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REMINDER

ROLE OF EUROPEAN MOBILITY AND ITS IMPACTS IN NARRATIVES, DEBATES AND EU REFORMS

FISCAL EFFECTS OF INTRA-EEA MIGRATION

WORKING PAPER

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UPPSALA UNIVERSITET

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REMINDER

Executive summary

Immigration inevitably generates a range of fiscal effects, positive and negative, for public budgets in the host countries. That is, the migrant population will be associated with both fiscal contributions, for example in the form of taxes on income and consumption, and costs in the form of benefits and the usage of public services. Precisely what the contributions and costs are, and therefore how the net balance turns out, can critically depend on the host country's particular set of policies, types of taxes and benefits, and labour market dynamics, as well as the characteristics of the migrants themselves.

This study presents the first large cross-country estimation of the fiscal effects of migration of EU citizens within the EEA (European Economic Area). The study uses a static model, matching micro-level data from the EU-SILC database with statistics from national accounts. The results are primarily intended to be used for comparative (cross-country) analysis, and specific numbers for individual countries may be subject to considerable uncertainty.

The analysis shows that for most EEA countries, the net fiscal effects of hosting EU migrants have been moderately positive across the time period 2004—2015. For most countries, the net fiscal effects of EU migrants appear to be $\pm 0.5\%$ of GDP. Indeed, in 24 out of 29 countries our analyses show net effects of the total population of EU migrants in the narrow range of $\pm 0.4\%$ of GDP. The variation increases when we include the deflationary effect (see 'understanding the evidence' section below), but the estimates remain within $\pm 0.4\%$ of GDP for most countries. These results are consistent with existing studies on other migrant populations.

Compared to native households, EU migrant households generate net fiscal effects within the range of ± 5000 euros per year in 23 out of 29 host countries, with only Norway showing a more markedly positive net balance in favour of EU migrant households. In most countries, however, EU migrant households appear to be a larger fiscal asset than native households.

But while EU migrant households are net fiscal assets in most of the countries included in the analysis, especially when assessing effects on the budget balance to GDP ratio, this is not the case in all countries. A smaller number of mainly Eastern European countries – Poland, Slovakia and Estonia — show negative fiscal effects from the EU migrant population. The only country with markedly negative fiscal effects per percent EU migrant population is Poland, which is due to a disproportionately large share of elderly among people classed as 'migrants'. This is likely due to migration and territorial changes in the wake of World War II, and thus not a consequence of free movement in the EU.

As may be expected in a large and complex analysis of this type, issues with comparisons between countries can occur — for example, data on migrant classification which allow us to identify which individuals are from the EU and which are from non-EU countries is missing from the EU-SILC for Estonia, Germany, Latvia, Malta and Slovenia. Estimates for these countries are therefore based on imputed migrant status and should be interpreted particularly carefully. This deficit underscores the importance of uniform reporting across the union going forward, and future work is needed to address these issues.

Understanding the evidence

As discussed above, the study uses a static model, matching micro-level data from the EU-SILC database with statistics from national accounts. The results are primarily intended to be used for comparative (cross-country) analysis, and specific numbers for individual countries may be subject to considerable uncertainty.

We define an EU migrant as a person born in a country that is currently a member of the

EU, but residing in a host country other than their country of birth. Host countries are the EU28, minus Luxembourg and Romania, but also include host countries in the wider EEA. Note that this also includes people who moved between European countries before the free movement in the EU was established.

The main results are presented with three different statistics. First, the fiscal impact is presented as a share of GDP for each country. Second, to make these figures comparable between countries with migrant populations of different sizes, the fiscal impact is then rescaled to the effect per percent of EU migrant households. Third, for our estimates to capture the impact on the budget balance to GDP ratio, we present estimates where we also consider that migration increases GDP, which in turn "deflates" the budget balance when measured as a share of GDP.

Again, as discussed above, data on migrant classification (EU vs other) are missing in the EU-SILC for Estonia, Germany, Latvia, Malta and Slovenia and these estimates should be used carefully.

The estimates are susceptible to bias from multiple sources, and should thus be interpreted carefully. Some of these possible biases are addressed in the sensitivity analysis. It is shown that the estimates are generally robust, but that allocation of pension expenditures poses a particular challenge. Another crucial question that can have a major impact on the estimates is how to handle public goods with plausibly zero marginal costs (such as defence spending or central government functions).

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1 Introduction

Free movement is a fundamental aspect of European integration and citizens in the European Economic Area have profited greatly from this right. As of 2015, almost 13 million Europeans were living in a member state other than their country of birth. A large part of this movement has been migration from East to West.

Notwithstanding the wider political questions surrounding the right to free movement, immigration inevitably generates a range of fiscal effects, positive or negative, for the public budgets in the host countries. That is, each new person added to a population will be associated with both fiscal contributions, for example in the form of taxes on income and consumption, and costs in the form of benefits, usage of public goods and the like. Precisely what the contributions and costs are in the individual tally, and how the net balance turns out, can critically depend on the host country's particular set of policies, types of taxes and benefits, and labour market dynamics, as well as the characteristics of the migrants themselves.

The literature on the fiscal effects of immigration contains a rich variety of studies for specific countries, but comparative estimates are rare. In particular, we lack comparative estimates on intra-EEA migration. This creates a significant knowledge gap: comparative estimates for a larger group of countries are necessary, not only to get an overview of the fiscal effects of migration in general, but also to conduct systematic analyses and comparisons of the impacts of different national welfare regimes and labour market policies on the fiscal effects of migration across states. Additionally, to date most existing estimates of the fiscal effects of immigration are based on data before the Great Recession (2009–2012), making it difficult to draw conclusions about, for example, the relative resilience of different welfare regimes in the face of economic crises.

This study aims to rectify both of these issues and presents the first large-scale, cross-national estimation of the fiscal effects of intra-EEA migration, with data both before and after the economic crisis. Estimates are produced for the fiscal effects of migrants from EU countries, using a static accounting model for 29 countries out of the 31 in the European Economic Area.[1] The models used involve a number of assumptions and are subject to both sampling and measurement error. Figures for individual countries should therefore be interpreted carefully. The results should, however, be useful for the above stated purpose of comparative analysis: **what cross-country differences shape the fiscal effects of intra-EEA migration?**

This report is under the umbrella of a larger research program (the REMINDER project) that investigates European migration, and is closely linked with efforts to map how national politics and the characteristics and impacts of intra-EEA migration are shaped by national institutions (Ruhs and Palme, 2018).

[1] The only countries completely excluded from our analyses are Luxembourg and Romania, for reasons stated in the technical details section of this report.

2 Background

A substantial literature has attempted to identify different types of economic effects of migration, both in host countries and in countries of origin. In this section we provide a brief overview of this previous work. In particular we focus on a) comparative estimates of fiscal effects in more than one country and b) studies of migration within the EEA specifically. While this review is by no means comprehensive in itself, it should be regarded as setting the stage for the particular analyses we conduct in this study.

2.1 Major reviews of the fiscal effects of immigration

For a more comprehensive overview of the field, a number of reviews of the literature on the fiscal effects of migration have previously been published. In one of these reviews, Rowthorn (2008) surveys the academic literature and presents both a list identifying the most important theoretical and methodological considerations involved in estimating such effects, as well as an overview of actual estimates published for a number of countries. Most studies covered in this review look at the US and the UK, with a smaller segment focusing on other Western European countries as well as Japan, Australia and New Zealand.

Generally speaking, the net fiscal effects of immigration, as estimated in the studies reviewed by Rowthorn, are consistent and small: few fall outside of the range of ± 1 per cent of GDP, despite using widely different methodologies and being set in different countries. Exceptions to this pattern are forward-looking estimates (that is, studies attempting to estimate the fiscal effects migration is likely to have in the future) in countries with severe demographic issues. In such contexts, immigration may alleviate the fiscal symptoms of an aging population (although Rowthorn argues that such long-term results are likely overestimated).

Similarly, a more recent report by the OECD (2013) also contains a review of the existing research literature. Here, too, the general takeaway is that the fiscal effects of immigrants are relatively modest and in the range of ± 1 per cent of GDP. According to the OECD review, the most important moderators of fiscal contributions found in the existing literature are 1) the state of the host country labour market and the labour market characteristics of the migrants, where countries with predominantly skilled labour immigration showed markedly more positive fiscal effects, 2) immigrants' age at arrival, with people arriving at the beginning of their careers having more time during which they are net contributors, and 3) the sustainability of the host country's fiscal regime (since long-term systematic deficits make even the average citizen a net liability).

2.2 Comparative estimates of the fiscal effects of immigration

Only two published reports to date have produced comparative estimates of the fiscal effects of immigration across several countries. The first one is the above mentioned report from the OECD (2013), which also provided a set of estimates of the net fiscal effect of all immigrants for 27 of the OECD member states. The OECD's results are based on a static model, averaged over the years 2007–2009, using a diverse set of data sources for different countries.

The OECD study concludes that the fiscal effects are minor on average, but also vary substantially between countries: whereas the net contribution is highly positive in Switzerland, Iceland, Luxembourg and Italy, it is slightly negative in Slovakia, Germany and Poland. Further, the report found that the net contribution of immigrants is lower, on average, than that of natives, but this also varies widely between countries. For example, in Luxembourg the net contribution of *natives* is substantially lower than that of immigrants.

The difference between natives and migrants is shown to be mainly a result of differences in contributions (taxes and social security contributions) rather than differences in costs. Net balance results are also shown to be highly sensitive, in particular, to the inclusion or exclusion of pension expenditures.

Bogdanov et al (2014) conduct another comparative study on the fiscal effects specifically of EU migration. The study includes estimates for Austria, Germany, the Netherlands and the UK. EU migrants are a special subgroup of migrants in the sense that they include very few refugees, are often well-educated, and tend to have higher employment rates than natives. On the other hand, they also receive lower wages on average, which translates to lower fiscal contributions through tax payments. The study by Bogdanov et al finds that EU migrants are net contributors in all four countries, but does not present data for their fiscal position relative to natives.

2.3 European migration: Fiscal and labour market effects

There have been few studies of fiscal effects specifically of intra-European migration. Dustmann et al (2010) and Dustmann & Frattini (2014) show that migrants to the UK from other EU countries have made strong fiscal contributions even during deficit years, while other migrants have been net fiscal burdens – a contrast that is even stronger for migrants from the A8 countries that joined the union in 2004. A similar evaluation in Denmark also found robust and positive net contributions from EU migrants (Martinsen & Rotger, 2016). Further, a static analysis of migration to Sweden from Bulgaria and Romania, by Ruist (2014), found a net positive contribution of about 30,000 SEK (roughly 3,000 euros) per person and year.

Apart from purely fiscal effects of intra-European migration, there are also studies that map macroeconomic and labour market effects, particularly after the Eastern enlargement of the European Union in 2004. For example, Lemos & Portes (2008) evaluated the labour market effects in the UK and found no effect on native unemployment, neither on average nor for any particular subgroup. The same lack of impact of European migrants on native employment in the UK was also corroborated by the Impacts of Migration study (Migration Advisory Committee, 2012).

Similarly, neither Doyle et al (2006) nor Hughes (2011) found any significant evidence for labour market displacement of natives in Ireland. Doyle et al (2006) finds the same lack of displacement in Sweden, but also concludes that the two-year gap since the enlargement is likely too short to fully evaluate the effects. In the same vein, a study of post-enlargement labour migration to Germany (Brenke et al, 2010) found that new EU migrants, primarily from Poland, mainly occupy low-skilled segments of the labour market and that any displacement of native workers is likely to be small. In Poland, conversely, emigration seems to have led to slightly increased wages for medium and high-skilled workers, but decreases for low-skilled workers (Dustmann et al, 2015).

A cross-national comparative study of macroeconomic impacts of increased labour mobility in the wake of the two EU enlargements, by Holland et al (2011), found that the macroeconomic impacts on the host countries (primarily EU15) are negligible but positive. However, potential output in the sending countries (in particular Bulgaria, Romania and Lithuania) may be permanently reduced by 5–10 per cent due to emigration to other EU countries. On the other hand, the wage rate of stayers (natives in the migrant's home country) appears to be positively affected in Lithuania (Elsner, 2013). Most recently, Kahanec & Pytlikova (2017) investigates a diverse range of economic effects of post-enlargement East-West intra-EEA migration and finds results that indicate a positive effect on the host countries' GDP, GDP per Capita and employment rate, but a negative effect on output per worker.

2.4 In summary

The general picture is that fiscal effects of immigration tend to be small, on average, but that there is still substantial variation between countries depending partly on various institutional characteristics. It is likely that the same applies to the specific population of EU migrants as well.

The study that is closest to ours is OECD (2013), which produced estimates of fiscal effects of all immigrants in OECD member countries. The set of countries we study overlaps to some extent, but the group of migrants does not, since we are only interested specifically in EU migrants. In that regard, our ambition is the same as Bogdanov et al (2014), but we aim to include a larger set of countries. We also intend to follow a uniform methodology and use, to the largest possible extent, data sources that are directly comparable across countries. This should lead to estimates that are also, in turn, comparable and useful for cross-country analyses. Furthermore, we will use data that extends *after* the Great Recession, which provides opportunities for investigating, for example, the relative fiscal resilience and adaptability of EEA countries.

3 Method and data

From a methodological point of view, estimates of the fiscal impacts of immigration are always associated with a large level of uncertainty. The complexity of the topic, paired with the lack of data for many of the things one wishes to measure, forces researchers to make a range of assumptions and simplifications that are bound to be subject to question or even controversy to varying degrees (Vargas-Silva, 2015). These complexities are yet compounded when attempting to produce statistics that are comparable across a large number of countries.

The ambition in this report is to not just follow, but also to contribute to establishing, 'best practices' within the field. This implies developing new methodological approaches suitable for the type of cross-county data that is available, as well as for the particular group of migrants in question. In this chapter we describe the model and data we use in this study. We justify the methodological choices we have made and, when applicable, explain in what ways they improve on previous research.

3.1 Target group

The target group for this study is EU migrants.[2] Defining who is and is not to be counted as a migrant is itself a fraught enterprise, with several considerations to keep in mind. For the purposes of this study, we define EU migrants as people who were *born* in an EU member state and who reside in an EEA member state other than their country of birth, regardless of their citizenship status in the host country. Because procedures and criteria for obtaining citizenship vary between member states, we contend that defining migrants based on their country of birth improves cross-national comparability. An important caveat in this regard is that one can be born in another EU country and have moved long before the free movement in the EU was established – for example, there was considerable migration in the wake of WWII.

Additionally, we count children living in households with migrant adults (presumably parents) as migrants in the analysis regardless of whether they were born abroad or in the host country.[3] Though perhaps somewhat controversial, this makes sense in the light of the counterfactual: most of these children would not have resided in the host country unless their parents had immigrated.

Another question arises when aggregating individuals into households. Households with only natives or only migrants are straightforward: they are "native households" and "migrant households" respectively. But how should we treat mixed households, i.e. those households consisting of more than one adult and where some, but not all, are defined as migrants? One solution would be to have a separate mixed category. The main problem with this solution is that (especially larger) mixed households can be very different from each other.[4] Another possibility would be to set a threshold (more than 50% migrants is classified as a migrant household, for example). This approach instead runs the risk of misattributing a large portion of fiscal effects in households with some migrants, but below the threshold.

We have chosen instead to allocate the quantity of interest by the fraction of the household that belongs to the specified group. That is: if 50% of the members of a household are natives, then 50% of the quantity of interest (for example, the net fiscal effect of the household) is

[2] While EEA countries are included as host countries, the migrant category we can identify in the data is people who were born in another EU country rather than another EEA country. Hence, we are talking about intra-EEA migration, but EU migrants.

[3] If there are more than two adults, we consider the children to live with migrant adults only if *more than* 50% of the adults are migrants.

[4] Consider a household with one migrant and nine natives, and vice versa – these are arguably more like the pure categories, and are also very different in terms of their composition.

attributed to natives. This solves the boundary problems caused by having a mixed category, and similarly alleviates the bias produced by thresholding. A potential problem with our approach, however, is that in the presence of systematic differences between the net fiscal effects of natives and migrants *within* households, the cases that are farthest away from 0 or 100%, will misallocate some of the net effect. In practice, however, estimates are robust to different ways of defining migrant households, since borderline cases are relatively few.

3.2 Model

The particular empirical strategy we employ is a *static accounting model*, where government expenditures and revenues to and from a household within a given time period are added up. Further, we allocate expenditures and revenues following a *top-down* approach, based on either micro-level data (when available) or on demographic assumptions. In essence, the procedure uses statistics from the annual national accounts on actual aggregated revenues and expenditures for a given fiscal year, and allocates this sum to households based on their shares of these budget items, as derived from micro-level (individual and household) data. In the following sections, we explain this approach in detail and compare it to alternative possible models.

3.2.1 Static vs dynamic

The most common way of estimating the fiscal effects of immigration is by using a so called static model. This approach amounts to what is in principle a fairly simple accounting exercise, whereby all contributions made by a given subject to the public finances in a given year are added up, and all benefits claimed and other expenses incurred are subtracted, yielding a *net fiscal effect*. These individual or household level net effects can then be aggregated for different groups in order to compare migrants and natives (although it could theoretically speaking be aggregated on any measurable characteristics: gender, age, occupation, etc.).

The results can be presented as per household effects on public finances or on the budget balance, or as the total net costs (positive or negative) of the migrant population as a whole. As such, the static model provides a type of per annum estimate of the effect on the public budget, on the margin, of adding a particular type of person or household to the population, in a given fiscal year.

Another important question is whether a given person or household will end up being a net contributor over the course of a life-cycle, rather than in a given fiscal year. To address this much more complex question, different types of dynamic models can be used. These will typically make a number of assumptions about the future labour market status, expected pensions and other benefits, fertility, etc. of individual subjects, coupled with expectations about future tax rates and expenditures from the public sector, to produce a discounted net present value of the contribution over the life cycle.

We follow OECD (2013) and Bogdanov et al (2014) in using a static modelling approach to produce our estimates. Dynamic considerations are largely left unexplored. This is, unfortunately, mainly driven by data limitations, but also by the particular difficulties involved in making assumptions about the future revenue streams from this segment of the migrant population. The uncertainty over, for example, how long EU migrants will stay in the host country, is larger than for other migrants (who will often tend to be more permanent), making dynamic approaches less feasible in this case.

It is not obvious how a more forward-looking/dynamic approach would affect our results. On the one hand, the current demographic composition of EU migrants is unlikely to remain, and an increased share of elderly migrants would naturally reduce the fiscal contribution from

the migrant population. On the other hand, in the very long run, the EU migrant population may be perfectly integrated (with regards to fiscally relevant areas such as labour market outcomes, education, etc.) into the host country, in which case the long-term effect of migration would be equivalent to the effect of a general population increase. If the marginal costs for providing public services is decreasing with population size (which is a plausible assumption in most cases), migration would arguably be a fiscal contribution in the very long run.

Our model is also static in the sense that we assume native labour market outcomes, such as wages and employment, to be unaffected by migration. This is the standard approach in the literature, because without this assumption, we would not be able to interpret the taxes paid by immigrants as the tax contribution from migration. While the "canonical" model predicts that competition from migrants will reduce wages and employment for low-skilled workers (Borjas 2003) and therefore reduce tax contributions of natives, more recent studies show that migration may actually improve the labour market outcomes of natives (Card 2009, Foged and Peri 2016) and therefore result in the opposite outcome. Most economists, however, believe the possible displacement and wage effects of migration to be quite small (Blanchflower et al 2007). As long as the latter is the case, regardless of whether a small effect is positive or negative, the standard assumption that native labour market outcomes are unaffected is warranted.

3.2.2 Top-down vs bottom-up

An important choice that has received too little attention in the literature is whether priority should be given to the micro-level or national level data when the two layers of data are combined. Most studies on fiscal effects follow a bottom-up approach, where information about benefits and taxes that is available in some micro-level database is summed up, and the share of the remaining budget items which may be attributed to migrants is simply added on top (Bogdanov 2014, OECD 2013, Ruist 2014).

In principle, such a procedure could work well. There is, however, always a risk that some budget items are omitted or that the aggregated micro-level data does not, in fact, add up to existing categories in the government budget. Our recommendation is therefore that this bottom-up approach should only be used when the final estimate is a comparison between natives and migrants, in which case it does not matter as much if some budget items are missing. It is also feasible when it is possible to create a residual post for all budget items which have not been accounted for, similar to how Ruist (2014) calculates 'Other public revenue and spending'.

In our view, it is more robust to use a top-down approach, in which one departs from the government's *known* revenues and expenditures, with pre-classified mutually inclusive and exclusive categories. These known aggregate quantities are then allocated to migrant and native households according to principles suitable to each particular budget item. For example, government tax revenues and social transfers, as measured in the national accounts, can be allocated to different households based on micro-level data on tax payments and received benefits. When allocating total expenditures to households in this fashion, we obtain items per household that are essentially directly scalable (by some under/over-reporting ratio) to a pure bottom-up approach, but with the added benefit of summing up across households to the known, and correct, quantities in the government budget.

If micro-level data is not available for a certain budget item, aggregate quantities can be allocated based on suitable demographic assumptions, per capita, or not at all (if the budget item can plausibly be considered to be unaffected by migration).

This procedure solves several problems. First, problems with systematic under- or over-reporting in micro-level data, which is a potentially large issue with self-reported income and tax

payments, are avoided. If the magnitude of the systematic bias is uncorrelated with migrant group classification, the procedure completely compensates for this problem. Consider, for example, if people tend to over-report taxes paid in self-reported data, on average. Absent the top-down approach, the model would then over-estimate the contributions made by all households and produce positively biased net fiscal effect estimates. By departing from known accurate aggregate quantities, any such systematic biases are evened out in our analysis.

Second, our procedure greatly facilitates cross-national comparisons where the micro-level data often differ in terms of variable definitions, or how the data were collected. As long as statistics from the national accounts are comparable between countries, allocated household items will also be comparable (at the very least relative to a pure bottom-up approach).

Third, it permits modelling budget items where there is no micro-level data to begin with. With plausible assumptions on how missing budget categories are distributed based on demographic characteristics, budget items such as consumption of health care can be included in the estimates despite being missing at the individual and household level. Pure bottom-up approaches would have to leave any such factors unconsidered.

Fourth, our approach ensures that all actual government budget items can be accounted for, and any items left out will be due to deliberate and transparent model assumptions.

3.3 Data

3.3.1 Data sources

The aggregate budget data we use are obtained from the AMECO macro-economic database and other Eurostat databases (European Commission, 2017a). Additionally, data for national population structures comes from the World Bank Health, Nutrition and Population Statistics (World Bank, 2017).

We obtained the micro-level data from the *European Union Statistics on Income and Living Conditions*, EU-SILC (European Commission, 2017b). This large database contains both individual and household level data on demographics and several different types of income, transfers received and taxes paid for large samples of people from all EEA countries. We use this data to derive the shares of the aggregated budget items that can be attributed to each household.

EU-SILC is put together by Eurostat based on reported data from the statistical authorities in the member states, using particular guidelines on what and how to report. There are, however, a number of inconsistencies in both sampling procedures, methods for weighting and imputation, and the type of data that is used (survey data in some cases, register data in others). This can possibly impose some constraints on the comparability of the reported data across countries, but it is nonetheless the best available source of micro-level data across the EEA.

Furthermore, since household cash flows are reported for the year *preceding* the year of the interview, surveys generally exclude migrants with no more than a year's residence (since they don't have full annual incomes to report for the previous year). This will tend to exclude very short term labour migrants, which may bias the net effects slightly downward (i.e. giving an unnecessarily negative estimate) since this category of migrants is likely associated with very few costs. The average fiscal effect of the group of migrants as a whole would therefore conceivably be slightly more positive if the very short term labour migrants could be included.

It should also be noted that the EU-SILC uses a rotational sampling design. This means that observations on the same households are done several years in a row (in this case, a maximum of four years). Since multiple observations on the same household will tend to be strongly correlated, this necessitates procedures for correction for this clustering. These are

described in the technical details section.

3.3.2 Weight adjustments

The cross-sectional weights provided in EU-SILC, when disaggregating migrant categories, produce age structures that in several cases deviate markedly from the known age structures in the underlying populations. There could be several reasons for this inconsistency. However, because age is one of the strongest determinants of an individual's net fiscal contribution, we have recalibrated the EU-SILC weights so that the weighted micro-data matches known population totals with regards to age and migrant status.

In addition to the age readjustments of the weights, we also adjust the final weights for listwise deletions: since households can only be included in the analysis if they have data for each of the items (described below), their weights also need to be scaled up in proportion to the country-year ratio of households missing any items.

3.3.3 Imputation

Since the availability of particular variables in EU-SILC varies between countries, we use some imputation procedures to keep data loss to a minimum. In most cases, alternative variables are available that serve as reasonable proxies for the ones we are interested in (e.g. gross income as opposed to net income), which can be used for imputation through linear predictions of the preferred variable by the proxy variable. Such a procedure means that household level variance is left intact, and is a less problematic form of imputation. In a few cases, however, imputation is based on other types of country-specific linear predictions that do not maintain the variance structure. The exact procedures are described in the "technical details" section later in this report.

A limitation in EU-SILC that has proved particularly unfortunate is the inconsistent reporting of citizenship and country of birth, which makes it impossible to a) identify origin countries and therefore to estimate *emigration* effects, and b) to separate EU migrants from other migrants in Germany, Estonia, Latvia, Malta and Slovenia. The analyses presented in this study has attempted to include this set of countries by imputing EU migrant status using a predicted probability model based on how intra-EU migrants differ from non-European migrants in the other included countries. This is an imperfect solution and estimates for these five countries should be interpreted accordingly.

3.4 Budget items

In the type of static model we employ, the categories of contributions made by, and expenses incurred by, a given household are generally fairly intuitive. On the one hand, taxes and social security contributions paid can be counted towards the contribution side. On the other hand, cash benefits and benefits in kind (such as schooling or healthcare), as well as expenditures for various public goods can be counted as costs. In practice, however, it is often substantially more complicated. Below we explain how we have categorized and allocated the budget items included at the household level.

3.4.1 Expenditures

The expenditure categorization we employ departs from the COFOG classification of government expenditure (OECD 2011), where all spending is categorized according to both transaction and area of expenditure. Based on this presentation, we have divided all social transfers into *benefits* (all areas of expenditure except old age) and *pensions* (old age) and all other

Table 1: Expenditures

Category	% of GDP	Transaction	Area of expenditure	Allocation criteria
Benefits (ben)	6.30	Social benefits	Everything but old age	Benefits
Pensions (pen)	7.64	Social benefits	Old age	Pensions
Non-congestible public goods (npg)	7.83	Every other transaction	General public services and Defence	Zero marginal cost
Demographically modelled expenditures (dem)	12.57	Every other transaction	See separate table	Age and sex
Congestible public goods (cpg)	11.34	Every other transaction	All government expenditure not included above	Pro-rata

transactions into *non-congestible public goods*, *congestible public goods* and *demographically modelled expenditures* based on the area of expenditure. We summarize expenditure areas, their shares of total GDP, their corresponding items in the national account statistics, and their respective allocation criteria in tables 1 and 2.

Benefits (ben)

We allocate the government expenditure on social transfers in proportion to how much cash benefits the households receive according to EU-SILC. By combining government statistics with such detailed micro data, our study distinguishes itself from most other studies, that have relied either on the assumption that every benefit recipient receives the same amount (Dustmann and Frattini 2014), or that the benefits in available micro-level data equal the government's total cost for social transfers (the bottom-up approach).

Pensions (pen)

The most difficult decision is perhaps how the cost for pensions should be allocated. The EU-SILC data includes information about pension receipts, and our main specification simply allocates pensions the same way as other benefits, that is, in proportion to pensions received. Since migrants are under-represented among the elderly in most countries, this approach will result in lower pension costs for migrants than for natives.

We note, however, that the right to pensions is not primarily determined by where you live, but where you have worked. This is true for migration within the EEA, but also for many bilateral agreements. Allocating pensions as-is is therefore going to attribute a cost to the host state that in many cases is actually incurred by the sender country (or by a previous host country) – especially since many EU migrants are fairly short-term migrants. The results are therefore going to be be somewhat skewed, especially for countries that, for example, are popular destinations for retirees. In the sensitivity analyses, we therefore complement this approach to pensions with a semi-dynamic model that allocates pension costs in proportion to wages instead. This alternative approach can be interpreted as a form of "liabilities created"-model, which allocates costs that will be incurred in the future based on earned wage income now.

Table 2: Demographically modelled expenditures

Category	% of GDP	Area of expenditure	Allocation criteria
Primary education (pri)	1.83	Pre-primary and primary education	Only age 3–10
Secondary education (sec)	1.84	Secondary education	Only age 11–18
Post-secondary and tertiary education (ter)	.99	Post-secondary non-tertiary education + Tertiary education	Only age 19–29
Old-age (old)	.62	Old age	Only age 65+
Health (hlt)	6.17	Health	Age intervals
Police and prisons (pol)	1.13	Police services and Prisons	Sex and age (peak at 18), higher for males

Non-congestible public goods (npg)

Some government services, like defence and the central administration, can be extended to the migrant population at virtually no extra cost. We will henceforth refer to these goods and services as *non-congestible public goods*. Following Rowthorn's (2014) recommendation, we assume that the total cost for this group of expenditures is unaffected by migration. While many previous studies have set the marginal cost to zero also for congestible public goods (OECD, 2013; Sindbjerg Martinsen and Rotger, 2017), we follow Dustmann and Frattini (2014) and restrict our measure of non-congestible public goods to include only two areas of expenditure: 'general public services' and 'defence'.

Congestible public goods (cpg)

While non-congestible public goods can be plausibly assumed to have a marginal cost of zero, congestible public goods are ones that cannot. Congestible public goods, rather, are public goods that will increase in cost as the total population increases. Typical examples are parks, roads and fire protection. These are all to some extent congestible, either directly (the roads have a maximum capacity) or indirectly (there is only a finite number of people who can live in the close proximity of a specific park or fire station), which means that the costs of providing these goods will increase as the population grows. In our models, congestible public goods are allocated on a per capita basis (pro-rata).

Demographically modelled expenditures (dem)

There are a number of public expenditures where individual or household level data is not available, but where the household costs can be inferred based on plausible demographic assumptions. This category of expenditures contains education (primary school, pri, secondary school, sec, and tertiary school, ter), healthcare (hlt), elderly care (old) and costs for policing and prison (pol). The models used for allocating these expenditures are described in the technical details. Table 2 contains a summary of the demographically modelled items, their shares of total GDP, corresponding items in national account statistics and the assumptions governing their allocation.

Table 3: Revenues

Category	% of GDP	Definition	Allocation criteria
Consumption taxes (con)	12.94	Taxes on production and imports - Wage bill and payroll taxes	Disposable income
Taxes on income and wealth (inc)	9.08	Current taxes on income, wealth, etc. from households	Income tax + wealth tax
Capital and corporate taxes (cap)	3.18	Capital taxes + Current taxes on income and wealth from corporations	Pro-rata
Social security contributions (ssc)	11.38	Social security Contributions + Wage bill and payroll taxes (D29C)	Wages
Sales (sal)	3.24	Sales of goods and services	Pro-rata
Other revenue (oth)	3.26	All government revenues not included above	Zero marginal revenue

It is important to note that this type of demographic allocation procedure assumes that given the same age and gender, a migrant will cost on average just as much as a native. This is unlikely to hold in practice, and will probably slighly overestimate the costs of migrants (or vice versa, underestimate the costs of natives) since we suspect that migrants of this kind are often less inclined to use public services of the kind the model includes.

3.4.2 Revenues

We categorize revenues based on the government finance statistics presentation, with definitions coming from the European system of national accounts (ESA). Total government revenue is composed into the following five categories: *income taxes*, *consumption taxes*, *social security contributions*, *sales* and *other revenues*. Table 3 summarizes all the revenue areas in the same fashion as for expenditures.

Income taxes (inc)

The income tax category includes income taxes from households and, where applicable, regular taxes on wealth. We exclude income taxes from corporations. The revenues are allocated based on household level data on income and wealth taxes.

Consumption taxes (con)

We define consumption taxes as *taxes on production and imports*, excluding *wage bill and payroll taxes*. VAT comprises the largest portion of this category, but it also includes excise duties and other consumption taxes. The consumption taxes are allocated based on household level data on disposable income.

Social security contributions (ssc)

Our measure of social security contributions consists of the *total social contributions* in ESA, as well the *wage bill and payroll taxes*. This revenue category is allocated based on individual level data on employer's social security contributions, summed at the household level.

Capital taxes (cap)

We define capital taxes as *capital taxes* plus corporate income taxes (*current taxes on income and wealth* paid by the corporate sector). We also follow Dustmann and Frattini (2014) and allocate the revenues from capital taxes on a per capita basis. The choice of this pro rata-principle can be understood in two different ways. Either that we assume ownership of capital and companies to be similarly distributed between EU migrants and others, or as an assumption that the burden of capital and corporate taxes is primarily born by workers and consumers. However, for most countries capital taxes are a small revenue source, and the final results are quite robust regardless of how the revenue is allocated.

Sales (sal)

Revenues from sales are received when citizens pay a fee in return for some government service, which often is the case with entrance fees for visiting a museum or tickets to use the public transport. For our purposes, this category equals *total sales of goods and services* in the ESA/GFS-presentation and we allocate the sales on a per capita basis.

Other revenues (oth)

Finally, the last category is residually defined: that is, other revenues are simply the difference between total known revenues and the sum of the already mentioned revenue categories. However, if it were not for rounding and imputational errors, this category would equal the sum of *other current revenue* and *other capital revenue* in the ESA/GFS presentation. Because these are revenues that can be assumed to be unaffected by migration, similar to how we treated non-congestible public goods, the marginal revenue from this category is considered to be zero per household.

3.5 Calculations

The net fiscal effect per household, in nominal terms, is simply calculated as the sum of revenues minus the sum of costs included in the analysis. This yields a net figure, in euros, of how much the household contributes to (or costs) the public budget. In principle, this raw unadjusted net effect for household j can be understood as simply:

$$\text{net effect}_j = \text{revenues}_j - \text{expenditures}_j. \tag{1}$$

While necessary for the further calculations, this number is usually not very interesting in itself. These household balances are therefore aggregated and compared between countries in several different ways, as follows.[5]

3.5.1 Total effect as per cent of GDP

To identify the effect on the public budget of the entire population of EU migrant households (or native households), we sum up the net balances above (revenues minus expenditures) for these households.[6] This sum is then divided by the gross domestic product, to give a sense of how large the net fiscal effect on the public budget is in relation to the economy as a

[5] Note that these formulas are used for illustrative and intuitive purposes – the actual calculations are somewhat more complex, involve weighting procedures and are summarized across years. Detailed descriptions can be found in the Technical details section below.

[6] The actual division of households is done as fractions – mixed households are counted as both, but weighted by the fraction of the household belonging to the relevant category.

whole. Naturally, this also means that a country with a larger share of EU migrants, other factors being equal, will have a larger fiscal impact. The calculation can be represented by the following equation:

$$\text{total effect}^{\%\text{gdp}} = \frac{\sum \text{net effect}_j}{\text{GDP}}. \tag{2}$$

3.5.2 Effect per per cent EU migrant households

Next, we attempt to assess the actual marginal effect of EU migrant households, that is, the impact of adding more migrant households to the population. To do this, we present estimates where the above total effects (total effect as per cent of GDP) are simply divided by the percentage of the households in the population that are classified as EU migrant households. This yields a figure that corresponds to the effect on the public budget, as a share of GDP, of increasing the share of the households in the population that are EU migrant households by one percentage point:[7]

$$\text{net effect}^{\%mig} = \frac{\text{total effect}^{\%\text{gdp}}}{100 \times \frac{\text{migrant households}}{\text{all households}}}. \tag{3}$$

In essence, this is simply the *net effect on GDP per household*, but scaled by population size.

3.5.3 Effect on the budget balance

A country running a large budget deficit will tend to have inhabitants that are net liabilities on average, while a large budget surplus will yield inhabitants that are net assets. This poses a problem if large deviations from a balanced budget are temporary, which we should expect them to be. Furthermore, the budget balance to GDP ratio is not just a function of the nominal surplus or deficit, but also of GDP (the denominator). Since a larger population will also increase GDP, immigration will tend to deflate the budget balance, since it is now shared among a larger number of people. For example: if the government runs a large surplus, an influx of fiscally neutral people (i.e. with fiscal effects of $\pm$ zero) will still have a net negative effect on the budget balance to GDP ratio.

One way of addressing this problem is by simply comparing the fiscal effects of natives and migrants (see for example Dustman & Frattini, 2014). This solution gives a sense of whether EU migrants are likely to be assets or liabilities in a situation where the budget is balanced, and thus addresses the first of the two issues raised above. It does not, however, give an accurate estimate of the deflationary effect on the budget balance. Neither would it provide us with an estimate of the fiscal impact, because it is possible that both natives and migrants are net contributors to the budget, especially if a large share of expenditures are classified as non-congestible public goods.

We solve this concern by complementing the estimates already mentioned (total effect$^{\%gdp}$ and net effect$^{\%mig}$) with a net effect estimate that is adjusted to account for the change in the budget balance. Since this requires an estimation of how migration affects GDP, we assume that the share of GDP which can be attributed to migrants is proportional to the migrants' share of the total wages. This is probably a slight overestimation, but other assumptions would only marginally alter the results.

[7] Note that in order to interpret this figure as a real marginal effect for future migrant flows, one has to assume an identical character of added migrants to that of the existing composition of the EU migrant population – i.e. the relevant characteristics for shaping net fiscal effects should not differ between EU migrants arriving next year and those who already reside in the host country.

The change in budget balance induced by household j can thus be described as:

$$\text{deflation}_j = \text{budget balance}^{\%\text{gdp}} \times \frac{\text{wage}_j}{\sum \text{wage}_i} \tag{4}$$

and the total change in budget balance due to the EU migrant population (for example) is simply:

$$\Delta\text{budget balance}_{\text{EU migrants}} = \text{total effect}^{\%\text{gdp}} - \sum \text{deflation}_{j \in \text{EU migrants}}. \tag{5}$$

4 Results

4.1 EEA summary

The costs and contributions for an average household in the European Economic Area – grouped into natives, EU migrants and non-EU migrants – are presented in figures 1 to 3. As shown in figure 1, the largest revenue source is social security contributions (ssc), followed by consumption taxes (con) and taxes on income and wealth (inc). Capital taxes (cap) and sales (sal) are both small by comparison, as is the residual post "other" (which is not included in the net effects). The European households are fairly similar, on average, when it comes to revenue sources. This applies both when comparing EU migrants to natives, as well as to other migrants.

On the expenditure side (figure 2), the demographically modelled items (dem) – that is, healthcare, schooling and elderly care – is the largest column (owing to the fact that it comprises the sum of six sub-items), while benefits (ben) is smallest. Among the demographically modelled items, figure 3 shows that health care is by far the largest expense, which is partially due to the fact that schooling expenditures are also subdivided. Differences between native and migrant households are small or non-existent – the largest difference observed is on benefit claims, where non-European migrants claim slightly more than either natives or EU migrant.

Since countries vary in both their taxation and spending structures, as well as in the size of their migrant populations, these aggregates may obscure within-country differences between households. Put simply, since intra-EEA migration tends to occur from poorer countries to richer ones, the average EU migrant household is going to be located in a richer country than the average native household.

To illustrate how EU migrants compare to other households within the same country, we have for each member state calculated the within-country *difference*, in nominal terms, between the average native household and the average EU migrant household, and then calculated a weighted EEA average of these differences. The results are presented in figure 4. Here (as expected) the picture is slightly different from the cross-European averages presented above, showing consistently both lower revenues *and* expenditures for EU migrant households. In particular, EU migrant households have markedly smaller demographically modelled expenditures (dem), likely owing to the fact that a larger share of this sub-population, compared to natives, is of working age.

We can also see in figure 8 how the within-country *net* fiscal effects (revenues minus expenditures per household) of EU migrants come out over time. We should expect there to be more negative effects during the Great Recession, since many EU countries ran deficits during the crisis years. The graph shows a clear slump during the recession years (most markedly in 2009 and 2010), but not below zero. This slump has recovered to pre-crisis levels since. In the EEA as a whole, migration from EU countries largely appears to have been a net fiscal asset for the host states. It's important to remember, however, that this does not include emigration effects (i.e. fiscal effects of moving *away* from, rather than to, a country), and therefore does not represent the full picture of whether intra-EEA migration is a net fiscal asset all things considered.

4.2 By item

The items where household allocation is directly based on micro-level data are income taxes, social security contributions and benefits. In figures 5–7, we can see the distribution of these

Figure 1: Revenue items per European household, by migrant status

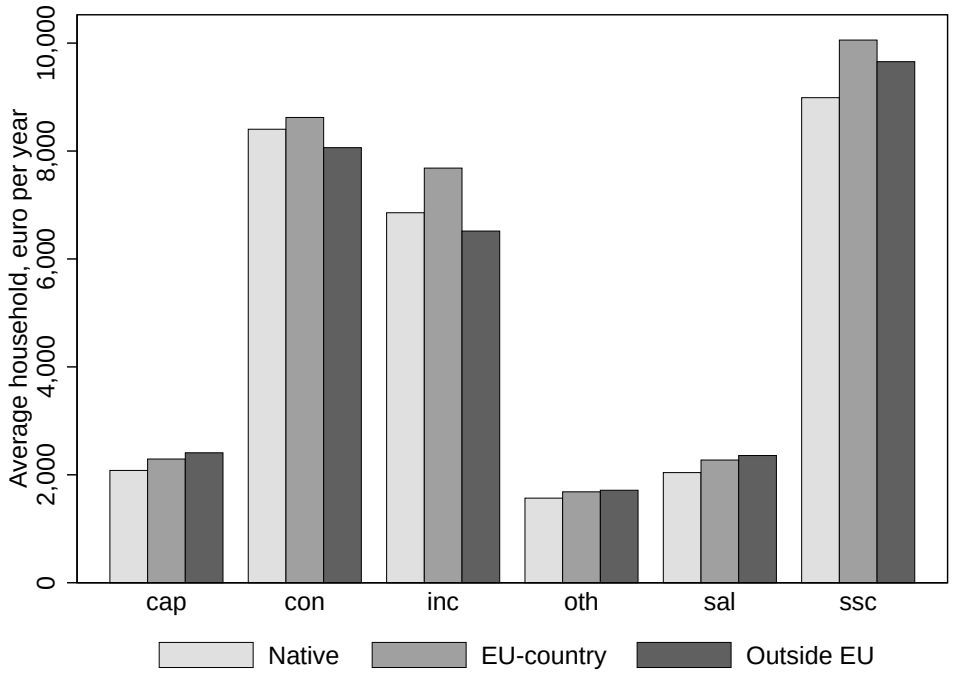


Figure 2: Expenditure items per European household, by migrant status

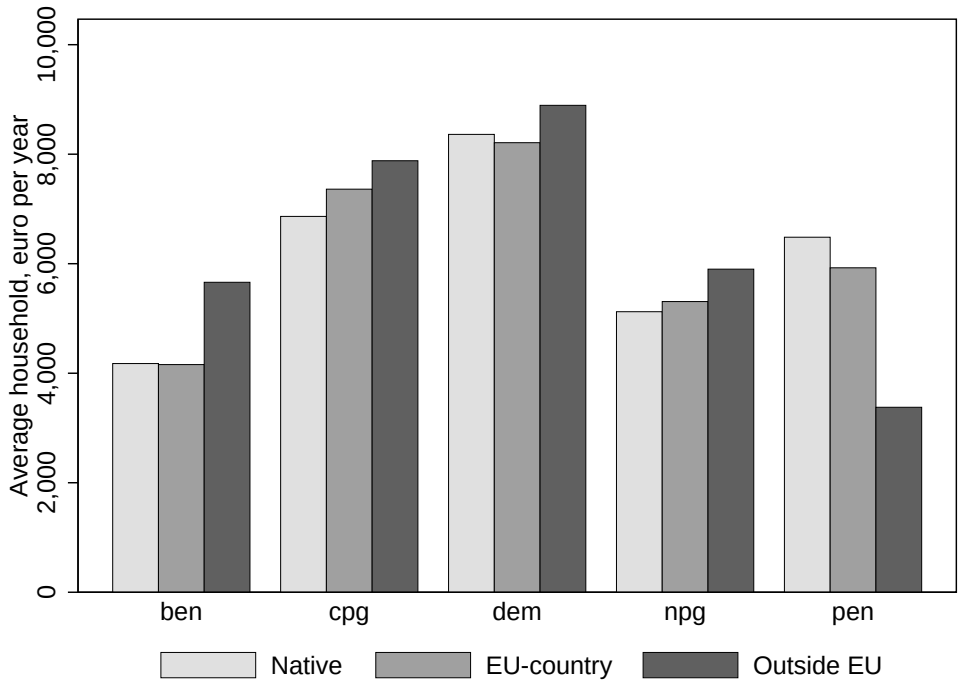


Figure 3: Demographically modelled expenditure item breakdown per European household, by migrant status

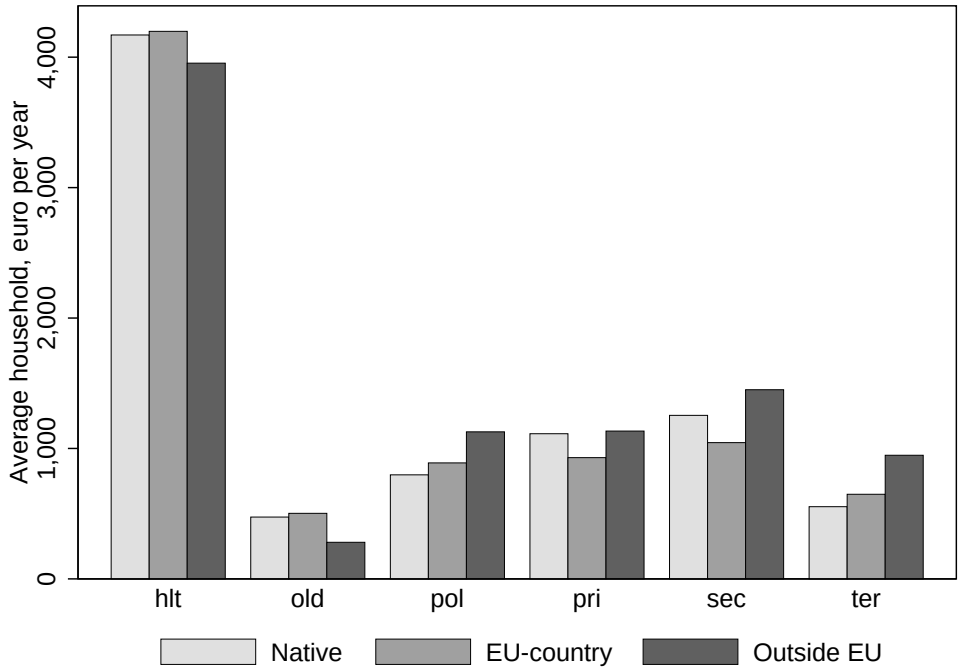


Figure 4: Differences across items between EU migrant households and natives/all others

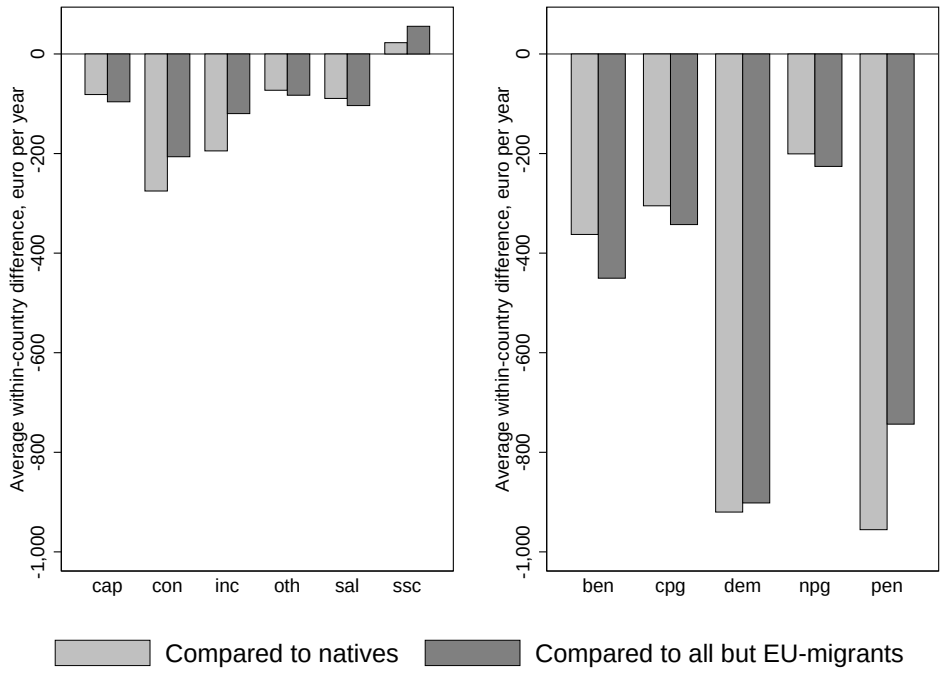


Figure 5: Income taxes per per cent EU migrant households as share of GDP

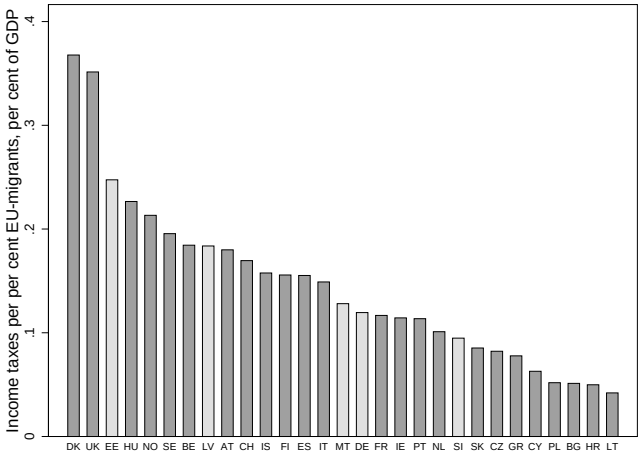


Figure 6: Social security contributions per per cent EU migrant households as share of GDP

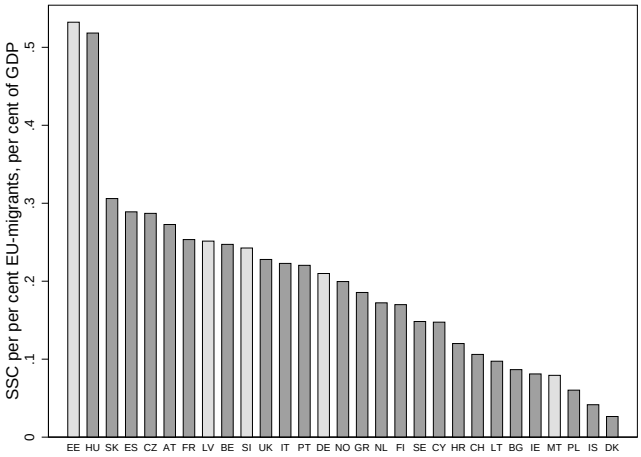
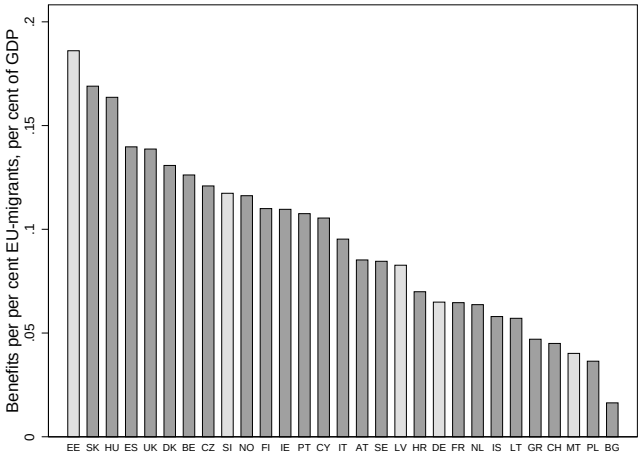


Figure 7: Benefits claimed per per cent EU migrant households as share of GDP



Note: lighter bars in figures on this page represent countries with imputed migrant status and should thus be interpreted with care.

items cross-country. Each figure is calculated as the sum of this item for all EU migrants, as a share of GDP, divided by the percentage share of EU migrants in the population.

For income taxes, we find generally countries with higher average income tax rates (such as the Nordic welfare states) in the top half of the distribution (i.e. with the highest tax payments per household), which should be expected. There are some exceptions to this pattern, for example Latvia and Estonia that are both based on imputed EU migrant status. Naturally, differences along this spectrum not only reflect tax rates but also the income of EU migrants relative to natives. Conversely, the same pattern applies to benefits claimed, with more generous welfare states generally ending up in the upper half of the distribution and vice versa.

4.3 Country comparisons

A key question is how net fiscal effects of EU migrant households are distributed across the European states. In the following analyses, each figure corresponds to an average over the years 2004–2015[8] (cross-national comparisons for different time periods are presented in the next section). To begin with, we can see in figure 9 that the relative sizes of EU migrant populations vary substantially by country – from more than 16% in Switzerland and 13% in Ireland, to just a fraction of a percent in Bulgaria, Poland and Lithuania. This is important to keep in mind since larger EU migrant populations will lead to larger total fiscal effects, other things being equal.

Figures 10 and 11 show the net fiscal effects of the whole EU migrant populations per country, as well as effects adjusted for the relative size of the EU migrant population.[9] The largest total effect is found in Switzerland, which shows a net total effect of about 1.6% of GDP, followed by Cyprus (see figure 10).

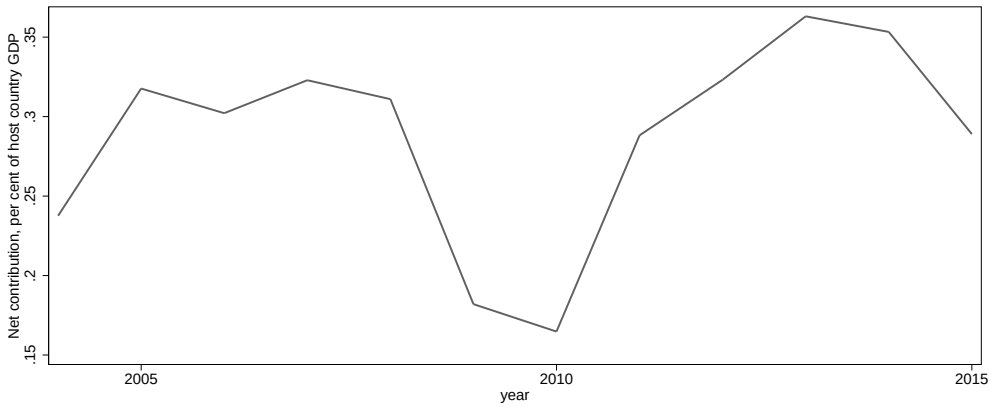
It is notable in figure 10 that almost all European states, with the exception of Switzerland and Cyprus, show total net effects of inra-EEA migration that are within the span most commonly reported in the existing literature ($\pm 1\%$ of the host country's GDP), and 25 out of the 29 are in the range of $\pm 0.4\%$ (but keep in mind that this is also for a subgroup of migrants rather than all migrants, and will therefore by necessity lead to a lower total). The effects are not distinguishable from zero in Iceland, Estonia, Slovenia, Latvia and Ireland.

Turning instead to the effect per per cent EU migrant households in figure 11, we see a

[8] Some countries have data for fewer years.

[9] Note that pseudo-CI's are reported only for the three main effect estimates, namely in figure 10, 11 and 13.

Figure 8: Average within-country net effects of EU migrants



fairly consistent order among the included countries, with a few notable exceptions. Switzerland occupies a particular position, with by far the largest total effect in figure 10, but a substantially lower ranking when adjusting for the size of the migrant population in figure 11. This indicates that the large total effect in Switzerland is driven by the large population of EU migrants, rather than large contributions per migrant household. Poland occupies a particular position in that a substantial share of the population classified as EU migrants are elderly, which shows up here as a substantial net burden per per cent. The reasons for this disproportionate representation of elderly are not certain, but likely have to do with the considerable migration and territorial changes in the wake of WWII. Many of these elderly may have technically been born in, for example, Germany, and are therefore classified as EU migrants by our definition.[10]

The reverse of the Swiss situation applies to Lithuania, which showed a total net effect very close to zero, but now shows up as the country with the fourth largest net burden. This implies that the lack of total effect was in fact driven by the small population of EU migrants.

Figure 12 shows us the net effects of EU migrant households compared to other households.[11] The largest difference can be seen in Norway, where EU migrant households have a net contribution that is almost 13.000 euros larger per year than that of natives. Furthermore, EU migrant households have marginally larger net contributions than natives (and than natives plus other migrants) in most of the included countries. EU migrant households are substan-

[10]A striking illustration of this is that among those classified as EU migrants in Poland for which there is data on year of immigration (only 135 out of 1394), the median year is 1953. It should be mentioned that a similar situation shows up in Latvia, Estonia and Lithuania, where the median years of immigration for those where this is reported are 1967, 1967 and 1972, respectively.

[11]The comparisons are to natives on the one hand and natives plus other migrants on the other, since this correponds to the two central questions one might want ask of the material. If one is interested in the actual fiscal impact of intra-EEA migration, it is the comparison to natives plus other migrants that is relevant, since that provides the proper counterfactual. If, on the other hand, one is interested in – for example – labour market integration of EU migrants, the proper comparison should rather be with only natives.

Figure 9: Relative size of EU migrant population in re-weighted EU-SILC data

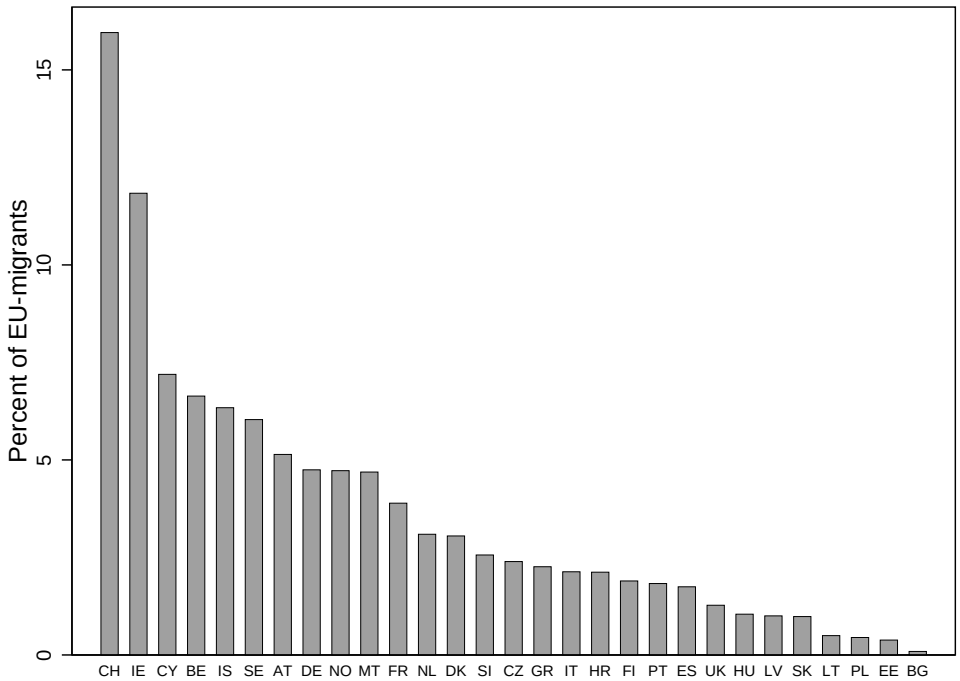


Figure 10: Net fiscal effect of all EU migrant households, per country

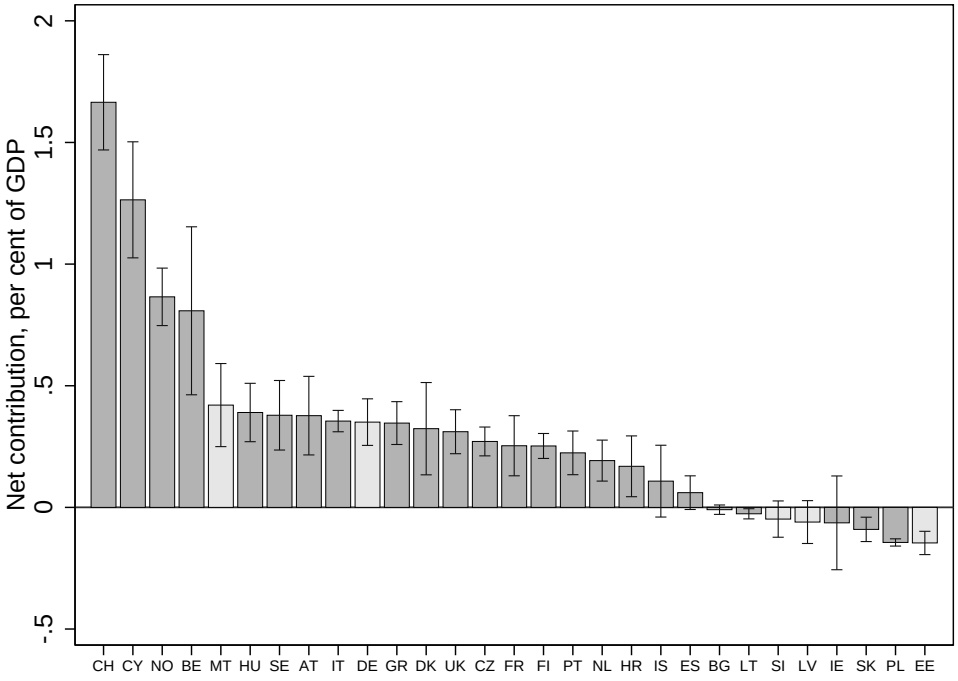
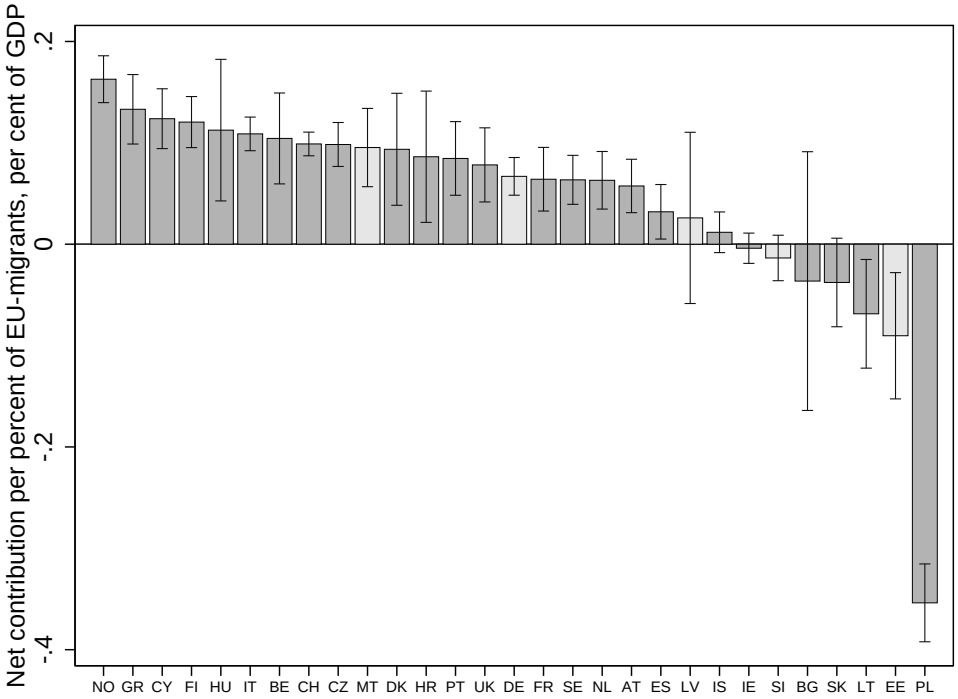


Figure 11: Net fiscal effect per percent EU migrant households, per country



Note: lighter bars in figures on this page represent countries with imputed migrant status and should thus be interpreted with care.

Figure 12: Difference in net fiscal effect between EU migrants and others, per country

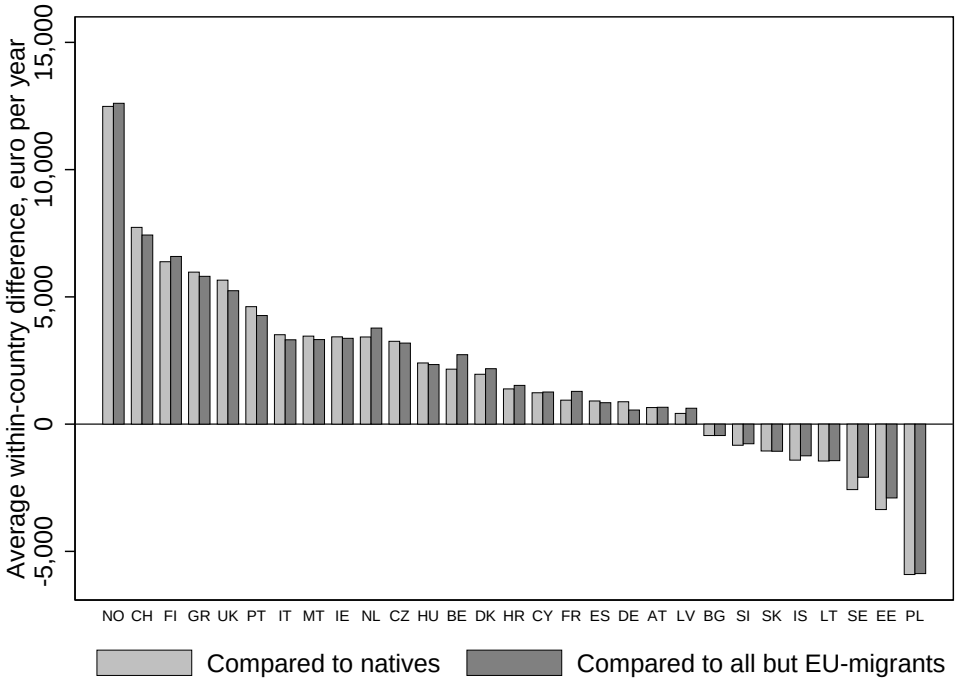
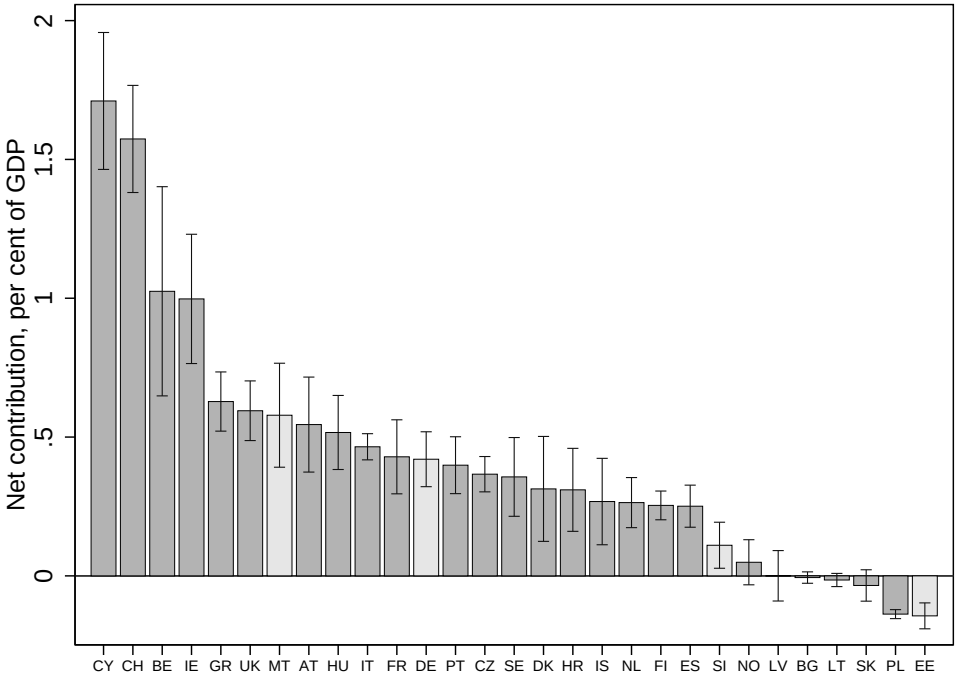


Figure 13: Net fiscal effect of EU migrants, measured as change in budget balance



Note: lighter bars in figure 13 represent countries with imputed migrant status and should thus be interpreted with care.

tially larger fiscal burdens than natives only in Poland, likely for reasons discussed above. In general, the difference in net fiscal effects between EU migrant and native households has to be considered fairly small. For 23 out of the 29 countries, the difference is within ± 5.000 euros per year.

It is notable, when comparing figures 11 and 12, that there is a strong overlap between countries where EU migrants have net negative fiscal effects, and where they also have more negative fiscal effects than natives. This is the case mainly in Poland, Estonia and Lithuania. The only country where the effect clearly goes in different directions (i.e. positive net effects, but less positive than natives) is Sweden.

An issue that needs to be addressed considering the period of study (which includes the Great Recession) is that fiscal effects of migration that are driven by an unusually weak budget balance can easily be misleading. If the fiscal situation is temporary, which typically is the case if the deficit is caused by an economic downturn, then the observed fiscal impact of migration will improve as soon as the economy recovers (the same applies in reverse, of course, if a country has an unusually strong budget balance). Moreover, budget balances are typically expressed as a share of GDP, and migration will not only affect the nominal budget balance, but also the denominator (GDP). Thus, migration will also 'deflate' the budget balance, as the existing deficit or surplus is shared by a larger population. Our preferred method to handle this problem is to estimate how intra-EEA migration affects the budget balance as percent of GDP.

The results are presented in figure 13. For most countries, these results are more positive than the ones which were presented in figure 10. This is a direct consequence of the fact that most countries have been running a deficit during this period and that this deficit decreases as share of GDP when GDP increases. The difference is largest in countries with deep deficits and a large share of EU migrants, like Cyprus and Ireland. Switzerland is virtually identical, implying that on average across the years studied, the budget has been in balance (thus there was nothing to deflate).

While, as mentioned, most countries appear to fare better with this measure, Norway stands out as the big exception, in fact now showing effects not distinguishable from zero.

To further elaborate on this, and also extend figure 5 to the cross-country analysis, we can look at the differences in net fiscal effects before, during and after the Great Recession. These are found in figures 14 to 16. As we can see in figure 15, there was a shift downward in the distribution during the crisis, moving several countries from small but positive net fiscal effects to small but negative. The largest movement is shown by Latvia, but it should be noted that the figures for Latvia are based on imputed migrant status data and are thus less reliable. Figures 17–19 show the effects measured as the change in the budget balance over the same three periods. When including the deflationary effect on the budget balance to GDP ratio, the fiscal impact actually improves during the crisis. This should not be all that surprising since the deflationary effect becomes positive when there are budget deficits.

Figure 14: Net fiscal effect per percent EU migrant households, per country, 2004–2008

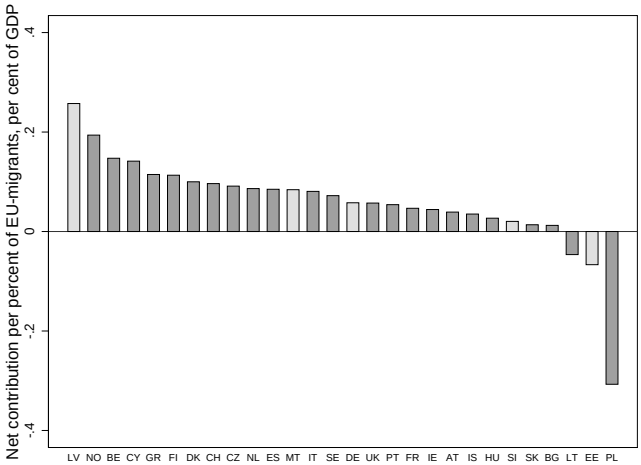


Figure 15: Net fiscal effect per percent EU migrant households, per country, 2009–2012

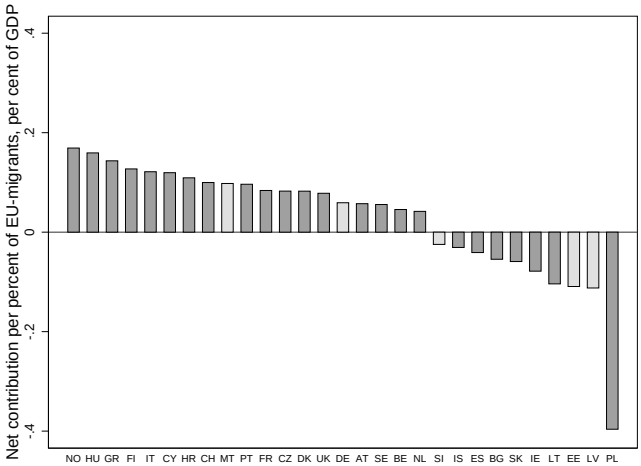
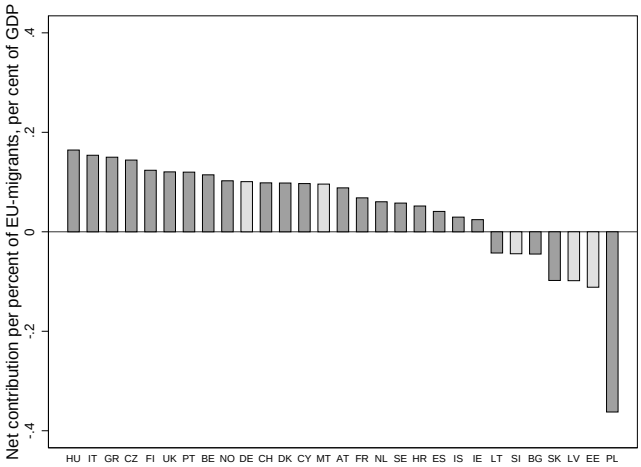


Figure 16: Net fiscal effect per percent EU migrant households, per country, 2012–2015



Note: lighter bars in figures on this page represent countries with imputed migrant status and should thus be interpreted with care.

Figure 17: Net fiscal effect per country, measured as change in budget balance, 2004–2008

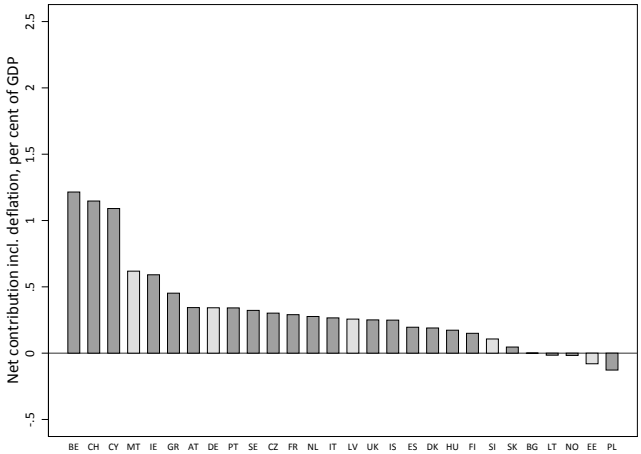


Figure 18: Net fiscal effect per country, measured as change in budget balance, 2009–2011

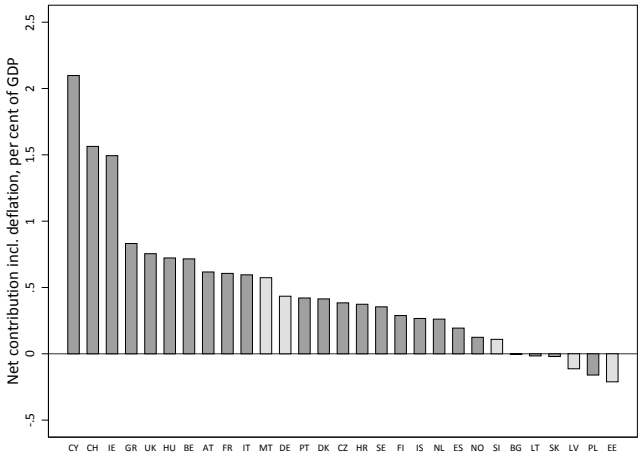
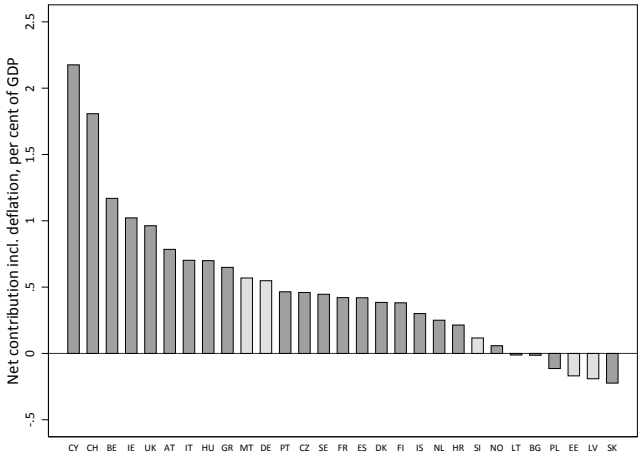


Figure 19: Net fiscal effect per country, measured as change in budget balance, 2012–2015



Note: lighter bars in figures on this page represent countries with imputed migrant status and should thus be interpreted with care.

5 Discussion

5.1 Summary

The general picture, when looking at the total net fiscal effects, is that migration of EU citizens within the EEA does not induce particularly sizable net benefits *nor* costs in the host countries. Apart from a few exceptional cases – Switzerland, Cyprus, Norway and Belgium, which show substantially larger positive fiscal effects of EU immigration than others – all countries show either zero effects or effects of less than $\pm 0.4\%$ of GDP. Predictably, this was on average higher before the crisis, and lower during. As a point of comparison, a total net effect of $+0.5\%$ of GDP corresponds to the additional revenue generated by an increase in the average income tax rate of roughly a percentage point (assuming the wage share of GDP is around 50%, and ignoring possible dynamic effects of income tax increases on GDP itself).

One reason for this lack of substantial effects is probably that the crisis years caused substantial, but temporary, budget deficits in many European countries. In line with this reasoning, the fiscal effects appear somewhat more positive when including the deflationary effect that the increase in GDP caused by migration has on the budget balance to GDP ratio. With this measure, we instead get effects of roughly $+0.5\%$ of GDP or higher in ten out of 29 countries, and a negative effect in only two. Furthermore, the effect became *more positive* during the crisis years.

While teasing out patterns in the results is for other analysts to engage with, one in particular deserves mentioning – namely that the countries with negative (or less positive) fiscal effects of EU immigration tend to be Eastern European countries. Notably, Estonia, Poland and Slovakia have small, but negative, total fiscal effects. One reason for the small magnitude of their total net effects is that the populations of EU migrants in these countries are very small. When taking this into account, the picture looks significantly worse for Poland in particular. It might be worth further pursuing the Polish case to find out why it is that the fiscal effects are so negative here, but not elsewhere. One possibility is that the result is driven by a skewed distribution of demographic characteristics in the data.

5.2 Biases and sensitivity

There are possible sources of bias in several of the included items, especially when it comes to comparisons between migrants and natives. Some of these possible biases are discussed below, and some of the results from the more elaborate sensitivity analyses conducted in section 7 are brought to bear on the question.

The first thing to note is that items that are demographically modelled typically don't allow systematic differences between natives and migrants other than those affected by *other* demographic characteristics than migrant status itself. That is, a migrant household might cost more or less than a typical native household if it is larger or smaller in size, or has a different age or gender profile, but not by virtue of simply being a migrant household. A household of two 30-year olds, for example, will have the same estimated healthcare costs regardless of migrant status.

This is unlikely to be precisely true in practice. It is probable, for example, that EU migrants will tend to use less health care services *in the host country* than their native counterparts, for a given age. The opposite logic applies to expenditures on primary and secondary schooling, where (for example) extra language resources may be required for children of migrants. On the balance, this likely skews the estimates somewhat in favour of natives, since the health care expenditures are by far the largest post among the demographically modelled items. To test

the sensitivity of the estimates to substantial alterations of this distributional assumption, the sensitivity analyses in section 7 present the robustness of the estimates to specifications with demographically modelled expenditures adjusted $\pm 25\%$ compared to natives. Results appear robust with regards to perturbations of the demographic allocation assumptions in almost all countries.

A similar assumption regards consumption taxes. Since consumption taxes are allocated solely based on disposable income, this assumes that rates of savings, and *where* one's disposable income is spent, is the same for migrants and natives. Both of these can be questioned. Rather, it's possible that migrants both save more, and also spend some of their income in their home country. The assumption of identical marginal consumption propensities is therefore also relaxed in the sensitivity analyses, and a specification where migrants pay 25% *less* in consumption taxes than natives is presented. As above, results appear robust.

So far, the possible sources of bias have been shown to be issues of minor importance. The pensions, however, are a different story. As we have seen, pensions are based on individual level data in the main specification, but in this way may be partially attributed to the wrong country. An alternative version where pensions are allocated based on working income rather than pensions received alters the results in several countries, and appears to do so in a predictable way: Eastern European countries with negative results in the main specification show less negative results with the alternative specification, whereas a few Western European countries instead show more negative results. It is unclear precisely what the reason is for this pattern, and additional research is needed to shed light on this.

An issue that has not been possible to address is the extent to which the age-reweighting procedures employed, which make sure that the demographic structures are correct, are also going to affect the distribution of *other* variables at the micro-level. How, and to what extent, this might affect the results is unknown. This data quality issue is a deeper matter that is beyond the capacity of this study to resolve, but underscores the importance of sound underlying data.

5.3 How to use the estimates

The estimates produced in this study is intended for use by researchers or analysts who want to investigate both the effects of, and determinants of, variation in fiscal effects of intra-EEA migration. Due to the limitations in the data and procedures used to estimate the fiscal effects, a number of considerations should be taken, and cautions heeded, before proceeding. These precautions will help safeguard against drawing erroneous inferences based on 1) volatility in the estimates, 2) uncertainty in the underlying data, and 3) imputation and modelling procedures used to obtain estimates.

5.3.1 Countries to include

Although estimates are produced for all EEA countries except Luxembourg and Romania, not all countries should be included in a cross-national analysis. There are two considerations to be made in this regard.

First, we recommend that countries with imputed migrant status are excluded. That is, estimates for Germany, Estonia, Latvia, Malta and Slovenia *should not be used for comparative purposes*. Second, countries with particularly volatile estimates should also be excluded on the grounds that it is statistically uncertain whether net fiscal effects in these countries are actually positive or negative. When using total effect estimates, we therefore also recommend excluding Iceland and Ireland. If fiscal effects per % EU migrant households are used, we

instead recommend excluding Bulgaria. No particular further exclusions apply when using effects measured as change in the budget balance.

5.3.2 Estimates to use

Furthermore, there are considerations to be made as to *which* of the estimates that are to be used, depending on the purposes of the comparisons. These considerations depend on whether the estimates are to be used as dependent or independent variables, and further why they are included.

As a general rule, we do not recommend using data for individual budget items. To the extent that one may wish to do so anyway, they can only be used if they are *not* demographically modelled. That is, if necessary, use data for individual items that are derived from micro-level data. These are the following:

- Taxes on income and wealth (tiw)
- Social security contributions (ssc)
- Benefits (ben)

Note that pensions are not mentioned here, for reasons previously discussed: while derived from micro-level data, some pension receipts may be misattributed to the host country. While such misattributions will largely "wash out" in the total effect estimates, using the pension item by itself is not recommended.

Furthermore, when used as a dependent variable, any explanatory variables that attempts to capture variation in fiscal effects that is due to differences in the types of expenditures that are demographically modelled cannot be used. For example, attempting to explain differences in fiscal effects across countries with differences in health care regimes will only capture the variation between natives and EU migrants in terms of the average ages of the households, and not any variation caused by actual health care consumption.

6 Technical details

In this chapter, the procedures used to obtain the estimates are described in detail. Henceforth, the following notation will be used. There are h households in the EU-SILC data in a given country-year. Individual i, with age α_{ii} and migrant classification γ_{ij}, is nested in household j, which contains a total of s_j individuals. Household j also comprises the proportion p_j^{γ} people of migrant category γ.

6.1 Countries included

Countries included as-is are Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech republic, Denmark, Finland, France, Greece, Hungary, Iceland, Ireland, Italy, Lithuania, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

Luxembourg is dropped due to a very large proportion of people who work in other countries, and likewise a large proportion of the labour force that live abroad. Romania is excluded because the EU-SILC data includes too few migrants who live in Romania.

For Estonia, Germany, Latvia, Malta and Slovenia, data is missing in EU-SILC on migrant categorization (EU versus other). These countries have been subjected to a separate set of estimation procedures described below.

6.2 Country-year data

Statistics on national accounts are taken from the annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs (AMECO) and the OECD Classification of the Functions of Government (COFOG). Data on demographic structure is from the World Bank Health, Nutrition and Population Statistics. For seven countries we had to impute some of the expenditure data. Imputation was done by linear interpolation for gaps of up to two years, and otherwise on extrapolation based on the trends in other EEA countries.

6.3 Household data

The micro-data we use is from the European Union Surveys on Income and Living Conditions, EU-SILC. This data contains a variety of items on for example income, taxes, benefits and pensions, as well as demographic characteristics, and, crucially, information on migrant status. Relevant individual level data is aggregated at the household level, and merged with household level data (see Definitions for precise variables used).

6.4 Weighting procedure

6.4.1 Age reweighting

Since age distributions in the (weighted) EU-SILC data do not always match the known age distributions in the countries included, the first weighting step is to age-adjust the existing cross-sectional weights in EU-SILC (DB090) to correspond to the known demographic pyramids per country/migrant status. More specifically, the procedure uses Stata's sreweight program to recalibrate the existing weights so that the weighted EU-SILC population resembles the known population sizes of eight demographic groups, defined by country of birth (native or foreign-born) and age-group (0–15, 15–29, 30–59 and 60–80). The calibration is based on the modified chi-squared distance function described by Deville & Särndal (1992).

6.4.2 Adjust for missing data

After subsequent data imputation (described for each item below), a final weight for each complete household is produced by adjusting the above derived weights by the residual response-rate (meaning the rate of non-missing households per country-year and migrant category as a fraction of the total number of households, when their original weights are taken into account). The previously age-structure adjusted weight ($DB090^{aa}$) is transformed, for each country-year, as follows:

$$w_j = \frac{DB090_j^{aa}}{\left[\sum_{k=1}^{h}(\prod_{l=1}^{m}\theta_{kl})p_j^{\gamma}\right] / \sum_{k=1}^{h} p_j^{\gamma}} \tag{6}$$

where θ_{kl} is a binary indicator of whether the variable l out of m exists for household k. Note that if data is not missing at a differential rate between migrant categories, this will inflate the weights at the same rate for all households and thus leave the aggregated results unaffected.

6.5 Item definitions

This section outlines the items that are used to obtain net effects. Each item departs from a total budget post from the national account statistics, which is then divided up and distributed over the households based on principles outlined below. In many cases we can match it against micro-level data and thus get shares that correspond to actual individual accounts, while in other cases, we rely on demographic models or other assumptions.

In the following, variable names in lower case (such as con_j) refer to the household budget item, while variable names in upper case (correspondingly, CON) refer to the aggregated country-year budget item.

6.5.1 Revenues

Consumption taxes (con)

Taxes on consumption, including production and imports (UTVG, AMECO), but excluding wage bill and payroll taxes (ECB), are allocated in proportion to the EU-SILC household disposable income (HY020).

$$\text{con}_j = \frac{\text{HY020}_j}{\sum_{k=1}^{h} w_k \text{HY020}_k} \times \text{CON}. \tag{7}$$

If HY020 is missing, it is imputed with a country-specific linear prediction based on HY010-HY140G, or only on HY010 if HY140G is missing.

Income taxes (inc)

Taxes on income, including wealth (UTYG, AMECO), are allocated in proportion to the EU-SILC variables taxes on income and social contributions plus regular taxes on wealth (HY140G and HY120G):

$$\text{inc}_j = \frac{\text{HY140G}_j + \text{HY120G}_j}{\sum_{k=1}^{h} w_k[\text{HY140G}_k + \text{HY120G}_k]} \times \text{INC}. \tag{8}$$

If HY140G is missing, it is imputed with a country-specific linear prediction based on total household disposable income (HY020), or gross income (HY010).

Capital taxes (cap)

Taxes on capital (UTKG, AMECO) are allocated in proportion to household size:

$$\text{cap}_j = \frac{s_j}{N} \times \text{CAP} \quad , \quad N = \sum_{k=1}^{h} w_k s_k. \tag{9}$$

Social security contributions (ssc)

Social security contributions (UTSG, AMECO) are allocated based on the EU-SILC variable employer's social security contributions (PY030G), summed at the household level:

$$\text{ssc}_j = \frac{\sum_{i=1}^{s_j} \text{PY030G}_{ij}}{\sum_{k=1}^{h} w_k \sum_{i=1}^{s_k} \text{PY030G}_{ij}} \times \text{SSC}. \tag{10}$$

If PY030G variable is missing, it is imputed with a country-specific linear prediction based on employer's cash or near-cash income (PY010G) summed at the household level, or total household gross (HY010) minus benefits (see below).

Sales (sal)

Sales are allocated in proportion to household size:

$$\text{sal}_j = \frac{s_j}{N} \times \text{SAL} \quad , \quad N = \sum_{k=1}^{h} w_k s_k. \tag{11}$$

Other revenue (oth)

Other revenues, defined as total revenues (URTG, AMECO) minus the sum of already allocated revenues (con, inc, cap, ssc and sal), are considered to have zero marginal contribution (analogous to npg below), and are therefore left out of the main specification of the net effects. They are allocated in proportion to household size for comparison:

$$\text{oth}_j = \frac{s_j}{N} \times \text{OTH} \quad , \quad N = \sum_{j=1}^{h} w_j s_j. \tag{12}$$

6.5.2 Expenditures

Benefits (ben)

Benefits are allocated in proportion to the EU-SILC variables total disposable household income (HY020) minus total disposable household income before social transfers including pensions and old-age benefits (HY023):

$$\text{ben}_j = \frac{\text{HY020}_j - \text{HY023}_j}{\sum_{k=1}^{h} w_k [\text{HY020}_k - \text{HY023}_k]} \times \text{BEN}. \tag{13}$$

Pensions (pen)

Pensions, in the main specification, are allocated in proportion to pensions received, as reported in EU-SILC:

$$\text{pen}_j = \frac{\text{pensions}_j}{\sum_{k=1}^{h} w_k \text{wages}_k} \times \text{PEN}. \tag{14}$$

Demographically modelled expenditures (dem)

Demographically modelled expenditures are budget items where no individual or household level information is available, but where plausible demographic models can be used to estimate such expenditures. These include the following:

- Costs for primary education (*pri*), estimated as the per child (aged 3–10) cost for primary education (COFOG), multiplied by household number of children aged 3–10:

$$\text{pri}_j = \sum_{i=1}^{s_j} (3 \leq \alpha_{ij} \leq 10) \times \frac{PRI}{\sum_{k=1}^{h} w_k \sum_{i=1}^{s_k} (3 \leq \alpha_{ik} \leq 10)}. \tag{15}$$

- Costs for secondary education (*sec*), estimated as the per child (aged 11–18) cost for secondary education (COFOG), multiplied by household number of children aged 11–18:

$$\text{sec}_j = \sum_{i=1}^{s_j} (11 \leq \alpha_{ij} \leq 18) \times \frac{SEC}{\sum_{k=1}^{h} w_k \sum_{i=1}^{s_k} (11 \leq \alpha_{ik} \leq 18)}. \tag{16}$$

- Costs for tertiary or other postsecondary education (*ter*), estimated as the per person (aged 19–29) cost for tertiary or other postsecondary education (COFOG), multiplied by household number of individuals aged 19–29:

$$\text{ter}_j = \sum_{i=1}^{s_j} (19 \leq \alpha_{ij} \leq 29) \times \frac{TER}{\sum_{k=1}^{h} w_k \sum_{i=1}^{s_k} (19 \leq \alpha_{ik} \leq 29)}. \tag{17}$$

- Costs for healthcare (*hlt*), allocated by age based on the weights found in Table 2, Hagist & Kotlakoff (2005) (weights denoted Ω_{ij}):

$$\text{hlt}_j = \sum_{i=1}^{s_j} \Omega_{ij} \times \frac{HLT}{\sum_{k=1}^{h} w_k \sum_{i=1}^{s_k} \Omega_{ik}}. \tag{18}$$

- Costs for policing and prison (*pol*), allocated by age and gender according to the following:

$$\text{pol}_j = \sum_{i=1}^{s_j} \pi_{ij} \times \frac{\text{POL}}{\sum_{k=1}^{h} w_k \sum_{i=1}^{s_k} \pi_{ik}} \tag{19}$$

where

$$\pi_{ij} = \begin{cases} 0 & \text{if } \alpha_{ij} < 12 \text{ or } \alpha_{ij} > 80 \\ \left(\dfrac{\alpha_{ij} - 12}{6}\right) \times \omega & \text{if } 12 \leq \alpha_{ij} \leq 18 \\ \left(\dfrac{80\alpha_{ij}}{62}\right) \times \omega & \text{if } 18 \leq \alpha_{ij} \leq 80 \end{cases} \tag{20}$$

and $\omega = 1$ if the person is female, and $\omega = 3$ if the person is male.

- Costs for elderly care (*old*), estimated as per person (aged 65 and above) cost for elderly care (COFOG), multiplied by household number of individuals at the age of 65 and above.

$$\text{old}_j = \sum_{i=1}^{s_j} (65 \leq \alpha_{ij}) \times \frac{OLD}{\sum_{k=1}^{h} w_k \sum_{i=1}^{s_k} (65 \leq \alpha_{ik})}. \tag{21}$$

The final sum of demographically modelled expenditures is simply:

$$\text{dem}_j = \text{pri}_j + \text{sec}_j + \text{ter}_j + \text{hlt}_j + \text{old}_j + \text{pol}_j. \tag{22}$$

Non-congestible public goods

Public goods with zero marginal cost, here defence and the functions of government, are not included in the main specification of net effects, but have been assigned values in proportion to household size for comparison:

$$\mathsf{npg}_j = \frac{s_j}{N} \times \mathsf{NPG} \quad , \quad N = \sum_{k=1}^{h} w_k s_k. \tag{23}$$

Congestible public goods (cpg)

Congestible public goods consist of public expenditures that will vary as a function of population size but are not specifically incurred at the individual or household level. These include: public order and safety, economic affairs, environmental protection, housing and community amenities, educational expenditures other than those included above, and social protection other than elderly care. These expenditures are summed up and allocated in proportion to household size:

$$\mathsf{cpg}_j = \frac{s_j}{N} \times \mathsf{CPG} \quad , \quad N = \sum_{k=1}^{h} w_k s_k. \tag{24}$$

6.6 Net effects

The main specification for the net effects excludes expenditures with zero marginal cost (npg) and revenues with zero marginal contribution (oth). The per household net fiscal effect is therefore defined as follows:

$$\begin{aligned}\mathsf{net}_j = \mathsf{con}_j + \mathsf{inc}_j + \mathsf{cap}_j + \mathsf{ssc}_j + \mathsf{sal}_j \\ - \mathsf{ben}_j - \mathsf{pen}_j - \mathsf{cpg}_j - \mathsf{dem}_j.\end{aligned}$$

6.7 Sums across migrant status

When all household level data have been produced, results are summed up across migrant categories, with mixed households attributed proportionally (that is, in households with 50% natives and 50% EU migrants, half of revenues and expenditures are attributed to natives and half to EU migrants):

$$\mathsf{NET}_{\mathsf{eu}} = \sum_{j=1}^{h} w_j p_j^{\mathsf{eu}} \mathsf{net}_j \tag{25}$$

where p_j^{eu} is the proportion of EU migrants in household j.[12] Numbers of households per category, further, are summed up proportionally (like above): a household with 50% natives and 50% migrants will add .5 weighted native households and .5 weighted migrant households to the respective populations of households:

$$N_{\mathsf{eu}} = \sum_{j=1}^{h} w_j p_j^{\mathsf{eu}}. \tag{26}$$

Also reported in figures are the net effects per percent households of a particular migrant classification, so that:

$$\mathsf{NET}_{\mathsf{eu}}^{\%} = \frac{\mathsf{NET}_{\mathsf{eu}}}{100 \times \frac{N_{\mathsf{eu}}}{N}}. \tag{27}$$

[12] Such that $p_j^{\mathsf{eu}} = \frac{1}{s_j} \sum_{i=1}^{s_j} (\gamma_{ij} = \mathsf{eu})$

The interpretation of $\text{NET}^{\%}_{\text{eu}}$ is, thus, as the marginal fiscal effect of adding another percentage point EU migrant households.

6.8 Special cases

For some countries (Germany, Estonia, Latvia, Malta and Slovenia), the EU-SILC data does not separate migrants from EU-countries from other migrants. To estimate the fiscal effects for these countries, the missing EU migrant variable has been imputed using a procedure which ensures that i) the share of EU migrants in our dataset equals the corresponding share in census data and ii) that the differences between the two migrant categories that are found in other countries – with respect to age distribution, time since immigration and a set of income variables – are reproduced in the countries where this data is imputed.

While these demographic and income variables are rather weak predictors for whether the migrants was born inside or outside the EU, they are also the variables which most heavily affect our estimates of the fiscal effects. As a result, the imputation procedure should do a good job for these purposes, *so long as* the composition of EU migrants compared to migrants from outside EU is similar in Germany and the other countries where information is lacking as compared to the countries for which there is data. However, this is a strong assumption, and the estimates for these countries should be interpreted with great care.

6.9 Standard errors

Standard errors should in principle be calculated based on weighted variances, and adjusted to account for the intra-class correlations among multiple observations on the same households (over several years), as well as adjusted for imputed data. The first step is fairly straight forward:

$$\text{Var}(y) = \frac{\sum_{j=1}^{n} w_j (y_j - \bar{y})^2}{\sum_{j=1}^{n} w_j - \frac{\sum_{j=1}^{n} w_j^2}{\sum_{j=1}^{n} w_j}} \tag{28}$$

where

$$\bar{y} = \frac{\sum_{j=1}^{n} w_j y_j}{\sum_{j=1}^{n} w_j}. \tag{29}$$

An obstacle to correctly adjusting the resulting standard errors for clustering, however, is that household identifiers in EU-SILC vary for the same household from year to year in all countries except Slovenia,[13] making it impossible to find the correct intra-class correlations. We have therefore chosen to report pseudo-CI's based on assumptions derived from the Slovenian data. The mean number of observations per household was 2.16 in Slovenia, and intra-class correlations for the different items are typically around 0.45. We have rounded these and assume 3 observations per household and intra-class correlations of 0.5, yielding a cluster correction factor for the standard errors of $\sqrt{1 + (3-1) \times 0.5} = \sqrt{2}$. The resulting country-year pseudo-CI's are then simply calculated as:

$$\text{Pseudo-}CI_y = \bar{y} \pm 2 \times \sqrt{\frac{Var(y)}{n/2}}. \tag{30}$$

These intervals should therefore not be interpreted as true 95% confidence intervals in the strict sense, since they rely on a number of assumptions that true CI's do not, and that are impossible

[13] Household identifiers are recycled in a small number of cases in Slovenia. These have been excluded when deriving the assumptions.

to verify. Rather, these intervals should be interpeted as crude measures of uncertainty in the estimates.

7 Sensitivity analyses

We believe the main specification presents an accurate picture of the fiscal effects, based on the most reasonable assumptions regarding how different revenues and expenditures are allocated. However, in order to explore how sensitive the estimates are to large changes in the underlying allocation assumptions, we here present an extensive set of sensitivity analyses. The main estimates for the total fiscal effect on GDP in % are summarized under the column Main in table 4, for comparison.

These analyses consist of five alternative specifications that adjust the main estimates in different ways. The adjustments are all additive, meaning that they can be independently added or subtracted from the main estimate to obtain the combined effect of a particular different set of assumptions. To facilitate such comparisons, the specific numbers for the adjustments, as presented in table 4, are *changes* to the main estimates rather than absolute levels (a figure for a particular adjustment is added or subtracted from the main estimate to obtain the effect of adopting that particular alternative assumption).

The alternative specifications are as follows.

7.1 Wage-based allocation of pensions (adjustment 1)

The main static specification of pension expenditures, as mentioned in the methods section, suffers from the possibility that some pensions received by a migrant household were not actually paid by the host country. We therefore also test a semi-dynamic model based on "liabilities created" by wage income. Following this logic, we can understand the cost for providing people with pensions as a financial obligation which the government incurs when the person is working in the country. The most straight forward way of modelling this is to allocate pensions in proportion to the annual wage income, reflecting that most member states have an earnings-related pension system (European Commission 2015, p. 74). Basing these future costs on the current pension expenditures corresponds to an implicit assumption that the current annual cost for pensions equal the projected present value of the financial obligations incurred by the government each year. We could also have used some long-term projection of pension expenditures, but these projections are typically based on an assumption about unchanged pension legislation, which is a reasonable assumption for some countries but not for others. We believe that using these projections would have biased the cross-national comparison in favour of countries where there is a legislated link between life expectancy and benefit levels or retirement age.

A counterargument to this type of procedure is that it blurs the line between proper static estimates and life-cycle or dynamic approaches. While it is true that this version of pension expenditures does indeed include a future cost, we argue there is no reason to worry since the cost is directly proportional to the pensions paid during the year in question (but allocated to households through a different principle), and as a result of work-income obtained during the year in question. No assumptions are required about work-income during previous years, or for years to come, meaning that no added dynamic assumptions are made.

The sensitivity of the net estimates to changing to the alternative pension specification is referred to as Adj1 in table 4. The largest changes relative to the main effects are seen in Estonia (+.19), Greece (-.25), Ireland (-.28), Latvia (+.16), Poland (+.14), Portugal (-.17) and Slovakia (+.07). In Estonia, Latvia, Poland and Slovakia, the change is positive, meaning that EU migrants in these countries receive more pensions relative to natives than they do wages, and thus create smaller future pension liabilities. In the other three, the opposite is the case, which represents a clear East/West divide in the effects of altering this assumption.

Table 4: Sensitivity analyses

Country	Main	Adj1	Adj2	Adj3	Adj4	Adj5
AT	0.38	0.14	0.11	−0.11	−0.14	−0.35
BE	0.81	−0.07	0.13	−0.13	−0.20	−0.59
BG	−0.01	0.01	0.00	−0.00	−0.01	0.00
CH	1.67	−0.18	0.12	−0.12	−0.19	−0.52
CY	1.26	−0.10	0.07	−0.07	−0.24	−0.52
CZ	0.27	−0.15	0.03	−0.03	−0.05	−0.08
DE	0.35	0.04	0.06	−0.06	−0.09	−0.28
DK	0.32	−0.04	0.06	−0.06	−0.09	−0.18
EE	−0.15	0.17	0.02	−0.02	−0.03	−0.02
ES	0.06	−0.04	0.05	−0.05	−0.06	−0.18
FI	0.25	−0.17	0.03	−0.03	−0.04	−0.10
FR	0.25	0.07	0.08	−0.08	−0.10	−0.26
GR	0.35	−0.25	0.02	−0.02	−0.06	−0.22
HR	0.17	−0.02	0.02	−0.02	−0.05	−0.14
HU	0.39	−0.06	0.04	−0.04	−0.10	−0.16
IE	−0.06	−0.28	0.17	−0.16	−0.23	−0.42
IS	0.11	−0.11	0.12	−0.12	−0.17	−0.35
IT	0.35	−0.27	0.04	−0.04	−0.06	−0.22
LT	−0.03	0.02	0.00	−0.00	−0.01	−0.01
LV	−0.06	0.16	0.02	−0.02	−0.04	−0.04
MT	0.42	−0.11	0.04	−0.04	−0.08	−0.20
NL	0.19	−0.04	0.05	−0.05	−0.05	−0.10
NO	0.87	−0.18	0.07	−0.07	−0.11	0.33
PL	−0.14	0.14	0.01	−0.01	−0.01	−0.01
PT	0.22	−0.17	0.03	−0.03	−0.06	−0.13
SE	0.38	0.15	0.14	−0.14	−0.14	−0.35
SI	−0.05	0.06	0.04	−0.04	−0.06	−0.15
SK	−0.09	0.07	0.02	−0.02	−0.02	−0.03
UK	0.31	−0.13	0.07	−0.07	−0.08	−0.21

Tables notes.

7.2 Adjusted demographically modelled expenditures (adjustments 2 and 3)

In the main specifications, demographically modelled expenditures are assumed to be a simple function of age and sex. That is, a native and a migrant of the same age and sex are assumed to be equally costly. As mentioned in the Discussion section, there are reasons to suspect that this is not precisely true. EU migrants might be less costly if the consume less healthcare in the host country, but they might also be more costly if they have children who require extra language resources, etc.

Two alternative assumptions are tested here, namely 1. that EU migrants cost 25% *less* than natives, and 2. that EU migrants cost 25% *more* than natives. These are referred to in table 4 as Adj2 and Adj3. The choice of ±25% is, of course, arbitrary, but we believe it represents extreme cases and therefore does a good job of exploring the sensitivity to fairly dramatic changes in assumptions.

Marked changes to estimates of altering these allocation assumptions occur only in a small group of countries, namely Ireland and Iceland, and to some extent Spain, indicating that in general our main estimates are robust to alterations of these particular distributional assumptions.

7.3 Adjusted consumption taxes (adjustment 4)

The main specifications calculate paid consumption taxes exclusively as a function of disposable income. This rests on an implicit assumption that the marginal propensity to consume is the same for natives and migrants. An alternative assumption is that migrants either save more, or spend some of their income in their home countries. The alternative specification we test here is that consumption taxes is 25% lower than that of natives, at the same level of disposable income. This is referred to as Adj4. As above, 25% is arbitrary but should be considered a large deviation. Substiantial deviations relative to the main estimates occur, again, only in Ireland, Iceland and Spain.

7.4 Pro-rata adjustments (adjustment 5)

The final adjustment we try is to also include other revenues and non-congestible public goods (which were previously assumed to be zero on the margin) as pro-rata items. That is, other revenues and non-congestible public goods (like defense) are assumed to be distributed as equal costs per capita instead of not at all. This is referred to as Adj5.

Unlike the adjustments above, this change will not affect the balance between natives and migrants since each person gets attributed the same costs and revenues. It is bound to have substantial negative effects on the total net fiscal effects estimates, however, considering that the non-congestible public goods represent a sizable portion of government expenditures across the European union, while other revenues are a fairly small source of government income. This is also seen to be the case in virtually all countries observed. The only exception is Norway, which likely stems from the sizable incomes generated by oil funds.

7.5 Summary

The assumptions with the largest degree of volatility, predictably, are ones regarding budget items where the marginal effect of migration is plausibly zero (and have thus assumed to be zero in the main specification). Since these items, on the expenditure side, represent a comparatively large portion of the government budget on average, including these as pro-rata expenditures/revenues will generally depress the estimates substantially. It is, as mentioned, important to keep in mind that this will apply equally to all residents in a given country, and as such does not imply that migrants in particular become more costly.

Alterations to pension allocation assumptions showed marked effects in seven countries. The sign of the change in the effect appears to coincide with an East/West divide, with the positive changes due to this adjustment appearing in the East.

With regards to the remaining three adjustments, that is, regarding demographically modelled expenditures and consumption taxes, the main specification proved remarkably robust.

8 Country profiles

The following pages contain profiles for each individual country, alphabetically ordered according to their two-character abbreviation. Since the purpose of this study is to produce a dataset that can be used for cross-country analysis, figures for specific countries should be interpreted with care. In particular, budget items not allocated by micro-level data should not be compared between natives and migrants.

Each country profile contains bar charts for each individual item by natives, EU migrants and non-EU migrants, the net fiscal effects in the country over time, and a table with different effect estimates and all sensitivity analyses.

8.1 Austria (AT)

Table 5: Details, AT

Budget post	Per cent of GDP
Revenues	**3.79**
Consumption taxes	0.97
Taxes on income and wealth	0.92
Capital and corporate taxes	0.18
Social security contributions	1.40
Sales of goods and services	0.33
Expenditures	**3.31**
Benefits	0.44
Pensions	1.08
Demographically modelled expenditures	0.93
Congestible public goods	0.87
Fiscal impact	**0.38**
Deflation of budget balance	**−0.17**
Budget balance	−2.71
Impact on GDP from EU-migration	6.21
Fiscal impact incl. deflation	**0.54**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.14
25 % lower dem. exp.	0.11
25 % higher dem. exp.	−0.11
25 % lower con. taxes	−0.14
Pro-rata allocation of NPG and OTH	−0.35

All values are unweighted annual averages for the period 2004–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 20: Net effect of all EU migrants over time, per cent of GDP, AT

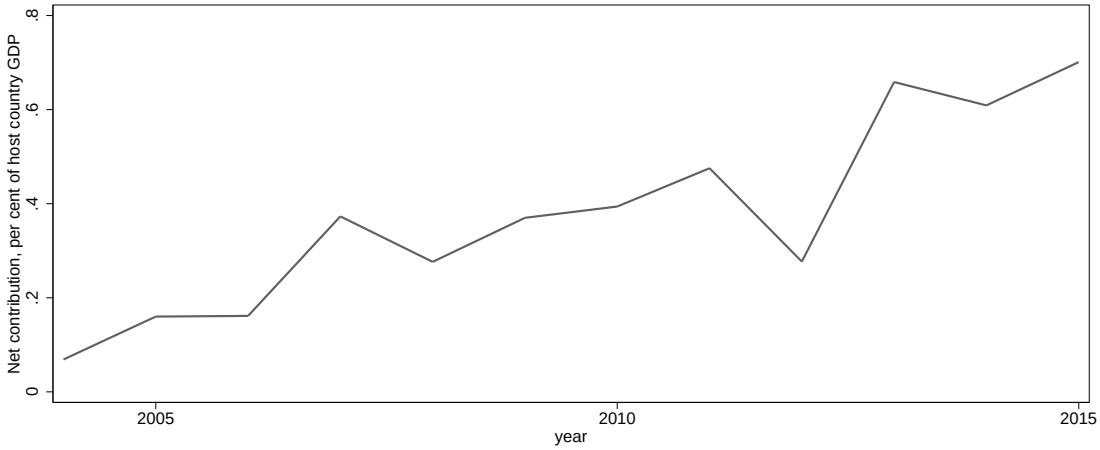


Figure 21: Contributions and costs per household, AT

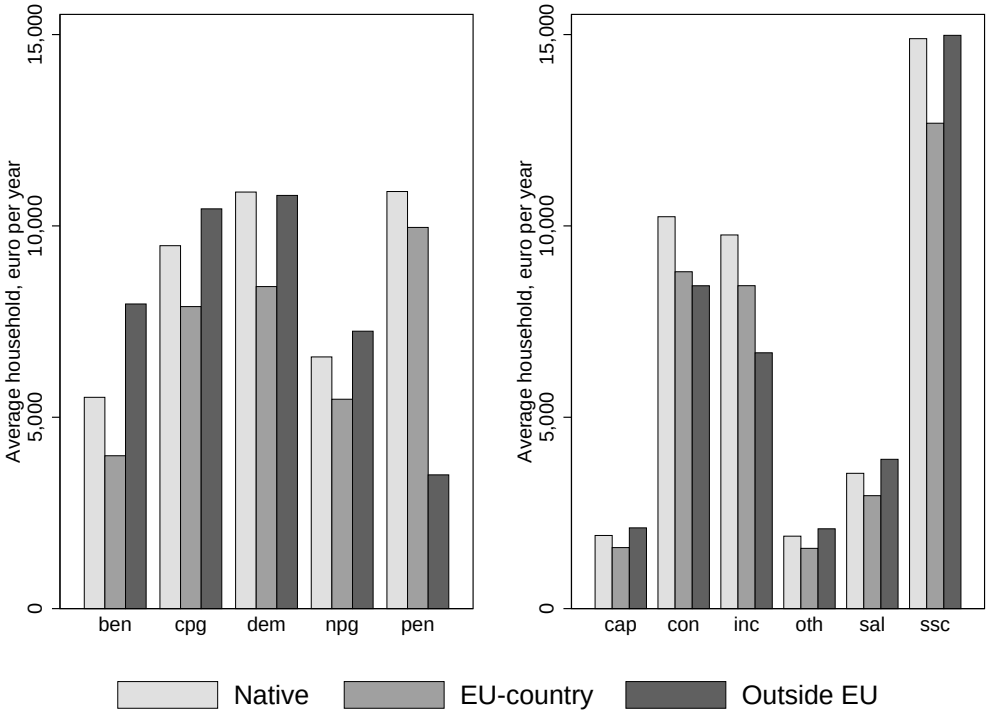
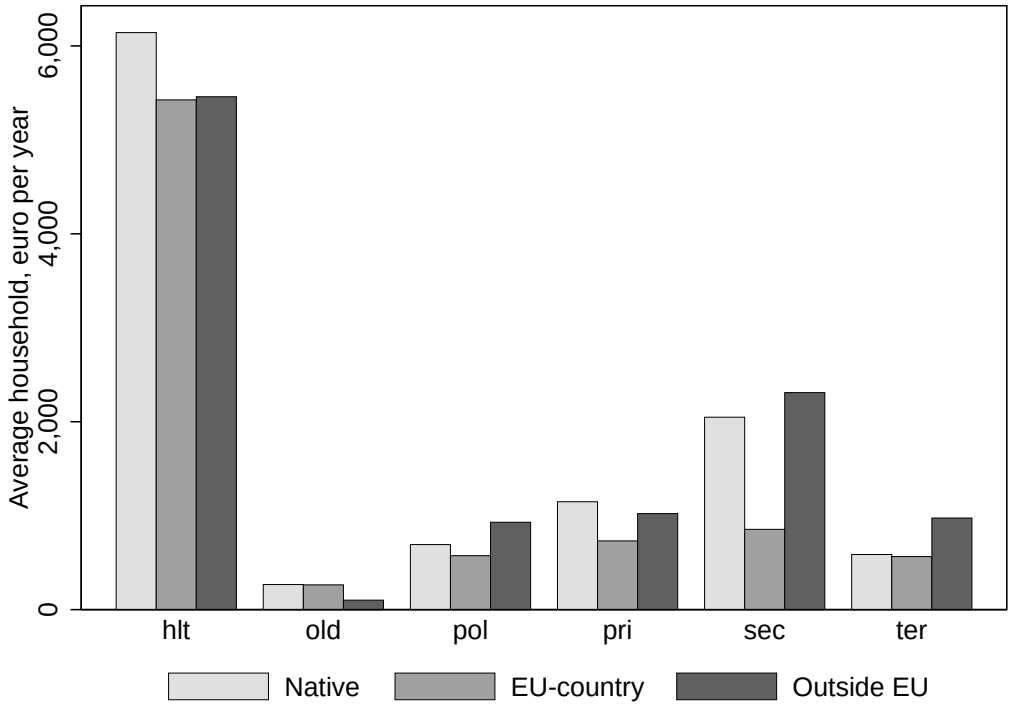


Figure 22: Demographically modelled items per household, AT



8.2 Belgium (BE)

Table 6: Details, BE

Budget post	Per cent of GDP
Revenues	**4.79**
Consumption taxes	1.33
Taxes on income and wealth	1.22
Capital and corporate taxes	0.36
Social security contributions	1.64
Sales of goods and services	0.23
Expenditures	**3.85**
Benefits	0.84
Pensions	0.68
Demographically modelled expenditures	1.20
Congestible public goods	1.13
Fiscal impact	**0.81**
Deflation of budget balance	**−0.22**
Budget balance	−2.51
Impact on GDP from EU-migration	8.64
Fiscal impact incl. deflation	**1.03**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.07
25 % lower dem. exp.	0.13
25 % higher dem. exp.	−0.13
25 % lower con. taxes	−0.20
Pro-rata allocation of NPG and OTH	−0.59

All values are unweighted annual averages for the period 2004–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 23: Net effect of all EU migrants over time, per cent of GDP, BE

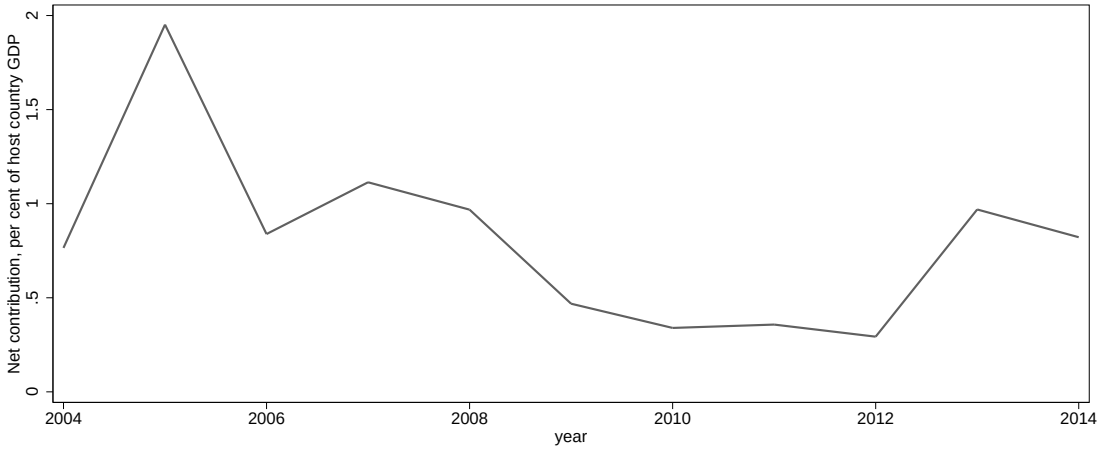


Figure 24: Contributions and costs per household, BE

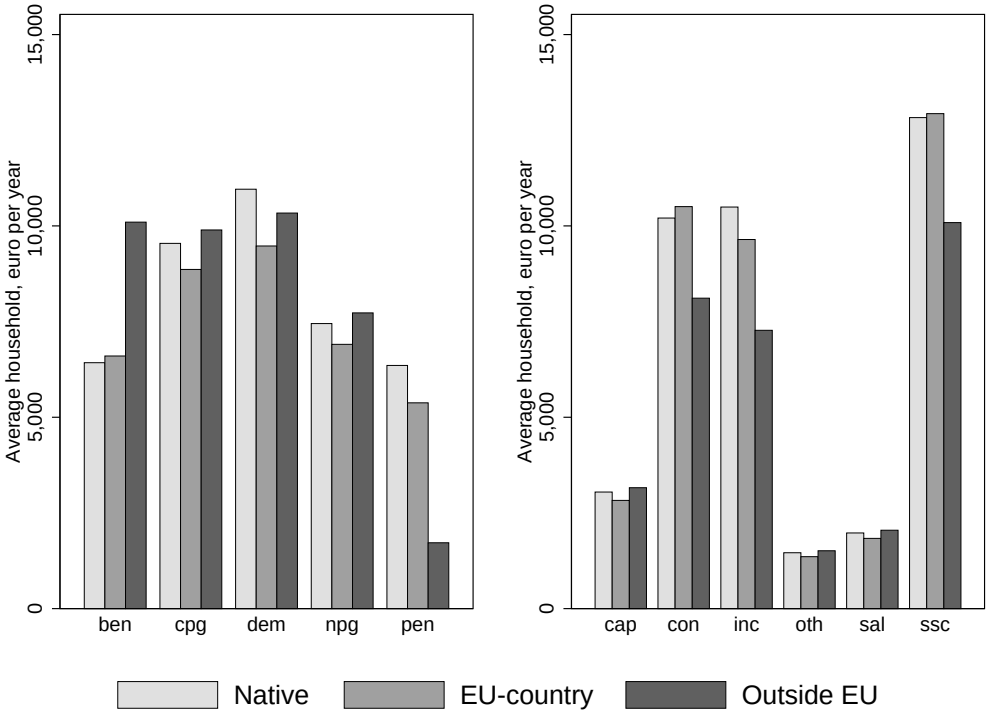
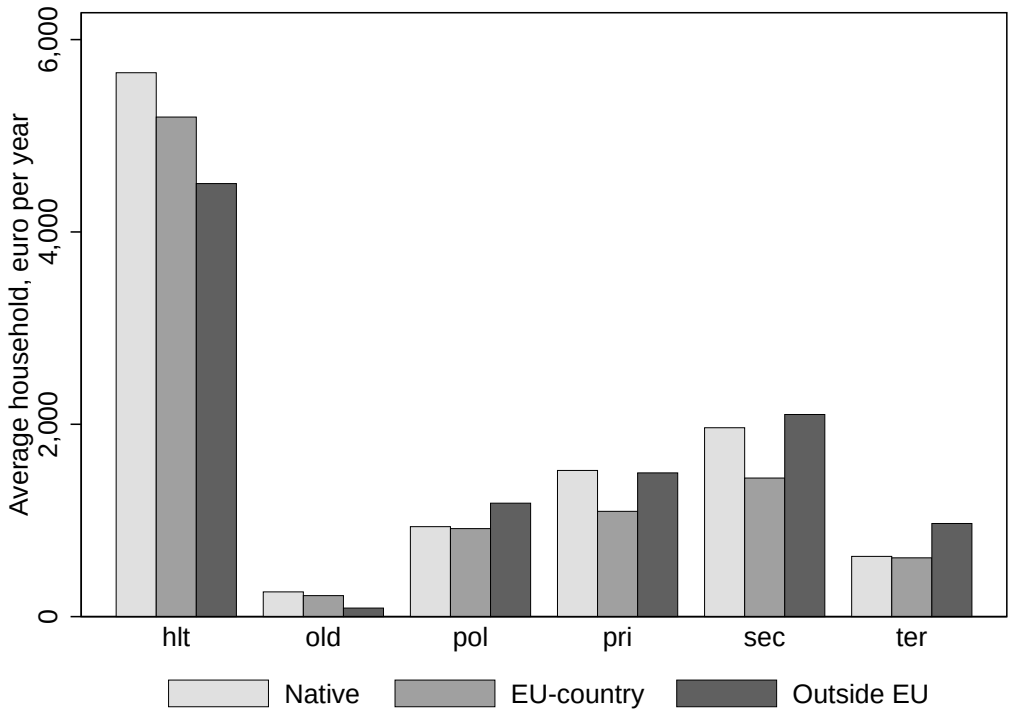


Figure 25: Demographically modelled items per household, BE



8.3 Bulgaria (BG)

Table 7: Details, BG

Budget post	Per cent of GDP
Revenues	**0.09**
Consumption taxes	0.06
Taxes on income and wealth	0.00
Capital and corporate taxes	0.01
Social security contributions	0.01
Sales of goods and services	0.01
Expenditures	**0.10**
Benefits	0.00
Pensions	0.03
Demographically modelled expenditures	0.03
Congestible public goods	0.04
Fiscal impact	**−0.01**
Deflation of budget balance	**−0.00**
Budget balance	−2.06
Impact on GDP from EU-migration	0.16
Fiscal impact incl. deflation	**−0.01**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.01
25 % lower dem. exp.	0.00
25 % higher dem. exp.	−0.00
25 % lower con. taxes	−0.01
Pro-rata allocation of NPG and OTH	0.00

All values are unweighted annual averages for the period 2007–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 26: Net effect of all EU migrants over time, per cent of GDP, BG

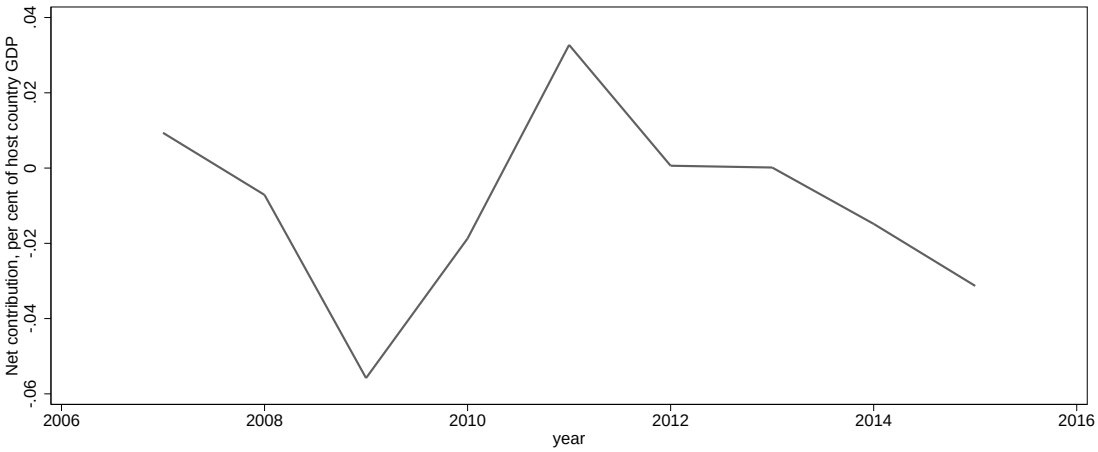


Figure 27: Contributions and costs per household, BG

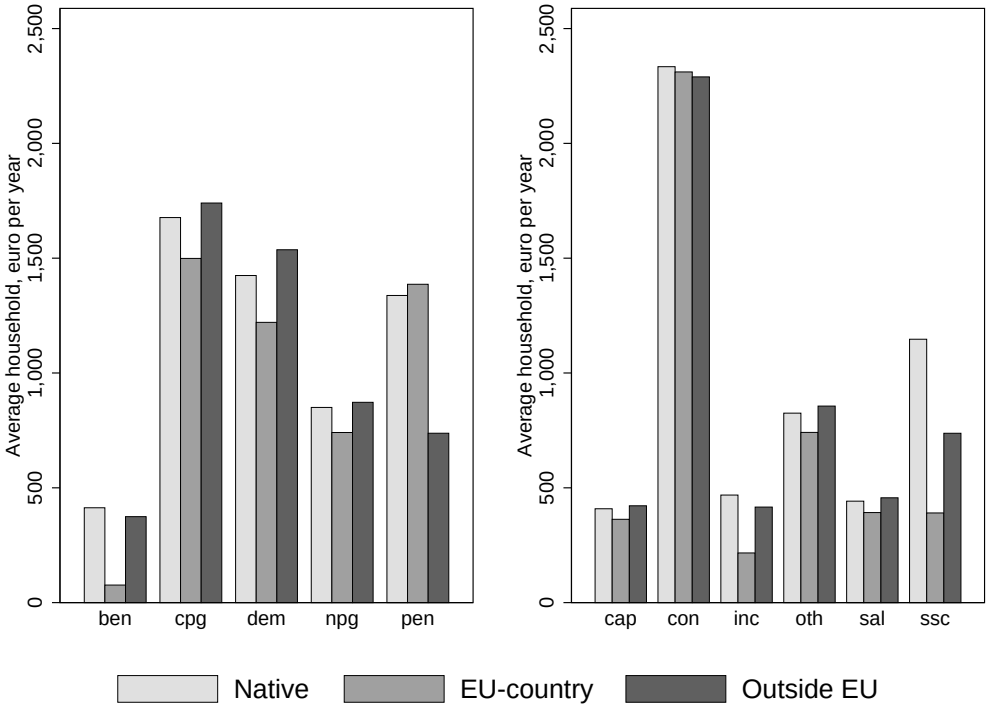
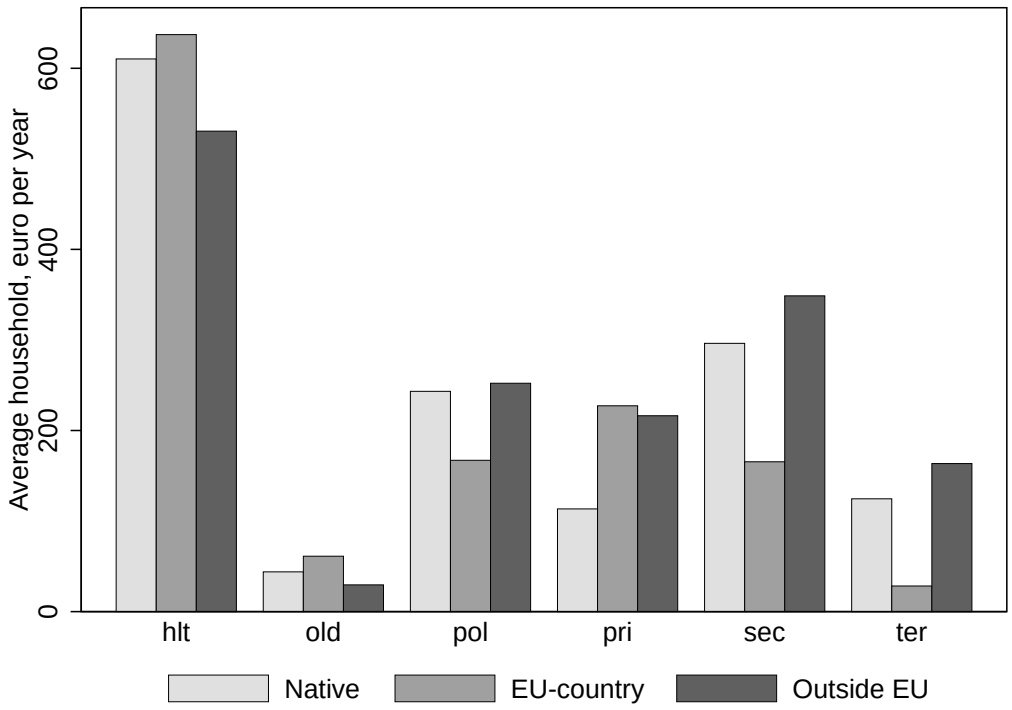


Figure 28: Demographically modelled items per household, BG



8.4 Switzerland (CH)

Table 8: Details, CH

Budget post	Per cent of GDP
Revenues	**7.58**
Consumption taxes	1.47
Taxes on income and wealth	2.71
Capital and corporate taxes	0.72
Social security contributions	1.69
Sales of goods and services	0.99
Expenditures	**5.50**
Benefits	0.72
Pensions	1.42
Demographically modelled expenditures	1.53
Congestible public goods	1.83
Fiscal impact	**1.67**
Deflation of budget balance	**0.09**
Budget balance	0.45
Impact on GDP from EU-migration	20.35
Fiscal impact incl. deflation	**1.57**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.18
25 % lower dem. exp.	0.12
25 % higher dem. exp.	−0.12
25 % lower con. taxes	−0.19
Pro-rata allocation of NPG and OTH	−0.52

All values are unweighted annual averages for the period 2008–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 29: Net effect of all EU migrants over time, per cent of GDP, CH

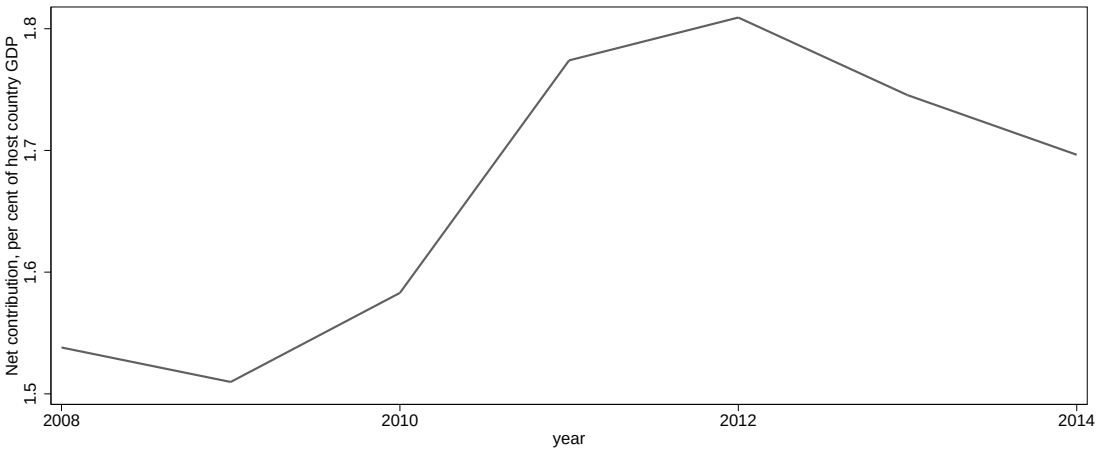


Figure 30: Contributions and costs per household, CH

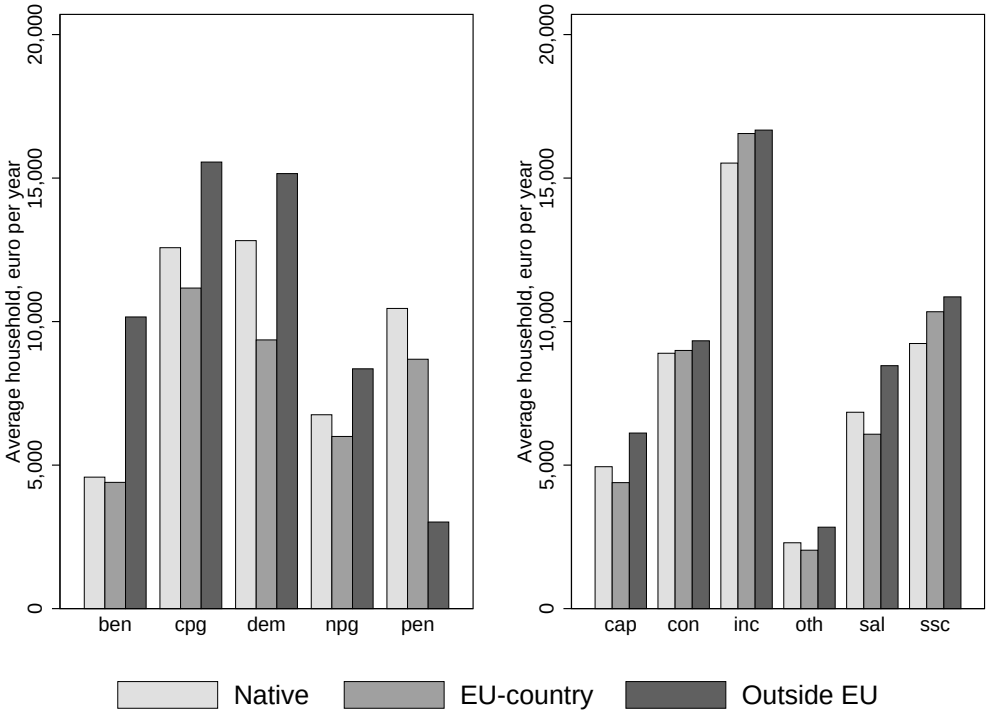
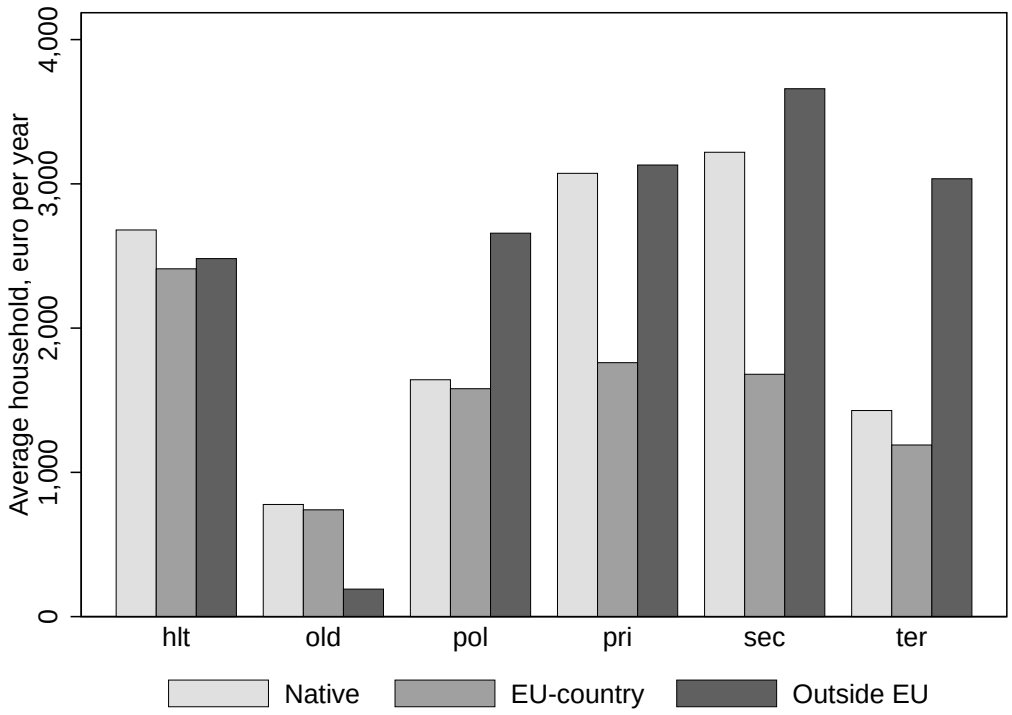


Figure 31: Demographically modelled items per household, CH



8.5 Cyprus (CY)

Table 9: Details, CY

Budget post	Per cent of GDP
Revenues	**4.41**
Consumption taxes	1.77
Taxes on income and wealth	0.45
Capital and corporate taxes	0.80
Social security contributions	1.06
Sales of goods and services	0.32
Expenditures	**2.86**
Benefits	0.76
Pensions	0.48
Demographically modelled expenditures	0.76
Congestible public goods	0.87
Fiscal impact	**1.26**
Deflation of budget balance	**−0.45**
Budget balance	−4.06
Impact on GDP from EU-migration	11.00
Fiscal impact incl. deflation	**1.71**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.10
25 % lower dem. exp.	0.07
25 % higher dem. exp.	−0.07
25 % lower con. taxes	−0.24
Pro-rata allocation of NPG and OTH	−0.52

All values are unweighted annual averages for the period 2005–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 32: Net effect of all EU migrants over time, per cent of GDP, CY

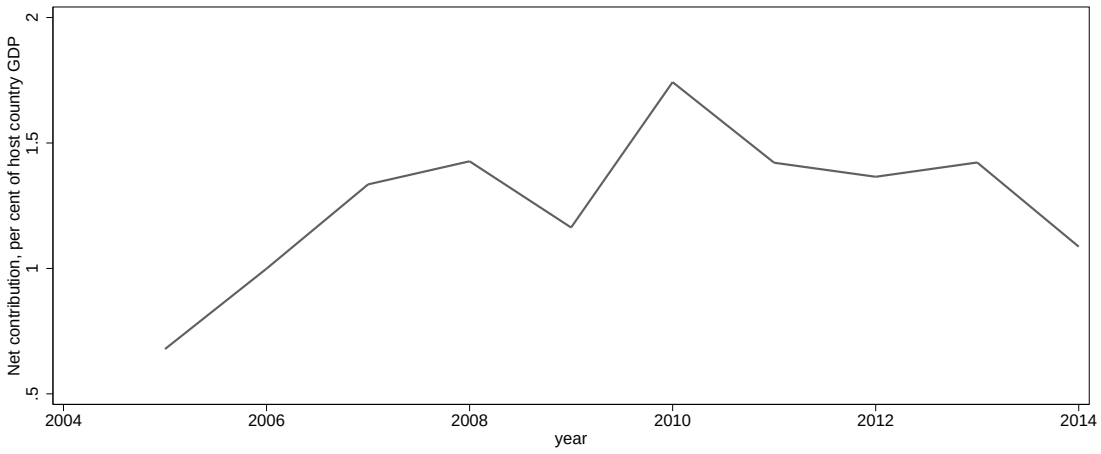


Figure 33: Contributions and costs per household, CY

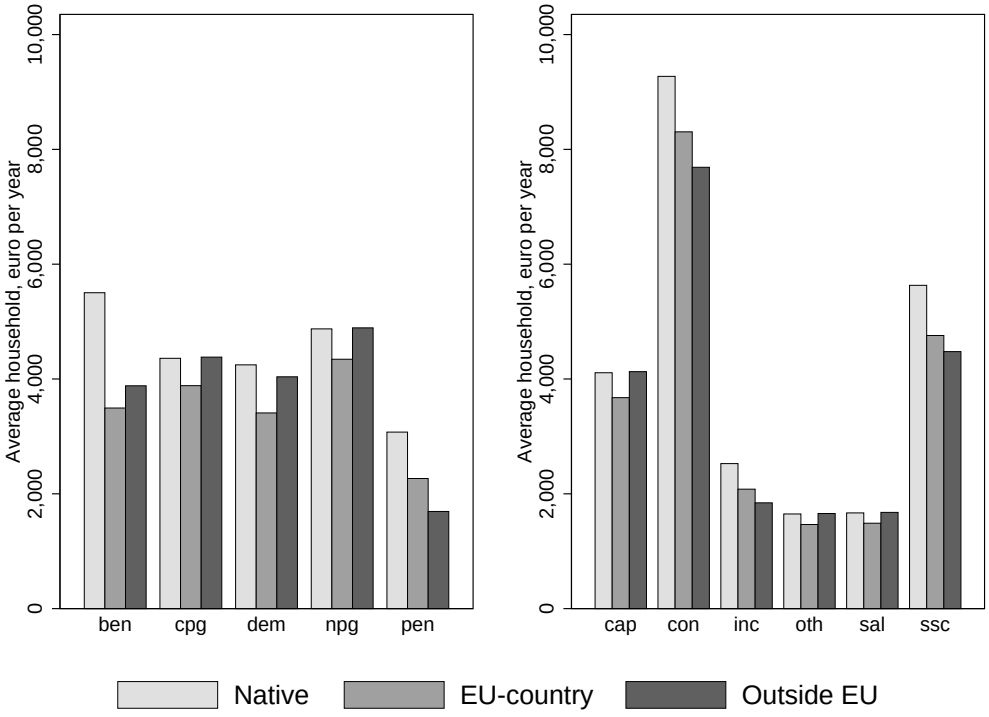
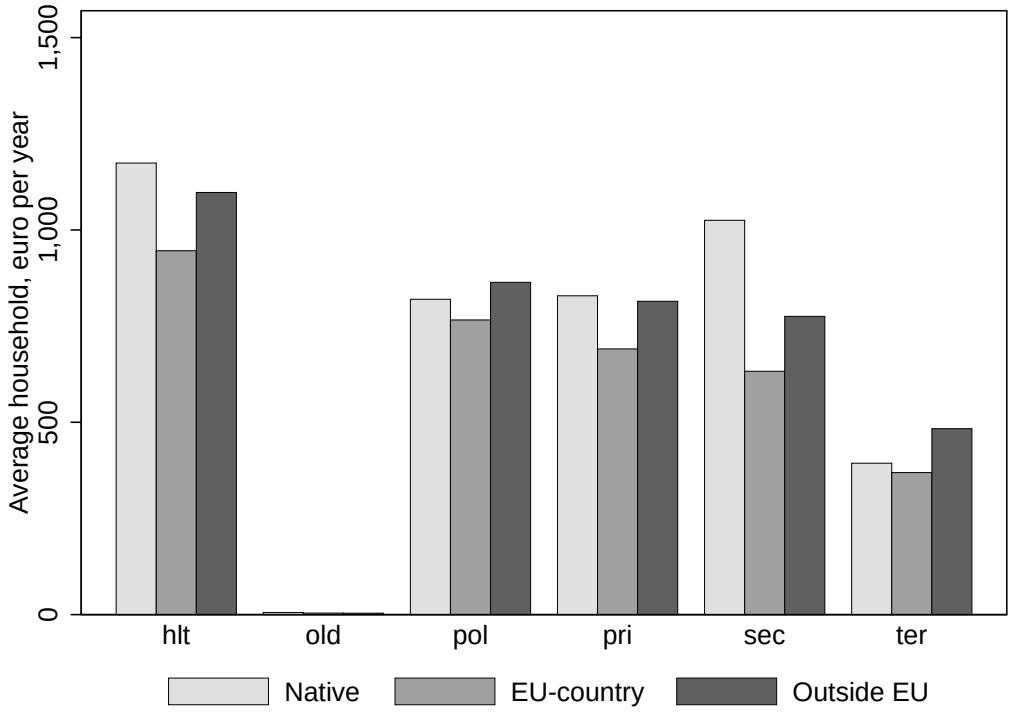


Figure 34: Demographically modelled items per household, CY



8.6 Czech republic (CZ)

Table 10: Details, CZ

Budget post	Per cent of GDP
Revenues	**1.60**
Consumption taxes	0.46
Taxes on income and wealth	0.20
Capital and corporate taxes	0.13
Social security contributions	0.69
Sales of goods and services	0.12
Expenditures	**1.23**
Benefits	0.29
Pensions	0.11
Demographically modelled expenditures	0.38
Congestible public goods	0.46
Fiscal impact	**0.27**
Deflation of budget balance	**−0.10**
Budget balance	−2.77
Impact on GDP from EU-migration	3.44
Fiscal impact incl. deflation	**0.37**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.15
25 % lower dem. exp.	0.03
25 % higher dem. exp.	−0.03
25 % lower con. taxes	−0.05
Pro-rata allocation of NPG and OTH	−0.08

All values are unweighted annual averages for the period 2005–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 35: Net effect of all EU migrants over time, per cent of GDP, CZ

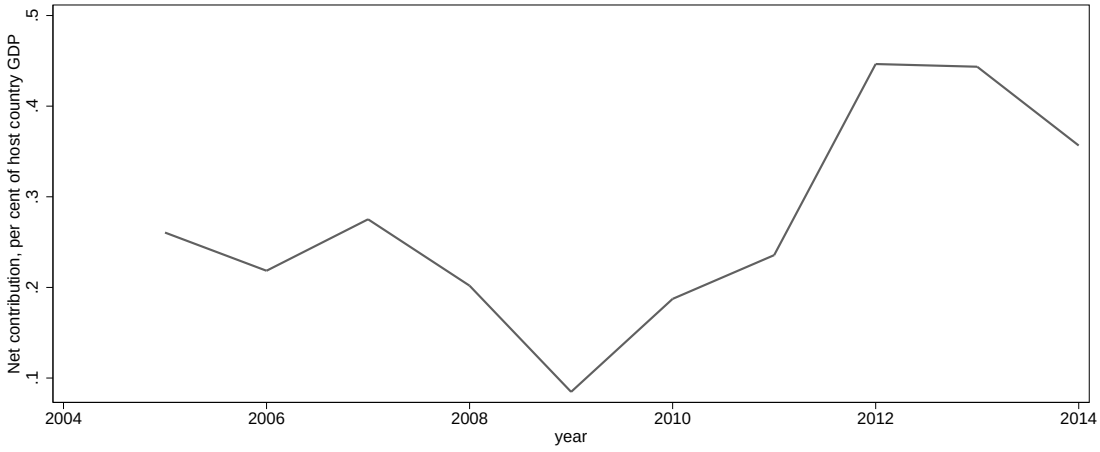


Figure 36: Contributions and costs per household, CZ

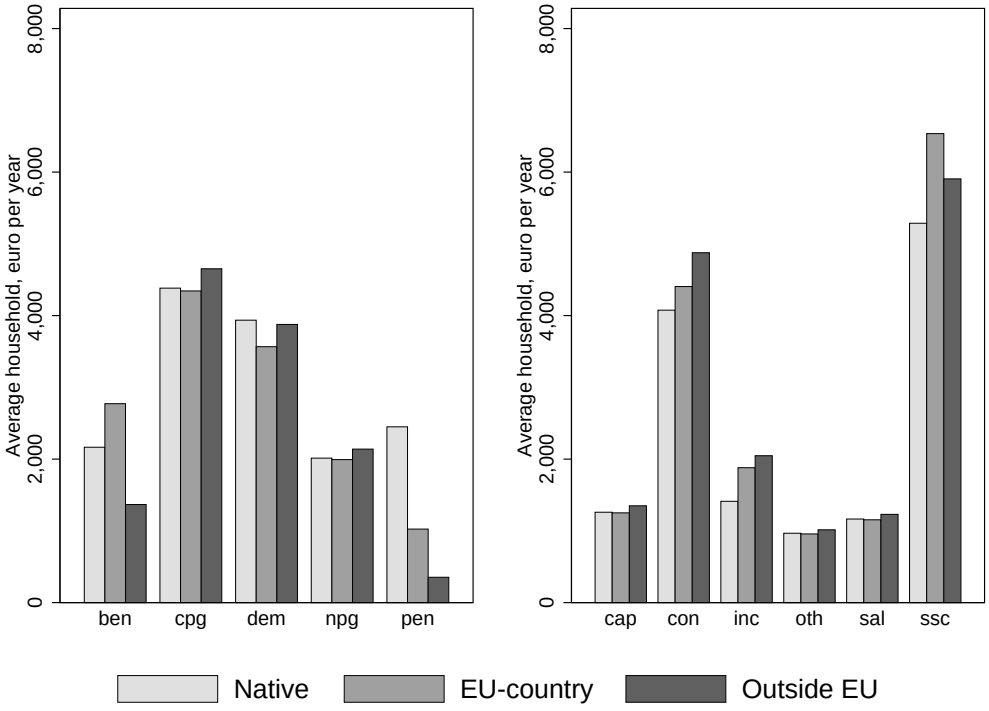
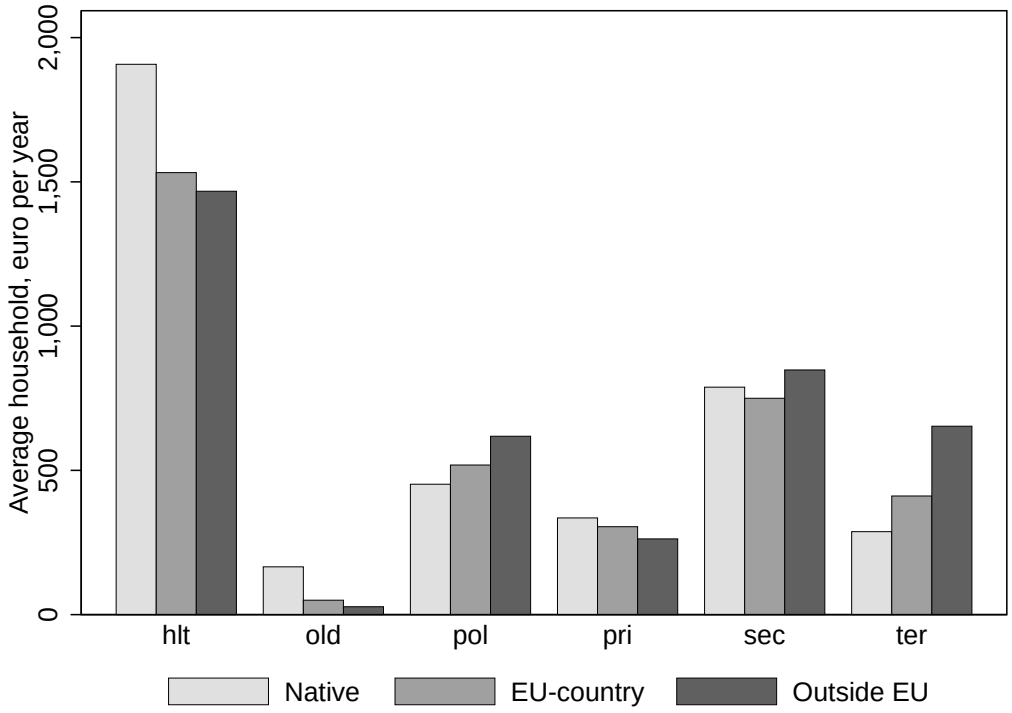


Figure 37: Demographically modelled items per household, CZ



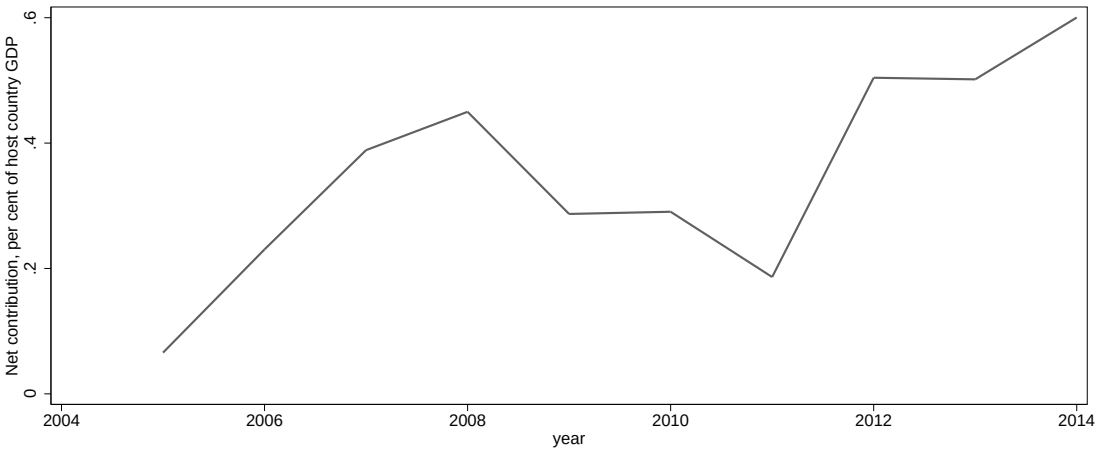
8.7 Germany (DE)

Table 11: Details, DE

Budget post	Per cent of GDP
Revenues	**2.54**
Consumption taxes	0.65
Taxes on income and wealth	0.57
Capital and corporate taxes	0.15
Social security contributions	1.00
Sales of goods and services	0.18
Expenditures	**2.14**
Benefits	0.31
Pensions	0.68
Demographically modelled expenditures	0.61
Congestible public goods	0.54
Fiscal impact	**0.35**
Deflation of budget balance	**−0.07**
Budget balance	−1.32
Impact on GDP from EU-migration	5.29
Fiscal impact incl. deflation	**0.42**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.04
25 % lower dem. exp.	0.06
25 % higher dem. exp.	−0.06
25 % lower con. taxes	−0.09
Pro-rata allocation of NPG and OTH	−0.28

All values are unweighted annual averages for the period 2005–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 38: Net effect of all EU migrants over time, per cent of GDP, DE



Note: EU migrant classification in Germany is based on a predicted probability model, and estimates should be interpreted carefully.

Figure 39: Contributions and costs per household, DE

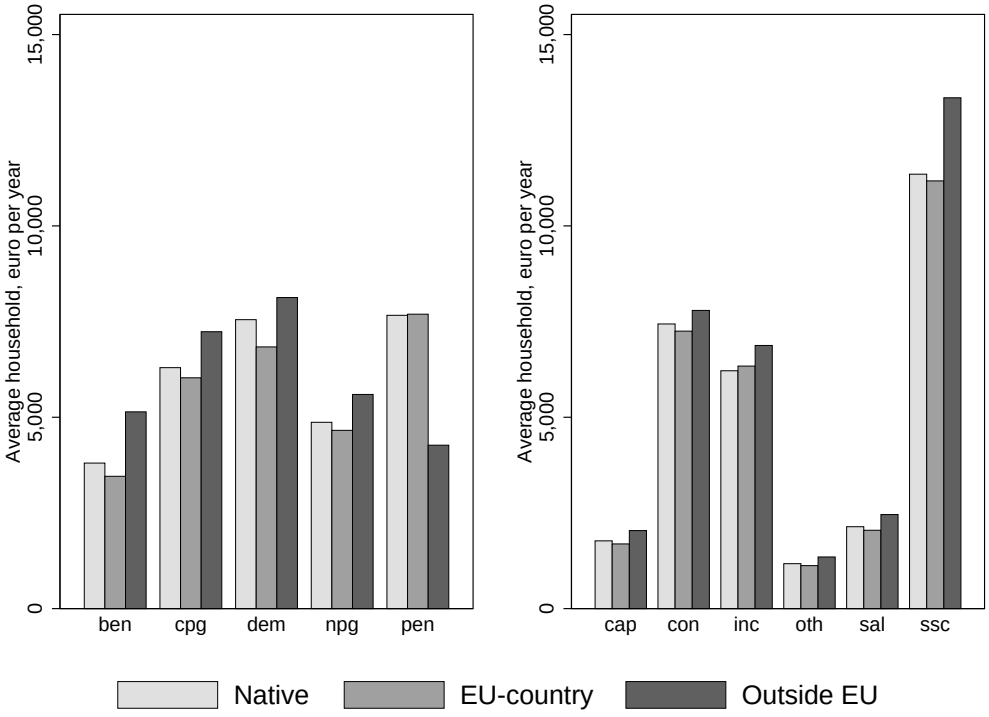
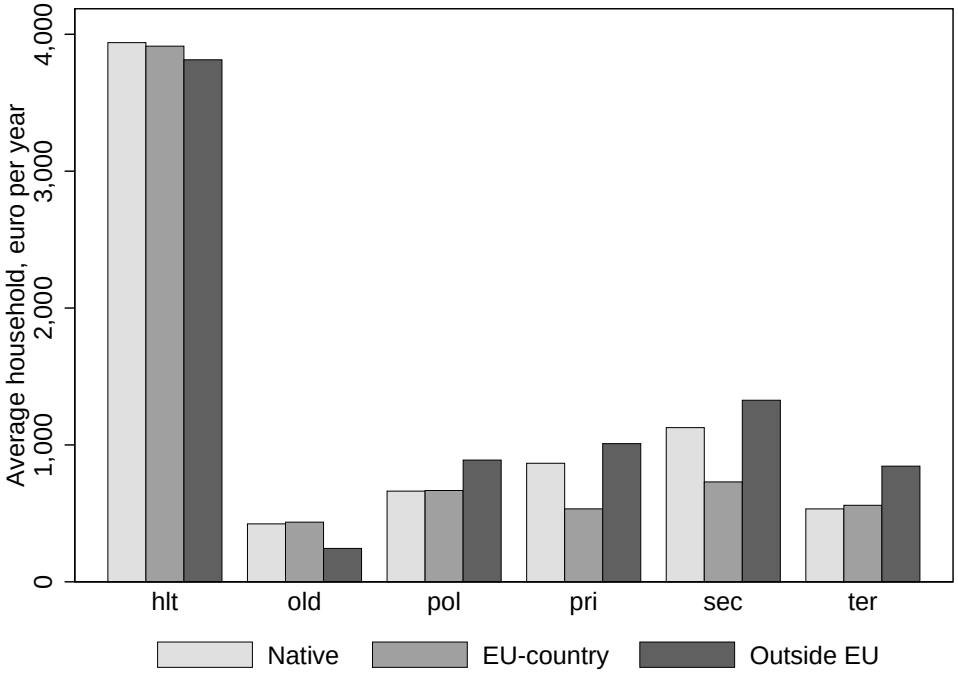


Figure 40: Demographically modelled items per household, DE



Note: EU migrant classification in Germany is based on a predicted probability model, and estimates should be interpreted carefully.

8.8 Denmark (DK)

Table 12: Details, DK

Budget post	Per cent of GDP
Revenues	**2.15**
Consumption taxes	0.67
Taxes on income and wealth	1.12
Capital and corporate taxes	0.12
Social security contributions	0.08
Sales of goods and services	0.16
Expenditures	**1.76**
Benefits	0.40
Pensions	0.23
Demographically modelled expenditures	0.58
Congestible public goods	0.55
Fiscal impact	**0.32**
Deflation of budget balance	**0.01**
Budget balance	0.29
Impact on GDP from EU-migration	3.51
Fiscal impact incl. deflation	**0.31**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.04
25 % lower dem. exp.	0.06
25 % higher dem. exp.	−0.06
25 % lower con. taxes	−0.09
Pro-rata allocation of NPG and OTH	−0.18

All values are unweighted annual averages for the period 2004–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 41: Net effect of all EU migrants over time, per cent of GDP, DK

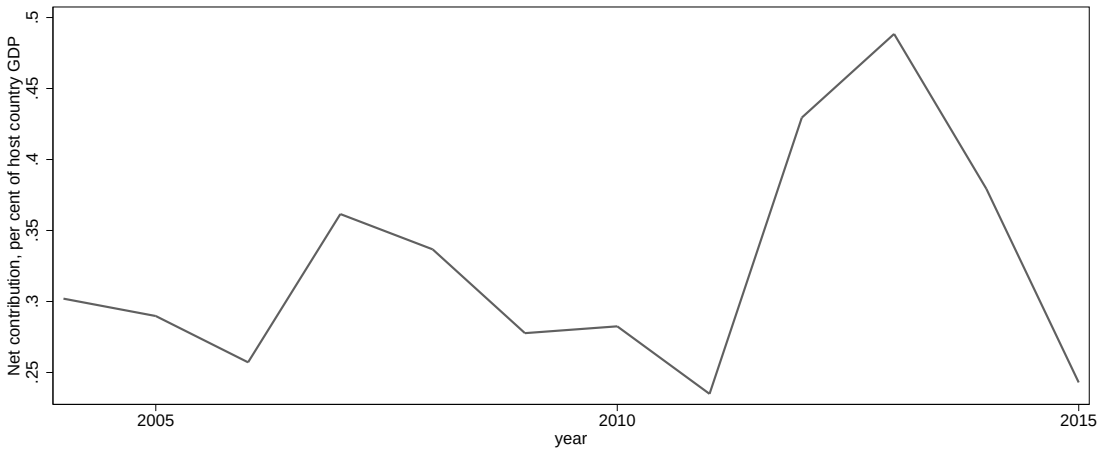


Figure 42: Contributions and costs per household, DK

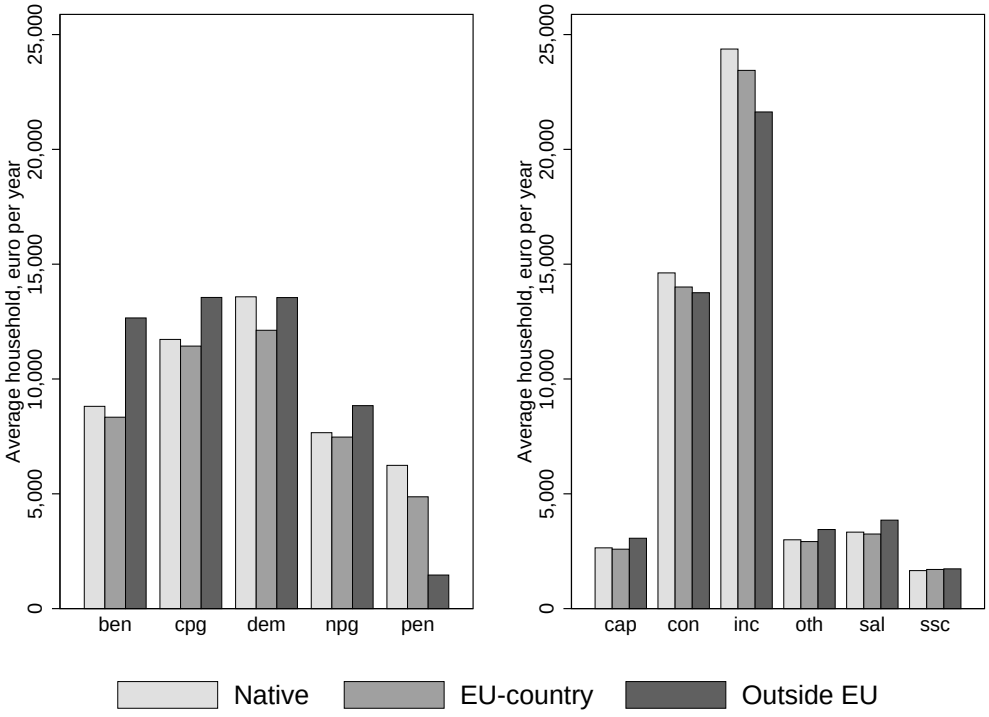
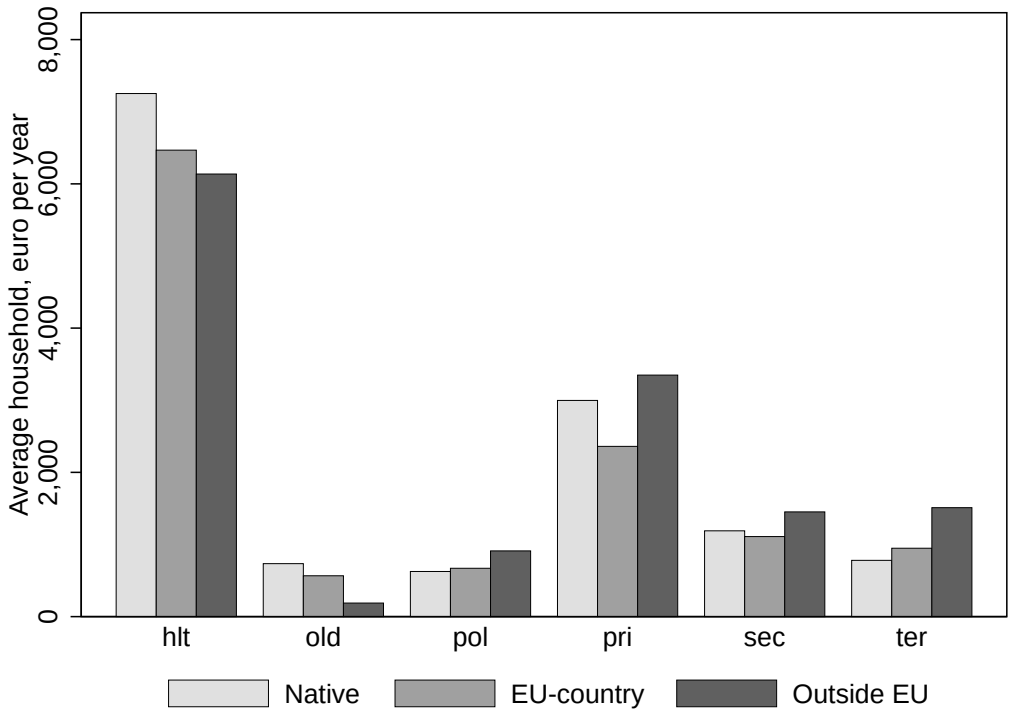


Figure 43: Demographically modelled items per household, DK



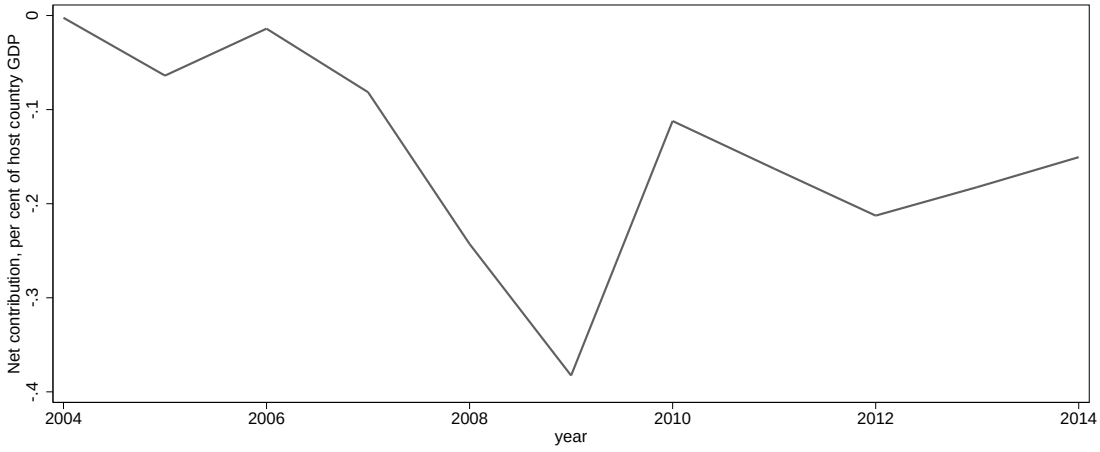
8.9 Estonia (EE)

Table 13: Details, EE

Budget post	Per cent of GDP
Revenues	**0.72**
Consumption taxes	0.31
Taxes on income and wealth	0.09
Capital and corporate taxes	0.04
Social security contributions	0.20
Sales of goods and services	0.07
Expenditures	**0.96**
Benefits	0.07
Pensions	0.40
Demographically modelled expenditures	0.25
Congestible public goods	0.24
Fiscal impact	**−0.15**
Deflation of budget balance	**−0.00**
Budget balance	−0.20
Impact on GDP from EU-migration	1.05
Fiscal impact incl. deflation	**−0.14**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.17
25 % lower dem. exp.	0.02
25 % higher dem. exp.	−0.02
25 % lower con. taxes	−0.03
Pro-rata allocation of NPG and OTH	−0.02

All values are unweighted annual averages for the period 2004–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 44: Net effect of all EU migrants over time, per cent of GDP, EE



Note: EU migrant classification in Estonia is based on a predicted probability model, and estimates should be interpreted carefully.

Figure 45: Contributions and costs per household, EE

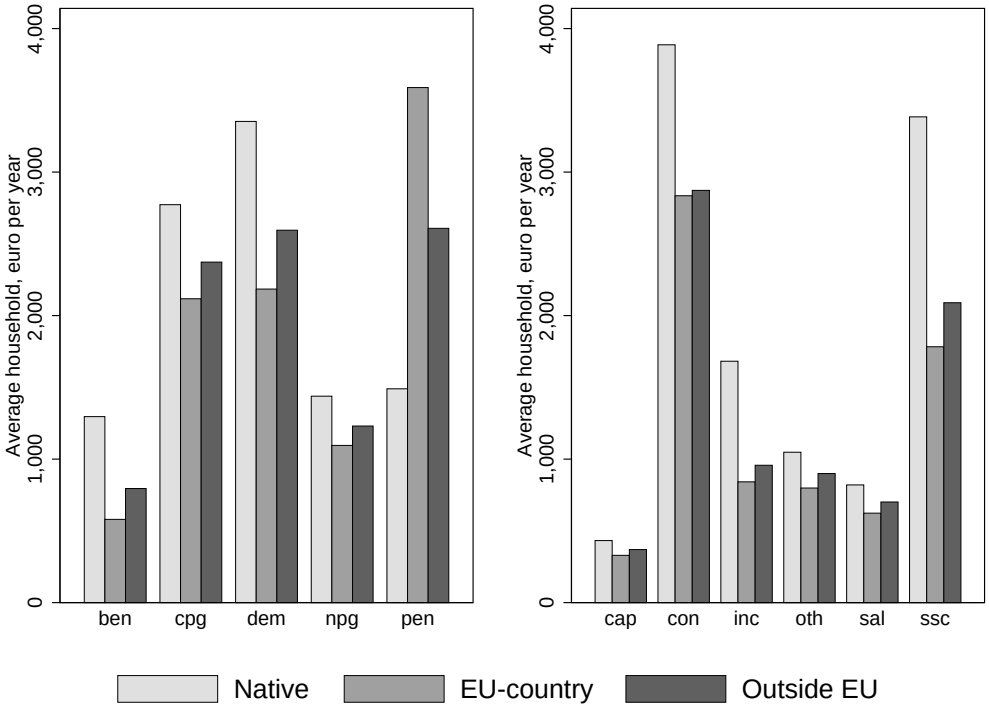
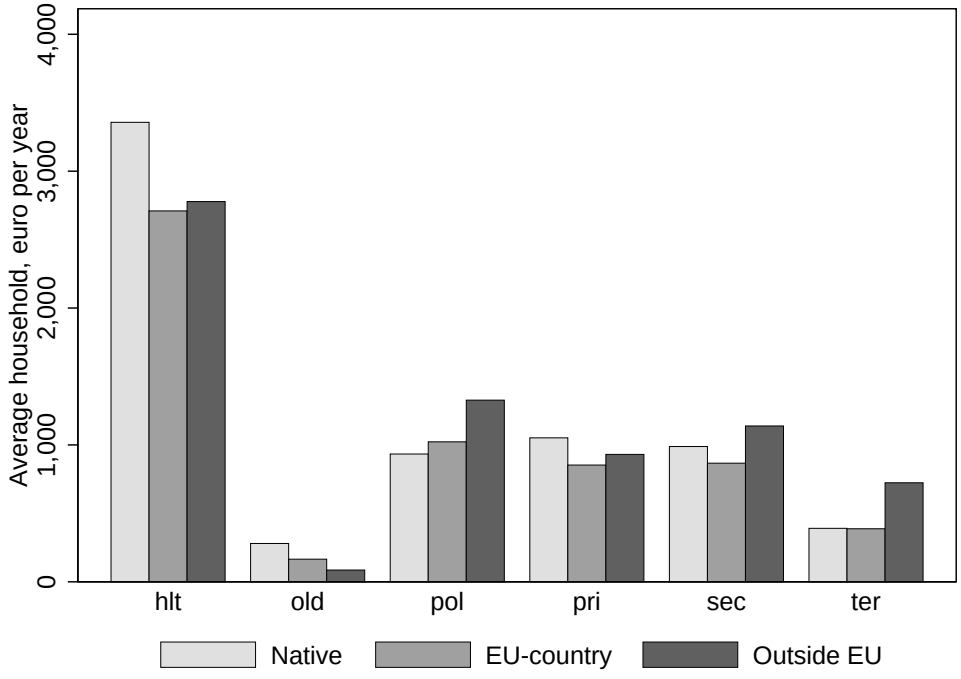


Figure 46: Demographically modelled items per household, EE



Note: EU migrant classification in Estonia is based on a predicted probability model, and estimates should be interpreted carefully.

8.10 Spain (ES)

Table 14: Details, ES

Budget post	Per cent of GDP
Revenues	**1.40**
Consumption taxes	0.41
Taxes on income and wealth	0.27
Capital and corporate taxes	0.13
Social security contributions	0.51
Sales of goods and services	0.09
Expenditures	**1.33**
Benefits	0.24
Pensions	0.23
Demographically modelled expenditures	0.43
Congestible public goods	0.43
Fiscal impact	**0.06**
Deflation of budget balance	**−0.19**
Budget balance	−5.89
Impact on GDP from EU-migration	3.23
Fiscal impact incl. deflation	**0.25**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.04
25 % lower dem. exp.	0.05
25 % higher dem. exp.	−0.05
25 % lower con. taxes	−0.06
Pro-rata allocation of NPG and OTH	−0.18

All values are unweighted annual averages for the period 2004–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 47: Net effect of all EU migrants over time, per cent of GDP, ES

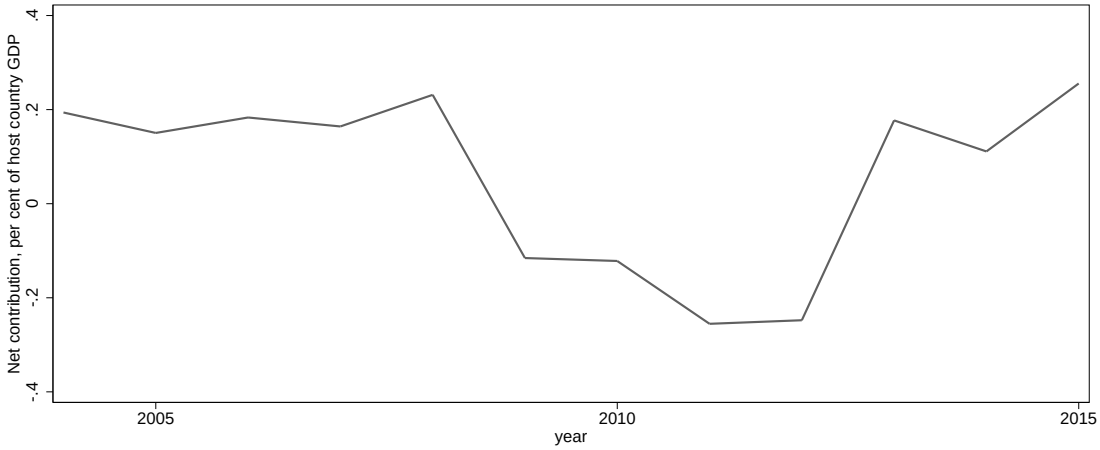


Figure 48: Contributions and costs per household, ES

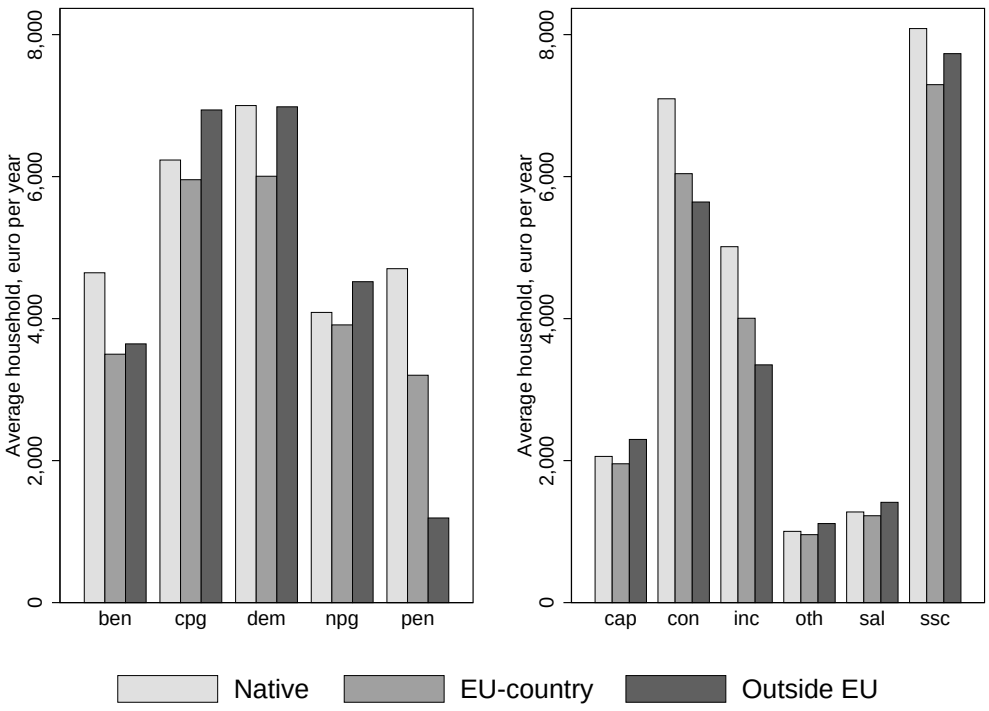
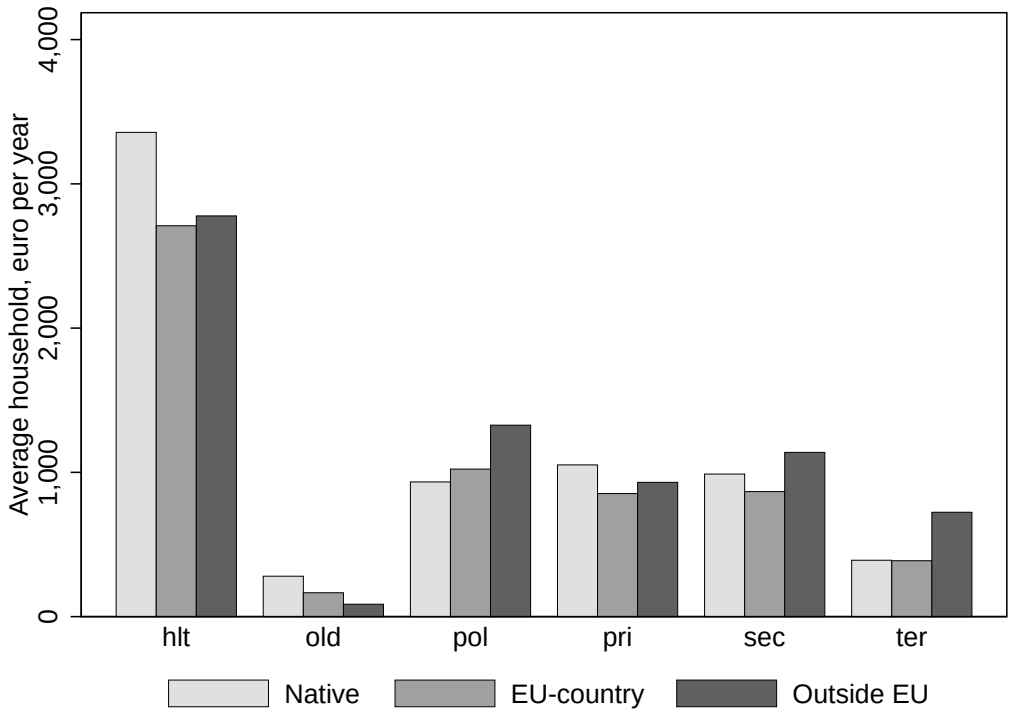


Figure 49: Demographically modelled items per household, ES



8.11 Finland (FI)

Table 15: Details, FI

Budget post	Per cent of GDP
Revenues	**1.17**
Consumption taxes	0.30
Taxes on income and wealth	0.30
Capital and corporate taxes	0.08
Social security contributions	0.32
Sales of goods and services	0.17
Expenditures	**0.87**
Benefits	0.21
Pensions	0.05
Demographically modelled expenditures	0.32
Congestible public goods	0.30
Fiscal impact	**0.25**
Deflation of budget balance	**−0.00**
Budget balance	−0.06
Impact on GDP from EU-migration	2.23
Fiscal impact incl. deflation	**0.25**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.17
25 % lower dem. exp.	0.03
25 % higher dem. exp.	−0.03
25 % lower con. taxes	−0.04
Pro-rata allocation of NPG and OTH	−0.10

All values are unweighted annual averages for the period 2004–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 50: Net effect of all EU migrants over time, per cent of GDP, FI

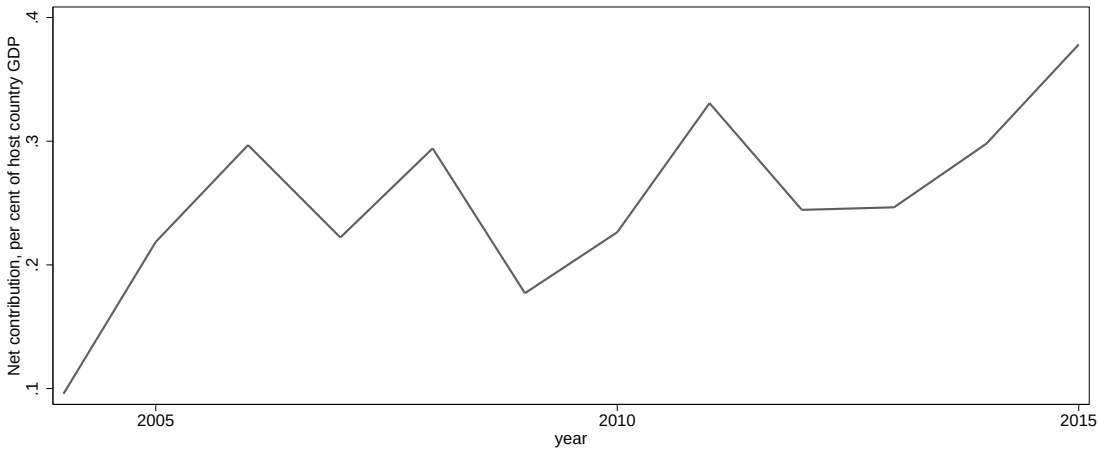


Figure 51: Contributions and costs per household, FI

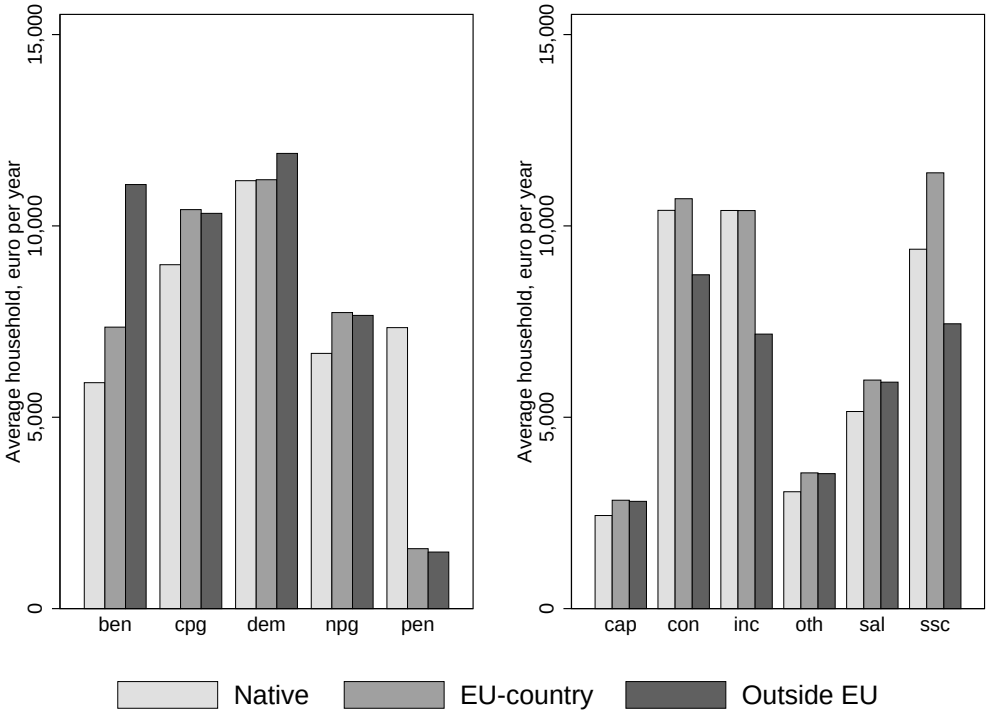
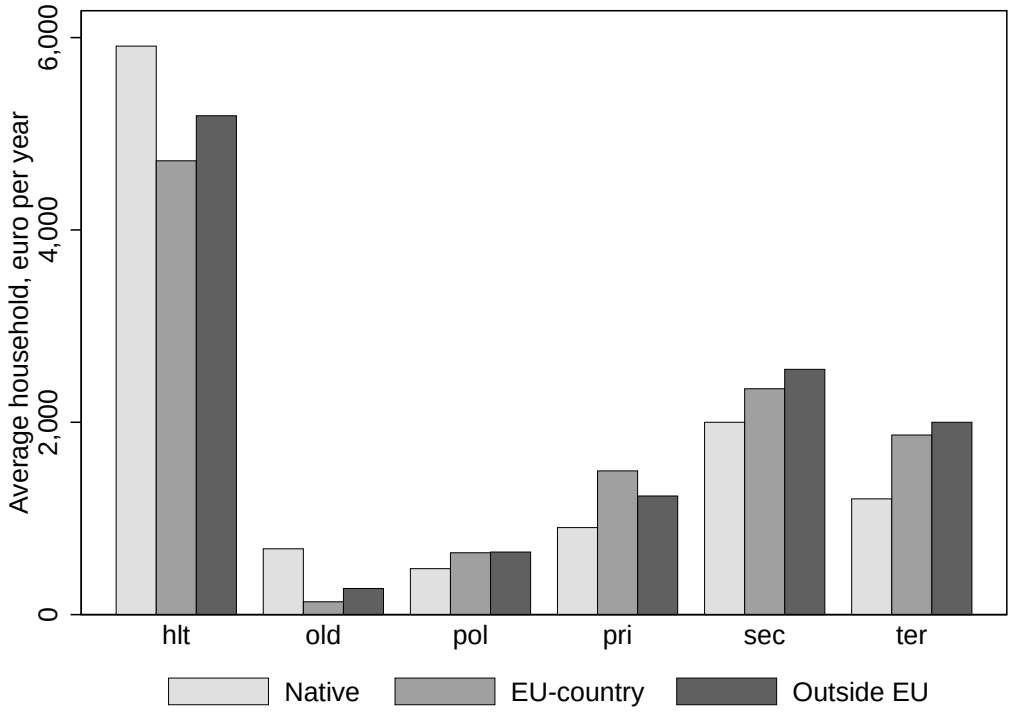


Figure 52: Demographically modelled items per household, FI



8.12 France (FR)

Table 16: Details, FR

Budget post	Per cent of GDP
Revenues	**2.39**
Consumption taxes	0.65
Taxes on income and wealth	0.45
Capital and corporate taxes	0.13
Social security contributions	0.99
Sales of goods and services	0.17
Expenditures	**2.09**
Benefits	0.25
Pensions	0.65
Demographically modelled expenditures	0.61
Congestible public goods	0.58
Fiscal impact	**0.25**
Deflation of budget balance	**−0.18**
Budget balance	−4.30
Impact on GDP from EU-migration	4.08
Fiscal impact incl. deflation	**0.43**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.07
25 % lower dem. exp.	0.08
25 % higher dem. exp.	−0.08
25 % lower con. taxes	−0.10
Pro-rata allocation of NPG and OTH	−0.26

All values are unweighted annual averages for the period 2004–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 53: Net effect of all EU migrants over time, per cent of GDP, FR

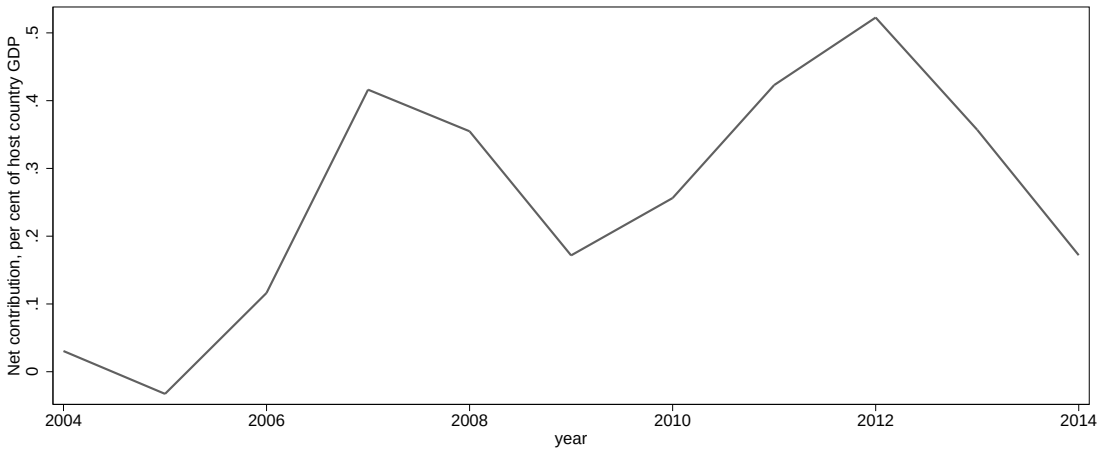


Figure 54: Contributions and costs per household, FR

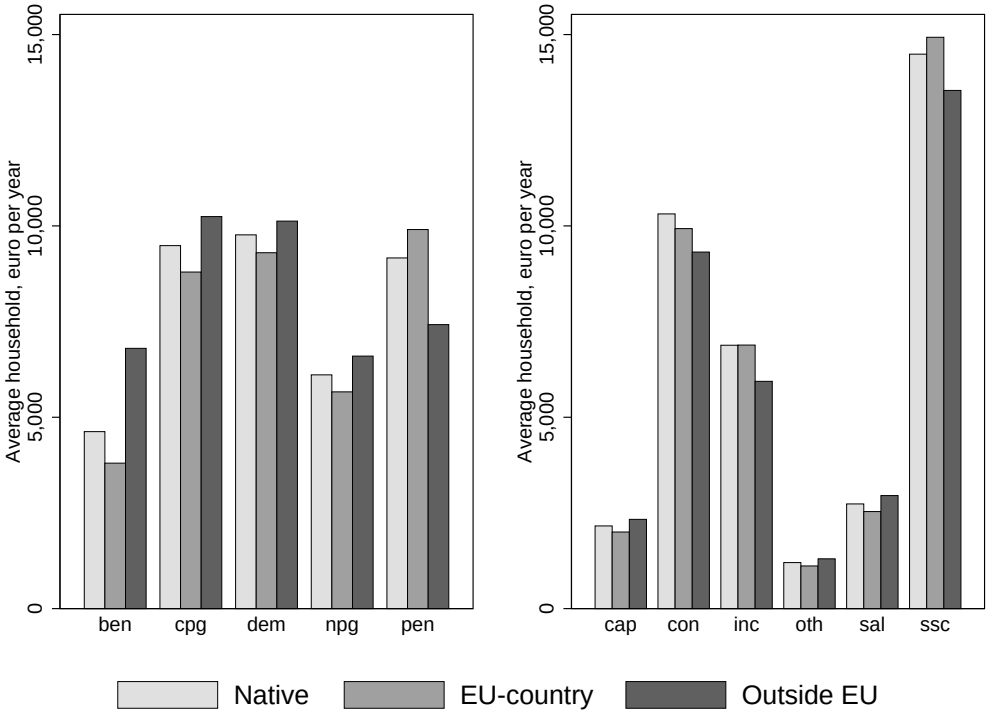
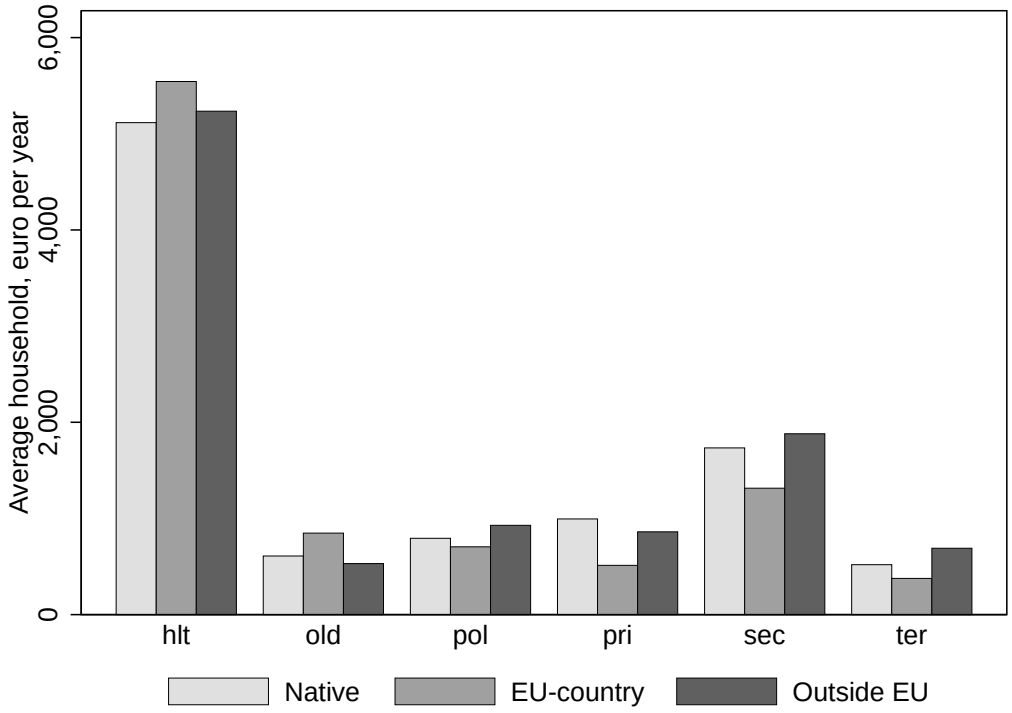


Figure 55: Demographically modelled items per household, FR



8.13 Greece (GR)

Table 17: Details, GR

Budget post	Per cent of GDP
Revenues	**1.15**
Consumption taxes	0.38
Taxes on income and wealth	0.18
Capital and corporate taxes	0.10
Social security contributions	0.42
Sales of goods and services	0.08
Expenditures	**0.80**
Benefits	0.11
Pensions	0.16
Demographically modelled expenditures	0.26
Congestible public goods	0.26
Fiscal impact	**0.35**
Deflation of budget balance	**−0.28**
Budget balance	−9.03
Impact on GDP from EU-migration	3.12
Fiscal impact incl. deflation	**0.63**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.25
25 % lower dem. exp.	0.02
25 % higher dem. exp.	−0.02
25 % lower con. taxes	−0.06
Pro-rata allocation of NPG and OTH	−0.22

All values are unweighted annual averages for the period 2004–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 56: Net effect of all EU migrants over time, per cent of GDP, GR

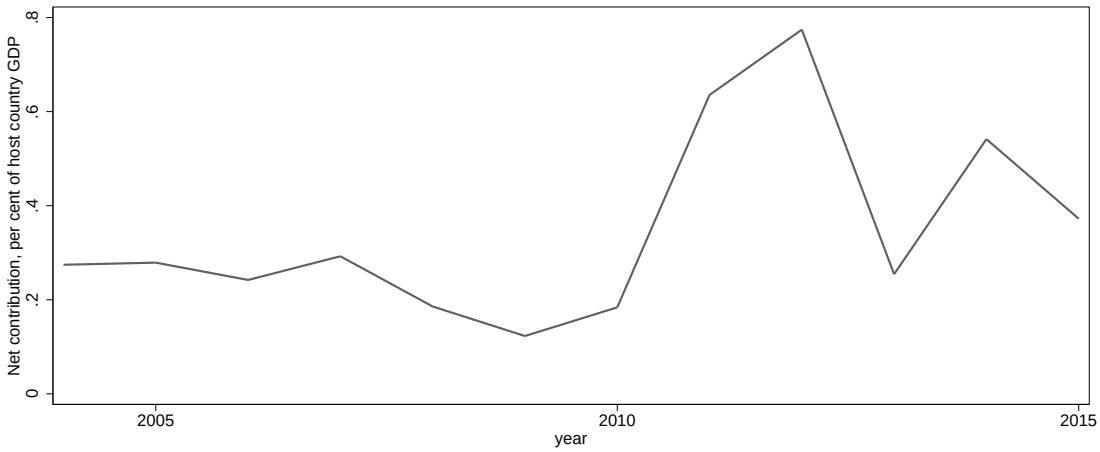


Figure 57: Contributions and costs per household, GR

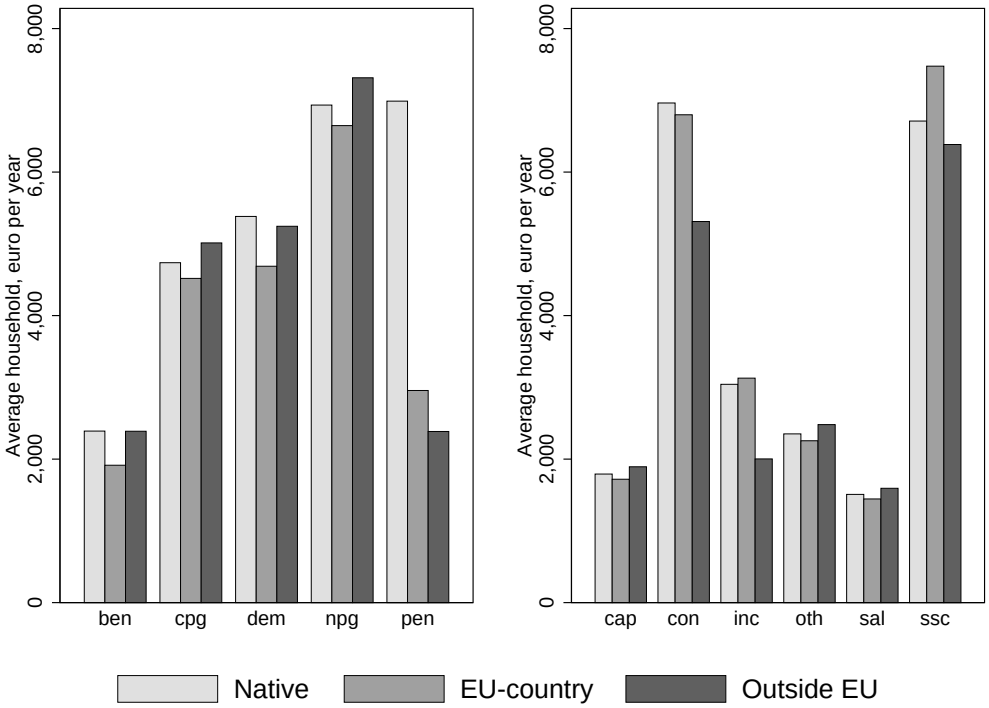
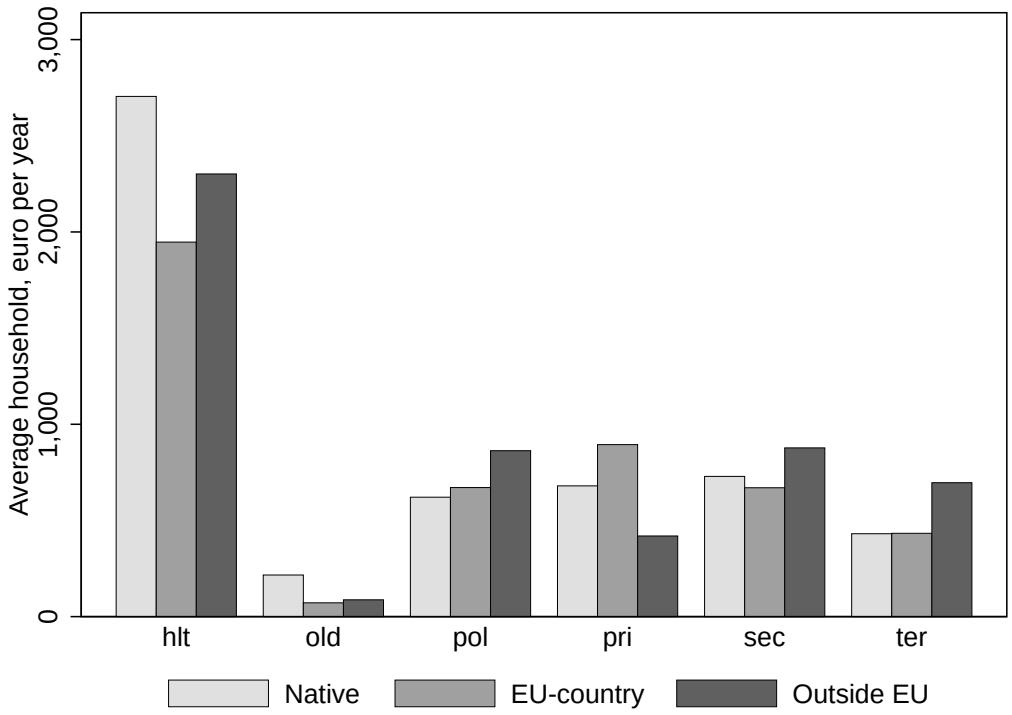


Figure 58: Demographically modelled items per household, GR



8.14 Croatia (HR)

Table 18: Details, HR

Budget post	Per cent of GDP
Revenues	**0.85**
Consumption taxes	0.39
Taxes on income and wealth	0.11
Capital and corporate taxes	0.03
Social security contributions	0.25
Sales of goods and services	0.07
Expenditures	**0.69**
Benefits	0.15
Pensions	0.12
Demographically modelled expenditures	0.23
Congestible public goods	0.19
Fiscal impact	**0.17**
Deflation of budget balance	**−0.14**
Budget balance	−6.09
Impact on GDP from EU-migration	2.32
Fiscal impact incl. deflation	**0.31**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.02
25 % lower dem. exp.	0.02
25 % higher dem. exp.	−0.02
25 % lower con. taxes	−0.05
Pro-rata allocation of NPG and OTH	−0.14

All values are unweighted annual averages for the period 2010–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 59: Net effect of all EU migrants over time, per cent of GDP, HR

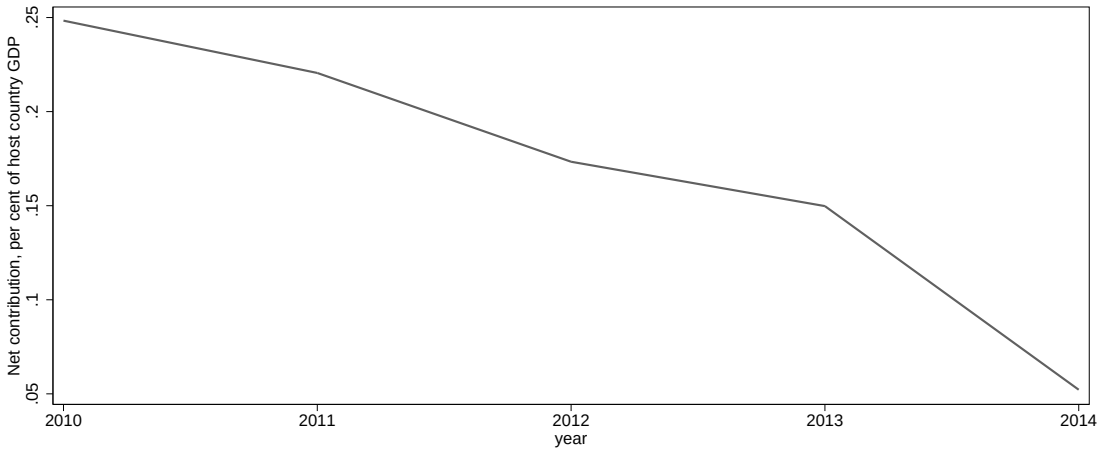


Figure 60: Contributions and costs per household, HR

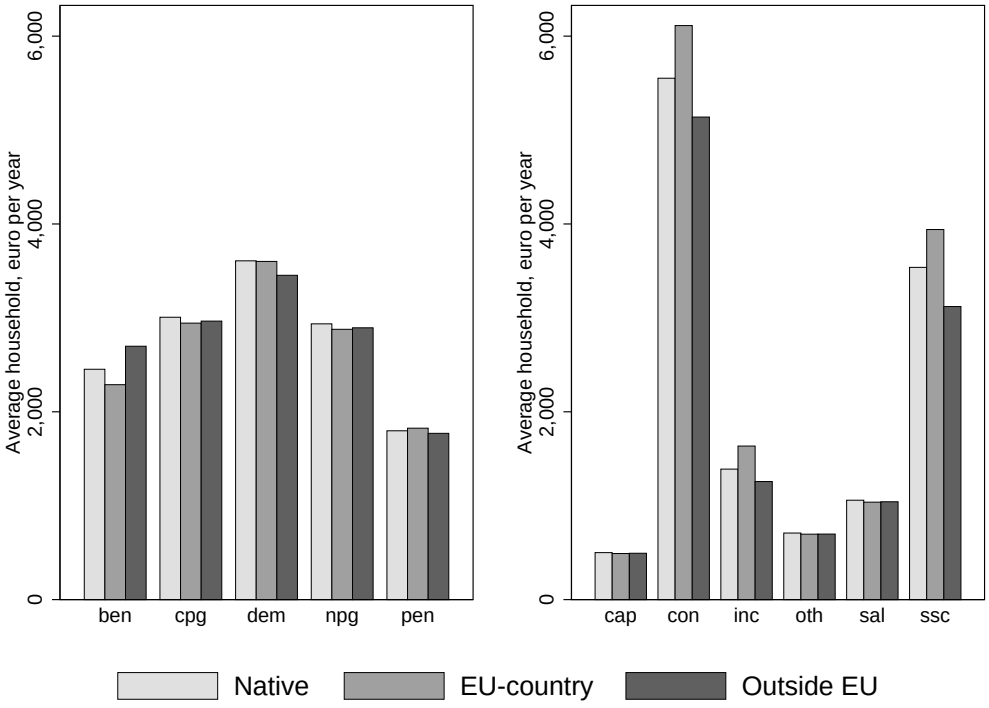
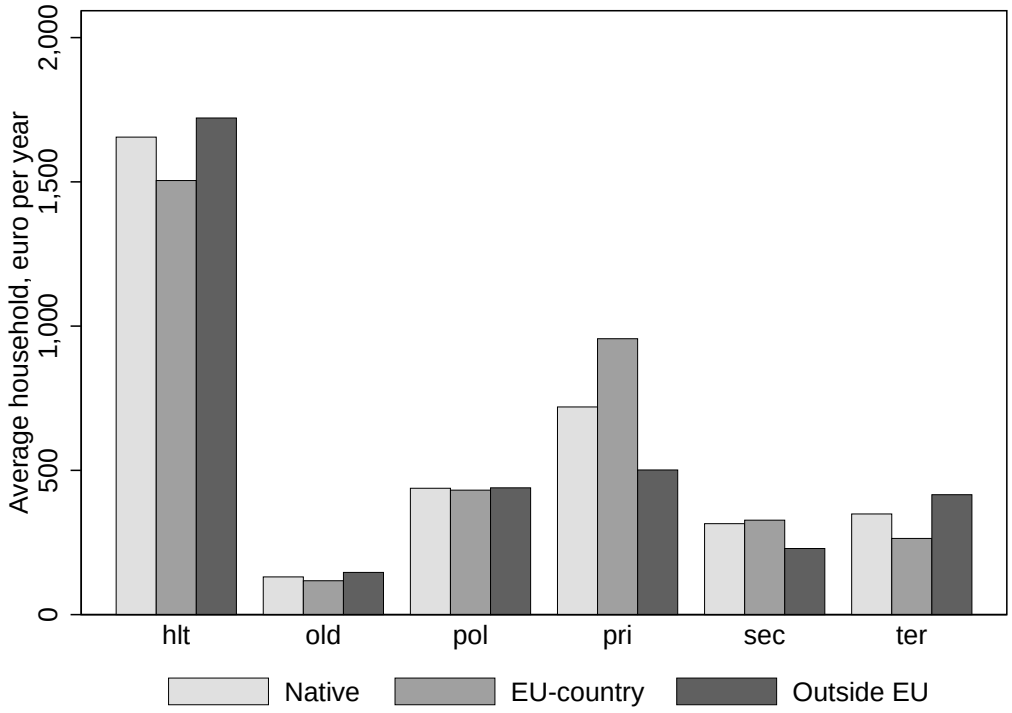


Figure 61: Demographically modelled items per household, HR



8.15 Hungary (HU)

Table 19: Details, HU

Budget post	Per cent of GDP
Revenues	**1.55**
Consumption taxes	0.62
Taxes on income and wealth	0.24
Capital and corporate taxes	0.06
Social security contributions	0.54
Sales of goods and services	0.10
Expenditures	**1.11**
Benefits	0.17
Pensions	0.22
Demographically modelled expenditures	0.31
Congestible public goods	0.41
Fiscal impact	**0.39**
Deflation of budget balance	**−0.13**
Budget balance	−3.51
Impact on GDP from EU-migration	3.61
Fiscal impact incl. deflation	**0.52**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.06
25 % lower dem. exp.	0.04
25 % higher dem. exp.	−0.04
25 % lower con. taxes	−0.10
Pro-rata allocation of NPG and OTH	−0.16

All values are unweighted annual averages for the period 2005–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 62: Net effect of all EU migrants over time, per cent of GDP, HU

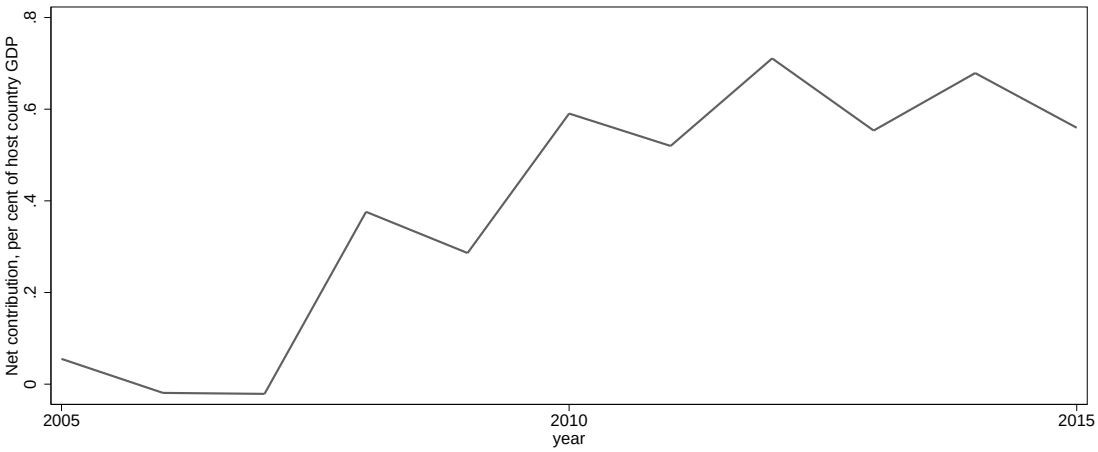


Figure 63: Contributions and costs per household, HU

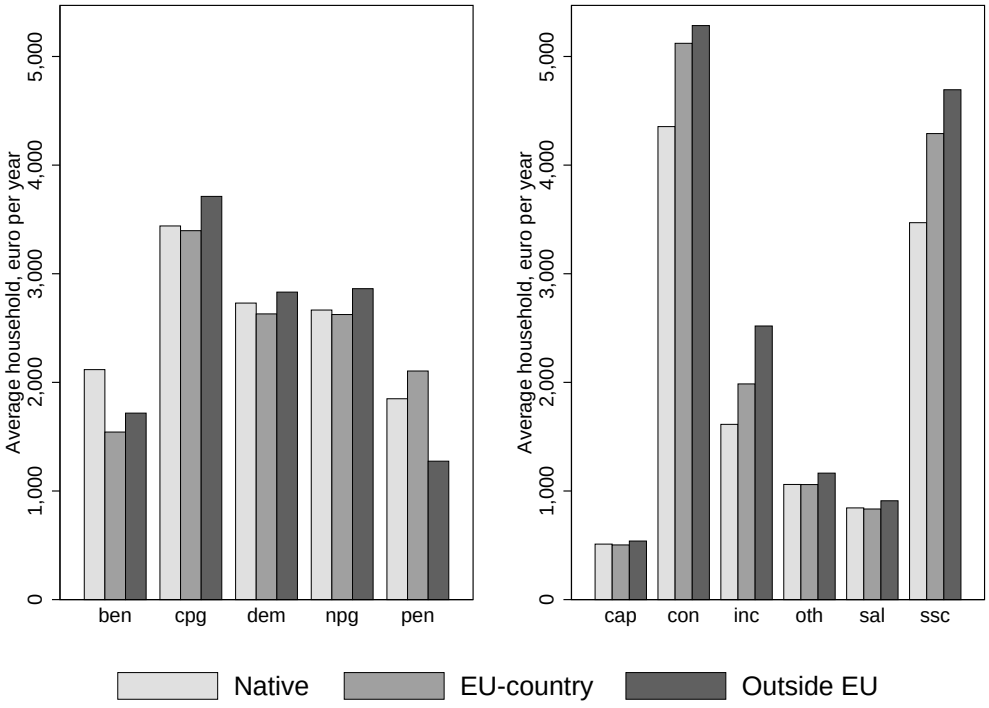
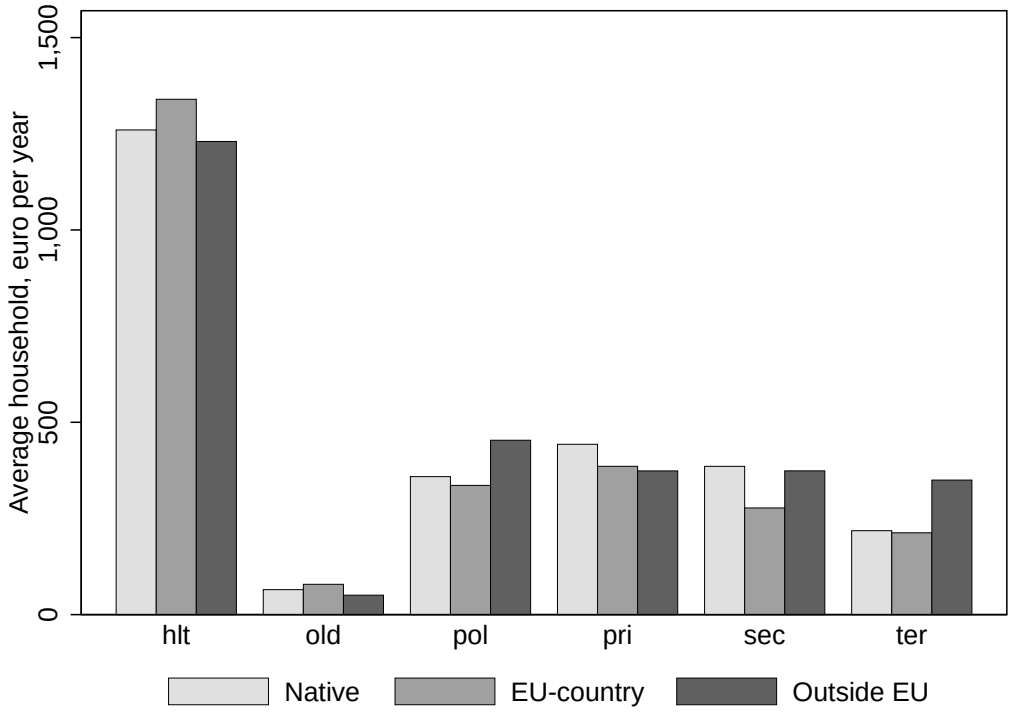


Figure 64: Demographically modelled items per household, HU



8.16 Ireland (IE)

Table 20: Details, IE

Budget post	Per cent of GDP
Revenues	**4.81**
Consumption taxes	1.66
Taxes on income and wealth	1.35
Capital and corporate taxes	0.47
Social security contributions	0.96
Sales of goods and services	0.37
Expenditures	**4.86**
Benefits	1.30
Pensions	0.17
Demographically modelled expenditures	1.64
Congestible public goods	1.74
Fiscal impact	**−0.06**
Deflation of budget balance	**−1.06**
Budget balance	−7.47
Impact on GDP from EU-migration	14.20
Fiscal impact incl. deflation	**1.00**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.28
25 % lower dem. exp.	0.17
25 % higher dem. exp.	−0.16
25 % lower con. taxes	−0.23
Pro-rata allocation of NPG and OTH	−0.42

All values are unweighted annual averages for the period 2004–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 65: Net effect of all EU migrants over time, per cent of GDP, IE

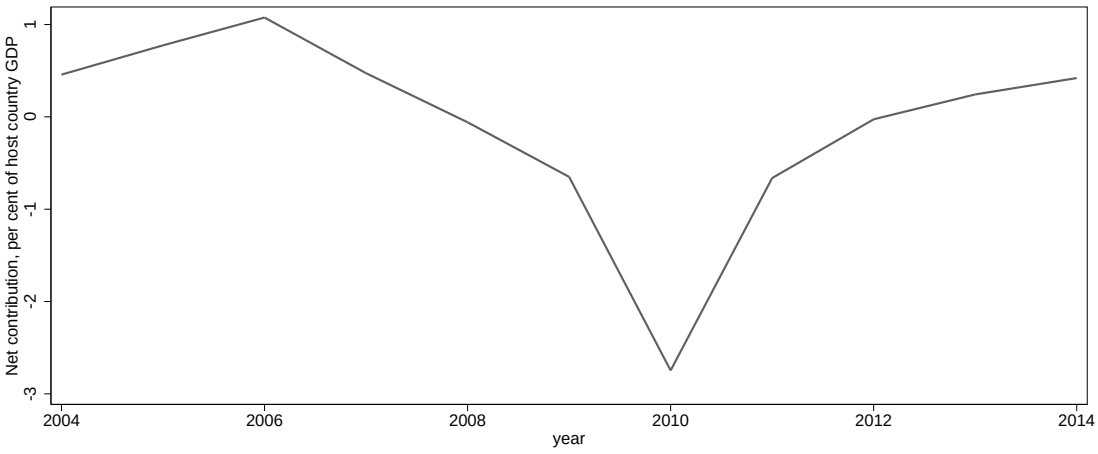


Figure 66: Contributions and costs per household, IE

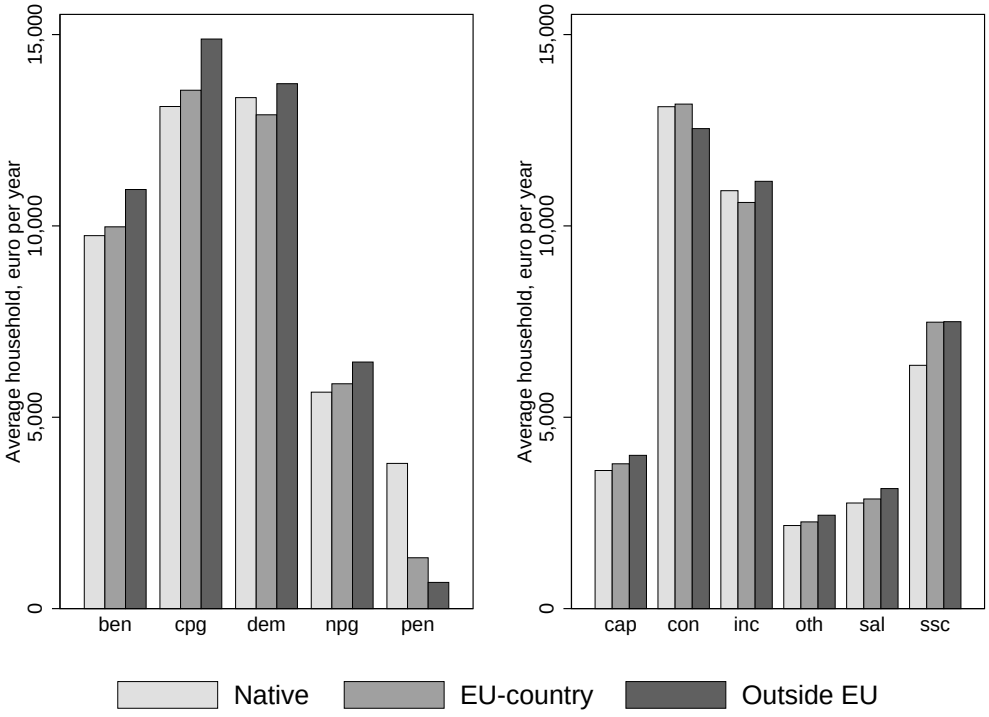
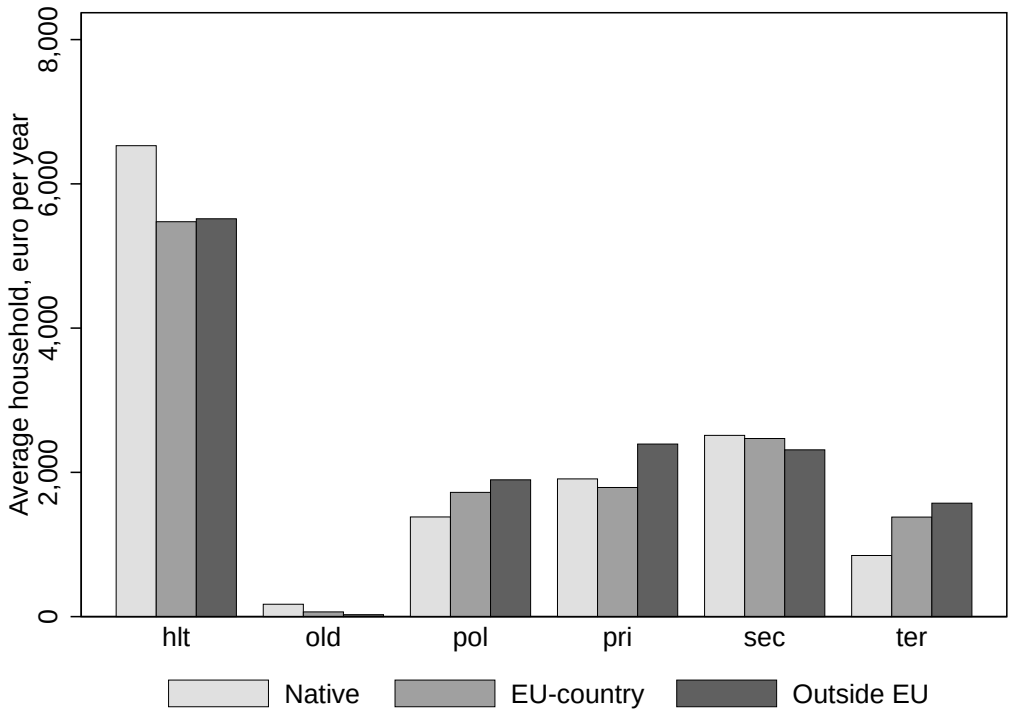


Figure 67: Demographically modelled items per household, IE



8.17 Iceland (IS)

Table 21: Details, IS

Budget post	Per cent of GDP
Revenues	**2.95**
Consumption taxes	1.17
Taxes on income and wealth	1.00
Capital and corporate taxes	0.26
Social security contributions	0.26
Sales of goods and services	0.25
Expenditures	**2.76**
Benefits	0.37
Pensions	0.06
Demographically modelled expenditures	1.16
Congestible public goods	1.18
Fiscal impact	**0.11**
Deflation of budget balance	**−0.16**
Budget balance	−2.22
Impact on GDP from EU-migration	7.19
Fiscal impact incl. deflation	**0.27**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.11
25 % lower dem. exp.	0.12
25 % higher dem. exp.	−0.12
25 % lower con. taxes	−0.17
Pro-rata allocation of NPG and OTH	−0.35

All values are unweighted annual averages for the period 2004–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 68: Net effect of all EU migrants over time, per cent of GDP, IS

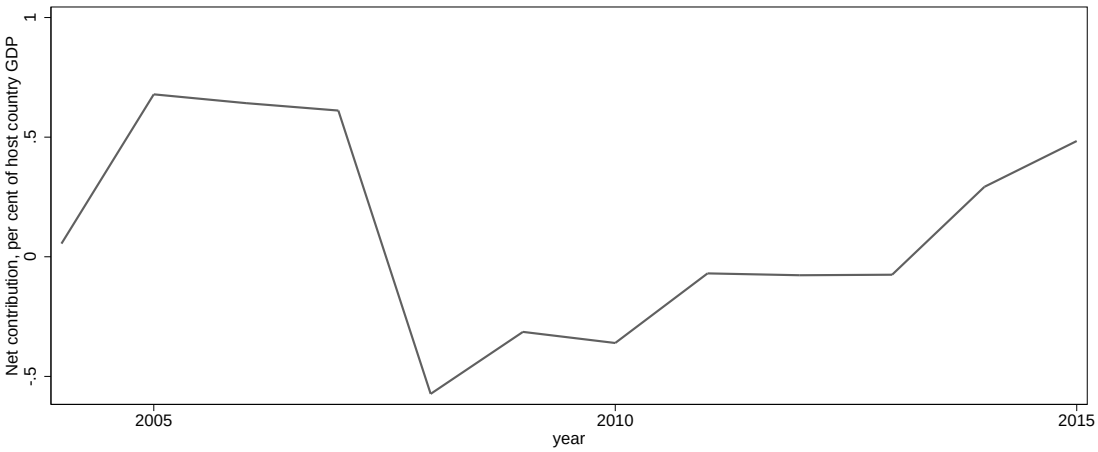


Figure 69: Contributions and costs per household, IS

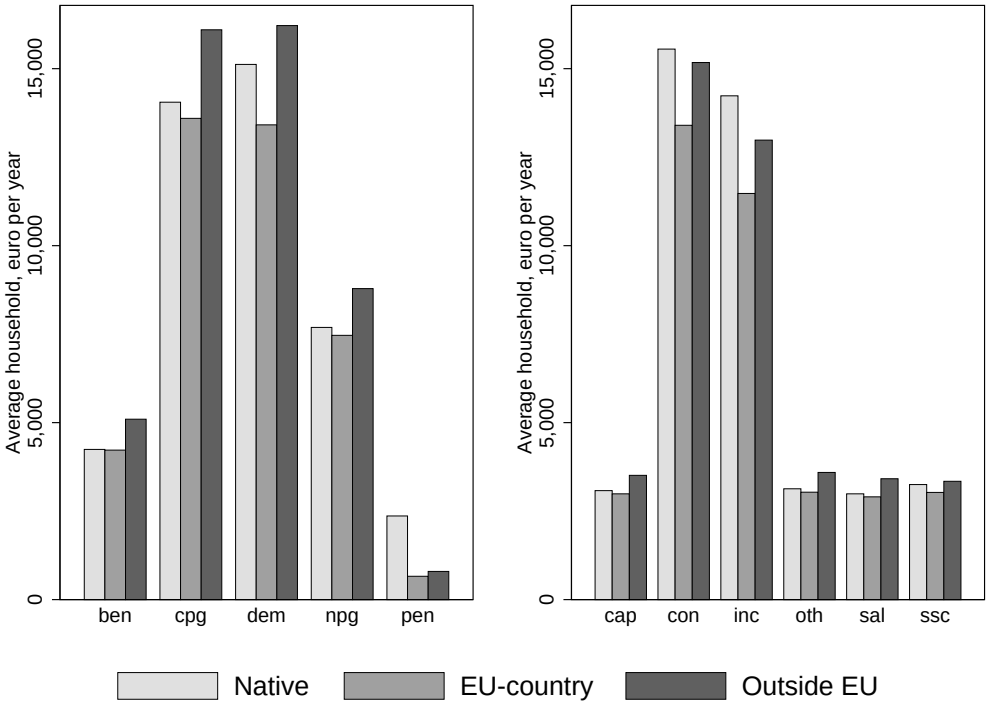
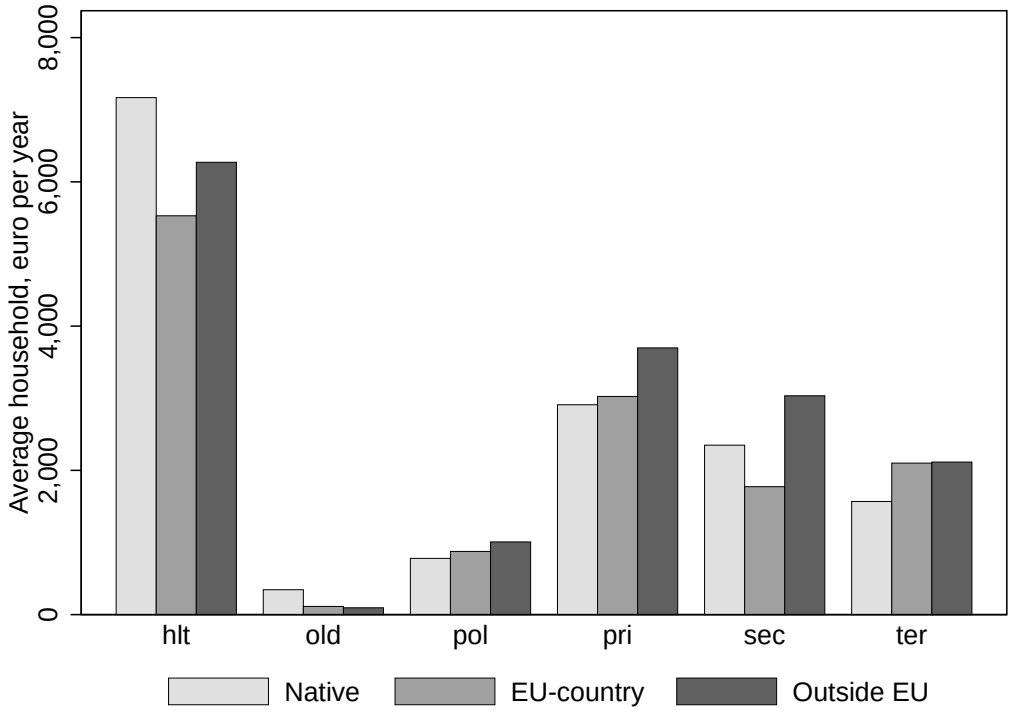


Figure 70: Demographically modelled items per household, IS



8.18 Italy (IT)

Table 22: Details, IT

Budget post	Per cent of GDP
Revenues	**1.34**
Consumption taxes	0.39
Taxes on income and wealth	0.32
Capital and corporate taxes	0.09
Social security contributions	0.48
Sales of goods and services	0.07
Expenditures	**0.95**
Benefits	0.20
Pensions	0.15
Demographically modelled expenditures	0.34
Congestible public goods	0.26
Fiscal impact	**0.35**
Deflation of budget balance	**−0.11**
Budget balance	−3.44
Impact on GDP from EU-migration	3.20
Fiscal impact incl. deflation	**0.47**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.27
25 % lower dem. exp.	0.04
25 % higher dem. exp.	−0.04
25 % lower con. taxes	−0.06
Pro-rata allocation of NPG and OTH	−0.22

All values are unweighted annual averages for the period 2004–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 71: Net effect of all EU migrants over time, per cent of GDP, IT

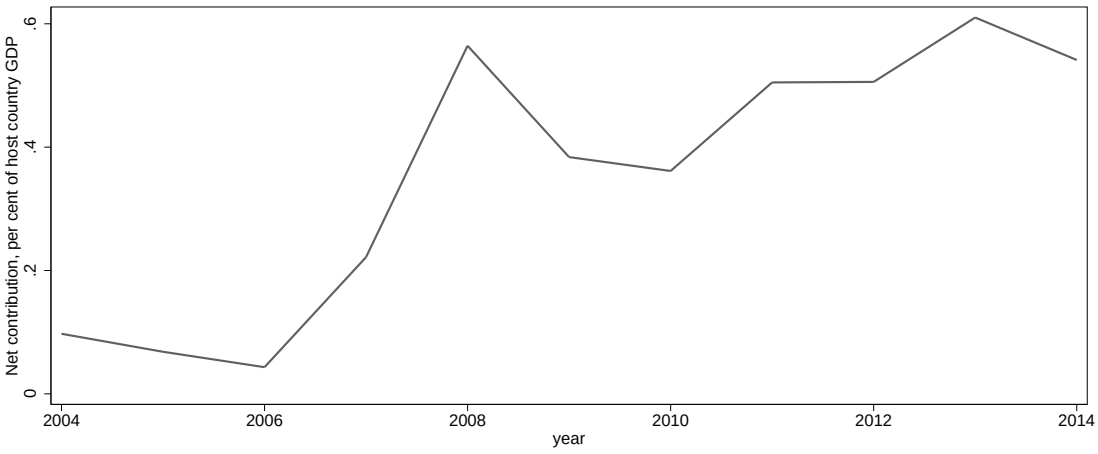


Figure 72: Contributions and costs per household, IT

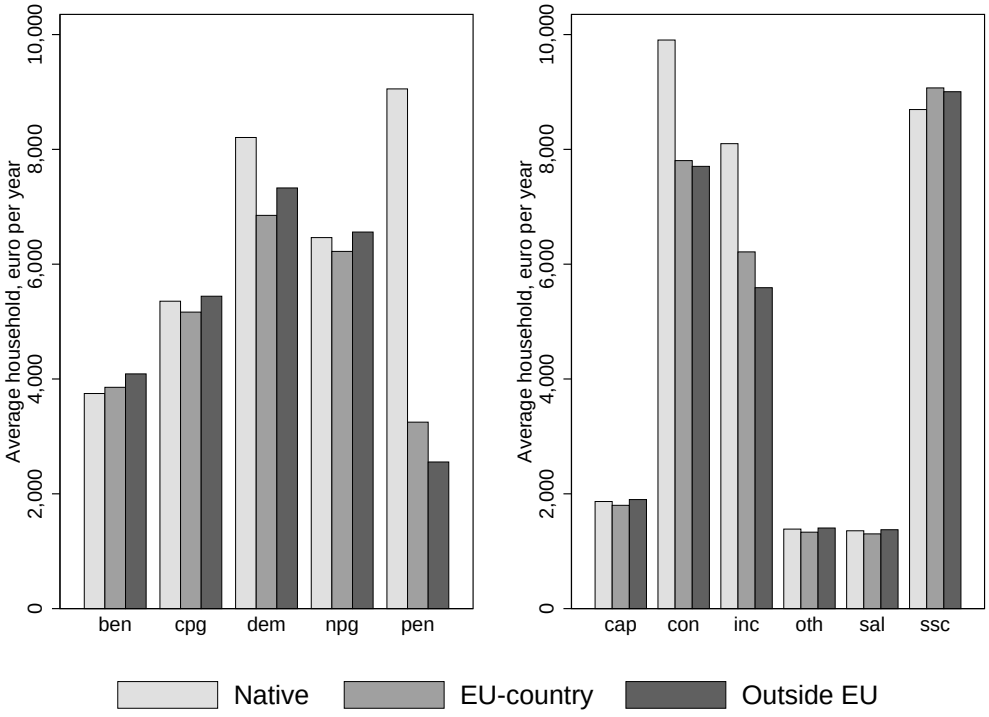
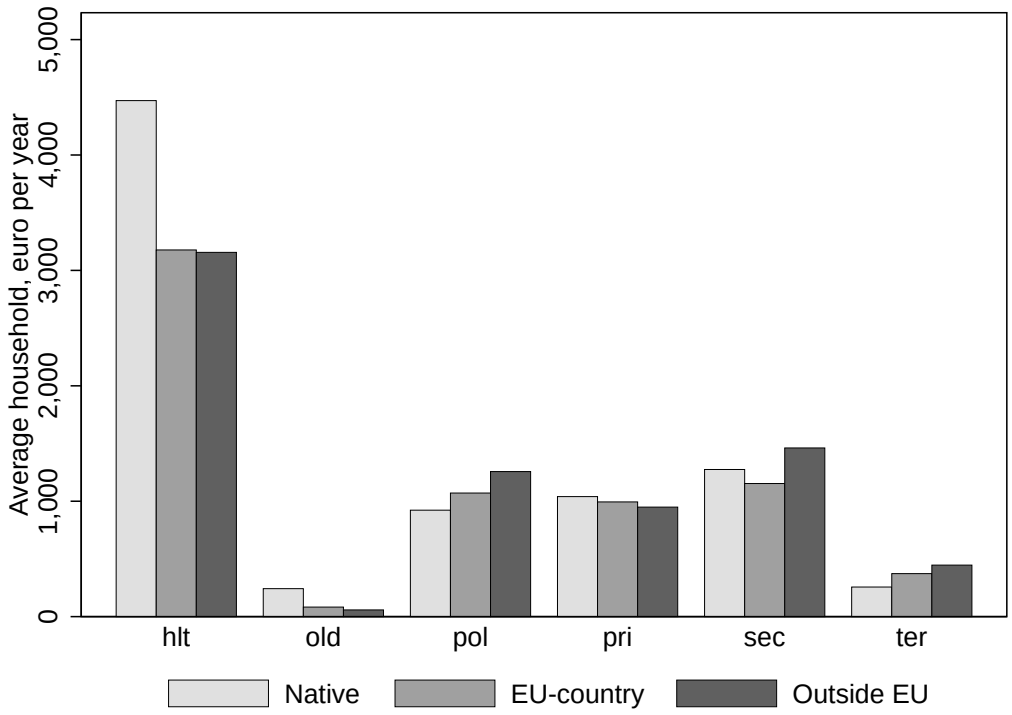


Figure 73: Demographically modelled items per household, IT



8.19 Lithuania (LT)

Table 23: Details, LT

Budget post	Per cent of GDP
Revenues	**0.15**
Consumption taxes	0.06
Taxes on income and wealth	0.02
Capital and corporate taxes	0.01
Social security contributions	0.05
Sales of goods and services	0.01
Expenditures	**0.19**
Benefits	0.03
Pensions	0.05
Demographically modelled expenditures	0.06
Congestible public goods	0.05
Fiscal impact	**−0.03**
Deflation of budget balance	**−0.01**
Budget balance	−3.54
Impact on GDP from EU-migration	0.32
Fiscal impact incl. deflation	**−0.01**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.02
25 % lower dem. exp.	0.00
25 % higher dem. exp.	−0.00
25 % lower con. taxes	−0.01
Pro-rata allocation of NPG and OTH	−0.01

All values are unweighted annual averages for the period 2005–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 74: Net effect of all EU migrants over time, per cent of GDP, LT

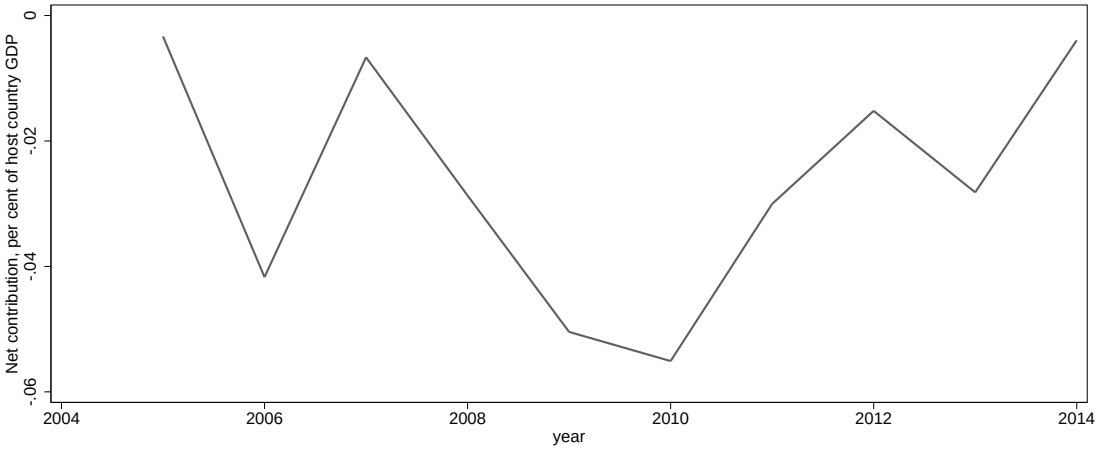


Figure 75: Contributions and costs per household, LT

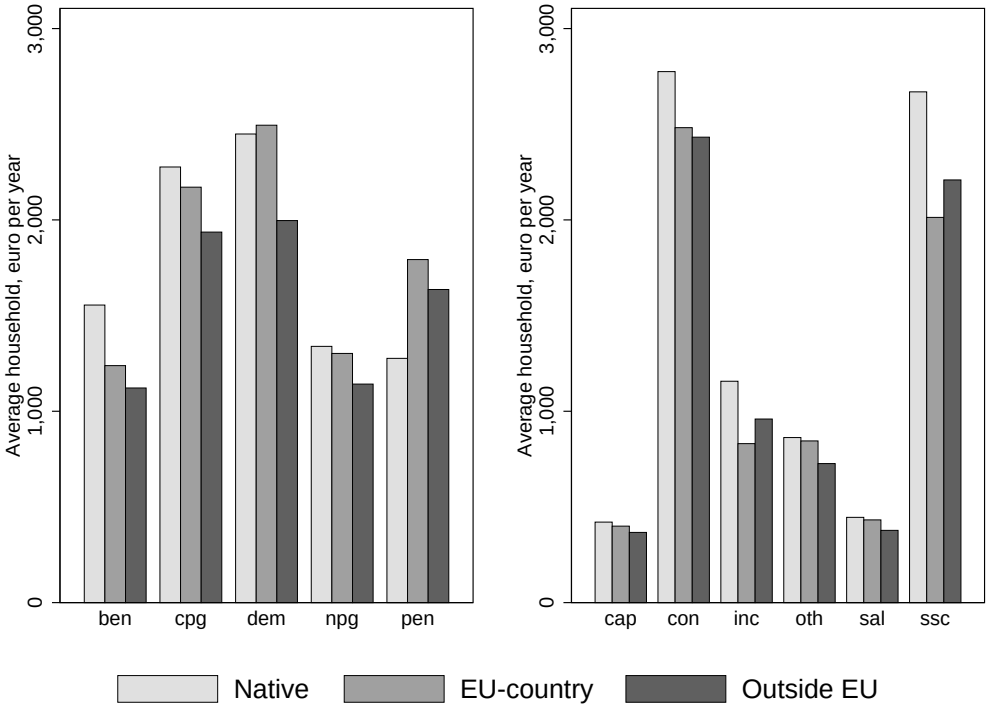
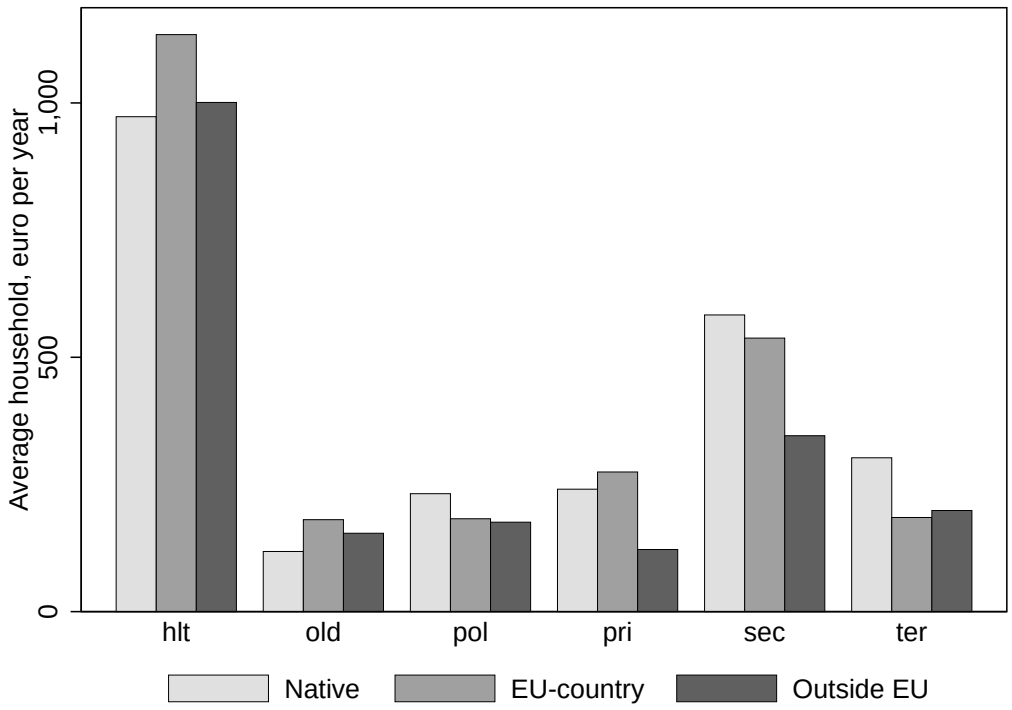


Figure 76: Demographically modelled items per household, LT



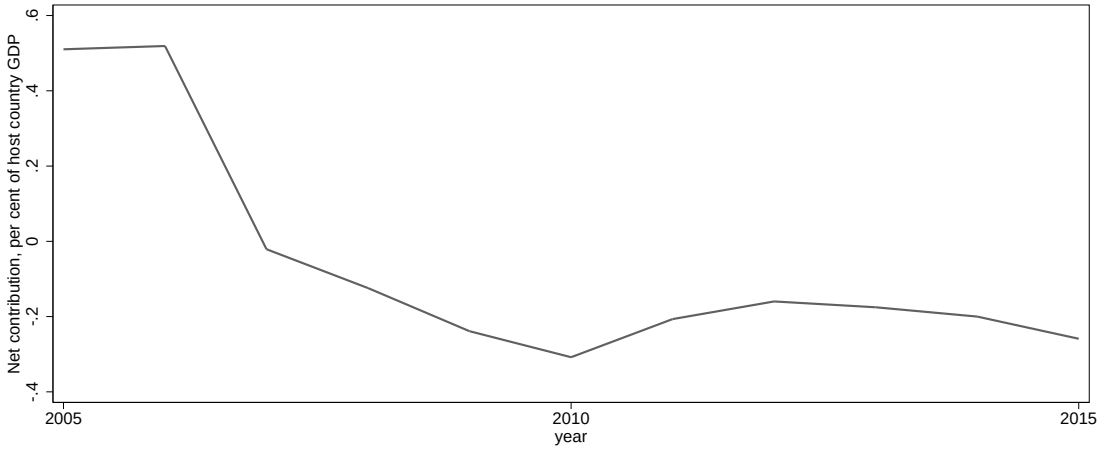
8.20 Latvia (LV)

Table 24: Details, LV

Budget post	Per cent of GDP
Revenues	**0.98**
Consumption taxes	0.40
Taxes on income and wealth	0.18
Capital and corporate taxes	0.05
Social security contributions	0.25
Sales of goods and services	0.10
Expenditures	**1.12**
Benefits	0.08
Pensions	0.44
Demographically modelled expenditures	0.25
Congestible public goods	0.34
Fiscal impact	**−0.06**
Deflation of budget balance	**−0.06**
Budget balance	−3.20
Impact on GDP from EU-migration	1.89
Fiscal impact incl. deflation	**0.00**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.16
25 % lower dem. exp.	0.02
25 % higher dem. exp.	−0.02
25 % lower con. taxes	−0.04
Pro-rata allocation of NPG and OTH	−0.04

All values are unweighted annual averages for the period 2005–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 77: Net effect of all EU migrants over time, per cent of GDP, LV



Note: EU migrant classification in Latvia is based on a predicted probability model, and estimates should be interpreted carefully.

Figure 78: Contributions and costs per household, LV

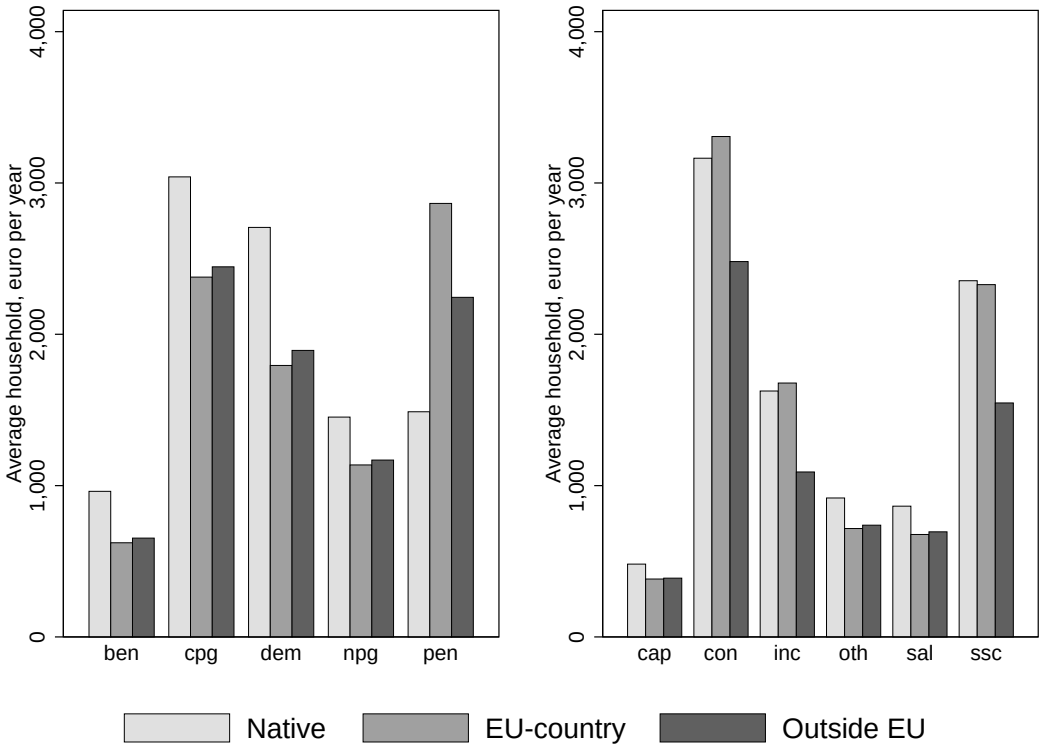
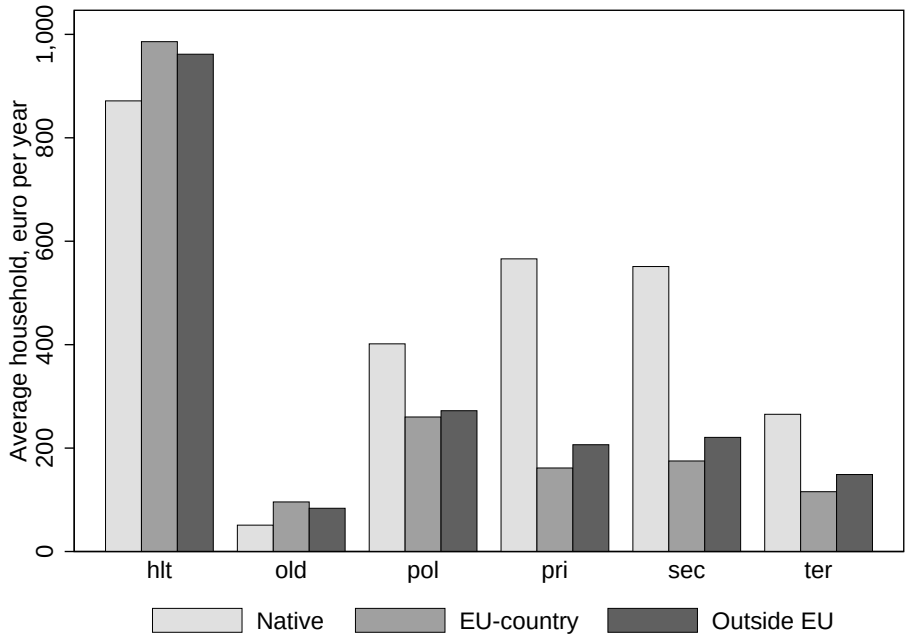


Figure 79: Demographically modelled items per household, LV



Note: EU migrant classification in Latvia is based on a predicted probability model, and estimates should be interpreted carefully.

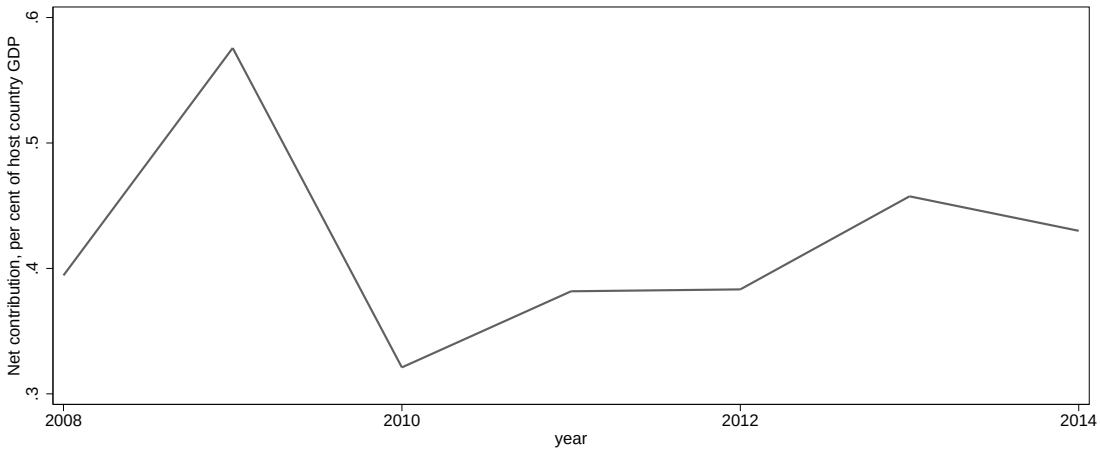
8.21 Malta (MT)

Table 25: Details, MT

Budget post	Per cent of GDP
Revenues	**2.00**
Consumption taxes	0.72
Taxes on income and wealth	0.60
Capital and corporate taxes	0.18
Social security contributions	0.37
Sales of goods and services	0.12
Expenditures	**1.52**
Benefits	0.19
Pensions	0.30
Demographically modelled expenditures	0.53
Congestible public goods	0.51
Fiscal impact	**0.42**
Deflation of budget balance	**−0.16**
Budget balance	−3.05
Impact on GDP from EU-migration	5.19
Fiscal impact incl. deflation	**0.58**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.11
25 % lower dem. exp.	0.04
25 % higher dem. exp.	−0.04
25 % lower con. taxes	−0.08
Pro-rata allocation of NPG and OTH	−0.20

All values are unweighted annual averages for the period 2008–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 80: Net effect of all EU migrants over time, per cent of GDP, MT



Note: EU migrant classification in Malta is based on a predicted probability model, and estimates should be interpreted carefully.

Figure 81: Contributions and costs per household, MT

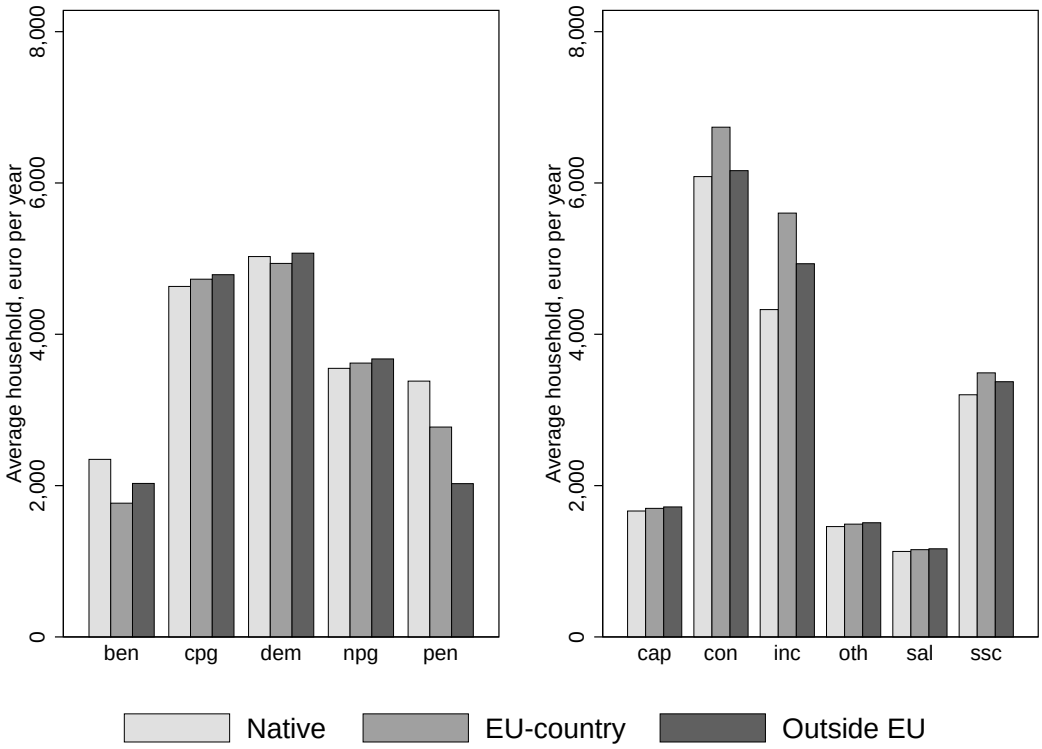
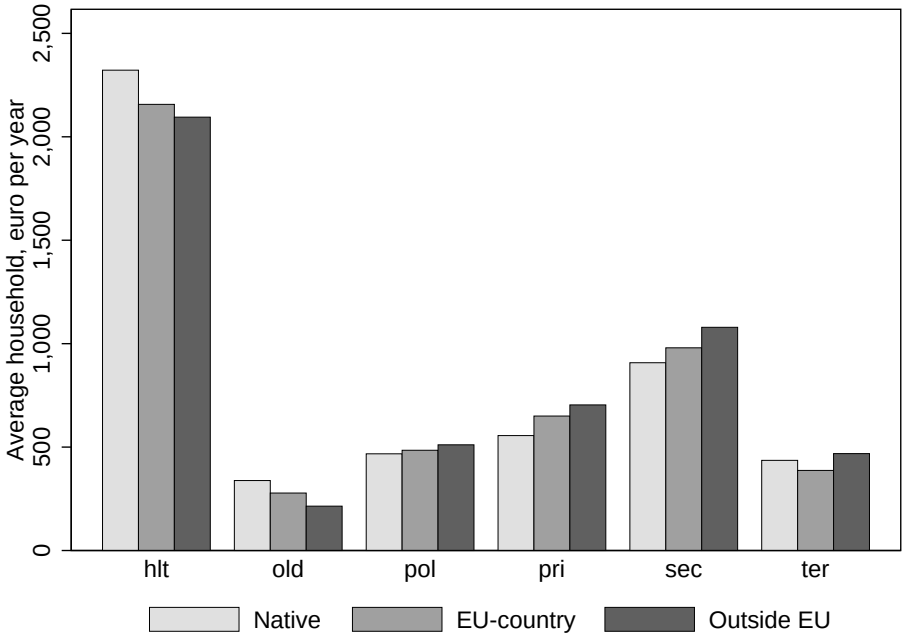


Figure 82: Demographically modelled items per household, MT



Note: EU migrant classification in Malta is based on a predicted probability model, and estimates should be interpreted carefully.

8.22 Netherlands (NL)

Table 26: Details, NL

Budget post	Per cent of GDP
Revenues	**1.47**
Consumption taxes	0.41
Taxes on income and wealth	0.31
Capital and corporate taxes	0.10
Social security contributions	0.53
Sales of goods and services	0.12
Expenditures	**1.25**
Benefits	0.20
Pensions	0.15
Demographically modelled expenditures	0.47
Congestible public goods	0.44
Fiscal impact	**0.19**
Deflation of budget balance	**−0.07**
Budget balance	−2.14
Impact on GDP from EU-migration	3.35
Fiscal impact incl. deflation	**0.26**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.04
25 % lower dem. exp.	0.05
25 % higher dem. exp.	−0.05
25 % lower con. taxes	−0.05
Pro-rata allocation of NPG and OTH	−0.10

All values are unweighted annual averages for the period 2005–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 83: Net effect of all EU migrants over time, per cent of GDP, NL

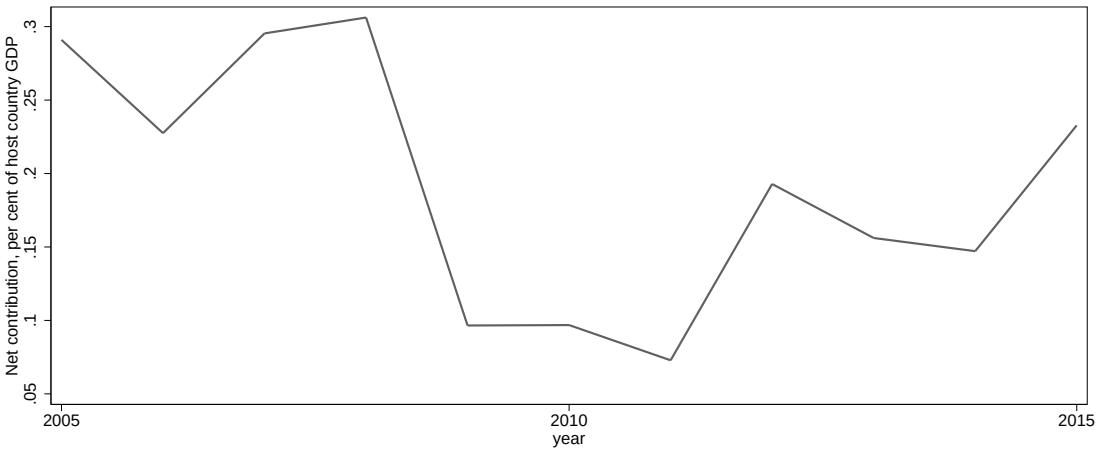


Figure 84: Contributions and costs per household, NL

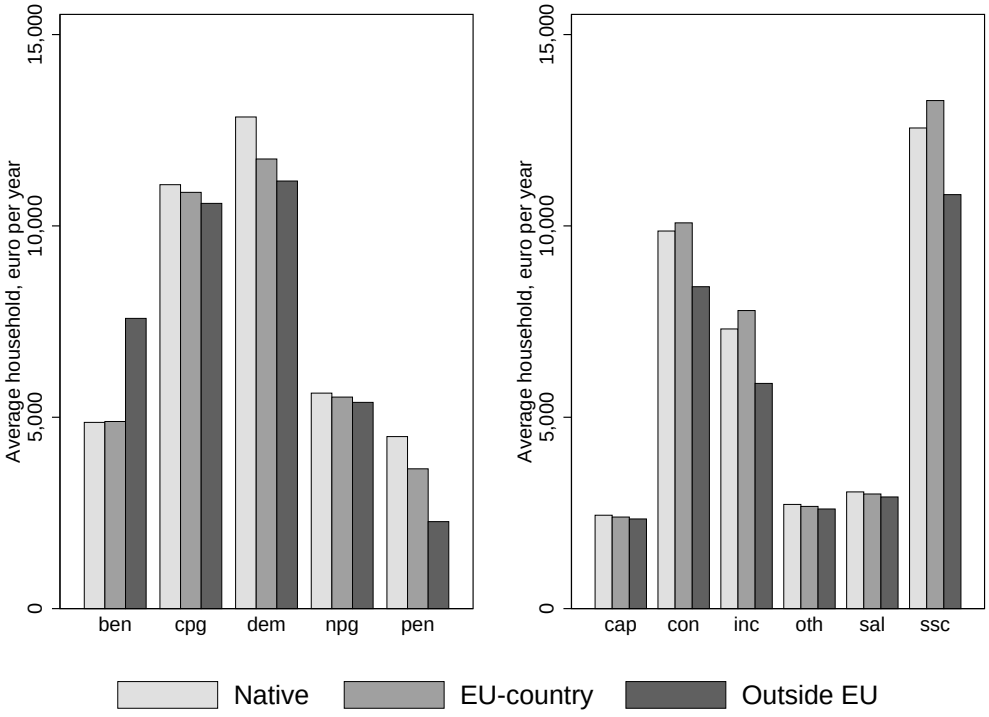
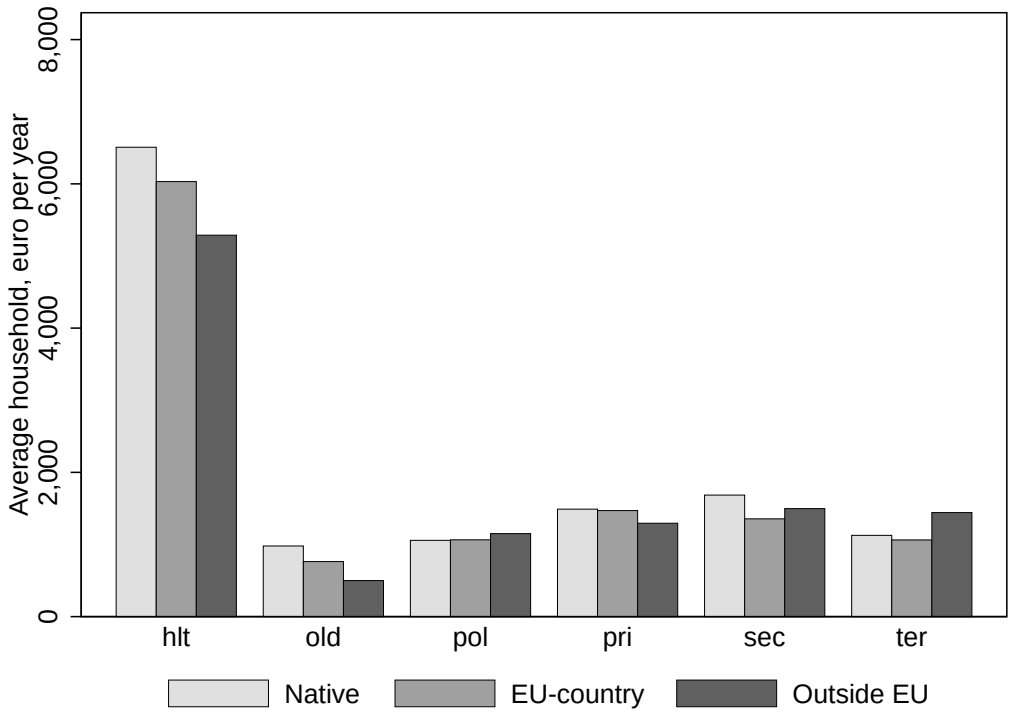


Figure 85: Demographically modelled items per household, NL



8.23 Norway (NO)

Table 27: Details, NO

Budget post	Per cent of GDP
Revenues	**4.06**
Consumption taxes	1.03
Taxes on income and wealth	1.01
Capital and corporate taxes	0.79
Social security contributions	0.94
Sales of goods and services	0.28
Expenditures	**2.76**
Benefits	0.55
Pensions	0.27
Demographically modelled expenditures	0.93
Congestible public goods	1.01
Fiscal impact	**0.87**
Deflation of budget balance	**0.82**
Budget balance	12.48
Impact on GDP from EU-migration	6.54
Fiscal impact incl. deflation	**0.05**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.18
25 % lower dem. exp.	0.07
25 % higher dem. exp.	−0.07
25 % lower con. taxes	−0.11
Pro-rata allocation of NPG and OTH	0.33

All values are unweighted annual averages for the period 2004–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 86: Net effect of all EU migrants over time, per cent of GDP, NO

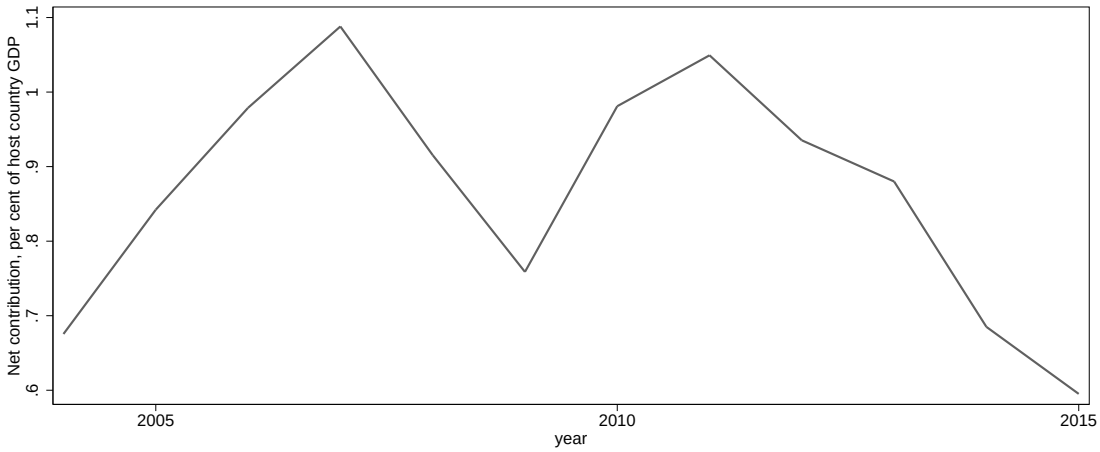


Figure 87: Contributions and costs per household, NO

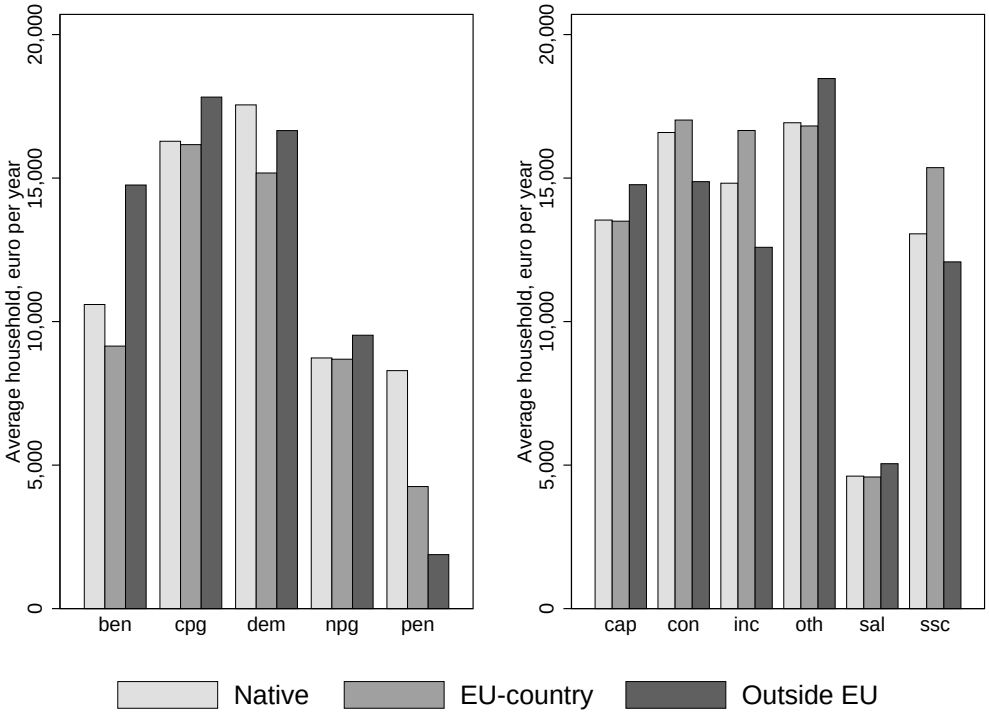
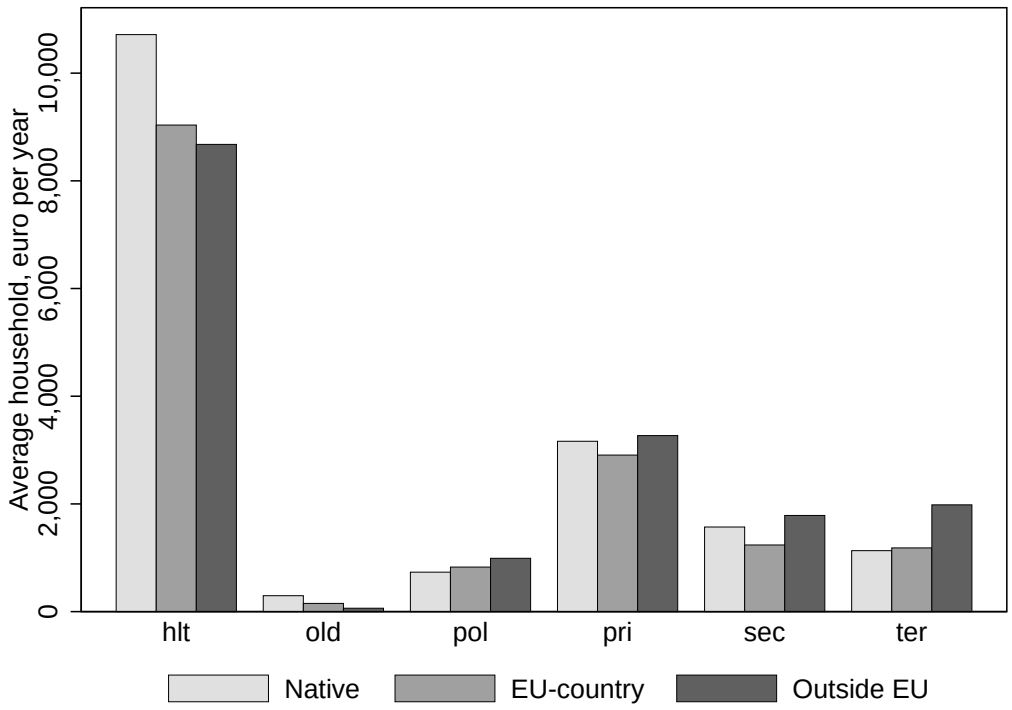


Figure 88: Demographically modelled items per household, NO



8.24 Poland (PL)

Table 28: Details, PL

Budget post	Per cent of GDP
Revenues	**0.17**
Consumption taxes	0.09
Taxes on income and wealth	0.02
Capital and corporate taxes	0.01
Social security contributions	0.03
Sales of goods and services	0.02
Expenditures	**0.37**
Benefits	0.02
Pensions	0.22
Demographically modelled expenditures	0.07
Congestible public goods	0.06
Fiscal impact	**−0.14**
Deflation of budget balance	**−0.01**
Budget balance	−4.19
Impact on GDP from EU-migration	0.15
Fiscal impact incl. deflation	**−0.14**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.14
25 % lower dem. exp.	0.01
25 % higher dem. exp.	−0.01
25 % lower con. taxes	−0.01
Pro-rata allocation of NPG and OTH	−0.01

All values are unweighted annual averages for the period 2005–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 89: Net effect of all EU migrants over time, per cent of GDP, PL

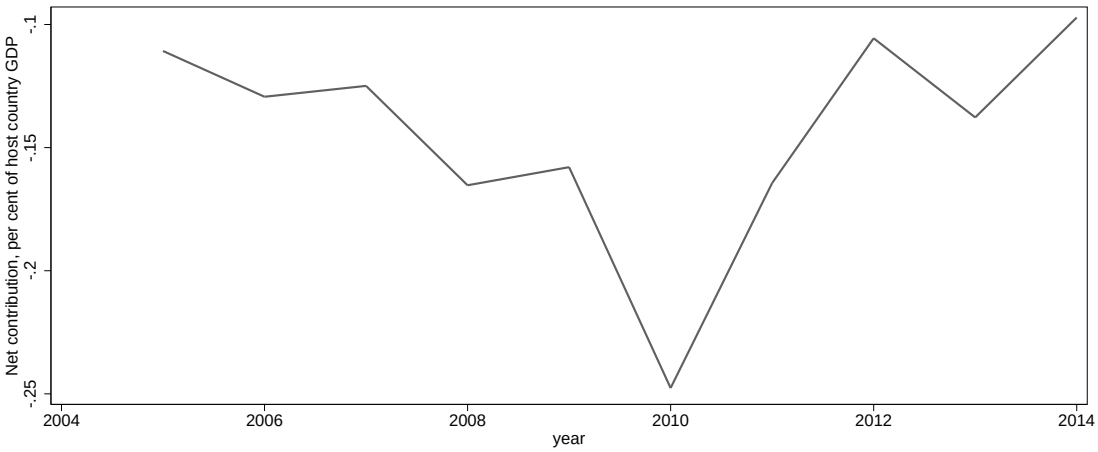


Figure 90: Contributions and costs per household, PL

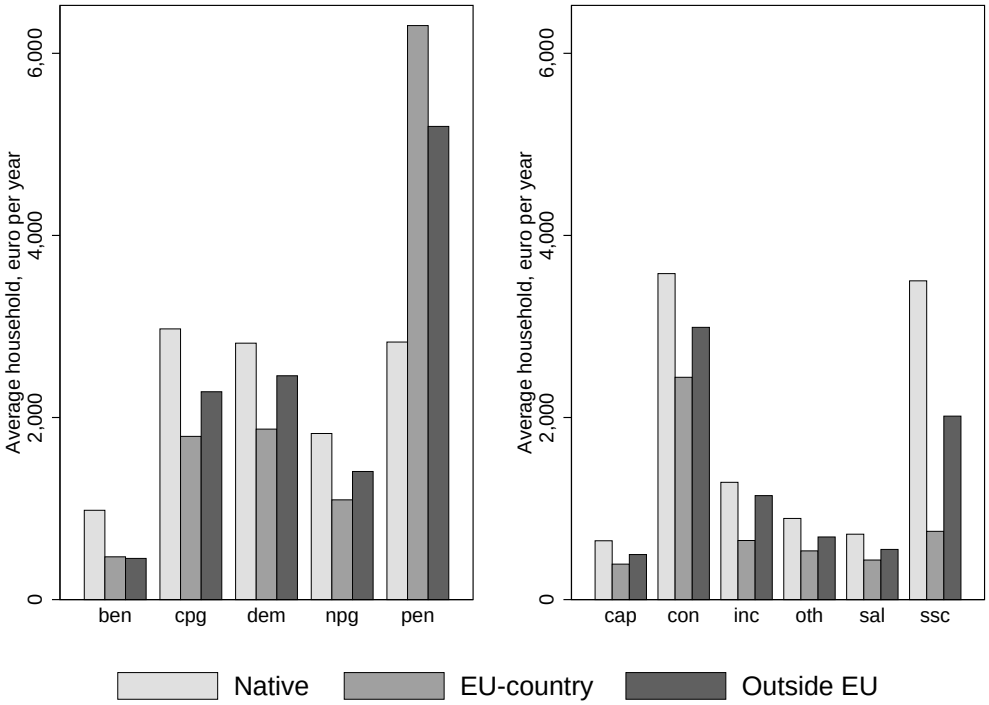
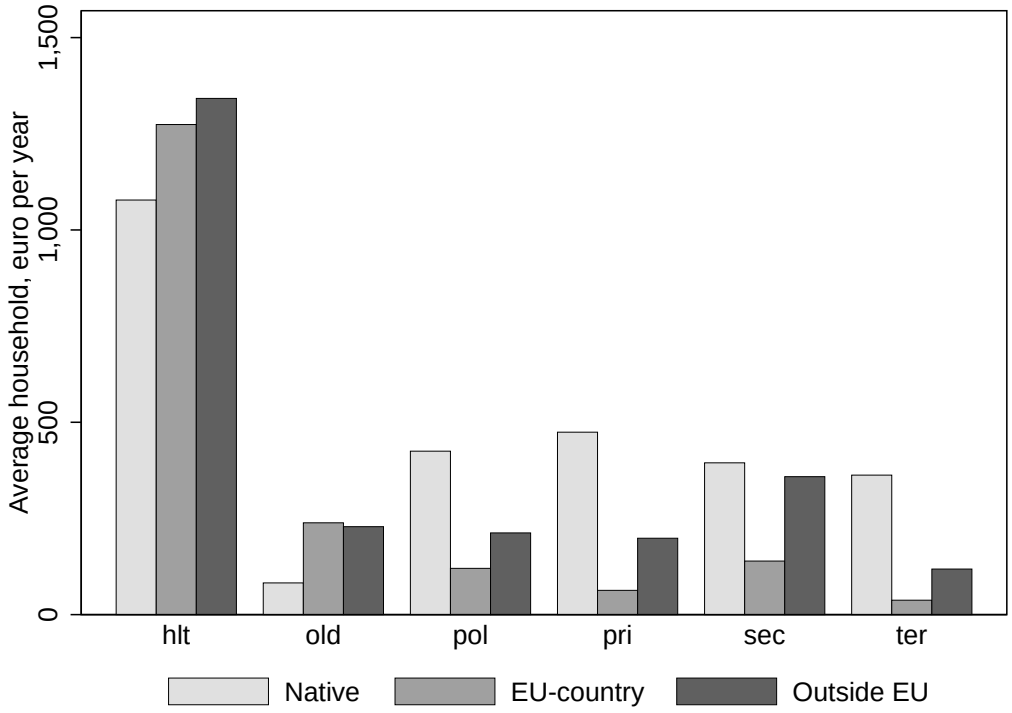


Figure 91: Demographically modelled items per household, PL



8.25 Portugal (PT)

Table 29: Details, PT

Budget post	Per cent of GDP
Revenues	**1.25**
Consumption taxes	0.44
Taxes on income and wealth	0.21
Capital and corporate taxes	0.10
Social security contributions	0.40
Sales of goods and services	0.11
Expenditures	**1.00**
Benefits	0.20
Pensions	0.14
Demographically modelled expenditures	0.36
Congestible public goods	0.31
Fiscal impact	**0.22**
Deflation of budget balance	**−0.17**
Budget balance	−5.76
Impact on GDP from EU-migration	3.03
Fiscal impact incl. deflation	**0.40**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.17
25 % lower dem. exp.	0.03
25 % higher dem. exp.	−0.03
25 % lower con. taxes	−0.06
Pro-rata allocation of NPG and OTH	−0.13

All values are unweighted annual averages for the period 2004–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 92: Net effect of all EU migrants over time, per cent of GDP, PT

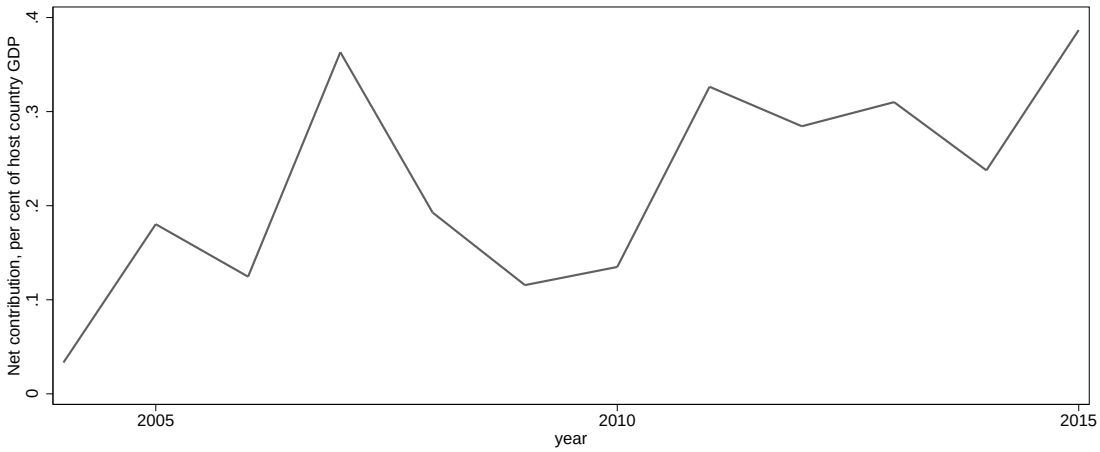


Figure 93: Contributions and costs per household, PT

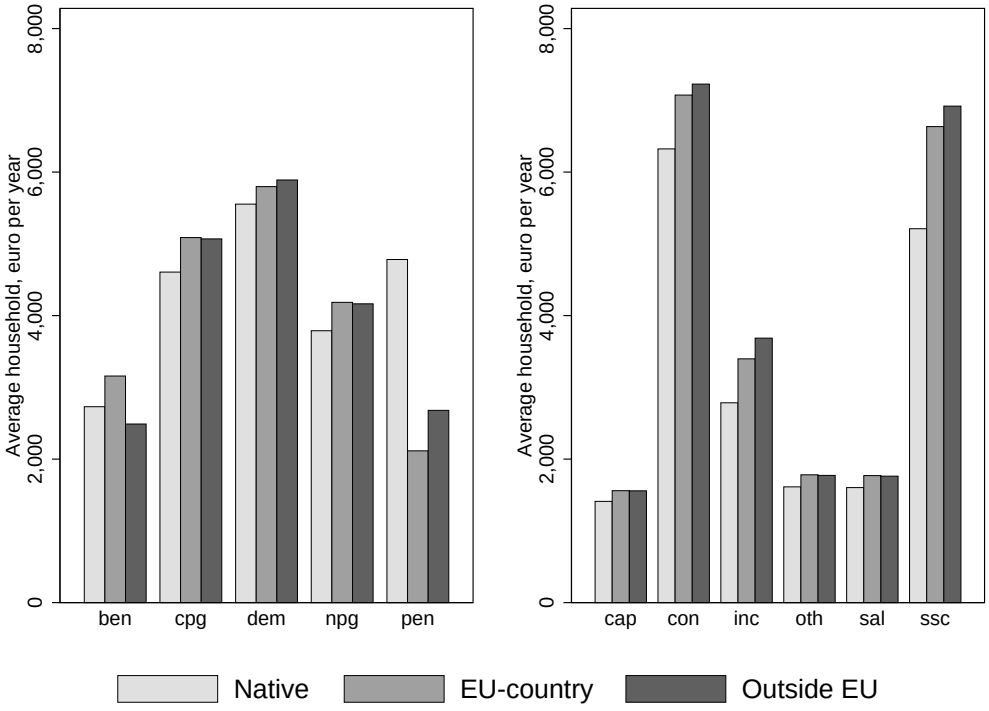
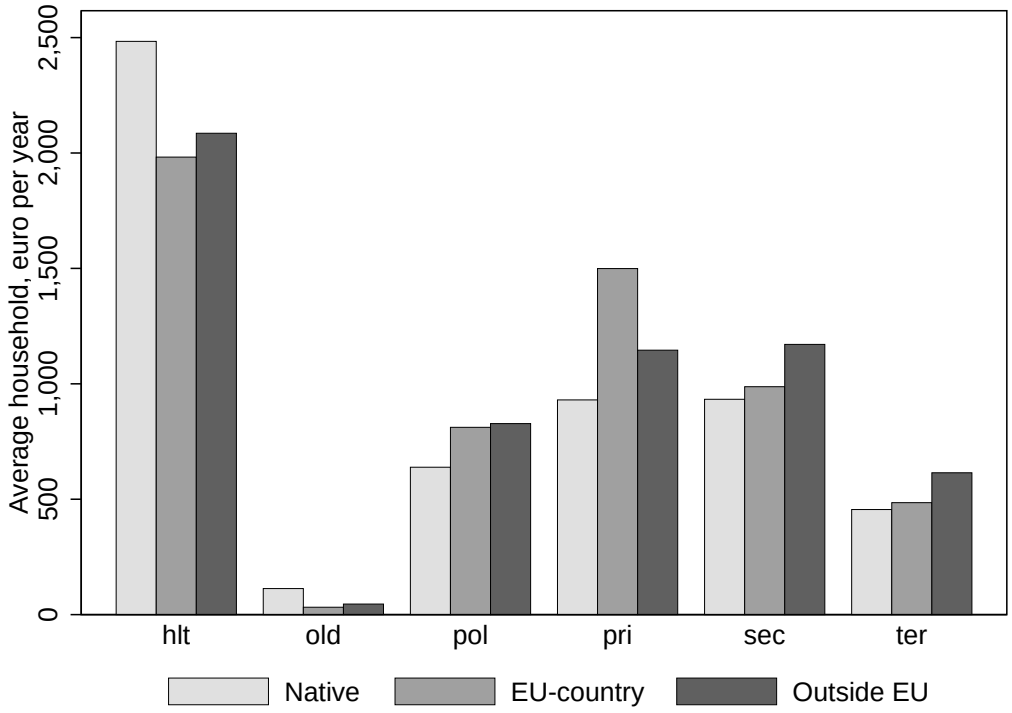


Figure 94: Demographically modelled items per household, PT



8.26 Sweden (SE)

Table 30: Details, SE

Budget post	Per cent of GDP
Revenues	**3.55**
Consumption taxes	0.96
Taxes on income and wealth	1.18
Capital and corporate taxes	0.21
Social security contributions	0.90
Sales of goods and services	0.30
Expenditures	**3.10**
Benefits	0.51
Pensions	0.69
Demographically modelled expenditures	1.11
Congestible public goods	0.79
Fiscal impact	**0.38**
Deflation of budget balance	**0.02**
Budget balance	0.39
Impact on GDP from EU-migration	5.77
Fiscal impact incl. deflation	**0.36**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.15
25 % lower dem. exp.	0.14
25 % higher dem. exp.	−0.14
25 % lower con. taxes	−0.14
Pro-rata allocation of NPG and OTH	−0.35

All values are unweighted annual averages for the period 2004–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 95: Net effect of all EU migrants over time, per cent of GDP, SE

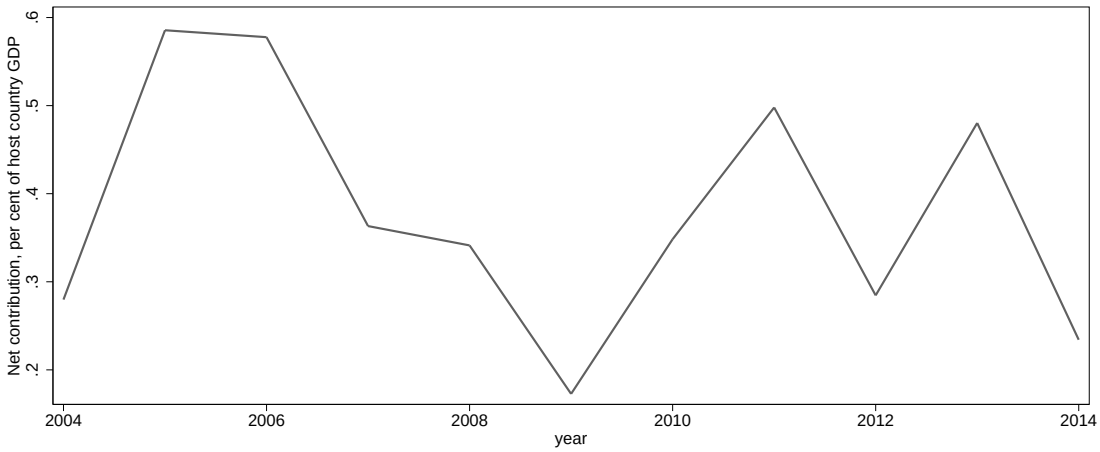


Figure 96: Contributions and costs per household, SE

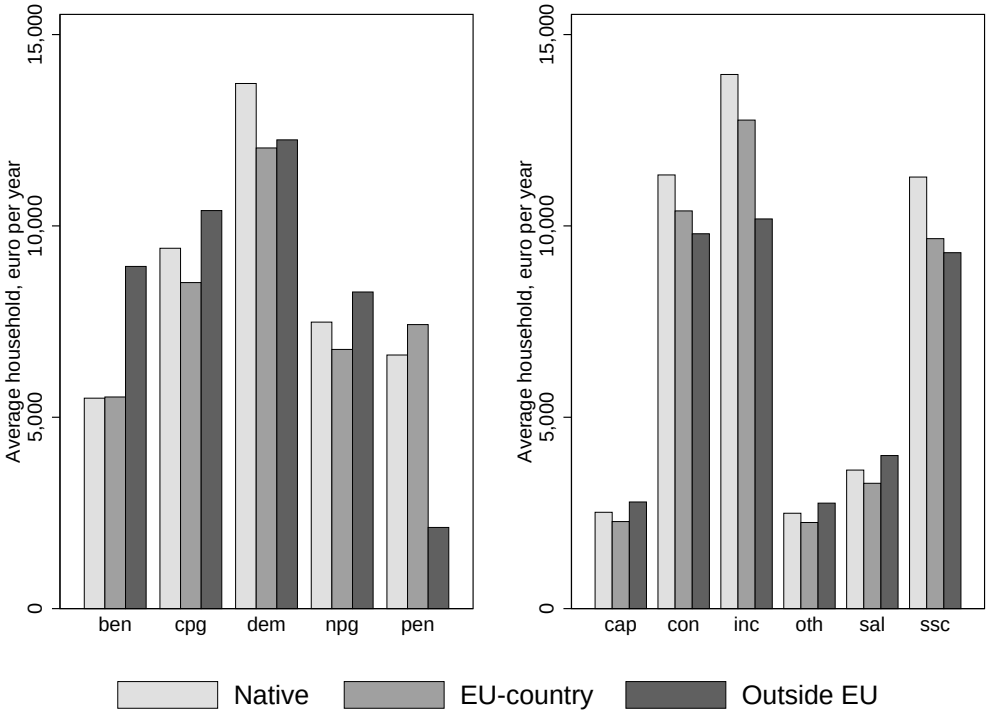
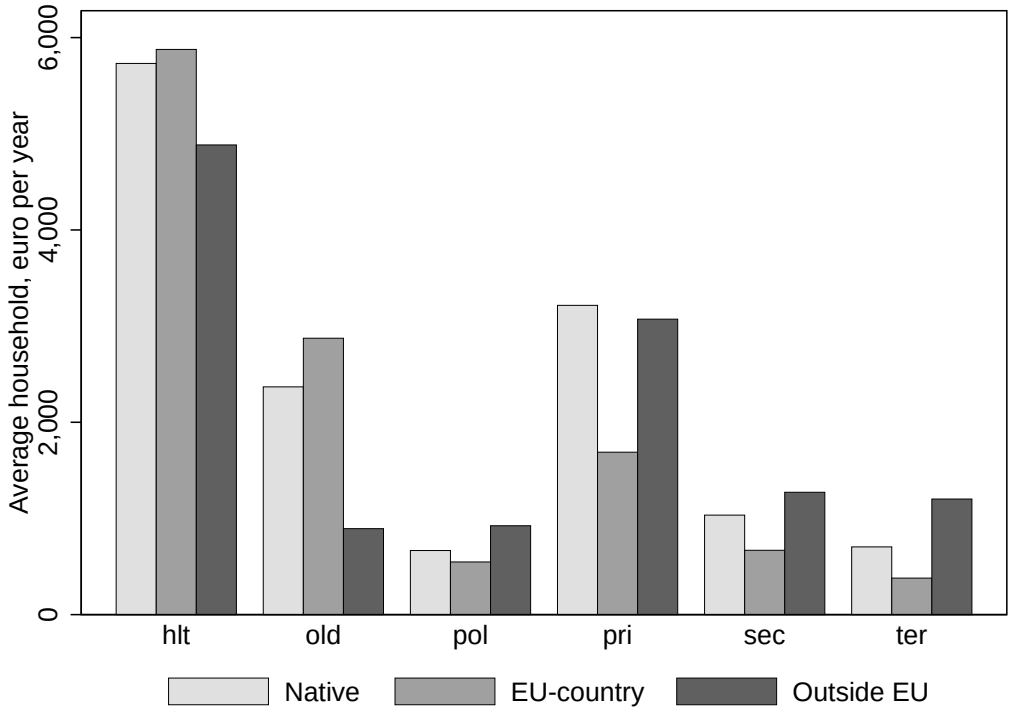


Figure 97: Demographically modelled items per household, SE



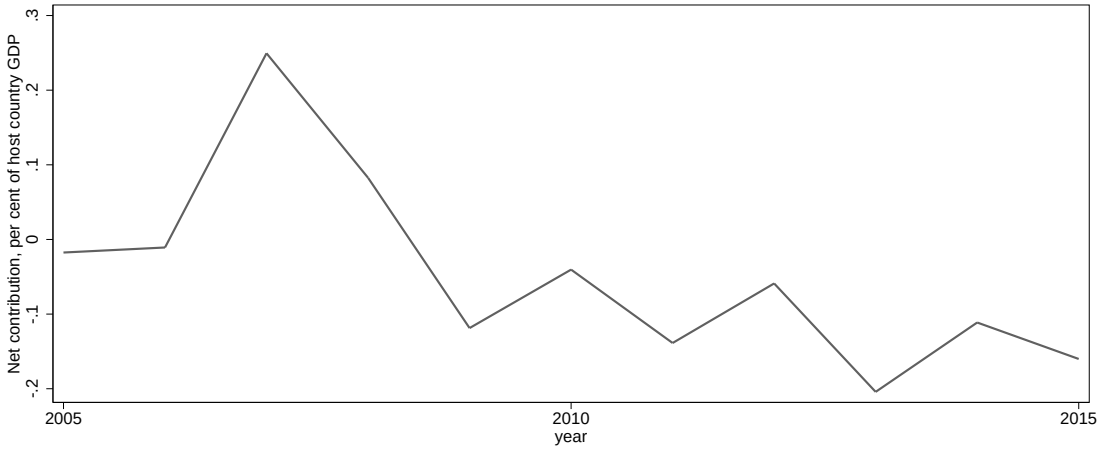
8.27 Slovenia (SI)

Table 31: Details, SI

Budget post	Per cent of GDP
Revenues	**1.71**
Consumption taxes	0.60
Taxes on income and wealth	0.24
Capital and corporate taxes	0.09
Social security contributions	0.62
Sales of goods and services	0.16
Expenditures	**1.77**
Benefits	0.30
Pensions	0.46
Demographically modelled expenditures	0.51
Congestible public goods	0.49
Fiscal impact	**−0.05**
Deflation of budget balance	**−0.16**
Budget balance	−4.71
Impact on GDP from EU-migration	3.37
Fiscal impact incl. deflation	**0.11**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.06
25 % lower dem. exp.	0.04
25 % higher dem. exp.	−0.04
25 % lower con. taxes	−0.06
Pro-rata allocation of NPG and OTH	−0.15

All values are unweighted annual averages for the period 2005–2015, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 98: Net effect of all EU migrants over time, per cent of GDP, SI



Note: EU migrant classification in Slovenia is based on a predicted probability model, and estimates should be interpreted carefully.

Figure 99: Contributions and costs per household, SI

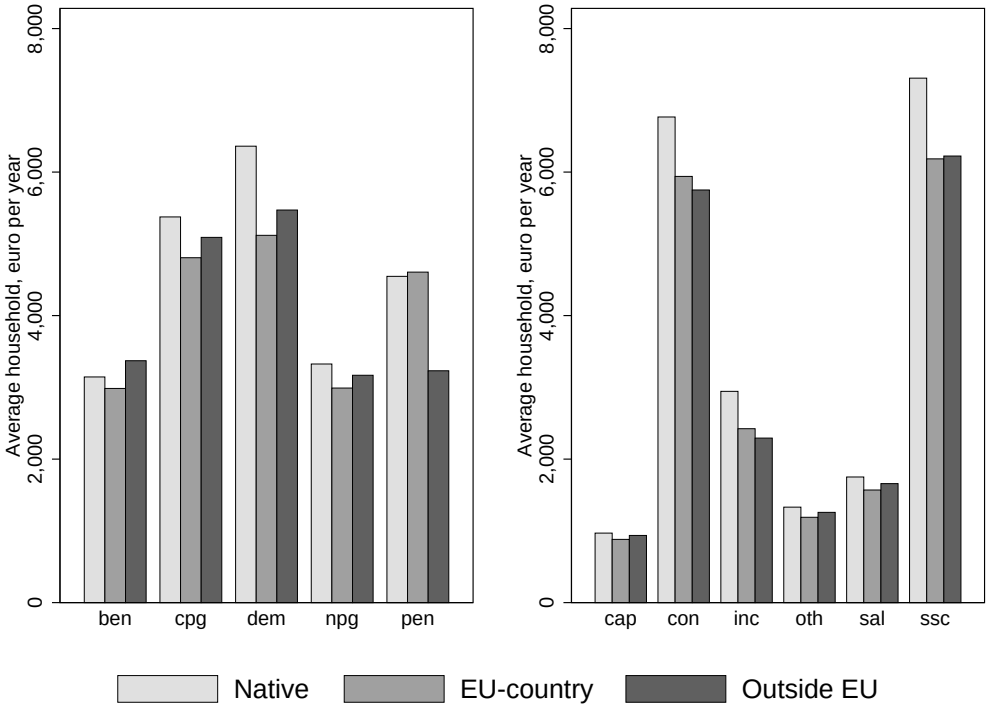
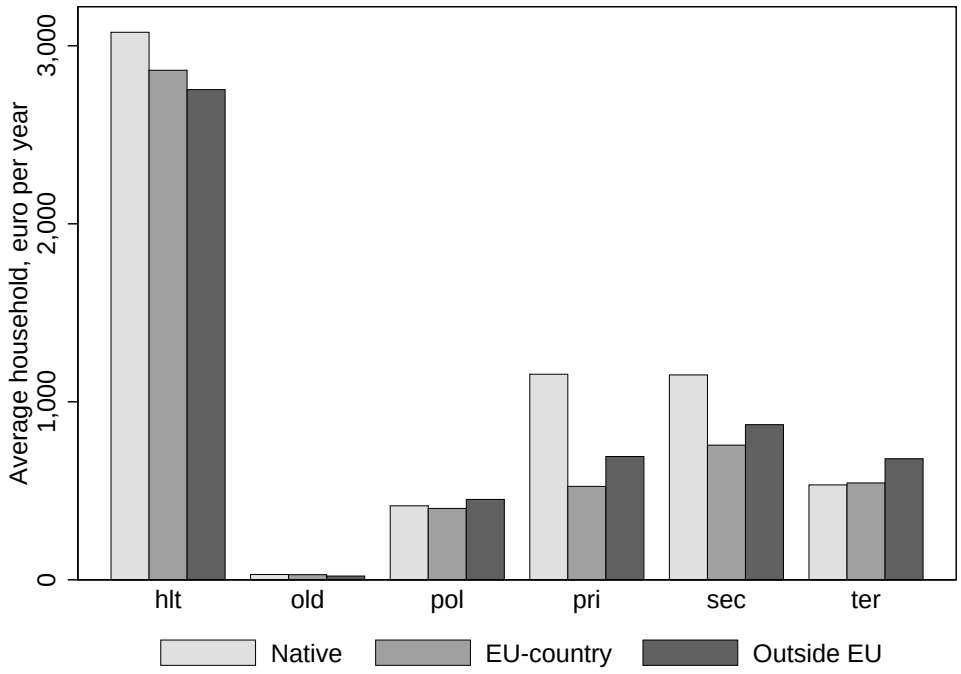


Figure 100: Demographically modelled items per household, SI



Note: EU migrant classification in Slovenia is based on a predicted probability model, and estimates should be interpreted carefully.

8.28 Slovakia (SK)

Table 32: Details, SK

Budget post	Per cent of GDP
Revenues	**0.85**
Consumption taxes	0.29
Taxes on income and wealth	0.08
Capital and corporate taxes	0.08
Social security contributions	0.30
Sales of goods and services	0.10
Expenditures	**1.03**
Benefits	0.17
Pensions	0.29
Demographically modelled expenditures	0.29
Congestible public goods	0.28
Fiscal impact	**−0.09**
Deflation of budget balance	**−0.06**
Budget balance	−3.87
Impact on GDP from EU-migration	1.45
Fiscal impact incl. deflation	**−0.03**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	0.07
25 % lower dem. exp.	0.02
25 % higher dem. exp.	−0.02
25 % lower con. taxes	−0.02
Pro-rata allocation of NPG and OTH	−0.03

All values are unweighted annual averages for the period 2005–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 101: Net effect of all EU migrants over time, per cent of GDP, SK

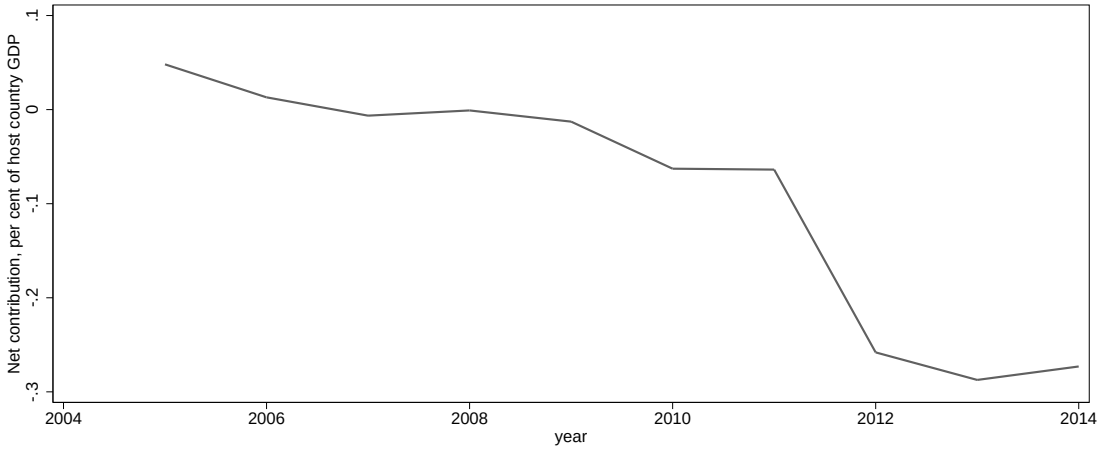


Figure 102: Contributions and costs per household, SK

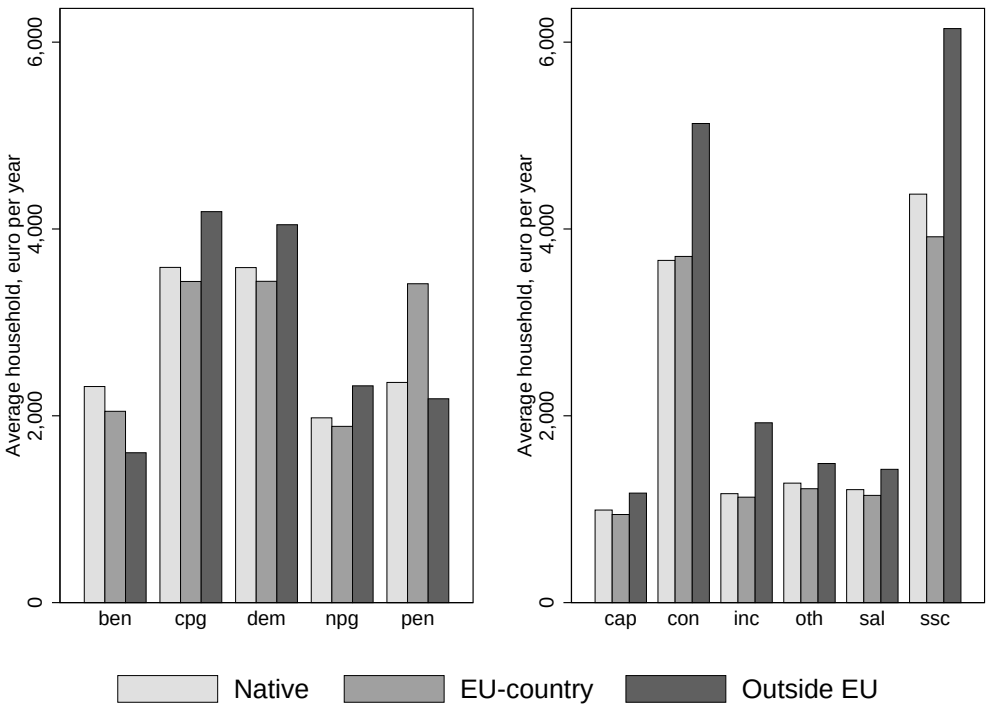
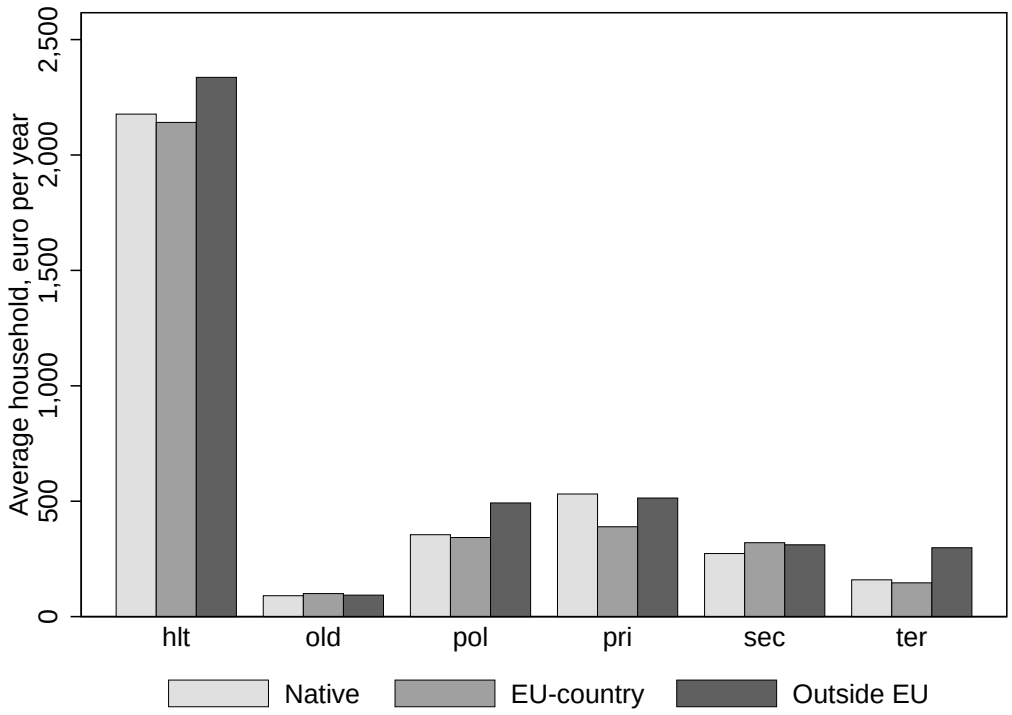


Figure 103: Demographically modelled items per household, SK



8.29 United Kingdom (UK)

Table 33: Details, UK

Budget post	Per cent of GDP
Revenues	**1.38**
Consumption taxes	0.44
Taxes on income and wealth	0.45
Capital and corporate taxes	0.11
Social security contributions	0.29
Sales of goods and services	0.09
Expenditures	**1.07**
Benefits	0.18
Pensions	0.16
Demographically modelled expenditures	0.44
Congestible public goods	0.29
Fiscal impact	**0.31**
Deflation of budget balance	**−0.28**
Budget balance	−6.81
Impact on GDP from EU-migration	4.17
Fiscal impact incl. deflation	**0.59**
Sensitivity analysis (change in fiscal impact)	
Wage-based allocation of pensions	−0.13
25 % lower dem. exp.	0.07
25 % higher dem. exp.	−0.07
25 % lower con. taxes	−0.08
Pro-rata allocation of NPG and OTH	−0.21

All values are unweighted annual averages for the period 2005–2014, except for the budget balance which is a weighted average with year-weights equal to the wageshare of EU-migrants. If the budget balance was unweighted, the deflationary effect would not equal the impact on GDP (operationalized as the EU-migrants share of all wages) times the size of the budget balance.

Figure 104: Net effect of all EU migrants over time, per cent of GDP, UK

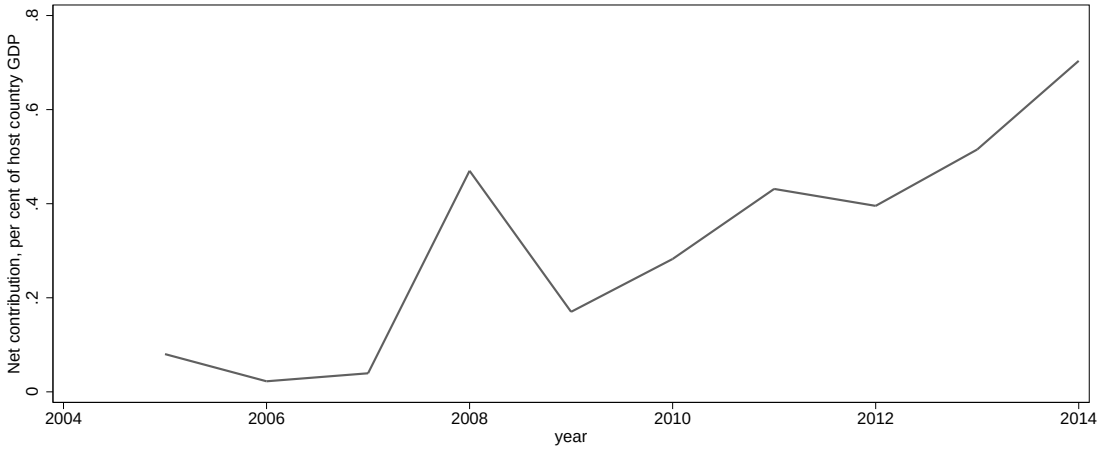


Figure 105: Contributions and costs per household, UK

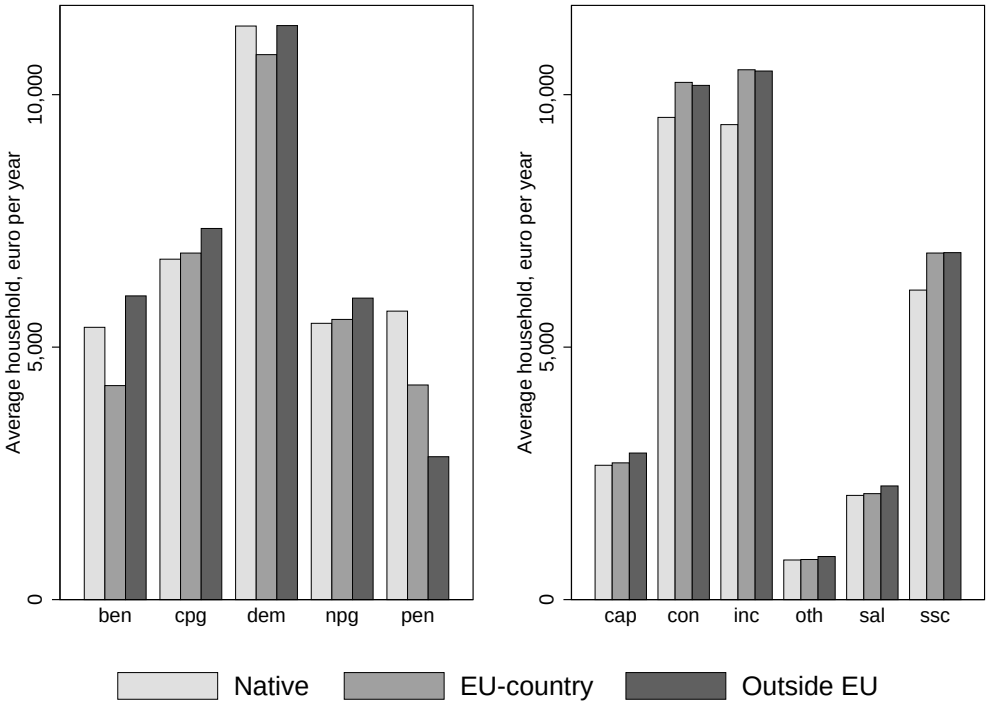
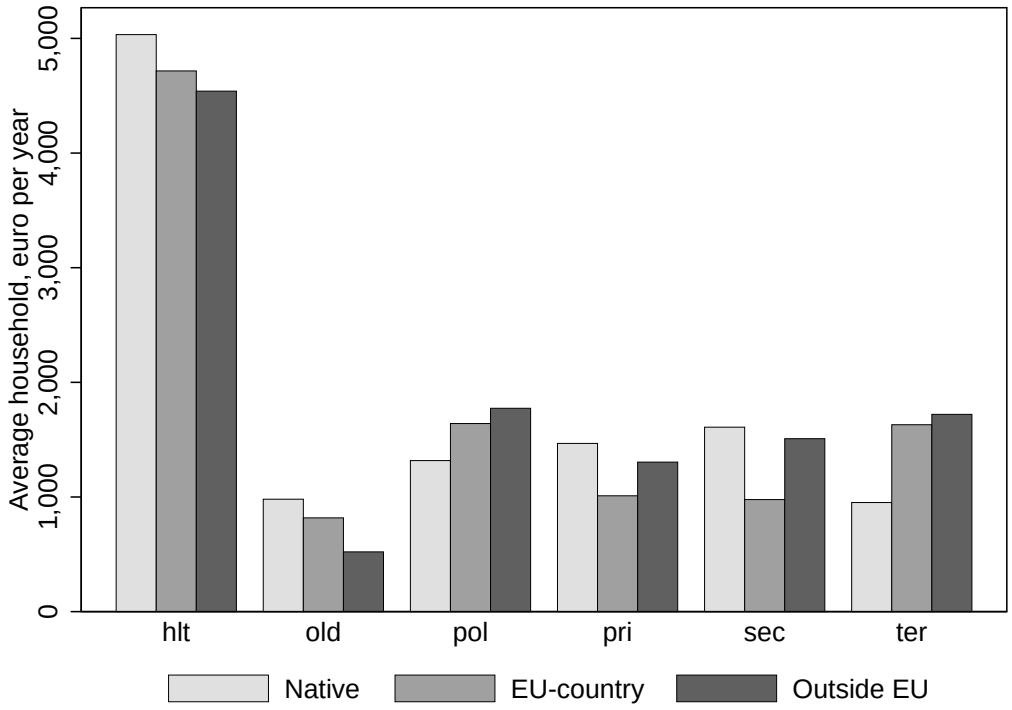


Figure 106: Demographically modelled items per household, UK



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REMINDER

ROLE OF EUROPEAN MOBILITY AND ITS IMPACTS IN NARRATIVES, DEBATES AND EU REFORMS

The REMINDER project is exploring the economic, social, institutional and policy factors that have shaped the impacts of free movement in the EU and public debates about it.

The project is coordinated from COMPAS and includes participation from 14 consortium partners in 9 countries accross Europe.

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