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HOUSEHOLD SIZE IN IRELAND: STYLISED FACTS IN A CROSS-COUNTRY CONTEXT

Conor O'Toole and Rachel Slaymaker[1]*

ABSTRACT

This paper uses cross-country data to explore the trends in household size in Ireland and to place these trends in a European context. Using cross-country data from the EU-SILC survey, the research presents a range of stylised facts regarding how Ireland differs from other countries, and attempts to explore what might explain the variation. We find that Ireland has a high average household size on a cross-country basis. However, this appears to be strongly influenced by demographics, with high fertility rate, younger population and thus high share of households with children being important factors in explaining the cross-country trends. Indeed, a majority of the differences between Ireland and other countries disappear in a regression setting when socio-demographic and basic economic factors are controlled for. In terms of the change over time in household size, we find little association with time-varying economic factors but, again, a strong effect of ageing and the proportion of households with children. We do find a negative relationship with housing supply; any change in household size would be, to a degree, affected by availability of housing. In terms of the long run trend in Irish household size, the level is likely to change in line with population ageing i.e. demographic factors are likely to be the most important driver going forward, subject to availability. Projections for future household numbers or housing demand would likely benefit from the deployment of age-specific household size trends which allow natural population dynamics to influence household size.

1. INTRODUCTION

The issue of new household formation is a key element in the development of housing and planning policy. Ensuring that sufficient housing is available to suit a growing population requires an understanding of the main elements that drive household formation and broader population dynamics. To appropriately assess housing demand based on population developments and other factors requires a detailed methodology which combines assumptions around a range of factors

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including population dynamics (ageing, natural increase, migration), housing market developments (obsolescence) and also a key input assumption around household size or headship. The headship rate measures the share of the population that is the head of a household. The inverse of the headship rate is the number of people in the household. Household size is therefore critical to these analyses as it turns population estimates into households and thus can provide a key lens into housing requirements.

As a key parameter in the broader methodology for determining structural housing demand from population estimates, determining the forward path for household size has been relatively unexplored as a standalone topic in the Irish literature, but also under-explored in an international context. Previous research (Bergin and Garcia-Rodriguez, 2020; Byrne et al., 2014) has considered the structural housing demand requirements for Ireland in a regional context and made assumptions around household size as an input into this. Their assumptions provided a range of estimates based on historical data but also some suggested convergence scenarios such as Irish household size moving to the UK level over time. Furthermore, Lyons (2021) provides an overview discussion of trends in household size in Ireland in a cross-country context and indicates a notable role for housing supply constraints as well as demographics.

However, few research papers have explored in detail the trends in household size specifically and what might be driving these trends in a cross-country setting. Indeed, it is also likely that headship itself is affected by a range of factors including demographics, norms and preferences, social structures and economic factors such as income growth and employment, credit markets and other housing-related issues.

In this research, we aim to address this gap in the literature. To do this, we undertake a cross-country assessment using the EU-SILC microdata to present some stylised facts around household size and then explore the correlation of household size to potential determinants such as demographics as well as economic (incomes, house prices, housing supply) and social factors (such as education and marital/co-habitation status). This exploration will aim to provide important context as to what factors are likely to impact the future trends in household size in Ireland. Our estimates and findings are best interpreted as stylised facts rather than a causal analysis. Causal analysis of household formation over time would require an individual-level panel dataset which is unavailable. It would also need to be undertaken across a longer timeframe than what is available within the EU-SILC dataset.

A number of findings emerge. We find that Ireland has a high average household size on a cross-country basis. However, this appears to be strongly influenced by demographics, with high fertility rates, a younger population and thus high share of households with children important factors in explaining the cross-country trends. Indeed, a majority of the differences between Ireland and other countries disappear in a regression setting when socio-demographic (household head age, share of families with children, educational attainment, marital status) and basic economic factors (income and employment status) are controlled for.

In terms of the change over time in household size, we find little association with time-varying economic factors but, again, a strong effect of ageing and the proportion of households with children. We do find a negative relationship with housing supply; any change in household size would be, to a degree, affected by availability of housing. In terms of the long-run trend in Irish household size, the level is likely to change in line with population ageing i.e. demographic factors are likely to be the most important driver going forward, subject to availability of housing.

There are a number of implications from our research for policy. First, any projections for future household numbers or housing demand would likely benefit from the deployment of age-specific household size trends which allow natural population dynamics to influence household size. We do not find any major moderation or convergence in the household size level in Ireland to the level of other countries in our sample period and this is affected by the demographic structure. Indeed, in our research we find little difference between Ireland and other countries in terms of household size for older age cohorts, with the younger age cohorts being the driving factors behind Irish household size levels. Given Ireland's continued high fertility rate, it is unlikely that major drops in household size will occur unless these demographic features abate. We do find a role for housing supply to act as a counterweight to any moderation in household size. However, the relative magnitudes of the effects suggests that supply would have to increase notably to offset the demographic effects and put major downward pressure on household size. Thus any scenarios should incorporate, at least implicitly, feasible ranges for housing supply. More generally, estimates of future housing supply requirements should be grounded in, among other factors, well-evidenced considerations of household size that take into consideration realistic assessments of population dynamics over time.

The rest of this paper is structured as follows. Section 2 presents the dataset and outlines some stylised facts on Irish household size trends in a cross-country

context. Section 3 presents cross-country regression analysis to explore the correlation between household size and country-time and household specific factors. Section 4 draws out some potential scenarios for policy given the research and Section 5 concludes.

2. DATA AND STYLISED FACTS

2.1 Data description

The main dataset used in this research is Eurostat's cross-country Survey on Income and Living Conditions (EU-SILC). The survey is undertaken in European Union Member States and selected other countries, and aims to provide nationally representative household-level information on tenure, household structure, housing costs, incomes and other socio-economic characteristics. The main aim of the EU-SILC survey more generally is to collate information for the measurement of poverty and living conditions on a pan-European basis. However the richness of the dataset in terms of the scope of the data across variables and the geographic coverage make it a useful source for housing research. For example, a number of studies such as Corrigan et al. (2019), Disch and Slaymaker (2023) and Doolan et al. (2022) have used the data for work on housing affordability. The data have also been used to explore other cross-country research topics such as mortgage arrears (Gerlach-Kristen and Lyons, 2018).

In terms of the coverage and scope of the dataset, it contains both household-level files and personal files with detailed information across a range of areas such as age, education, nationality, employment, occupation, hours worked and labour market contract type. There are also critical information linkages across the relationships within households such as partners and parent/child relationships. The data also contain a range of indicators on household tenure (such as rental status), housing affordability issues such as mortgage and rental payments, as well as information on household incomes and other economic indicators.

While Census data provide the most authoritative picture on household size as they capture all households, they are only collected every five years in Ireland. Estimates from the nationally representative EU-SILC surveys may differ slightly,[2] but have the advantage of being collected annually, comparable across countries and combined with a rich set of socio-demographic characteristics for each household,

[2] For comparison, Irish Census vs Irish EU-SILC figures for average household size: 2.81 vs 2.85 in 2006; 2.73 vs 2.7 in 2011, 2.75 vs 2.7 in 2016 and 2.74 in 2022 Census vs 2.6 in 2021 EU-SILC. From 2018-2021 the EU-SILC figures declined slightly, falling to 2.6 in 2021, a fall not observed in the Census data for 2022 where the average household size remained at 2.74.

thus permitting the econometric assessment of which factors are associated with differences in household size. We return to the longer-term trends in Irish household size from historical Census data in Section 4.

For the purposes of this research, we use a sample of the EU-SILC for a subset of 16 western European economies, covering the period 2005-2021. The breakdown of the overall sample in terms of the country coverage is presented in Figure A.1 in the Appendix. In total, over 2.2 million observations are contained in the sample over the full period. For the purposes of this research, we exclude central and eastern European countries for both data availability reasons and due to their lack of comparability in terms of housing systems relative to the Irish case. See Disch and Slaymaker (2023) for further discussion. In the remainder of Section 2, we present a series of descriptive statistics and stylised facts on Irish household size and other socio-demographic trends in a cross-country context.

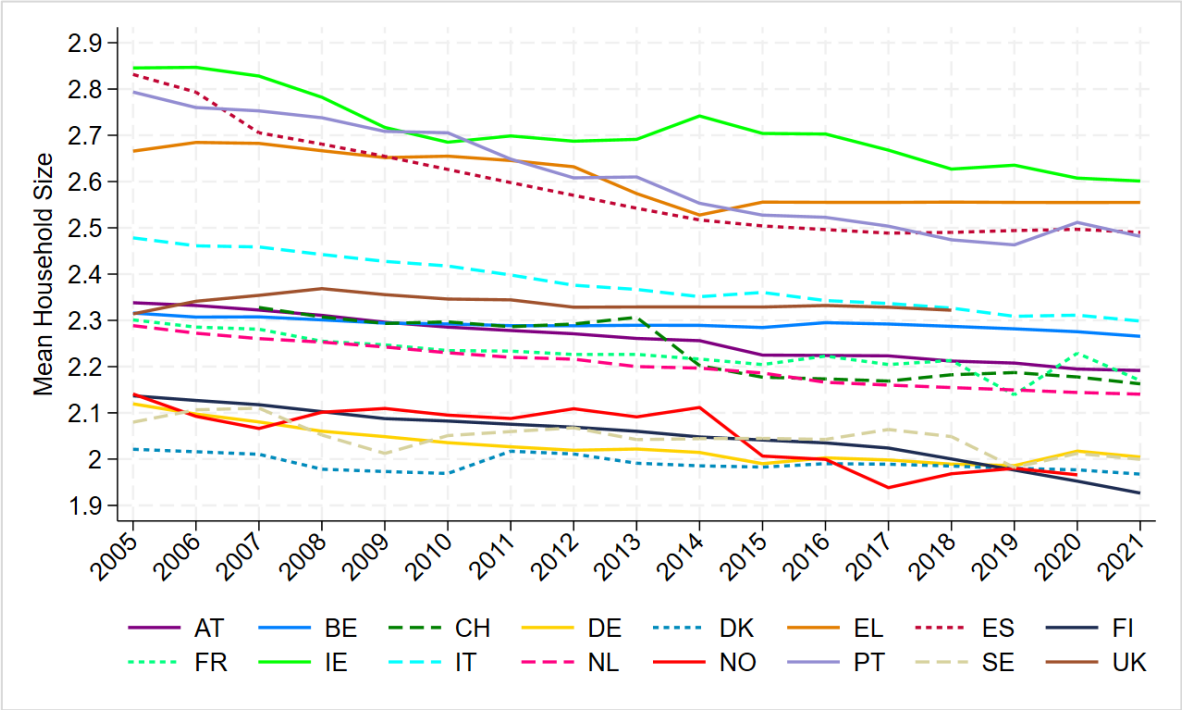
2.2 Trends in household size and composition across countries

Figure 1 presents the trend in household size (average number of persons per household) for the countries in our sample for the period 2005-2021.[3] Ireland is a very clear outlier for much of the period with consistently high household size levels; since 2011 onwards Ireland has had the highest level of average household size of all the countries presented. Another notable feature of the data is a general downward trend across all households over time, albeit with somewhat of a decline in the pace of reduction. A further feature is the apparent grouping of the data with three distinct country groups: Ireland is highest with Spain, Portugal and Greece; a second group of countries in the middle range of the household size distribution including Italy, France, the UK, Austria, Belgium, Netherlands, and Switzerland. The group of countries with the lowest household sizes are the Nordic countries of Denmark, Sweden, Finland, Norway and also Germany. The trend over time in these groups also highlights that the differences across countries in the level, what could be considered the country fixed effect or time-invariant country factors, appears extremely large and persistent. This has implications for what is driving these

[3] It must be kept in mind here that the Central Statistics Office (CSO) notes a break in the Irish SILC data series from 2020 onwards due to several methodological changes. Of relevance to Figure 1 is the change in how households are defined, moving from an address-based definition to one based on shared income and expenditure. On the one hand, the move from address-based to shared income and expenditure means that those living together but not sharing expenditure i.e. unrelated flatmates will now be treated as separate households which would increase the overall number of households and therefore reduce average household size. On the other hand, students living away from the family home but who are substantially supported by their families are now considered part of the family home household, thus likely increasing average household size. The ex-ante overall likely impact of this change in definition is therefore unclear. In practice there is a small downward change in the average Irish household size from 2.64 in 2019 to 2.61 in 2020.

differences, as slow-moving factors such as cultural or institutional influences may be extremely influential, as are factors relating to population dynamics and fertility.

FIGURE 1 HOUSEHOLD SIZE (AVERAGE NUMBER OF PERSONS PER HOUSEHOLD): 2005–2021

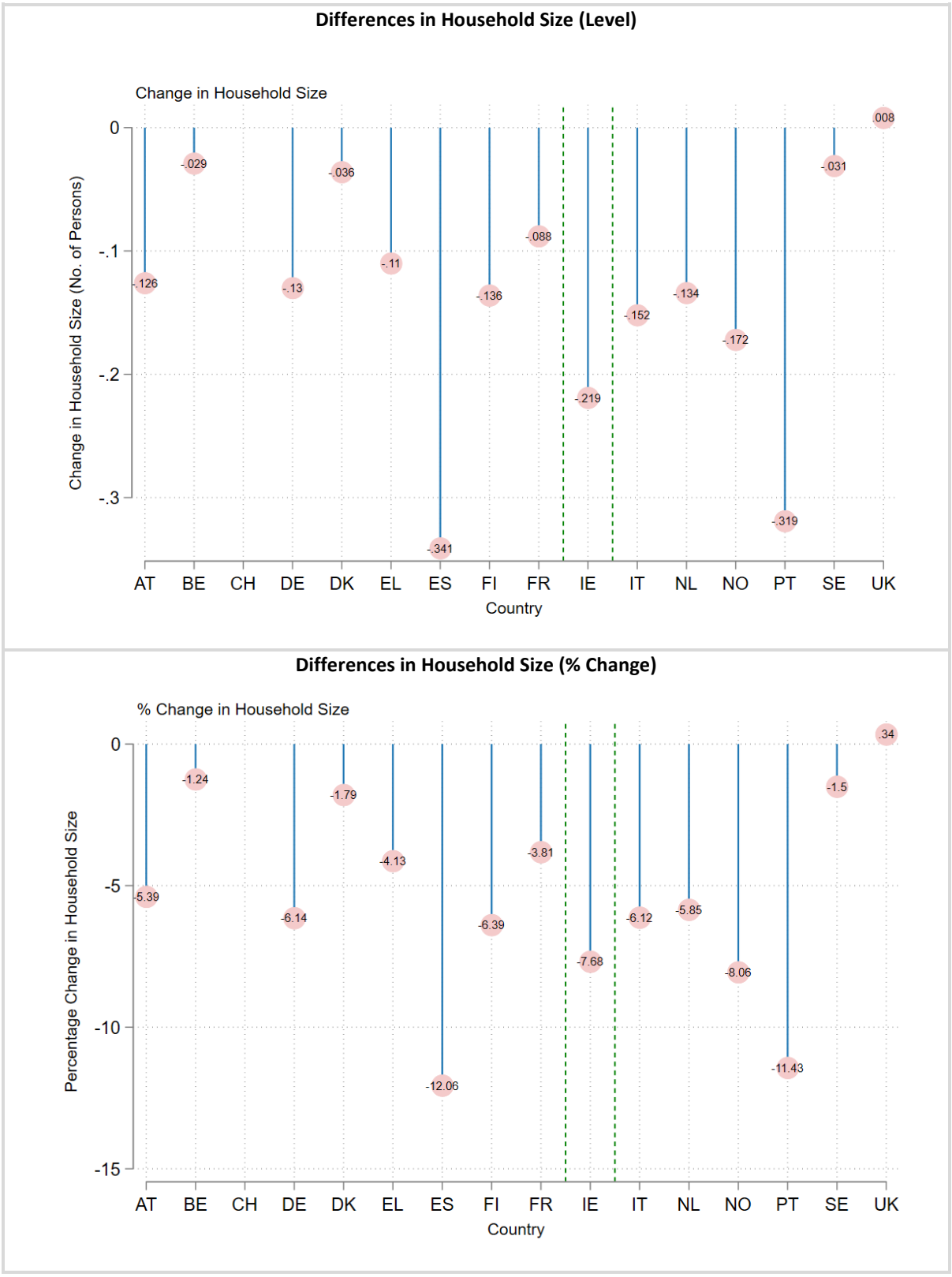


Source: Authors' analysis of Eurostat EU-SILC data.

To gain some insight into the changes over time, Figure 2 presents the level and percentage differences across countries between the time periods 2005 to 2018. The second date is selected to pre-date the COVID-19 pandemic which may have had impacts on both the household size directly but also on the sampling activities of the survey collection during the pandemic.[4] A number of findings emerge from these data. It is noticeable that, with the exception of the UK which has remained virtually constant, all other countries have experienced some decline in household size over the period thus indicating a general co-moving downward trend. Second, some of the largest declines in percentage terms are in the countries with the highest levels of household size. For example, the greatest percentage reductions were in Spain and Portugal. However, the percentage change was similar in places like Norway and Finland relative to Ireland, and given the very large level differences between these areas, this does not suggest that a major convergence occurred for Ireland in this time period.

[4] We limit to 2018 rather than 2019 to include the UK for which data are only available until 2018.

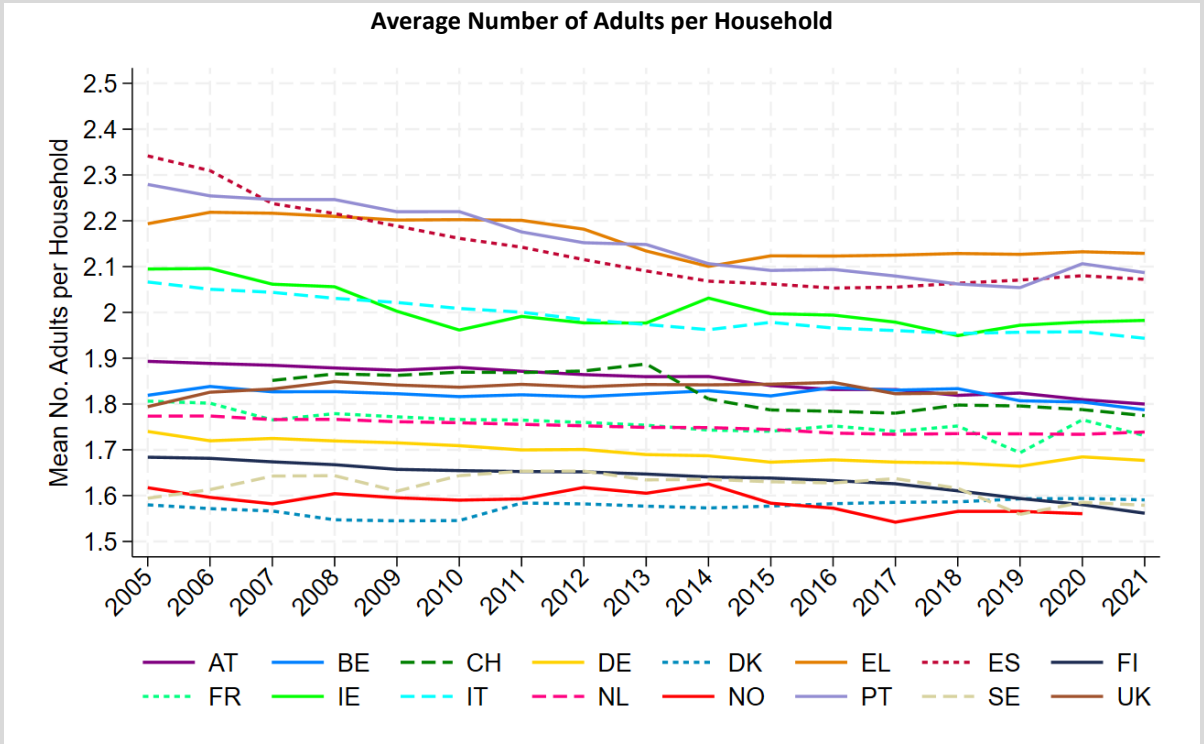
FIGURE 2 CHANGE IN HOUSEHOLD SIZE: LEVEL AND % DIFFERENCES: 2005–2018



Source: Authors' analysis of Eurostat EU-SILC data.

Given the range of different factors that are likely to be driving differences across household size, we attempt to explore further differences that might explain some of the above trends. For example, two more straightforward explanations are differences in fertility or variation in the level of multi-generational living. To unpick the data in more detail, Figure 3 presents the average number of adults and children per household over time. Focusing in on the number of adults, it is clear that Ireland is no longer the highest and an outlier. Rather, it is grouped more centrally relative to the basket of countries presented. There also appears to be a huge degree of stability over time with very few countries experiencing notable changes in the average number of adults per household. Some evidence of a change in the ordering is notable, with Germany moving away from the Nordic countries towards the middle group.

FIGURE 3 AVERAGE NUMBER OF CHILDREN AND ADULTS PER HOUSEHOLD: 2005–2021



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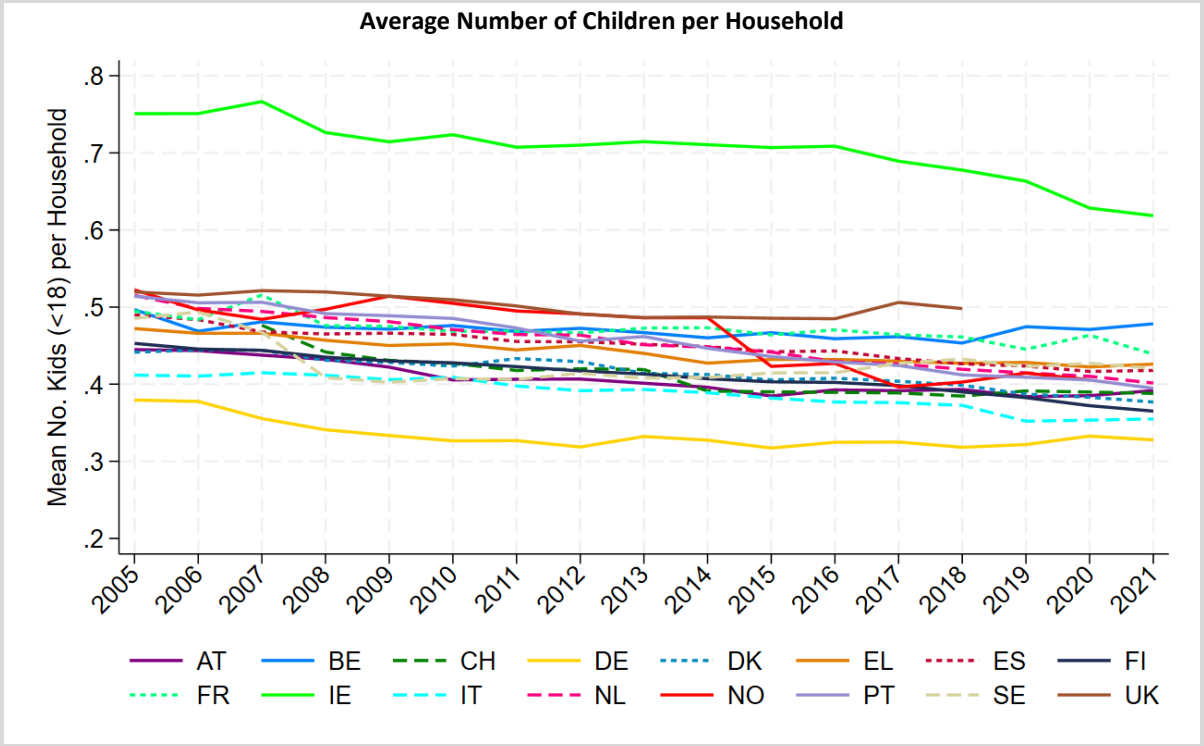
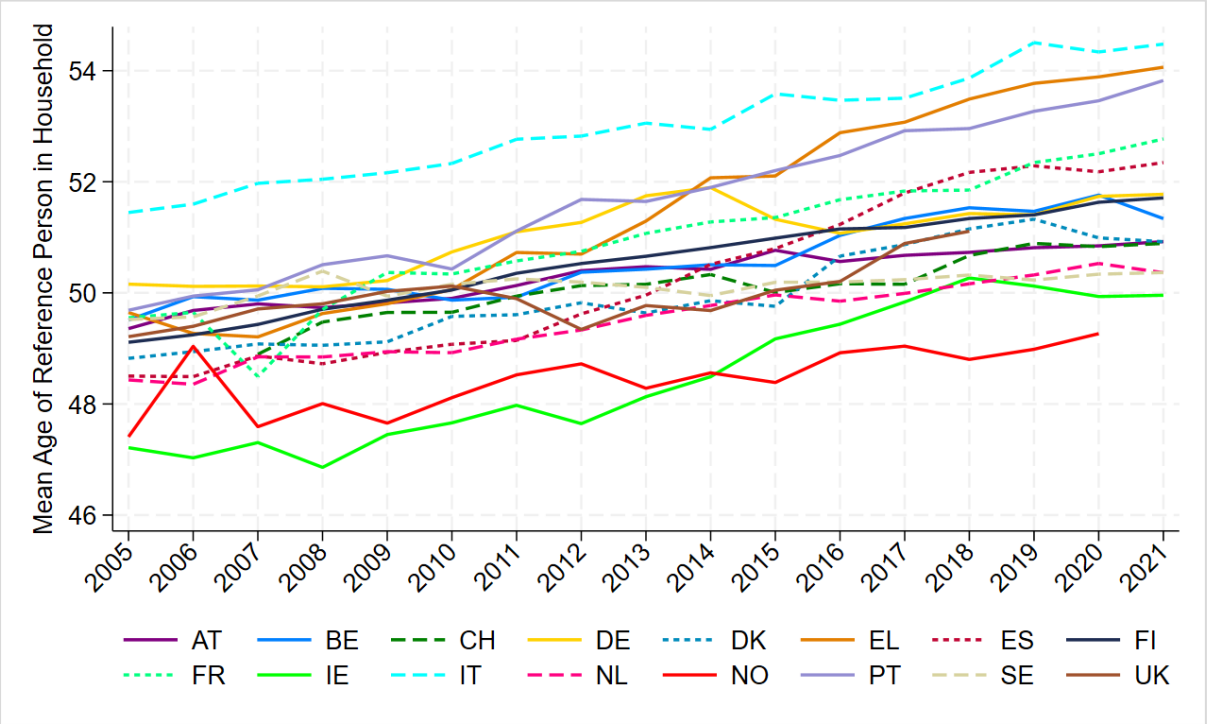


Source: Authors' analysis of Eurostat EU-SILC data.

Focusing in on the number of children per household, this clearly shows Ireland as a considerable outlier as it has the highest average number of children throughout the sample period. Thus Ireland's high ranking in terms of household size is more driven by higher levels of fertility than any major concentration of adults living together. This has some potential implications for Ireland's future household size trajectory as ageing impacts will likely lead to lower household sizes over time relative to other countries. These differences can clearly be seen in Figure 4 which shows the average age of the head of household. All countries are affected by ageing, but with clear variation in levels. For example, Italy has the oldest adults, and the age profile of household heads has been rising steadily over time. Ireland has the second lowest age of adults per household with only Norway lower. It is important to keep in mind that this age profile refers to the head of household and not the population as a whole, so will likely also be impacted by differences in who is actually able to enter different housing tenures and live independently.

FIGURE 4 AVERAGE AGE OF HEAD OF HOUSEHOLD: 2005–2021

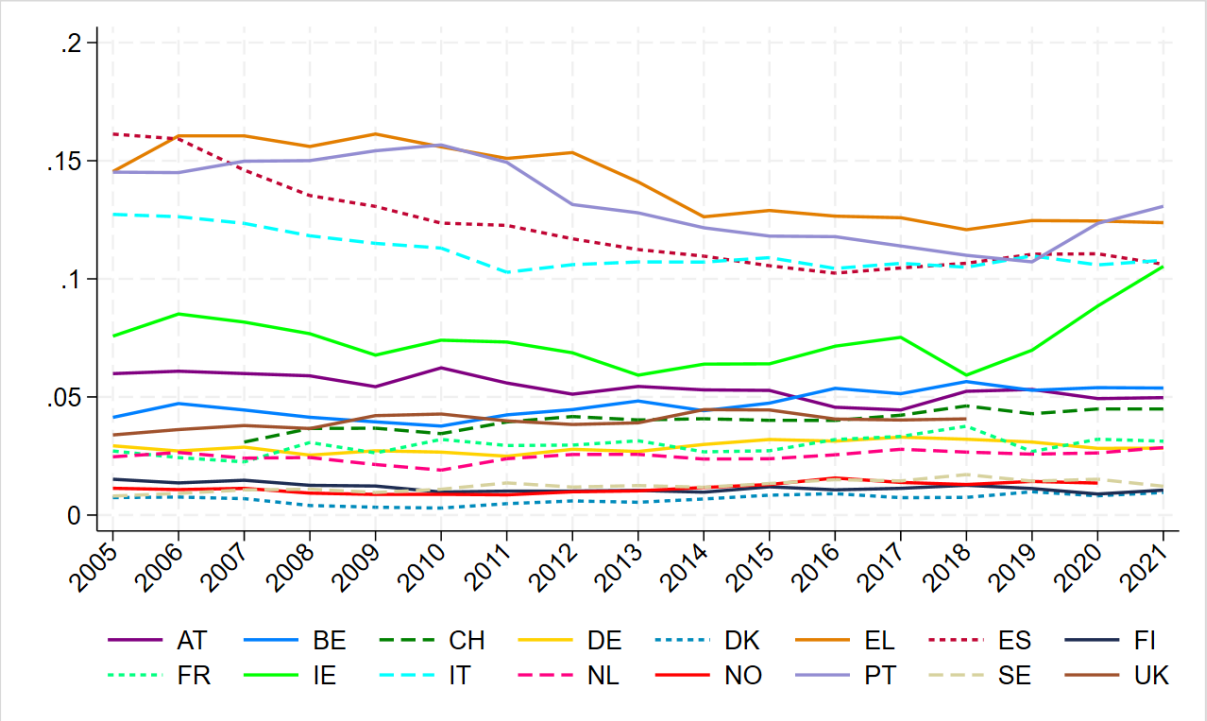


Source: Authors' analysis of Eurostat EU-SILC data.

The question of whether young adults are able to form independent households also has implications for household size. Figure 5 explores the cross-country trends in the share of households that contain a son or daughter aged 25-34 and still living in the family home, which may be a potential family formation constraint indicator. Note this is considered from a household perspective i.e. how many households contain an adult child aged 25-34 rather than how many of this age group continue to live in the family home. Some households may therefore contain more than one adult child. Between 2005-2018 there was a clear distinction, with households in Greece, Portugal, Spain and Italy much more likely to contain adult children than elsewhere (ranging from 10-15 per cent). At the other end of the spectrum, a consistently low 1 – 1.5 per cent of households contain adult children aged 25-34 in the Nordic countries. Ireland sat at the top of the remaining countries, seeing rates of 6-8 per cent. However, the 2020 and 2021 figures have rapidly increased for Ireland, bringing it up to 10.5 per cent and in line with Italy and Spain. Some caution is however warranted with these Irish figures for the last few years in this sample. Discrepancies have been noted between the 2022 Census figures on young adults remaining in the family home and the corresponding Eurostat figures which come from the EU-SILC datasets, with the Census figures notably lower. It is important here to reiterate the break in the Irish SILC data series from 2020 onwards and the change in how a household is defined, moving from an address-based concept to one based on shared income and expenditure. Of particular

relevance for Figure 5 is that students living away from the family home but who are substantially supported by their families are now counted as a member of the family household. It is therefore possible that the increase in adult children living at home observed in Figure 5 may at least partly result from this change in the household definition.

FIGURE 5 PROPORTION OF HOUSEHOLDS WITH ADULT CHILD: 2005–2021



Source: Authors' analysis of Eurostat EU-SILC data.

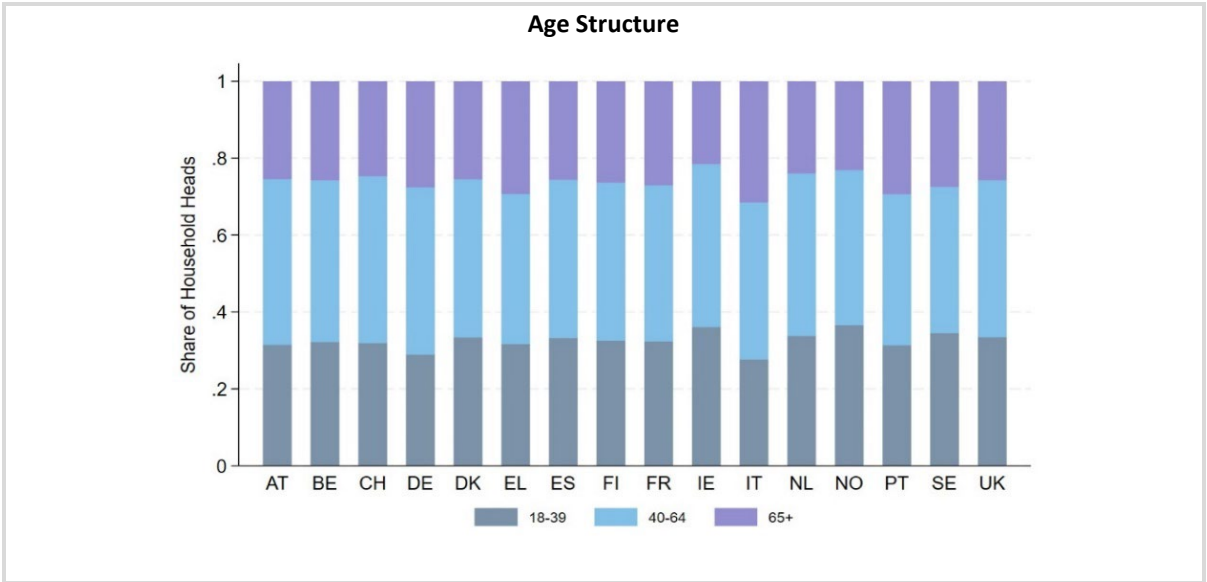
2.3 Exploring cross-country differences

In the previous section we established that trends in household size vary considerably across countries, with Ireland having the largest households among the western European countries studied. There are a range of different factors that are likely to be contributing to cross-country differences in household size. In this section we examine descriptively how households in different countries vary across a number of socio-economic characteristics and how these factors may correlate with the observed differences in household size.

Figure 6 presents four key characteristics of the heads of households in each country: age, marital status, employment status and educational attainment. Consistent with Figure 4, Ireland and Norway see the highest share of household heads aged under 40, while Italy, Greece and Portugal see the highest numbers of

households headed by over 65s. Sweden interestingly has a relatively high share of both over 65s and under 40s, with fewer middle-aged household heads. There are notable differences in marital status patterns across countries. The share of household heads who have never been married ranges from little over 20 per cent in Greece to more than 40 per cent in Sweden and Norway. A higher share of individuals are married in the southern European countries, namely Greece, Portugal, Spain and Italy, along with Ireland. Divorce rates are also notably lower in Greece, Spain Italy and Ireland (below 10 per cent) and higher in the Nordic countries (around 20 per cent), as well as in Germany, Austria, Switzerland, Belgium and the UK. Looking at labour market status, the share of heads of households in employment ranges from just over 40 per cent in Greece to around 60 per cent in Switzerland. Ireland, along with the Netherlands, has a lower share of households headed by retired individuals, but almost 30 per cent are headed by those otherwise inactive in the labour market. Regarding educational attainment, Ireland sees the highest share of household heads educated to third-level standard, but also 20 per cent with only primary level or no education. Elsewhere, Portugal in particular sees nearly 50 per cent of household heads educated only to a maximum of primary level, followed by around 30 per cent in Greece. It seems likely that in part this may be related to the higher numbers of households headed by older individuals in those countries. It is important to reiterate that Figure 6 refers only to heads of household and not trends across the population as a whole.

FIGURE 6 CROSS-COUNTRY PATTERNS IN SOCIO-ECONOMIC CHARACTERISTICS: 2020



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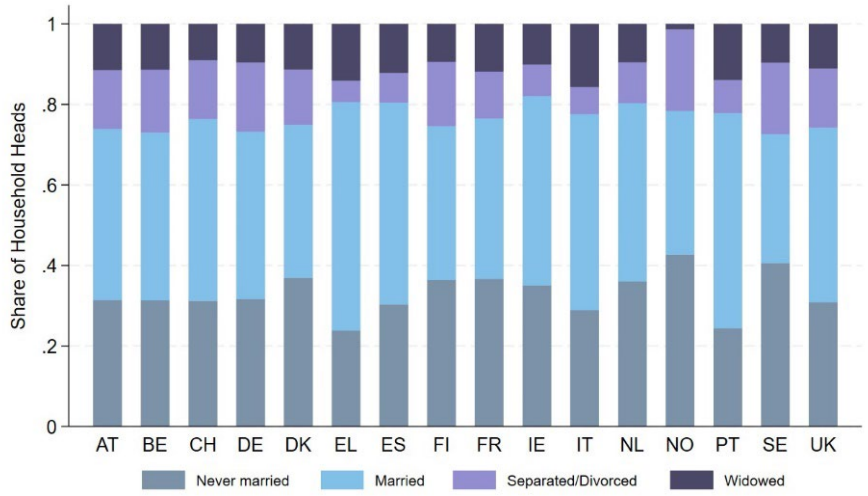
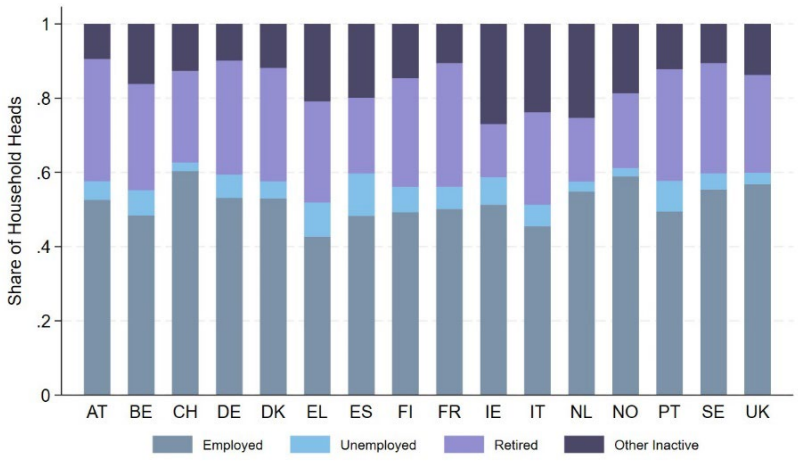
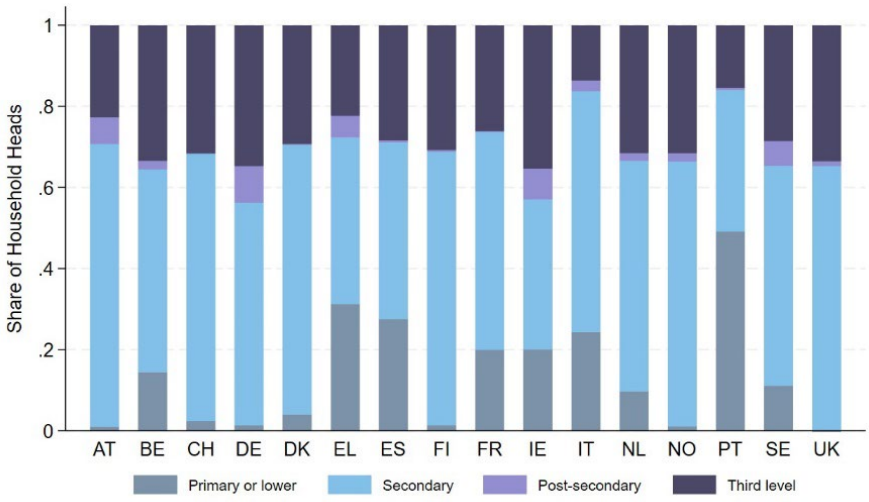
Marital Status



Employment Status



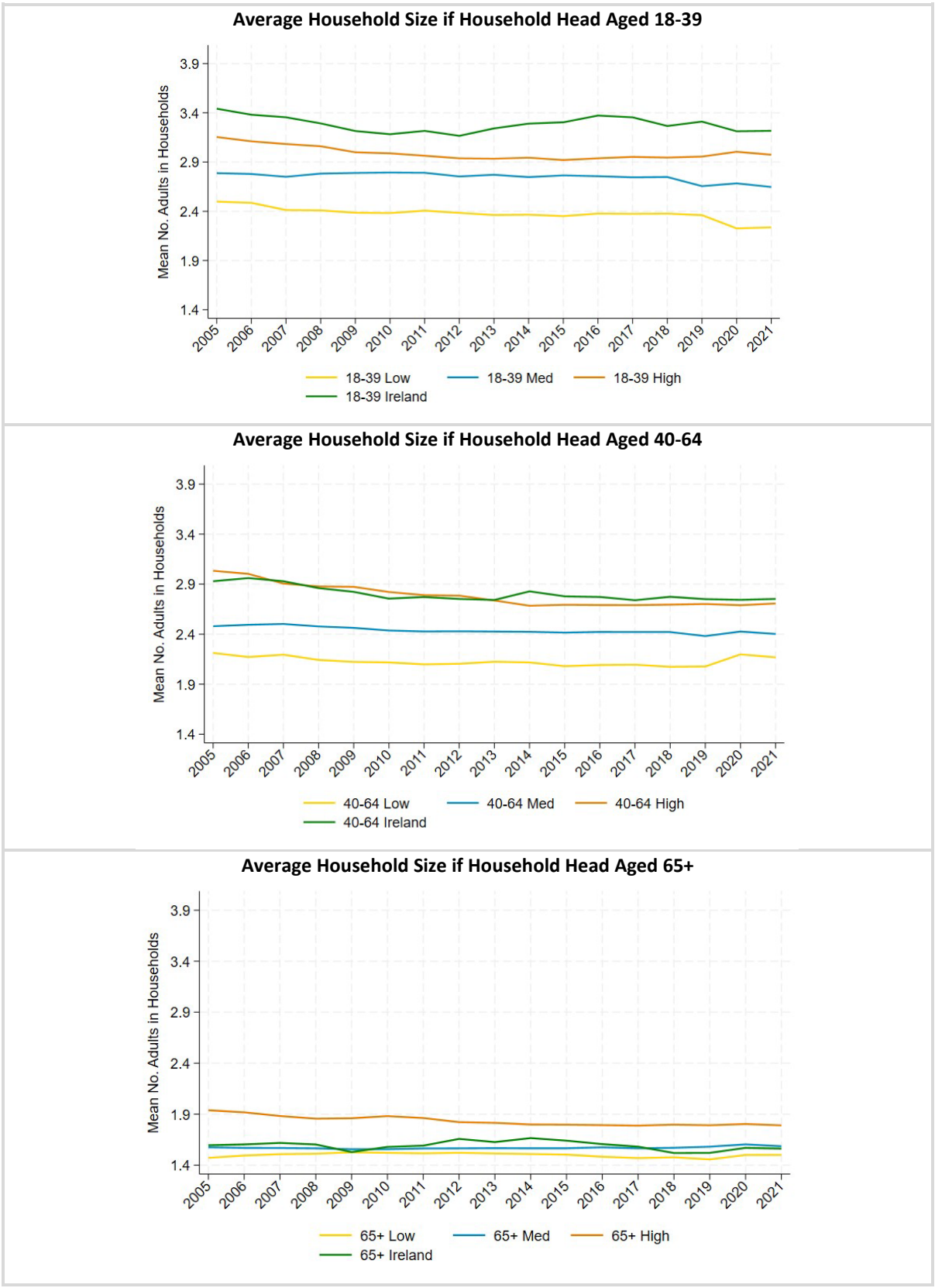
Educational Attainment



Source: Authors' analysis of Eurostat EU-SILC data.

Having observed differences in the age structure across countries, Figure 7 presents the average household size separately for each of the age groups. We compare Ireland with three country groupings based on Figure 1: high (Portugal, Greece and Spain); medium (Italy, UK, Belgium, Austria, France, Switzerland and Netherlands); low (Germany, Sweden, Denmark, Finland and Norway). Households are larger on average for younger age groups compared to older ones and there is little change in the patterns over the period 2005-2021. For those aged 65 and over, Ireland's household size falls in the middle of the countries studied, below the likes of Portugal, Greece and Spain, countries which are typically associated with higher levels of multi-generational living, and only marginally above the rate in the Nordic countries. For households headed by someone aged 40-64, Ireland's household size is broadly in line with the high group, with a slightly higher rate from 2014 onwards. Younger (18-39) Irish households are clearly substantially larger than elsewhere, containing on average one extra person relative to the low group of Nordic countries and Germany. These findings are consistent with those of Disch and Slaymaker (2023) who highlight the comparatively low share of young single adults living alone. Among households under 40, just 11 per cent are composed of single adults with no children in Ireland, compared to 40 per cent in other western European countries.

FIGURE 7 AVERAGE HOUSEHOLD SIZE BY AGE AND COUNTRY GROUP: 2005–2019

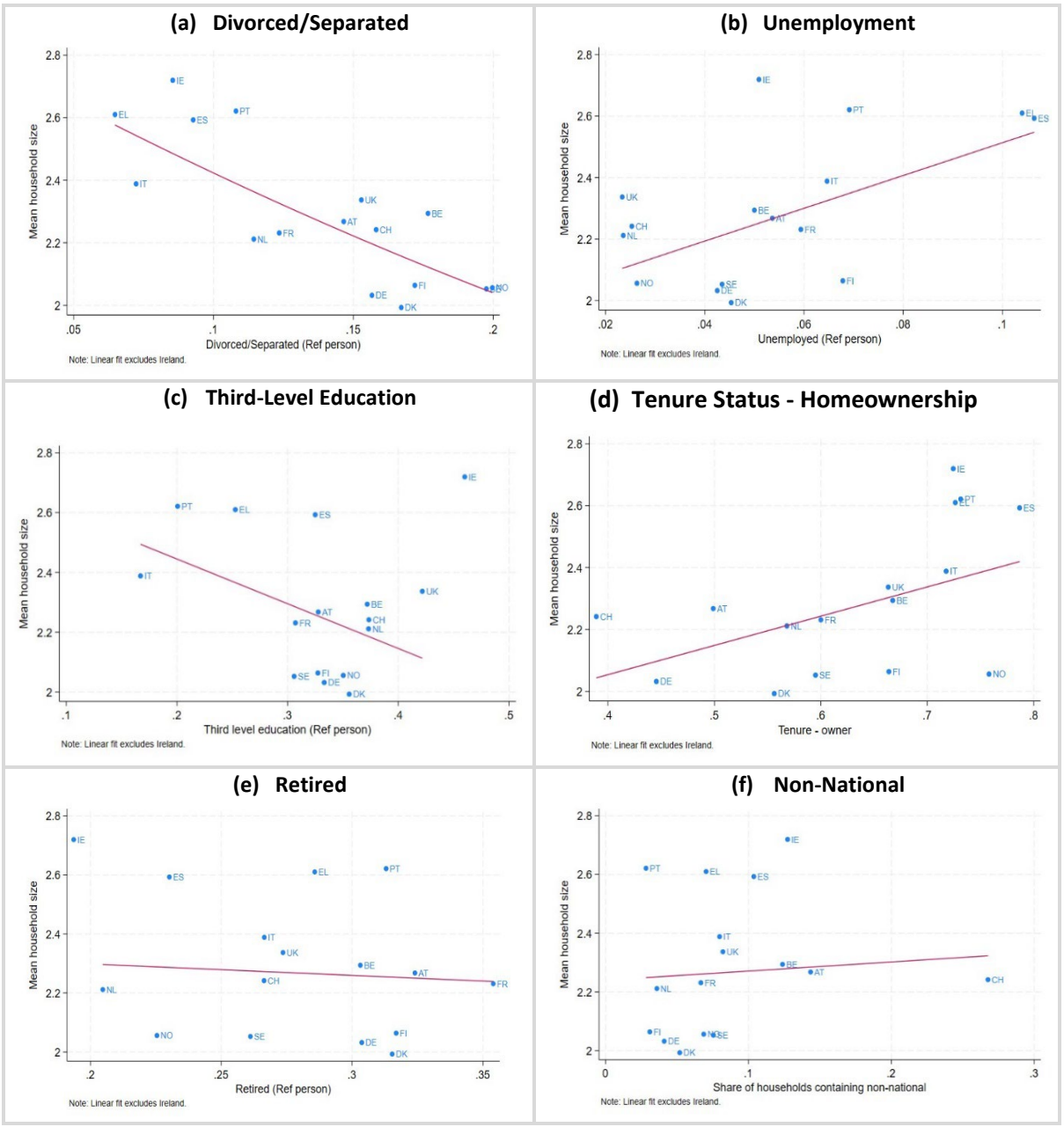


Source: Authors' analysis of Eurostat EU-SILC data.

Notes: Low: Germany, Sweden, Denmark, Finland and Norway; Medium: Italy, UK, Belgium, Austria, France, Switzerland and Netherlands; High: Portugal, Greece and Spain.

Up to this point we have observed differences across countries in both the average size of households and across a number of socio-demographic factors. Figure 8 presents simple pairwise correlations between household size and these other characteristics. Note that in each case Ireland is omitted from the line of best fit. A higher rate of divorce or separation is unsurprisingly associated with smaller household size on average. While Ireland is a clear outlier, elsewhere higher rates of third-level education are associated with smaller household size. Conversely, countries with higher rates of homeownership typically have larger households and a higher rate of unemployment is also associated with larger household size. In the final two panels of Figure 8, we see that the share of head of households who are retired appears to be unrelated to household size patterns. There is also only a very slight positive correlation between the household being headed by a non-national and household size. It appears that Switzerland here is a clear outlier with high levels of migration and low household size and may be driving this finding. It is important to note that the findings presented in Figure 8 are just simple pairwise correlations and we will test these relationships between household size and socio-economic characteristics more formally in Section 3.

FIGURE 8 PAIRWISE CORRELATIONS BETWEEN HOUSEHOLD SIZE AND SOCIO-DEMOGRAPHIC CHARACTERISTICS



Source: Authors' analysis of Eurostat EU-SILC data.

3. ECONOMETRIC ANALYSIS OF HOUSEHOLD SIZE

To this point, we have presented and discussed a range of stylised facts and trends which provide insights into the development of household size across a group of western European countries. The aim has been to contextualise Ireland's progress across a range of indicators and explore the factors that may be associated with Ireland's position. It is clear from this descriptive analysis that average household size in Ireland is high, and this appears to be strongly correlated with factors such

as a young population with a high proportion of children. However, there may be other factors which also play a role.

In this section, we attempt to undertake a more structured assessment of the factors that are associated with differences in household size across countries. Our econometric set-up proceeds in two stages. First, we undertake a micro-level assessment on the pooled cross-sectional data across countries to explore the impact different household characteristics have in explaining the level of household size. Second, we create a country-year panel dataset from the microdata to explore the impact of country-time varying factors on the changes in average household size.

3.1 Differences in household characteristics

Our first assessment explores the relationship between household level demographic and household economic characteristics and household size. To do this, we estimate a simple regression framework on the pooled cross-sectional data for each household *i* in country *c* at year *t* as follows:

$$lnHS_{i,ct} = \alpha + X_{i,ct}\beta + Z_{i,ct}\gamma + (\tau\ x\ \omega) + \varepsilon_{i,ct} \quad (1)$$

where $lnHS_{i,ct}$ is the log of household size, $X_{i,ct}$ is a vector of demographic or social variables relating to the household and $Z_{i,ct}$ is a vector of household economic characteristics. Note the purpose of Equation (1) is purely to examine the relationship between key household characteristics and the level of household size.

To ensure that, in this exercise, the estimates are not being affected by any country-time varying factors such as macroeconomic conditions, credit markets or country time varying housing market factors, we include a full set of country-time fixed effects which will purge any of these influences from our model. We return specifically to examine how changes in these types of countrywide factors over time may influence changes in household size in Section 3.2. The model is estimated over the timeframe 2005-2020 as some household variable/country combinations have missing data in 2021.

In terms of the household characteristics, we include the following variables in the model (relating to the head of household unless otherwise specified): marital status, education level, age group, whether the household is headed by a non-

national and whether the household contains children under 18. Please note the marital status and children variables are included as binary dummy variables. In this regard, they can be interpreted as fixed effects for the groups of households which have these characteristics and thus are an intercept control for differences across households in the different countries. In the vector of economic controls at the household level we include household disposable income (in logs), employment status (employed, unemployed, retired, other inactive), and whether the household lives in the rental sector. The estimated coefficients are presented in Table 1. In the first column (1), we include the household demographic and social factors, and in the second column (2), we add the economic variables. The country-time fixed effects are included in both regressions.

TABLE 1 HOUSEHOLD CHARACTERISTICS – ESTIMATED MARGINAL EFFECTS

	(1)	(2)
Married	0.422***	0.304***
	(0.001)	(0.001)
Separated	-0.102***	-0.053***
	(0.003)	(0.002)
Widowed	-0.147***	-0.148***
	(0.001)	(0.001)
Divorced	-0.100***	-0.057***
	(0.001)	(0.001)
Secondary	-0.011***	-0.053***
	(0.001)	(0.001)
Post-secondary	-0.061***	-0.127***
	(0.002)	(0.002)
Third level	-0.054***	-0.162***
	(0.001)	(0.001)
Age 30-39	-0.262***	-0.217***
	(0.002)	(0.001)
Age 40-49	-0.265***	-0.231***
	(0.002)	(0.001)
Age 50-59	-0.241***	-0.226***
	(0.002)	(0.001)
Age 60-69	-0.319***	-0.295***
	(0.002)	(0.002)
Age 70+	-0.365***	-0.320***
	(0.002)	(0.002)
Children	0.655***	0.602***
	(0.001)	(0.001)
Unemployed		0.158***
		(0.002)

Contd.

TABLE 1 CONTD.

	(1)	(2)
Retired		0.061***
		(0.001)
Other Inactive		0.144***
		(0.001)
lnYi		0.270***
		(0.001)
Renter		-0.059***
		(0.001)
Non National		0.068***
		(0.001)
Constant	0.711***	-2.034***
	-0.007	(0.010)
Observations	2,318,869	2,266,963
R-squared	0.646	0.733

Source: Authors' analysis of Eurostat EU-SILC data.
Notes: Standard errors in parentheses, * p<0.10, ** p < 0.05, *** p < 0.01.

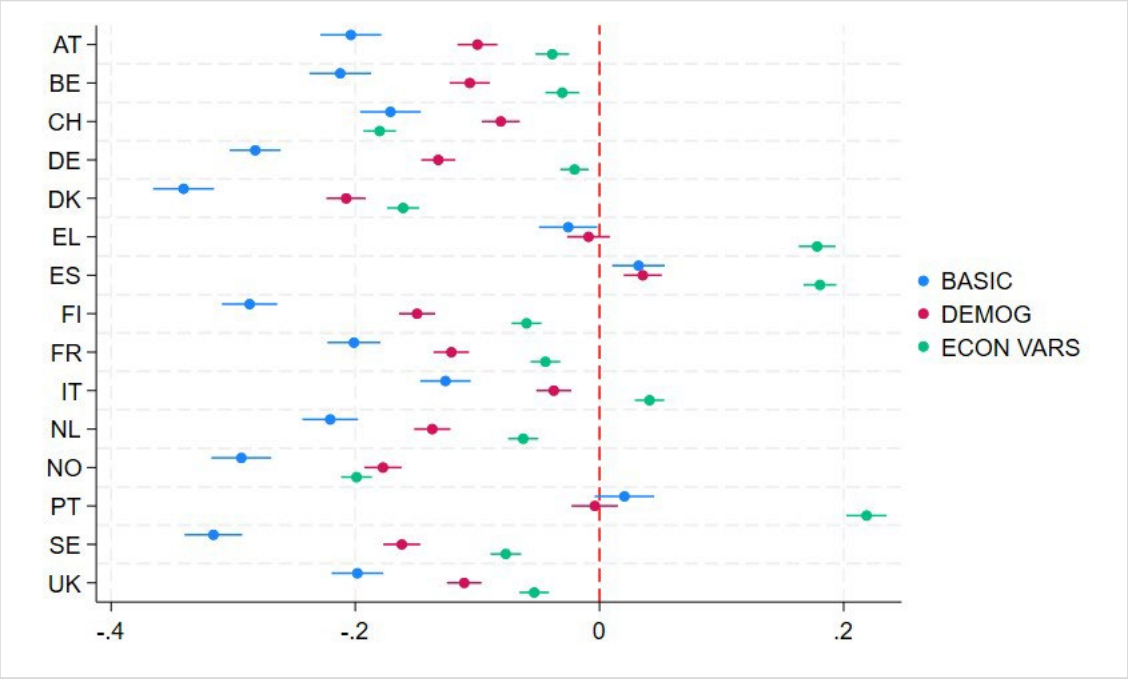
A number of findings emerge. First, being married, relative to unmarried, has a very strong positive effect on household size. Being divorced, separated or widowed reduces the average household size relative to being unmarried. These effects are in line with our prior expectations that households who are married are more likely to co-habit which raises the expected household size. We also find a negative impact of increasing education on household size: as households remain longer in education, this can potentially delay the household formation decision and potentially delay the decision to have children. We find very strong and increasing age effects: as households age, the average size of the household declines. A very strong effect comes through from having children; a household having at least one child is associated with on average larger households. While this is an expected relationship, the fact that Ireland has such a high share of households with children is a strong explanatory factor for its higher average household size. Households headed by a non-national also have a higher average household size.

In terms of the household economic variables, we find that relative to employed households, being unemployed, retired or inactive increases the average household size. It must be noted that these effects are over and above all the age, family status and other controls, and thus are comparing households holding these other factors constant. Older households (who would be more likely to be retired) have much lower household size on average. We also find a positive association between household income and average household size. We find that renters on

average, across these European countries, tend to have smaller household sizes. When we consider the structure of the European rental market, relative to Ireland, this finding would correspond to more mature rental sectors predominating. In this model the R-squared is 73 per cent which is high for a microdata model; the suite of variables included here appears to do a good job at explaining the variation in household size across countries.

The main objective of this research is to understand what is different about Ireland's average household size relative to other countries. With this aim in mind, it is informative to explore how the various household characteristics that capture some of the cross-country effects can explain the differences to Ireland. To do this, we run three models. First, we first run a parsimonious (BASIC) model which only includes the country-time dummies, and we then pull out the country fixed effects relative to Ireland. These country fixed effects will capture how different each country's household size appears relative to Ireland, when no household controls are included. Second, we then run models (1) and (2) from Table 1 to see whether some of these country fixed effects are explained by the (1) socio-demographic and (2) household economic status variables.

FIGURE 9 CROSS-COUNTRY FIXED EFFECTS ACROSS MODELS



Source: Authors' analysis of Eurostat EU-SILC data.

The country fixed effects are presented in Figure 9. The countries are listed on the y-axis and the coefficient size represents the fixed effect. Standard error bars (at

the 5 per cent level) are also presented, thus any coefficient whose standard errors cross the 0 line is not statistically significantly different from Ireland. Focusing first on the blue coefficients which represent the parsimonious specification, it is clear that all countries except Spain, Portugal and Greece have a significantly lower average household size compared to Ireland. The difference is greatest to Denmark, Norway, Sweden, Finland and Germany, a fact which was evident from the trend charts presented in Section 2.2.

However, if we move from the blue coefficients to the red coefficients, this represents the country fixed effects from the model with the household demographic variables (marital status, age, education, presence of children). In nearly all cases, the country fixed effect is now notably smaller, indicating that the variation across countries can be explained in large part by differences in these demographic characteristics. Indeed, relative to some of the Nordic countries, nearly half of the coefficient size falls away. Moving further to the green coefficients, which control for the household economic status variables (in addition to the household demographic characteristics) as in specification (2) above, again we can see the differences relative to Ireland shrink as the economic variables explain a notable part of the variation across countries. Controlling for both socio-demographic and household economic status variables brings Ireland's household size much closer to Austria, Belgium, Germany, Finland, France, Italy, Netherlands, Sweden and the UK. In contrast, the addition of the economic status variables moves Ireland further away from Greece, Spain and Portugal. This suggests that while the raw averages may have been more similar, structurally Ireland is quite different from those countries.

From an Irish perspective, these findings have the following implications: Ireland has a high average household size in a cross-country context but a large component of that is well explained by differences in demography (e.g. age, number of children) and social structures (marital status), as well as the economic differences in employment and incomes.

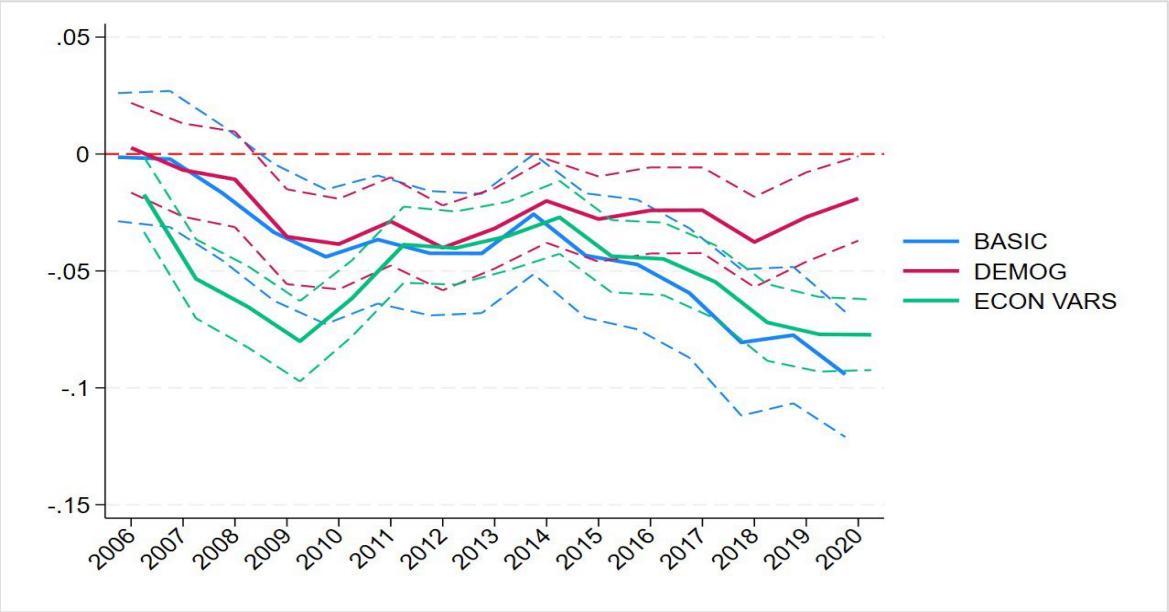
3.2 Do time varying country factors matter?

While the differences across countries are clearly evident from the descriptive charts presented in Section 2.2, as well as the country differences, the initial statistics also indicate that somewhat of a downward trend is evident across countries over time from 2005 onwards. A question arises as to whether this is related to changes in demographic structures over time or whether it can be attributed in part to time-varying macroeconomic, housing market, credit market or other factors. For example, it is possible that changes over time in house prices,

credit availability, housing supply and interest rates may all exert pressure on the change in average household size if they impact household formation, overcrowding etc.

To explore whether this may in fact be the case, rather than present the country dummies from the above regressions, we instead extract the time fixed effects to test whether a trend is evident. If a statistically significant trend is evident in the data, and it changes after we control for the aforementioned factors at the household social and economic level, this allows us to infer whether the trend is unexplained by the model or captured by the set of variables we include. Figure 10 presents the relative trends over time for the three models; 5 per cent confidence intervals are also presented which allow us to judge the difference in the time coefficients from zero (red line). The base year is 2005 for all coefficients. In the basic model, a statistically significant downward trend is evident. When we consider the household demographic characteristics model (red) and the full model with all variables (green), some differences exist over time, but most years continue to show a lower level of the average household size over time. The overlapping confidence intervals also suggest that any differences across the models are not statistically significant.[5]

FIGURE 10 TIME EFFECTS ACROSS MODELS – MARGINAL EFFECTS



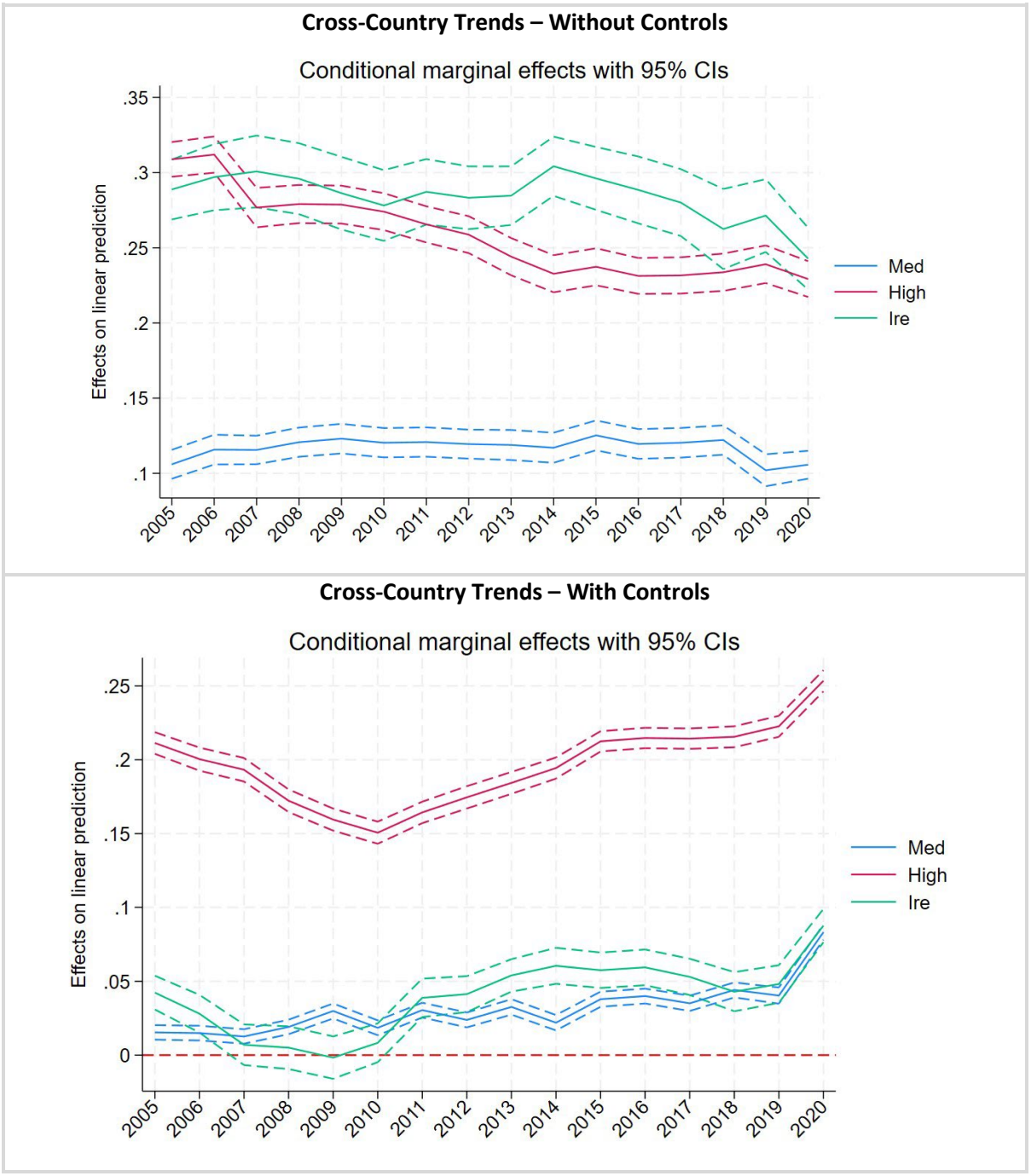
Source: Authors' analysis of Eurostat EU-SILC data.

5 If the confidence intervals from the two regressions overlap, this indicates that they are not statistically different from each other at that confidence level.

To this point, we have considered both the differences across countries and also the differences over time. However, we have not considered the trend in different country groups over time. To understand this in some more detail we alter the model and replace the country dummies with the country groups outlined in Figure 7. We run two models: a) first with these country groups interacted with time dummies; and b) with the interactions and all the controls. The aim is to explore whether the differences over time in the groups are explained by the characteristics. The first group (which includes Germany, Finland, Norway, Denmark and Sweden) is set as the reference category. The trend over time across the groups is presented in Figure 11. In the first figure, the differences across the groups are very clearly evident. The middle group (in blue) is statistically different from the low group (reference category) in all years. No clear trend is evident however. Ireland and the high group (Spain, Portugal and Greece) are relatively similar and notably higher than the reference (low) and middle group.

In the second figure, what is interesting is that Ireland converges down to the middle and low groups as well as a notable change in the trends over time. This occurs as we have included the household controls in the model both for the socio-demographic variables as well as the economic variables at the household level. This indicates that the raw differences in average household size between Ireland and the other country groups (in particular to the middle group) can be explained in the main by observed differences in household characteristics. The high group appears to be structurally different from Ireland and this is unexplained by the household socio-demographic and economic status variables in our model.

FIGURE 11 DIFFERENTIAL COUNTRY TIME TRENDS – MARGINAL EFFECTS



Source: Authors' analysis of Eurostat EU-SILC data.
Notes: Medium: Italy, UK, Belgium, Austria, France, Switzerland and Netherlands; High: Portugal, Greece and Spain. Omitted reference group: the low group (Germany, Finland, Norway, Denmark and Sweden).

To explain the mechanisms behind this shift in a little more detail, the first chart shows that Ireland has a much higher level of household size to the lowest group, similar to the group of high countries. However, when we include the control variables, the differences between Ireland and the medium group are eliminated i.e. the variables that we have included explain the difference and it no longer

remains in the cross-country trend coefficient. However, the difference with the high group remains, suggesting we cannot explain why that group have such high household size rates and these are structurally different. The implication for Ireland is that the socio-demographic and economic variables we include can explain why it is different, and thus give us clarity on why Ireland is higher than the medium group of countries.

3.3 Do time varying country factors matter?

The analysis to this point highlights that a large component in the variation in household size across countries is explained by differing socio-demographic structures. In these analyses we have removed the effects of time-varying country level factors using country-time fixed effects, which has allowed us to isolate the impact of household socio-demographic and economic status variables. However, a final question arises as to whether some of the time-varying factors actually matter, in particular where changes in a country's financial, economic or housing market variables occur.

To attempt to shed some light onto this, we collapse the microdata at the country-year level at the average of key variables. We then run a cross-country panel model which attempts to explain changes in the log average household size ($\Delta lnHS_{ct}$) across countries as follows:

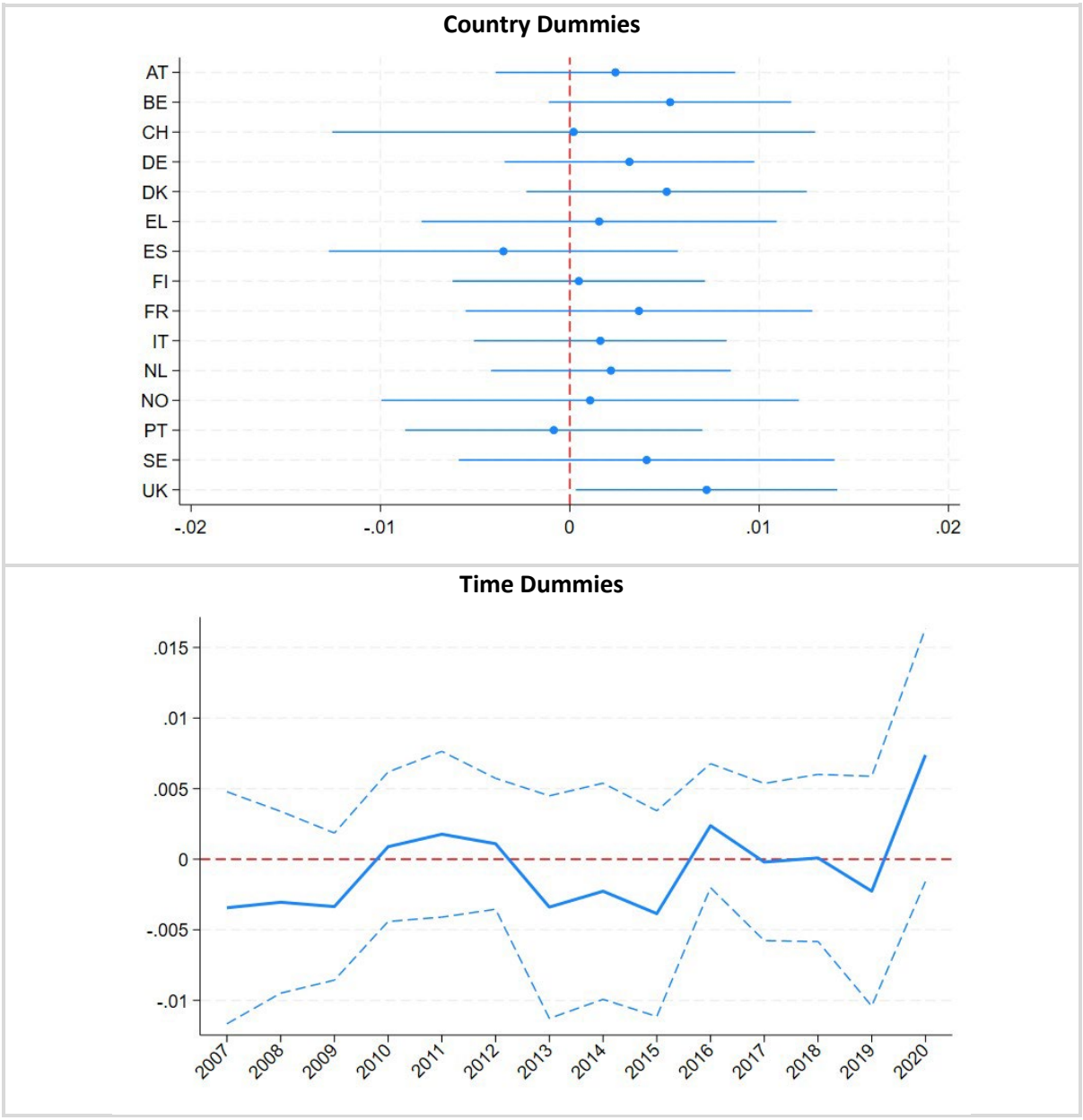
$$\Delta lnHS_{ct} = \alpha + \Delta lnX_{ct}\beta + \Delta lnG_{ct-1}\gamma + \tau_t + \omega_c + \varepsilon_{ct} \quad (2)$$

where ΔlnX_{ct} is a vector of socio-demographic variables that were important in the first set of household-level regressions, including the average share of married persons, the average age, the proportion of third-level education and the proportion of households with children (all in logs). Controls are also included for the share of households who are renters as well as the share of households whose household head is a non-national. We also include the share of employed persons and the average disposable income level (in logs). All of these variables are entered into the model in first differences to test the impact of changes in these factors on changes in household size. The economic variables are entered with a one-year lag to avoid any contemporaneous reverse causality. In addition to these variables, in the vector ΔlnG_{ct-1}, we include a number of housing market and financial variables to test whether any of these factors can explain the variation in household size. These variables include changes in house prices, changes in the housing stock per capita (to measure housing supply), changes in mortgage lending interest rates and changes in mortgage credit. These variables are also included with a lag to remove any contemporaneous reverse causality concerns. All variables are included in logs. In all specifications, we include fixed effects for time and country. As the regression

is a log-log specification, coefficients can be interpreted as an elasticity i.e. a 1 per cent change in the explanatory variable impacts the dependent variable by the size of the coefficient.

To begin, and in a similar vein to our previous analysis, we first run a parsimonious model which includes only country fixed effects and time fixed effects. The country and time dummies are presented in Figure 12. The reference category for the country fixed effects is Ireland. There does not appear to be any major downward trend over time and no major differences are evident across countries.

FIGURE 12 PANEL REGRESSION – TIME AND COUNTRY FIXED EFFECTS



Source: Authors' analysis of Eurostat EU-SILC data.

We now come to the results of our regression analysis. These are presented in Table 2. In column (1) we only include the household variables. There is a strong impact of the change in marital status as well as the change in the share of households with children. These variables are highly significant and positive: a 1 per cent increase in the share of married households and a 1 per cent increase in the share of households with children increases the average household size by 0.21 per cent and 0.19 per cent respectively. The age effects are of a similar magnitude but the coefficient is negative and insignificant. The insignificance of age is likely to reflect the fact that this variable is correlated with other factors such as the impact of children and marital status (these likely capture differences in the age structure across countries, thus the ageing factors are being controlled for using the other variables). There is no effect evident of the increase in the third-level education share or increases in average incomes. The R-squared in this regression is nearly 0.6 which suggests a large proportion of the variation in the change in household size is driven by these variables.[6]

[6] Additional specifications with the inclusion of lagged net migration and changes in the Gini coefficient are reported in Table A1. Neither were found to be statistically significant. While we do not find evidence in the short-term that changes in migration flows impact changes in household size, the positive statistically significant coefficient for non-nationals in Table 1 does aim to capture this migration channel. This suggests that any impact of migration on household size is likely to be a longer-term effect.

TABLE 2 TIME VARYING CHARACTERISTICS – MARGINAL EFFECTS

	(1)	(2)	(3)	(4)	(5)	(6)
ΔlnMarried t	0.214***	0.214***	0.212***	0.213***	0.213***	0.211***
	(0.042)	(0.041)	(0.043)	(0.043)	(0.041)	(0.043)
ΔlnAge t	-0.170	-0.200*	-0.168	-0.166	-0.169	-0.192
	(0.115)	(0.116)	(0.115)	(0.117)	(0.114)	(0.117)
ΔlnThird Level t	0.01	0.011	0.01	0.011	0.01	0.011
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
ΔlnKids t	0.188***	0.190***	0.187***	0.187***	0.188***	0.189***
	(0.029)	(0.028)	(0.029)	(0.029)	(0.028)	(0.028)
ΔlnEmploy t-1	0.037	0.037	0.040	0.038	0.039*	0.041*
	(0.023)	(0.023)	(0.023)	(0.023)	(0.023)	(0.024)
Δln(Y) t-1	0.005	0.003	0.008	0.005	0.01	0.009
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
ΔlnNon-National t	-0.003	-0.002	-0.002	-0.003	-0.001	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
Δln(HS.p.c) t-1		-0.090**				-0.083*
		(0.042)				(0.043)
Δln(HP) t-1			-0.009			-0.004
			(0.015)			(0.016)
Δln(r) t-1				-0.002		-0.002
				(0.005)		(0.005)
Δln(C) t-1					-0.016*	-0.014
					(0.009)	(0.010)
Observations	216	216	216	216	216	216
R-squared	0.584	0.590	0.586	0.585	0.590	0.595

Source: Authors' analysis of Eurostat data.
Notes: Standard errors in parentheses * p<0.10, ** p<0.05, *** p<0.01.

For the housing and financial variables, we include these separately in regressions (2) to (5) and then jointly in regression (6). In our specifications, we do not find an impact of changes in house prices, interest rates or credit on changes in household size. We find some slight effect of additional credit (column 5), but this does not hold when all other factors are controlled for, meaning the finding is not robust (column 6). However, we do find evidence of a housing supply effect that is statistically significant at the 10 per cent level. As housing supply rises (as proxied by a higher housing stock per capita) by 1 per cent, the growth in household size declines by 0.083 per cent. It must be noted that while we may not find impacts of other housing variables in this analysis, it does not necessarily mean that they do not have an influence over the household size in the long run. If a longer sample was available, or if more countries were included, the results of these findings might change. Furthermore, we do not claim that these findings are causal in nature

as we do not deal with omitted variables and other sources of endogeneity (outside reverse causality). For example, changes in mortgage credit availability and the cost of borrowing may impact specific cohorts of the market seeking to access credit, and therefore may not come through as large-scale effects for the population as a whole.

These findings suggest opposing effects of additional housing supply and demographics, whereby a population with more children and married couples increases household size by raising the growth rate, and increased housing supply lowers the growth in household size. It appears from the elasticities in the regression that the effect of the demographics is stronger than the housing supply effect. However, the unit differences in these variables mean this is not necessarily a straightforward conclusion. To test the impact of economic magnitude of these variables, we run an exercise similar to that in McClean et al. (2012) which explores the impact of a one standard deviation shock to each variable on the sample mean. The benefit of this is that it allows each variable to impact the sample average change in household size by the type of shock seen in the data for that variable. It is therefore a plausible shock to deploy into the data. It also allows the difference in the levels of the independent variables to be controlled for as the standard deviation is unique to each level. Our calculations use the following formula:

$$\Delta\mu_{\Delta lnHS} = \mu_{\Delta lnHS} + \beta_{var}\, x\, \sigma_{var}$$

where $\mu_{\Delta lnHS}$ is the sample average change in the log of household size. We take each of the significant variables (housing stock, marital status, children), use the coefficient from Table 2 (β_{var}) which is multiplied by the standard deviation for each variable (σ_{var}) and then added to the mean to see how a typical shock impacts the mean. The figures are presented in Table 3.

TABLE 3 EXPLORING THE ECONOMIC MAGNITUDES

Variable	(1) β_{var}	(2) σ_{var}	(3) $\beta_{var}\, x\, \sigma_{var}$	(4) $\Delta\mu_{\Delta lnHS}$
Δln(HS.p.c) t-1	-0.083	0.0105	-0.0009	-0.0051
ΔlnMarried t	0.211	0.0235	-0.0049	0.00007
ΔlnKids t	0.189	0.0219	0.004	-0.000

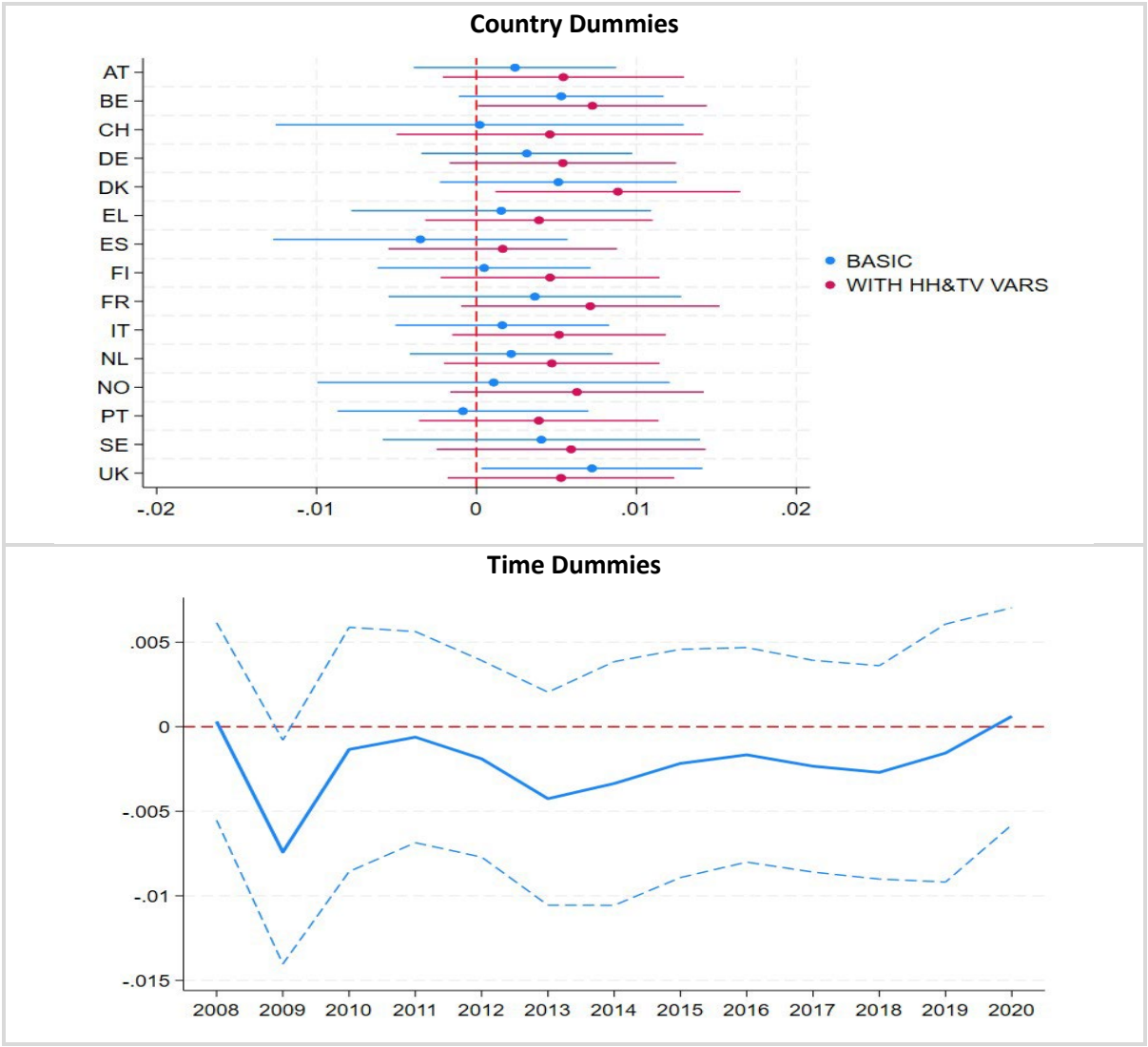
Source: Authors' analysis of Eurostat EU-SILC data.
Note: μ_ΔlnHS = -0.0043.

Firstly, the average change in household size across the sample is negative and amounts to -0.0043 on average (less than -0.43 per cent). This suggests the level of

household size is very slow moving across the sample. The impact of a shock to housing supply reduces the mean change in household size by 0.0009 to -0.0051. The impact of a shock to marital status is larger than that of housing supply at 0.0049. In the case of marital status, the mean change in household size actually becomes positive. The magnitude of the impact for a shock to age is similar in magnitude to that for housing supply.

A final test we conduct is to re-calculate the time and country dummies for the model with all the controls (Model 6). We also include for the country dummies (Model 1). The results are presented in Figure 13. Again there does not appear to be any downward trend over time and no major differences are evident across countries.

FIGURE 13 PANEL REGRESSION – TIME AND COUNTRY FIXED EFFECTS AFTER CONTROLS



Source: Authors' analysis of Eurostat EU-SILC data.

4. WHAT DOES THIS MEAN FOR HOUSEHOLD SIZE IN IRELAND?

In the previous sections we documented large differences in average household size across countries and that differences in socio-demographic characteristics help to explain a large portion of these differences. In particular, we saw that the differences observed in household size between Ireland and the middle group of countries (Austria, France, Belgium, Netherlands, Italy, Switzerland and the UK) can in the main be explained by differences in household socio-demographic and economic status characteristics such as age, number of children, marital status, income and employment. In addition, over and above the differences driven by socio-demographic factors, we also find evidence that shorter-term changes in household size are affected by short-run changes in housing supply. The question arises as to what implications these findings have for the likely trajectory of household size patterns in Ireland. The aim of this section is to provide indicative inputs into Bergin and Egan's (forthcoming) broader research on household formation trends in Ireland.

Household size is a key parameter when projecting future housing demand as it turns population estimates into households and therefore any assumptions made about the likely future path of household size will have implications for housing demand estimates. In previous work, Bergin and Garcia-Rodriguez (2020) assume a constant headship rate i.e. that household size remains unchanged over their projection period. Similarly, Conefrey and Staunton (2019) also assume a constant headship rate in their housing demand projections. They also conduct an alternative scenario where the headship rate increases (i.e. household size falls) in a linear fashion to UK levels over time.

Bergin and Garcia-Rodriguez (2020) utilise narrow five-year age bands for headship rates in their projections. In Table 4 we therefore present average household size for narrower age bands in both 2007 and 2018, as well as documenting the changes in household size over this time period. Figures are presented overall and separately for Ireland as well as for the low, medium and high household size country groupings previously used in Section 2.2. Note only ten-year age bands are feasible using the EU-SILC household survey data and the ages here refer to the head of household.

TABLE 4 LEVEL OF HOUSEHOLD SIZE OVER TIME

Age Group < 30 Years					
	Low	Med	High	Ireland	Total
2007	1.92	2.27	2.90	3.08	2.54
2018	1.92	2.33	2.84	3.22	2.58
CAGR	0.0%	0.2%	-0.2%	0.4%	0.1%
Age Group 30-39 Years					
	Low	Med	High	Ireland	Total
2007	2.22	2.48	2.66	2.98	2.58
2018	2.15	2.44	2.51	2.82	2.48
CAGR	-0.3%	-0.1%	-0.5%	-0.5%	-0.4%
Age Group 40-49 Years					
	Low	Med	High	Ireland	Total
2007	2.21	2.59	2.87	2.95	2.65
2018	2.20	2.48	2.67	2.81	2.54
CAGR	-0.1%	-0.4%	-0.6%	-0.4%	-0.4%
Age Group 50-59 Years					
	Low	Med	High	Ireland	Total
2007	1.73	1.98	2.52	2.39	2.15
2018	1.66	1.96	2.31	2.27	2.05
CAGR	-0.4%	-0.1%	-0.8%	-0.4%	-0.5%
Age Group 60-69 Years					
	Low	Med	High	Ireland	Total
2007	1.50	1.67	1.98	1.77	1.73
2018	1.44	1.61	1.86	1.63	1.64
CAGR	-0.4%	-0.3%	-0.6%	-0.7%	-0.5%
Age Group 70+ Years					
	Low	Med	High	Ireland	Total
2007	1.36	1.38	1.60	1.41	1.44
2018	1.37	1.40	1.54	1.37	1.42
CAGR	0.1%	0.2%	-0.3%	-0.3%	-0.1%

Source: Authors' analysis of Eurostat EU-SILC data.
Notes: We use 2007 and 2018 as these are the first and last years for which we have data for all countries in the sample. Stopping in 2018 also avoids the fall in household size seen in the EU-SILC data for 2018-2021 which is not observed in the Irish Census data. Low - Finland, Denmark, Sweden, Norway, Germany. Med - Austria, Belgium, Netherlands, France, Switzerland, Italy, UK. High - Spain, Greece, Portugal.

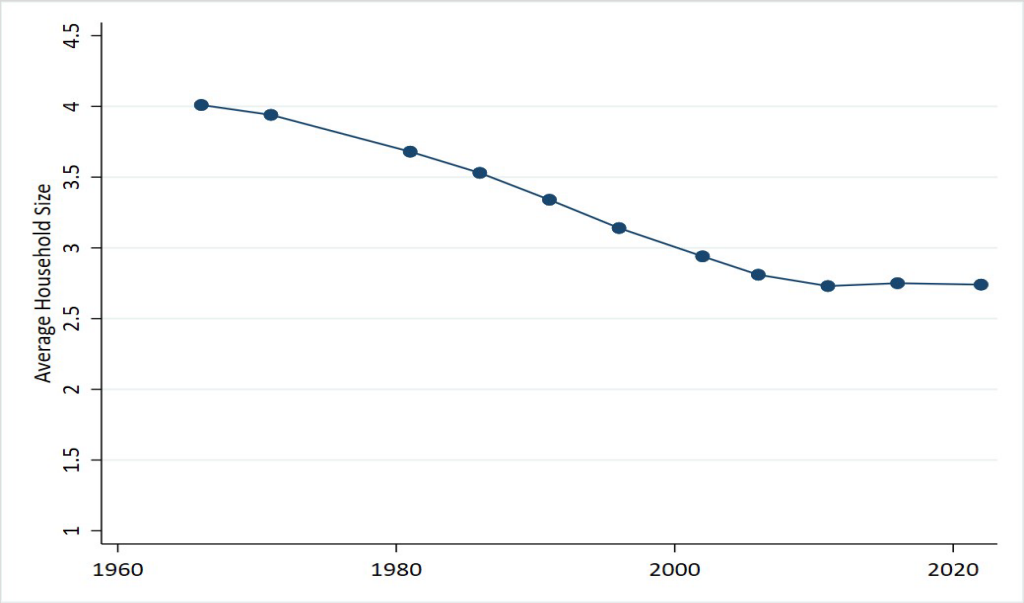
For households headed by individuals aged 70 plus, Ireland's household size is very similar to those seen in the low and medium group countries and lower than in the high group countries. This likely reflects higher levels of multi-generational living in

the high group southern European countries. At the other end of the age spectrum, households in Ireland headed by someone under the age of 30 see the highest household size, above those seen in the high group countries. These findings are consistent with Disch and Slaymaker (2023) who show that Ireland has the lowest share of single adult households amongst independently formed households under 40. Looking at the changes over the 2007-2018 period, falls in household size have generally been concentrated across middle-aged households in all of the country groupings. The magnitude of the falls has been pretty small over this period across the various age groups. The under 30s are the only age group in Ireland to see an increase in household size over the 2007-2018 period. It is plausible that this may have been influenced by the well-documented housing affordability and availability issues identified by Disch and Slaymaker (2023) but could also be due to high birth rates and demographic factors.

A limitation of the EU-SILC household datasets used in Sections 2 and 3 above is that they only permit analysis from the mid-2000s onwards, a relatively short timeframe in the context of observing changes in household size and key demographics. At this juncture it is useful to take a longer-term perspective on these trends. Using historical Census data, Figure 14 shows that the average household size in Ireland decreased with every Census between 1966 and 2011, falling from around 4 to 2.73 in that time. Since the 2011 Census it has remained static, standing at 2.75 in 2016 and 2.74 in 2022.[7] Note that these figures refer to the trends for the population as a whole, not for separate age groups.

[7] For comparison the corresponding figures from EU-SILC for Ireland were 2.7 in both 2011 and 2016. From 2018-2021 the EU-SILC figures declined slightly, falling to 2.6 in 2021, a fall not observed in the Census data for 2022 where the average household size remained at 2.74.

FIGURE 14 AVERAGE HOUSEHOLD SIZE IN IRELAND: 1966–2022

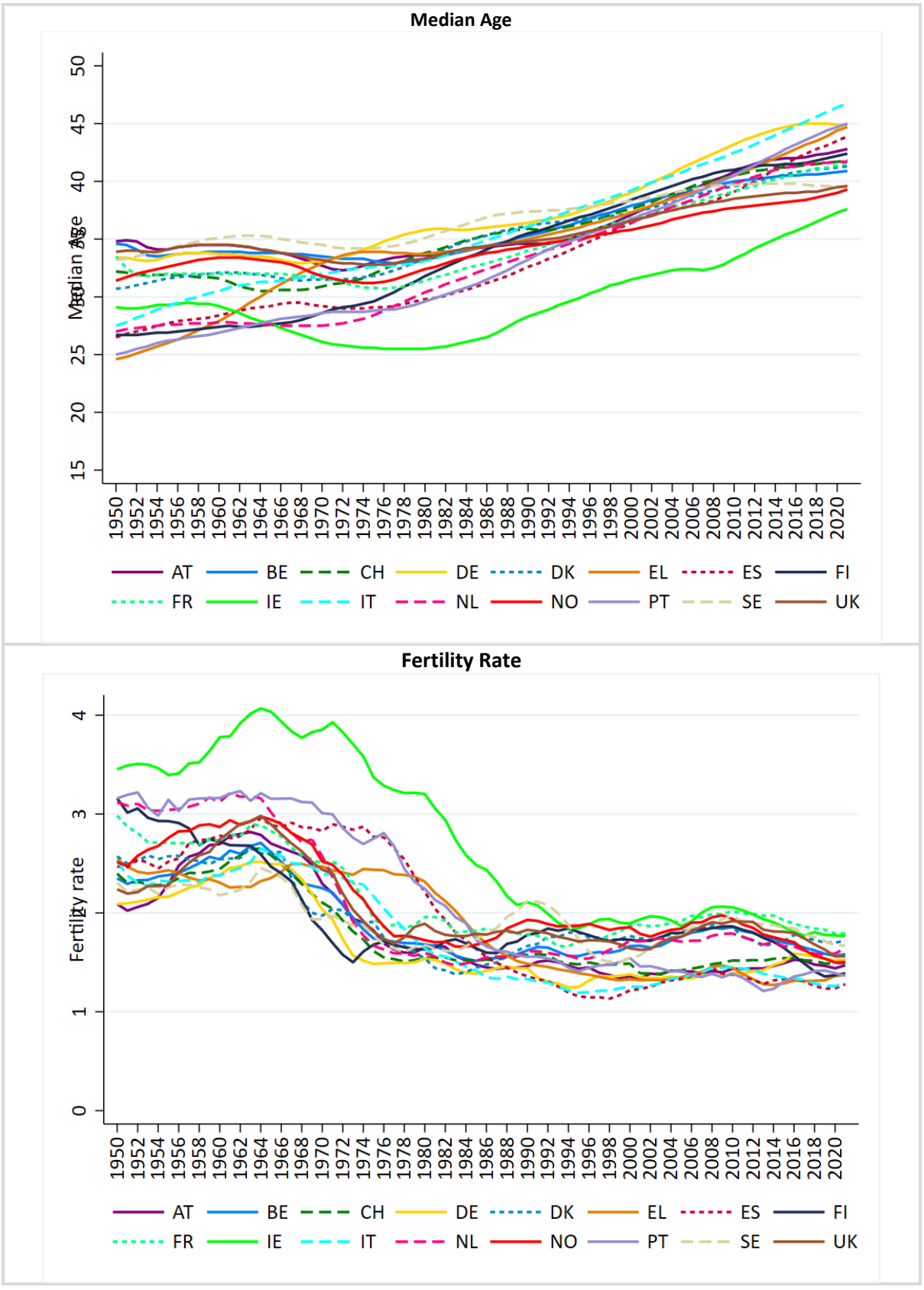


Source: Authors' analysis of CSO data.

Two key factors associated with Ireland's higher average household size in our analysis in Section 3 were Ireland's younger age structure and higher numbers of children. Cross-country data from the UN on median household age and fertility rates on a long-term cross-country basis dating back to 1950 are presented in Figure 15. The most striking difference is how much higher Ireland's fertility rate was compared to other countries up to the mid-1990s. In the early 1970s Ireland's fertility rate stood at just under 4, with Portugal the next highest around 3 and the majority of countries between 1.5 and 2.5. Between the mid-1970s and the mid-1990s Ireland's fertility rate declined drastically, halving from around 4 to just under 2 over that period. This coincided with a fairly rapid fall in Ireland's average household size (Figure 14). From the 1990s onwards Ireland's fertility rate has remained one of the highest amongst these western European countries, standing at 1.77 in 2021, second only to France (1.79).

However, while Ireland's fertility rate is at the top end of the countries studied, it is not now drastically out of line as it was prior to the 1990s. This may suggest that any major, rapid convergence in Ireland's household size relative to other western European countries may have already occurred and any future convergence may be more gradual. However, the recent stalling in the decline in household size from 2011 onwards may indicate other factors have become important, and this longer term trend may re-emerge over time as discussed below.

FIGURE 15 CROSS-COUNTRY DEVELOPMENTS IN MEDIAN AGE AND FERTILITY RATES: 1950–2021



Source: Authors' analysis of UN data.

Our findings indicate that future changes in household size are likely to be driven primarily by demographics; Ireland's age and fertility dynamics in particular would suggest we would expect to see average household size fall over time. Over and above this, our findings also highlight that changes in housing supply are likely to impact the rate at which this happens. With Ireland seeing the highest average household size amongst the western European countries studied, we might have expected to see some convergence towards the other western European countries over the 2007-2018 period, but this was not the case. Indeed, from the Census figures in Figure 14, household size remained pretty much constant between 2011 and 2022 in Ireland. It is important to acknowledge the very low levels of construction in Ireland during much of this period, particularly in the years following the Global Financial Crisis. While demographics are likely to drive the majority of changes in household size patterns, sustained increases in housing supply could result in a continuation of the previously observed downward trajectory in household size. Both the composition as well as the level of housing supply are likely to matter; i.e. as the Irish population ages, it is probable that household size will drop, but this finding is likely contingent on the type of housing supply that is available. Ensuring that the housing stock is rightsized to the population (for example the balance across smaller housing units like apartments and larger houses) is another aspect of the link between population dynamics and household size which needs further exploration.

5. CONCLUSION

The aim of this work has been to present some stylised facts around trends in household size on a cross-country basis and then to explore the correlation of household size to potential determinants such as socio-demographic characteristics, economic factors and other influences. To do so we have utilised the cross-country nationally representative EU-SILC dataset and a subset of 16 western European countries. Our modelling framework had two components. First, we undertook a micro-level assessment on the cross-sectional data across countries to explore the impact household factors have in explaining the level of household size. Second, we created a country-year panel dataset from the microdata to explore the impact of time varying factors on the changes in household size.

It is clear from our analysis that average household size in Ireland is high. The countries fall into three distinct groups: Ireland is highest with Spain, Portugal and Greece; a second group of countries in the middle including Italy, France, the UK, Austria, Belgium, Netherlands and Switzerland. The group of countries with the lowest household sizes are the Nordic countries of Denmark, Sweden, Finland, Norway and also Germany. The EU-SILC datasets also show a downward trend in

household size across countries between 2005-2021 although Census data for Ireland show the long-term downward trajectory stalled in Ireland between 2011 and 2022.

We find the differences observed in household size between Ireland and the middle group of countries can in the main be explained by differences in household socio-demographic and economic characteristics such as age, number of children, marital status, income and employment. On the other hand, the other countries with high household size, Greece, Portugal and Spain, appear to be structurally different and these differences are not explained by the variables in the model. In addition, over and above the differences driven by socio-demographic factors, we also find evidence that shorter-term changes in household size are affected by short-run changes in housing supply, with an increase in supply associated with a fall in household size. It must be noted that while we may not find statistically significant impacts of other housing variables in this analysis, ours is a short-run analysis based on yearly changes in these factors; it does not necessarily mean that key housing factors and policies do not have an influence over the household size in the long run. These may be longer-run, more structural factors and therefore remain part of the unexplained country specific component in the model. If a longer sample was available, or if more countries were included, the results of these findings might change.

The magnitude of our findings suggests that demographic factors (ageing, marital status and children) are likely to outweigh the effects of changes to housing supply, thus changes are likely to be driven by demographics. However, that notwithstanding, the fact that housing supply exerts a negative influence on the household size indicates that a sustained period in which a society encounters difficulties in achieving increases in housing could well offset any change due to demographics. i.e. if the population ages, has fewer children etc., one would expect household size to fall. However, without sufficient supply these effects may not be able to materialise.

For Ireland, the high birth rate and relatively young population compared to other countries indicate that any convergence, not seen in the period of our SILC analysis, will only come if the demographic conditions change. The timeframe for any re-emergence of convergence factors is likely to be generational as the population ages. Over and above this though, our findings highlight that changes in housing supply are likely to impact the rate at which this happens. This is consistent with (but not fully explained by) the pause in the downward trajectory in Ireland's household size between 2011-2022, which coincided with the low levels of housing

supply in the wake of the Global Financial Crisis. The magnitude of our estimated coefficients and our illustrative economic shocks would suggest that the combined effect of the demographic factors is much larger than any housing supply impacts when considering the change in household size across countries, over our sample period.

That notwithstanding, as we do find a role for housing supply to impact household size, any future scenarios for housing demand requirements should incorporate, at least implicitly, feasible ranges for housing supply. Furthermore, any projections for future household numbers or housing demand would likely benefit from the deployment of age-specific household size trends which allow natural population dynamics to influence household size. Indeed, in our research we find little difference between Ireland and other countries in terms of household size for older age cohorts, with the younger age cohorts being the driving factors behind Irish household size levels. However, given the lagged impact of housing supply on household size (as indicated in our model), the achievement of future housing formation levels is going to depend on the path of housing supply i.e. in an Irish context, any reduction in household size which impacts housing demand will be likely predicated on achieving sufficient near-term housing supply levels to enable this.

At this juncture it is important to highlight the dynamic and endogenous nature of household size patterns. While we are not able to make causal statements, our findings show that holding other factors constant, household size is affected by a series of socio-demographic and economic factors. This interdependence highlights the need for regular monitoring and reappraisal of key parameters such as household size, and any resulting impacts on housing demand, as these factors are not static.

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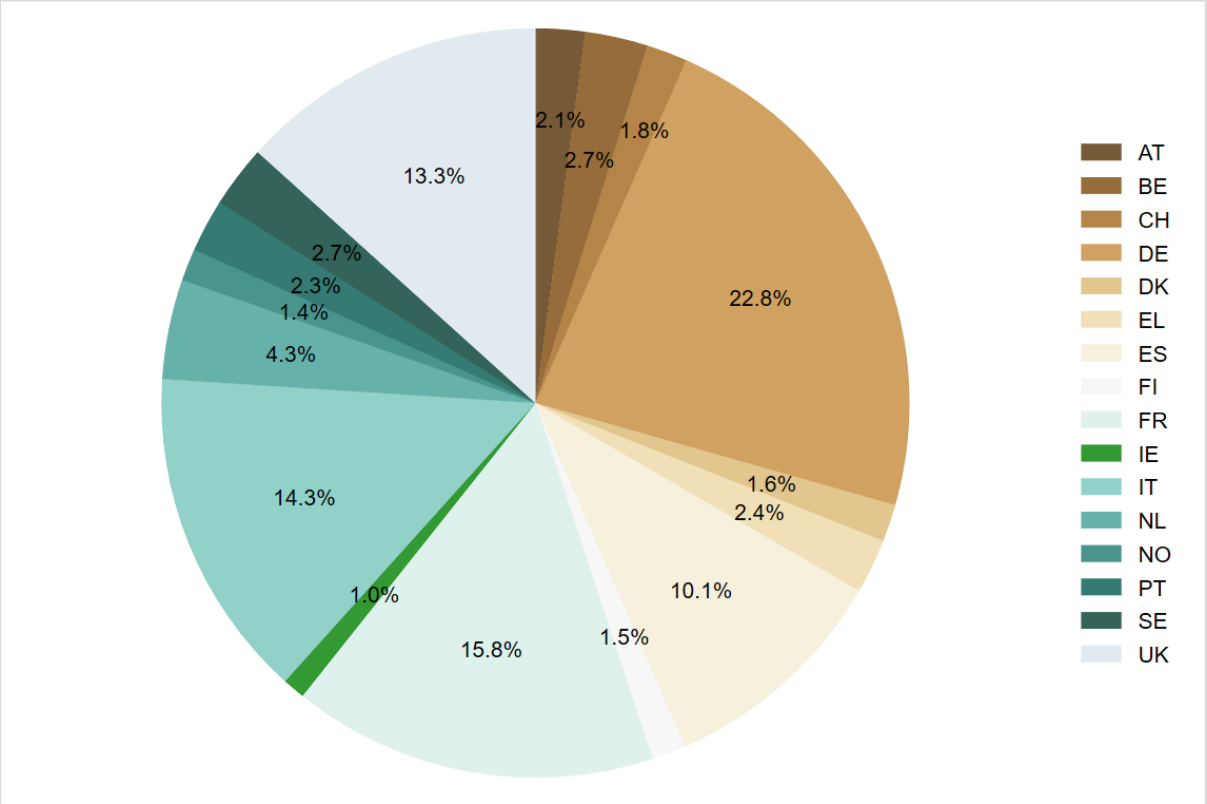
APPENDIX 1 EU SILC SAMPLE DESCRIPTIVES AND ADDITIONAL REGRESSIONS

FIGURE A.1 OBSERVATIONS ACROSS COUNTRIES (% OF TOTAL): 2005–2021



Source: Authors' analysis of Eurostat data. Data are weighted.

TABLE A.1 TIME VARYING CHARACTERISTICS – MARGINAL EFFECTS WITH MIGRATION AND GINI COEFFICIENT

	(1)	(2)	(3)
Δln(HP) t-1	-0.014	-0.013	-0.015
	(0.016)	(0.017)	(0.016)
Δln(HS.p.c) t-1	-0.094**	-0.075*	-0.094*
	(0.048)	(0.041)	(0.048)
Δln(r) t-1	-0.005	-0.005	-0.005
	(0.005)	(0.005)	(0.005)
Δln(C) t-1	-0.007	-0.010	-0.009
	(0.013)	(0.014)	(0.014)
Δln(Gini) t-1	-0.035		-0.038
	(0.025)		(0.025)
ln(Net Migration) t-1		0.000	0.001
		(0.001)	(0.001)
Observations	216	216	216
R-squared	0.587	0.593	0.588

Source: Authors' analysis of Eurostat EU-SILC data.
Notes: Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01.