.5
Hungary	72.4	80.3	78.5	69.9	70.1	75.9	20.1	16.7	10.7	57.7	51.0	55.4	22.2	32.3	33.8
Ireland	72.4	78.7	70.8	68.9	69.9	65.7	23.7	14.3	9.4	38.7	41.4	29.1	37.6	44.3	61.5
Italy	64.9	71.6	70.3	58.7	58.8	61.2	38.2	38.1	55.4	43.7	49.5	31.9	18.2	12.4	12.7
Latvia	77.5	66.7	76.8	72.5	72.3	71.5	15.7	16.1	4.7	52.9	58.4	63.6	31.4	25.4	31.7
Lithuania	78.1	73.2	76.6	73.0	73.0	72.6	11.3	17.5	5.7	50.7	50.8	57.9	38.0	31.7	36.3
Luxembourg	65.5	78.9	71.0	62.9	68.6	62.5	29.7	24.3	24.2	42.2	23.1	26.9	28.1	52.6	49.0
Malta	73.4	86.1	84.2	70.9	72.4	80.1	45.0	29.5	34.7	33.3	28.7	24.7	21.7	41.8	40.6
Netherlands	82.7	79.0	67.9	80.2	80.0	63.2	24.6	21.6	34.9	40.7	32.9	34.2	34.7	45.6	30.8
Poland	70.5	75.4	80.4	68.2	68.2	75.8	13.4	:	4.6	58.6	33.4	48.5	28.1	59.9	46.9
Portugal	74.6	85.8	82.6	69.8	70.0	75.3	49.4	29.4	32.1	27.7	36.0	37.8	22.9	34.6	30.1
Romania	68.6	:	75.6	65.8	65.8	72.6	25.1	:	:	58.9	:	:	16.0	:	:
Slovakia	72.6	83.5	78.4	68.3	68.4	73.3	14.6	:	:	62.4	62.1	44.0	23.0	32.6	44.0
Slovenia	75.6	74.4	71.8	72.3	72.3	67.5	14.4	12.7	30.3	54.5	57.4	58.5	31.1	29.9	11.2
Spain	73.0	80.1	76.4	63.4	63.7	60.8	39.4	30.8	44.5	23.7	35.9	30.9	36.9	33.3	24.6
Sweden	84.5	82.3	76.5	80.7	80.5	62.3	16.2	18.5	40.0	46.1	30.3	25.8	37.7	51.3	34.2
United Kingdom	78.2	84.8	73.8	75.3	75.8	70.0	19.8	14.0	17.5	41.6	39.2	30.8	38.6	46.7	51.6

TABLE A1. NET FISCAL CONTRIBUTIONS BEYOND AGE 15 BY IMMIGRANT STATUS, EU MEMBER STATES, 2015-2019
NOTE: COUNTRIES ARE RANKED FROM THE LOWEST TO THE HIGHEST GAP BETWEEN NET FISCAL CONTRIBUTIONS OF NATIVES AND EXTRA-EU MIGRANTS.

	Natives	Intra-EU migrants	Extra-EU migrants	Gap in NFI between natives and extra-EU migrants
CY	-2302	789	1059	-3361
CZ	388	3138	3547	-3160
PT	-621	2304	2120	-2742
IT	1173	4798	3276	-2102
IE	-940	1718	1047	-1986
MT	-635	2507	1228	-1863
GR	-857	1119	718	-1575
ES	38	3007	884	-846
FI	1495	9734	1391	104
All	407	3118	47	360
DE	1017	3932	646	371
AT	382	5527	-11	393
HR	9	936	-604	613
NL	-486	5231	-1221	735
HU	130	697	-1156	1286
FR	-42	423	-1509	1467
BG	-284	-855	-2379	2094
SI	-416	787	-2511	2095
LV	1090	461	-1042	2132
SE	630	759	-1698	2328
LT	545	862	-1826	2371
SK	158	-1276	-2463	2621
EE	944	1671	-2257	3201
PL	243	1009	-3688	3931
RO	-93	3916	-4586	4493
DK	2214	1465	-4372	6586
BE	1023	5096	-6312	7335

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