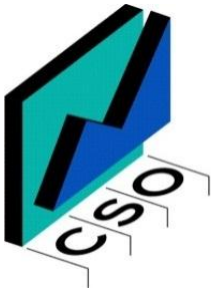

An Phríomh-Oifig Staidrimh
Central Statistics Office

A Review of the Sampling and Calibration Methodology of the Survey on Income and Living Conditions (SILC) 2010-2013

A response to the Technical Paper on The Measurement of Household Joblessness in SILC and QNHS 2004-2012

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http://www.cso.ie/shorturl.aspx/441

Abstract

This paper is a response to a Technical Paper published by the ESRI on behalf of the Department of Social Protection (DSP) in May 2015. The ESRI's paper investigated the potential reasons for the gap in the figures on household joblessness from two sources; the Quarterly National Household Survey (QNHS) and Survey on Income and Living Conditions (SILC). They concluded that the bulk of the difference could be attributed to an under-representation of working households and the use of sample substitution in the SILC, while the differences in definition were of secondary importance and accounted for about 25% of the difference in the indicators. They recommended re-calibration and a review of the practice of sample substitution as the solution to the perceived issue of under-representation.

This paper will show that SILC is a robust and reliable source of information on income, poverty and social inclusion. It will reassure users of SILC data that the practices and methodology followed by the CSO in relation to SILC are sound and do not adversely impact on the results.

Introduction

This paper is a response to a Technical Paper published by the ESRI on behalf of the Department of Social Protection (DSP) in May 2015. The ESRI's paper investigated the potential reasons for the gap in the figures on household joblessness from two sources, the Quarterly National Household Survey (QNHS) and Survey on Income and Living Conditions (SILC). The authors concluded that the bulk of the difference could be attributed to an under-representation of working households and the use of sample substitution in the SILC, while the differences in definition were of secondary importance and accounted for about 25% of the difference in the indicators. They recommended re-calibration and a review of the practice of sample substitution as the solution to the perceived issue of under-representation.

This paper examines the issues raised in the ESRI technical paper. It is divided into the following six sections:

1. The purpose and operation of both the QNHS and the SILC.
2. An overview of the SILC sample and an assessment of the robustness of the sample (2010-2013).
3. Discussion of the concept of calibration and the impact of changing the calibration methodology. It provides an assessment of the re-calibration proposed in the ESRI Technical Paper.
4. Consultation with Eurostat.
5. Information from other sources to support the findings in sections 1, 2, and 3.
6. Conclusion with a summary of the work completed.

1. The purpose and operation of both the QNHS and the SILC surveys

1.1 The Quarterly National Household Survey (QNHS)

The Quarterly National Household Survey (QNHS) is a large-scale, nationwide survey of households in Ireland. It is designed to produce quarterly labour force estimates that include the official measures of employment and unemployment in the state (ILO basis). The survey began in September 1997, replacing the annual April Labour Force Survey (LFS).

A field-force comprising 10 field co-ordinators and 100 field interviewers interview approximately 20,000 households each quarter. Information is collected on laptop computers using computer-assisted personal interview (CAPI) software. The survey meets the requirements of *Council Regulation (EC) No. 577/98* adopted in March 1998, which requires the introduction of quarterly labour force surveys in EU member states.

1.2 The Survey on Income and Living Conditions (SILC)

The Survey on Income and Living Conditions (SILC) is a nationwide annual survey of households in Ireland. It is the official source of data on household and individual income and also provides a number of key national poverty indicators, such as the 'at risk of poverty' rate, the consistent poverty rate and rate of enforced deprivation. The Survey began in 2003 under *Council Regulation No. 1177/2003* and was the successor to the ECHP and the Living in Ireland Survey.

The CSO operates an integrated household survey field-force consisting of 10 Field Coordinators and 100 interviewers to collect information continuously for both the Survey on Income and Living Conditions (SILC) and the Quarterly National Household Survey (QNHS). For SILC the field-force team interview approximately 5,000 households per year made up of both cross-sectional and longitudinal households.

1.3 A comparison of the SILC with the QNHS

Table 1A below compares the SILC survey with the QNHS survey across key dimensions of the surveys:

Table 1A: *A comparison of the SILC survey with the QNHS survey by key dimensions, 2013*		
	SILC	**QNHS**
Primary purpose of the survey	Collection of information on Income and Living Conditions	Collection of Labour market information
Target population	All private households and their current members in the State. All household members are surveyed but only those **aged 16** or more are interviewed.	All private households and their current members in the State. All household members are surveyed but only those **aged 15** or more are interviewed.
Periodicity	Annual (over 4 annual rotations)	Quarterly (over 5 quarterly rotations)
Non-response	All household members must respond to the survey. Non-response within the household is not allowed.	Households are accepted where the majority of members agree to take part.
Average time to complete	40 minutes	10 minutes
Recall (in relation to the joblessness indicator)	Questions relate to each month of the previous twelve months (Annual)	Questions relate to the week previous to the interview (current)
Proxy Interviews **(interviews completed by another household member on behalf of an absent respondent)**	Information collected by proxy is acceptable (**29.7%** of responses in 2013 were by proxy).	Information collected by proxy is acceptable (**48.1%** of responses in 2013 were by proxy).

It is important to consider the above dimensions when comparing data on a similar domain from different sources; as data from different sources may not be fully comparable.

The primary purpose of the SILC survey is to collect information on household and individual income as well as the living conditions of all members of the household. Therefore, the questions in the survey focus on these primary issues. Information is collected on labour market activities but only in terms of classification variables. As well as the nature and focus of the SILC survey differing from the QNHS the position, structure and wording of the questions may also lead to further differences.

One area that is of particular interest is the level of recall of the respondent. In the QNHS the respondent is asked to respond about their situation in relation to work in the previous week. In SILC the respondent is asked to give an account of their situation in each of the previous twelve months. The difference in reference periods here could lead to differences in how accurately the respondents recall the information.

A proxy interview is an interview that is completed with another household member who is not the original respondent. Therefore the person completing the proxy interview is answering questions about another member of their household. In cases where the survey is responded to by proxy the likelihood of the responses being accurate is far higher when recalling the situation of a fellow household member in the previous week rather than in each of the previous 12 months. However, the proxy rate in the QNHS is higher (48.1% in 2013) than that in the SILC (29.7% in 2013).

Other factors to consider are the length of the survey (average SILC is 40 minutes versus an average of 10 minutes for the QNHS). In SILC all household members must respond while in the QNHS a response is accepted from the household where the majority of the members of the household agree to take part. The target population also differs slightly between the two and the length of time that respondents participate in the survey also differs. Respondents to the SILC survey remain in scope for four years, capturing the longitudinal component annually, while those in the QNHS remain in scope for only 5 quarters.

1.3.1 Example of recorded differences between SILC and QNHS outputs on the same domain

In 2009 the CSO published a report on Community Involvement and Social Networks[1] in Ireland using data from a 2006 QNHS module and the 2006 module on social and cultural participation module in SILC. Each module contained the same question and response categories. See Table 1B below:

[1] http://www.cso.ie/en/media/csoie/releasespublications/documents/labourmarket/2006/comsoc06.pdf

Table 1B: *SILC 2006 module question compared with the QNHS 2006 Q2 module question on the frequency of seeing relatives*	
QNHS Interviewer instruction at the start of the module was: *Only relatives who do not live in the same house should be considered*	**SILC**
How often do you see your relatives? 1. Daily 2. Every week (not every day) 3. Several times a month (not every week) 4. Once a month 5. At least once a year (less than once a month) 6. Never	How often do you see your relatives? *Interviewer instruction: Only relatives who do not live in the same house should be considered* 1. Daily 2. Every week (not every day) 3. Several times a month (not every week) 4. Once a month 5. At least once a year (less than once a month) 6. Never

The results from SILC differed significantly from those of the QNHS for this question. The SIL C results for *'Daily' were 14%* while the 'Daily' option from the QNHS was 25%. A review of both questions and responses pointed towards the placement of the interviewer instruction as the root cause of the difference in the frequencies for each response to the question. The fact that the QNHS interviewer read the instruction at the start of the module along with other information suggested a lack of recall when they approached the question. On the SILC the instruction was placed under the question and before the response options. This is just one example of how data from different surveys may not be comparable despite having similar questions. It is rarely possible to quantify what impact differences in key dimensions of the survey will have on results e.g. average time to complete the survey, level of recall etc.

In conclusion, researchers must be mindful of the limitations of comparing data from different surveys.

2. The SILC Sample

2.1 An overview of the SILC sample

Between 2010 and 2013 a two-stage sample design was used. This comprised of a first stage sample of 1690 blocks (or small areas) selected at county level to proportionately represent eight strata reflecting population density. Each block was selected to contain, on average, 30 dwellings for SILC.

The eight population density strata groups used were as follows:

1. Cities
2. Suburbs of cities
3. Mixed urban/rural areas bordering on the suburbs of cities
4. Towns and their environs with populations of 5,000 or over (large urban)
5. Mixed urban/rural areas bordering on the environs of larger towns
6. Towns and their environs with a population of 1,000 to 5,000 (other urban)
7. Mixed urban/rural areas
8. Rural areas

The second stage of sampling involved the random selection of one sample and two substitute households for each block. In cases where interviewers could not secure an interview from the sample household, they systematically approached the two substitute households in the selected order (in the same block as the sample household), in order to secure a SILC interview. In this manner variations in response by region were controlled.

In the 'implications' section of the ESRI paper the authors discuss sample substitution as a source of bias and suggest it leads to an underrepresentation of busy working households. The purpose of this section of the paper is to investigate this potential issue.

2.2 Methodology

A two track approach was taken:

1. Households who took part in SILC in year 1 (Wave 1 households) normally stay in the survey for the four year panel. Therefore, the CSO's analysis has focussed on those being asked to take part in the survey for the first time in each of the four years. Responding households

were analysed by whether they were a sample or a substitute household and by the characteristics of both the household and the head of household .

2. Information on sample households that refused was available from a non-response questionnaire completed by the interviewers at the time of the refusal. This consisted of questions which were also asked in the household questionnaire. The information from the non-response questionnaire was compared with both sample and substitute households for each year from 2010 to 2013 inclusive.

2.3 Results

2.3.1 Substitute compared with sample households by key characteristics of the household

Overall the analysis showed that substitute households were not significantly different from the sample households across key characteristics of the household. *(See Table 2A)*

For example, in 2013, 43.8% of sample households described the Principal Economic Status (PES) of the head of household as *at work*, compared with 43.7% of substitute households. The situation was similar for each year, 2010-2013, where there was no statistically significant difference in the proportions. *See Fig 2A*

Fig 2A The proportion of households where the Principal Economic Status of the head of household was *at work* by type of household and year, SILC 2010-2013 (%)

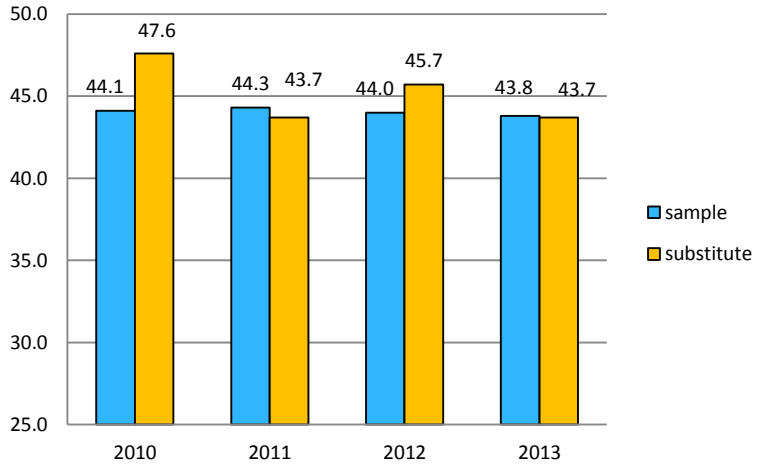


Table 2A Breakdown of the type of household by socio demographic characteristics of the household, SILC 2010-2013

Wave 1 households for each year (households entering the survey for the first time)

	2010		2011		2012		2013	
	Sample	Substitute	Sample	Substitute	Sample	Substitute	Sample	Substitute
Gender of the head of household								
Male	56.9	57.9	58.1	54.1	56.4	54.2	55.2	51.1
Female	43.1	42.2	41.9	45.9	43.6	45.8	44.8	48.9
Age group of the head of household								
15-64	73.1	74.0	74.7	75.6	75.5	75.0	73.9	71.9
65+	26.9	26.0	25.3	24.4	24.5	25.0	26.1	28.1
Principal Economic Status (PES) of the head of household								
At work	44.1	47.6	44.3	43.7	44.0	45.7	43.8	43.7
Unemployed	11.5	9.9	9.3	11.6	10.2	10.6	10.3	9.8
Student	2.1	1.6	2.4	2.4	2.3	2.1	2.3	2.4
Home duties	16.3	15.5	22.2	18.8	17.6	17.3	18.2	17.2
Retired	18.8	18.6	16.8	17.3	19.4	17.8	19.7	20.9
Not at work due to illness or disability	6.5	6.4	4.5	5.2	5.9	5.4	5.3	4.9
Other	0.8	0.6	0.6	1.1	0.7	1.1	0.4	1.1
Household composition								
1 adult aged 65+	13.2	12.1	12.5	12.6	11.2	13.0	14.5	14.7
1 adult aged <65	15.2	13.9	12.6	14.2	13.6	14.1	13.9	14.8
2 adults, at least 1 aged 65+	12.0	10.7	12.6	11.2	11.8	11.3	10.7	13.0
2 adults, both aged <65	15.4	14.9	13.3	14.7	13.9	14.7	13.8	13.1
3 or more adults	7.2	9.4	8.9	9.6	9.6	10.0	9.6	8.7
1 adult with children aged under 18	7.5	8.0	7.1	7.4	7.8	7.9	5.6	6.8
2 adults with 1-3 children aged under 18	21.8	23.3	23.3	23.5	22.9	22.3	24.6	22.3
Other households with children aged under 18	7.8	7.7	9.7	6.8	9.2	6.8	7.4	6.6
Type of dwelling								
Detached	37.7	34.7	37.4	33.4	38.2	35.1	37.7	33.6
Semi-detached	33.1	34.3	35.4	34.7	34.7	35.8	34.3	36.0
Terraced	24.0	24.2	21.3	25.4	19.9	22.1	21.4	22.9
Apartment/Flat/Bedsit/other	5.2	6.9	5.7	6.4	7.3	7.0	6.6	7.6
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

2.3.2 Non-responding households compared with sample and substitute households

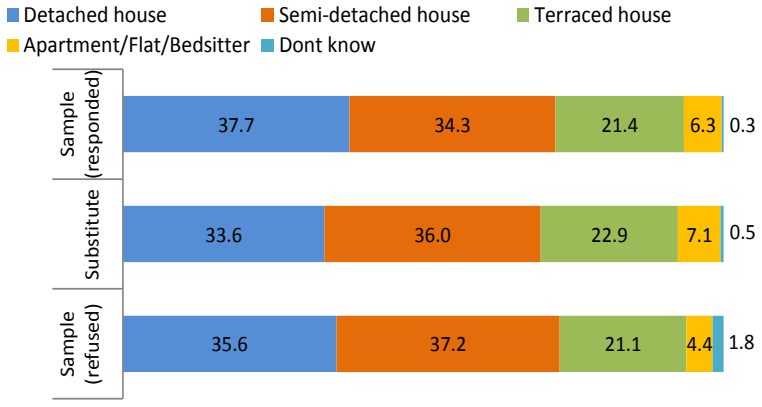
An analysis of available data on non-responding households for 2010 to 2013 was carried out. This data was compared with both sample and substitute households. The three main questions related to;

1. The type of dwelling
2. Whether the household contained a child or not and
3. The number of rooms in the dwelling

The responses in the case of non-responding households were completed by the interviewer at the time of the refusal. Feedback from the field staff indicated that the question on the number of rooms in the non-responding dwelling was the most difficult of the three questions to answer. The results discussed below focus on 2013, however, the 2013 results were in line with what was found in 2010, 2011 and 2012. *See Appendices A-D*

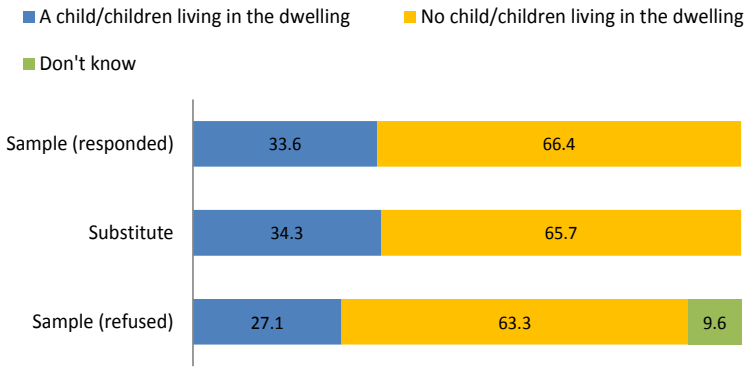
In 2013, the proportion of households in each type of dwelling was consistent across sample households that responded, sample households that refused and substitute households. This pattern was repeated in each year from 2010 to 2012. (*See Fig 2B and Appendix A)*

Fig 2B Type of dwelling by households that responded, households that refused and substitute households, SILC 2013 (%)

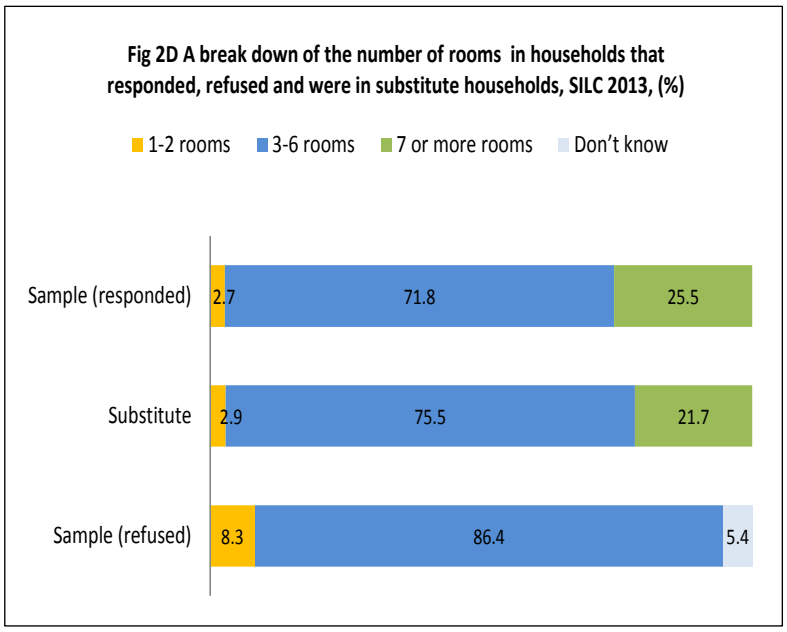


Just over one third of households that responded, both sample and substitute households, had a child/children living in the dwelling in 2013. Households that refused had a slightly lower proportion, at 27.1%. However, when the 'don't know' element is excluded the proportions are consistent with both types of responding households. This pattern was followed in all years between 2010 and 2012. (See Fig 2C and Appendix B for details).

Fig 2C A breakdown of households with/without children by households that refused, responded or were substitute households, SILC 2013 (%)



In 2013, in the case of sample households that refused, available information on the number of rooms in the dwelling differed somewhat from the sample and substitute households. This was an estimate by the interviewers and was less obvious than other characteristics of the dwelling. This result was consistent in all other years from 2010 to 2013 inclusive. *(See Fig 2D and Appendix 1)*



2.4 Conclusion

The first part of this analysis has shown that sample households and substitute households do not differ significantly from each other across key characteristics of the household. This result was consistent over time, 2010 to 2013 inclusive.

A second element of this analysis focussed on sample households that refused to take part. Information was available for this group from a non-response questionnaire completed by the interviewer at the time of the refusal. Results showed that sample households that refused are not significantly different from sample or substitute households by type of dwelling and whether or not there are children living in the household. We have not focussed on the differences between the sample, substitute and refused households by number of rooms in the dwelling as we believe this to be a less reliable variable when collected as part of the non-response questionnaire. Therefore one can conclude, given the information available, households that refuse are not statistically different from either the households that respond or the households that replace them in the sample (substitute households).

In conclusion, this analysis shows the SILC sampling methodology (2010 to 2013) to be robust and not unduly affected by the practice of sample substitution. It clearly shows that it should not lead to an under-representation of busy working households as is suggested by the ESRI Technical Paper referenced earlier.

3. Calibration

This section of the paper reviews the proposal in the ESRI paper; a change to the calibration methodology to increase the proportion of people who describe their Principal Economic Status (PES) as 'at work'. It will begin with a brief introduction to calibration and will continue by looking at the calibration methodologies of other EU countries taking part in EU-SILC. This section presents a set of alternative weights, an alternative time series of key indicators and draws a conclusion.

3.1 Calibration

Calibration is an approach used by survey practitioners to improve estimates from sample surveys when additional information about the population that is under study is available. The key feature of *calibration* is the modification of the sample survey weights to reproduce from the sample known population characteristics, usually totals. For example, in SILC, the distribution of the population by age and gender of the population was taken from the Census to improve survey weights. In general, it is considered inappropriate to calibrate one set of survey variables to another as each set of results contain known and unknown biases which are compounded through calibration.

In the CSO calibration is carried out using CALMAR. CALMAR is a SAS macro written at INSEE (French national statistics institute) in 1992-1993 and subsequently upgraded with CALMAR 2 at the same institution in 2000. The CALMAR macro is run using PC SAS at the CSO.

3.2 Methodology

Initially a review of the calibration methodologies, of a sample of other EU countries taking part in the EU-SILC was undertaken. This allows a comparison of the methodology used in Ireland with other EU countries and determines consistency. Information on the methodologies applied by other Member States was obtained from their Quality Reports available on the Eurostat website.

In this paper the SILC calibration methodology is also compared with that of the QNHS. The analysis focussed initially on the differences in the methodologies and subsequently on the impact of alternative calibration methodologies on the population weights.

For the years 2010 and 2011 this involved adjusting the SILC weights to take account of the results of Census 2011. This was a necessary first step in replicating the calibration methodology of the QNHS for those two years. The next step was to expand the age categories to 5-year age groups and remove household composition as a calibration variable. Finally, an additional calibration category of PES was constructed. To accommodate sample size restrictions it was an aggregated version of PES; *at work, not at work, not in the labour force*.

Population weights for each calibration methodology were created for all years, 2010-2013. The results for key indicators under each of the population weights over time were then calculated. The results are presented below.

3.3 Results

3.3.1 A comparison of EU calibration methodologies

Ireland (IE) - Calibration to population totals (Census totals adjusted with Labour Force Survey (QNHS) information during inter-censal years)

Age group	Sex	Region	Household composition
0-14	Male	NUTS3 (8 regions)	1 adult no children
15-34	Female		2 adults no children
35-64			3 adults no children
65+			1 adult 1+ children
			2 adults 1-3 children
			Other households with children

SILC calibration methodologies of EU countries with publicly available quality reports are presented below:

United Kingdom (UK)

Age group	Sex	Sex	Region
0-4	Males and Females	Males and Females	Metropolitan
5-15	Males and Females	Males and Females	Non-metropolitan
16-24	Males	Females	London
25-44	Males	Females	South East
45-64	Males	Females	Wales
65-74	Males	Females	Scotland
75+	Males	Females	Northern Ireland

Portugal (PT)

Age group	Sex	Region	Household size
5 year age groups	Male/Female	NUTS 2	1/2/3/4+

Spain (ES)

Age group	Sex	Region	Household size
0-15	Male/female	Autonomous Community	1/2/3/4+
5 year groups			
75+			

This review showed that the calibration methodology used in Ireland was broadly in line with practices in other EU countries. Therefore the focus moved to the QNHS calibration methodology.

3.3.2 A comparison with the QNHS calibration methodology[2]

To review the proposal of recalibration as set out by the authors in the ESRI paper, the impact of changes to the calibration variables was analysed. The first step was to revise the current calibration totals for Census 2011 revisions (this applied to 2010 and 2011 only). This would allow for a more direct comparison with the QNHS data. See the change to the PES and key indicators for 2011 in Table 3A below:

Table 3A Key indicators of poverty and social inclusion and PES by weight, SILC 2011

	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES	(E) QNHS (PES)	
PES (%)						
At work	34.9	35.18	37.17	39.29	39.29	
Unemployed	8.64	8.71	9.33	8.09	8.11	
Student	7.47	7.73	6.57	6.45	7.36	
Home duties	12.94	12.83	12.34	11.9	11.56	
Retired	7.69	7.65	7.18	7.13	7.80	
Not at work due to Illness/disability	3.33	3.31	3.23	3.04	N/A	
Other inactive person	1.23	1.26	1.19	1.13	3.21	
Under 16	23.79	23.32	22.99	22.96	22.68	
					Confidence Interval lower limit	*Confidence Interva Upper limi*
At risk of poverty Rate (%)	15.96	15.92	14.52	13.30	*14.60*	*17.4(*
Deprivation rate (%)	24.51	24.48	23.94	22.64	*22.80*	*26.3(*
Consistent Poverty rate (%)	6.89	6.92	6.27	5.60	*6.00*	*7.8(*
Equivalised disposabe income (€)						
Mean	€21,440	€21,479	€22,015	€22,505	*€20,935*	*€21,944*
Median	€18,148	€18,171	€18,887	€19,597	*€17,544*	*€18,737*

PES for weighting purposes = at work, not at work, not in the labour force

The results show, the revision of the calibration totals to take account of Census 2011 information had a little or no impact on the breakdown of PES and key indicators of income, poverty and social

[2] Information for 2013, 2013 and 2010 is presented in Appendices E, F and G respectively. The 2011 figures are discussed in detail here as they include an adjustment for Census 2011.

exclusion. The next step was to replicate in SILC, in so far as was possible, the calibration variables used as part of the QNHS weighting methodology. See the calibration variables used as part of the QNHS weighting methodology in Table 3B below:

Table 3B Calibration variables for the QNHS
Matrix 1
Age group: 5 year age group, 18 categories Gender: 2 categories *Region*: NUTS 3, 8 categories
Matrix 2
Age group: 2 categories, 0-14 and 15+ *Gender*: 2 categories *Nationality*: 5 categories –Ireland, UK, 'old ' EU, 'new' EU and others

Nationality, as collected in SILC, is not considered to be a robust enough indicator to be called an official statistic. This is due to the smaller sample (when compared with the QNHS) and the nature of the SILC survey. As a result it would be inappropriate to use this variable as part of the calibration process for SILC. Therefore changes to the original calibration categories used in the SILC methodology will focus on Matrix 1.

Region was already at NUTS 3 so there was no change to this calibration variable. This was the case for gender also. Age group was expanded to 5 year age group and household composition was dropped. See results in Table 3C below:

Table 3C Key indicators of poverty and social inclusion and PES by weight, SILC 2011

	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES	(E) QNHS (PES)	
PES (%)						
At work	34.90	35.18	37.17	39.29	39.29	
Unemployed	8.64	8.71	9.33	8.09	8.11	
Student	7.47	7.73	6.57	6.45	7.36	
Home duties	12.94	12.83	12.34	11.9	11.56	
Retired	7.69	7.65	7.18	7.13	7.80	
Not at work due to Illness/disability	3.33	3.31	3.23	3.04	N/A	
Other inactive person	1.23	1.26	1.19	1.13	3.21	
Under 16	23.79	23.32	22.99	22.96	22.68	
					Confidence Interval lower limit	*Confidence Interval Upper limit*
At risk of poverty Rate (%)	15.96	15.92	14.52	13.30	*14.60*	*17.40*
Deprivation rate (%)	24.51	24.48	23.94	22.64	*22.80*	*26.30*
Consistent Poverty rate (%)	6.89	6.92	6.27	5.60	*6.00*	*7.80*

Results showed statistically significant changes in the at-risk-of-poverty rate and in the mean and median equivalised disposable income. Movement in other key indicators remained within the confidence interval limits and therefore was not considered statistically significant.

As the Survey on Income and Living Conditions (SILC) is used to estimate household joblessness, the next step was to include a proxy for joblessness as part of the calibration. Therefore PES was aggregated into 'at work', 'not at work' and 'not in the labour force' categories were used. PES is a self-defined status and those who described their Principal Economic Status as 'at work' was included in the first category while the remainder split between 'not at work' and not in the labour force. This calibration category was added to the 'matrix 1' categories of the QNHS. See Table 3D below for results:

Table 3D Key indicators of poverty and social inclusion and PES by weight, SILC 2011

	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES	(E) QNHS (PES)	
PES (%)						
At work	34.9	35.18	37.17	39.29	39.29	
Unemployed	8.64	8.71	9.33	8.09	8.11	
Student	7.47	7.73	6.57	6.45	7.36	
Home duties	12.94	12.83	12.34	11.9	11.56	
Retired	7.69	7.65	7.18	7.13	7.80	
Not at work due to Illness/disability	3.33	3.31	3.23	3.04	N/A	
Other inactive person	1.23	1.26	1.19	1.13	3.21	
Under 16	23.79	23.32	22.99	22.96	22.68	
					Confidence Interval lower limit	*Confidence Interval Upper limit*
At risk of poverty Rate (%)	15.96	15.92	14.52	13.30	*14.60*	*17.40*
Deprivation rate (%)	24.51	24.48	23.94	22.64	*22.80*	*26.30*
Consistent Poverty rate (%)	6.89	6.92	6.27	5.60	*6.00*	*7.80*

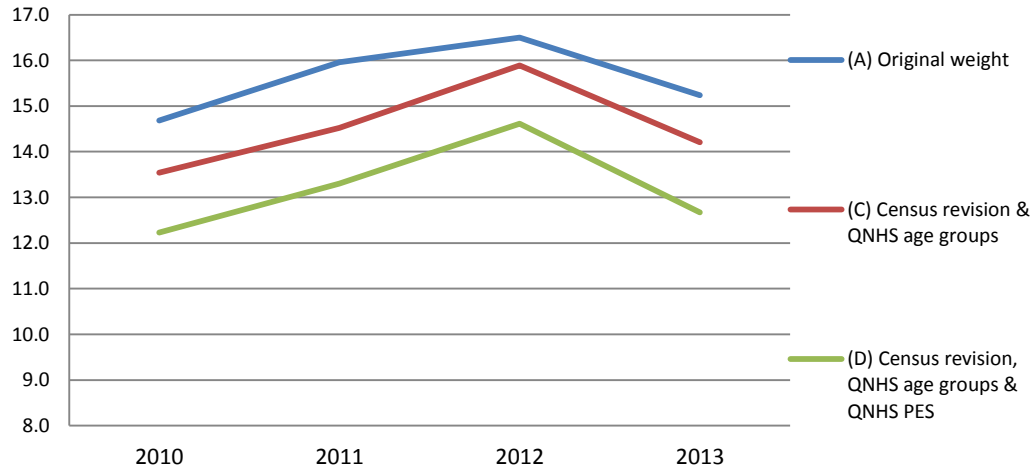
Results show that all key indicators for 2011 are significantly different from the original under the calibration which includes PES. The at risk of poverty rate is significantly lower at 13.3%, the deprivation rate is also lower at 22.6%, the consistent poverty rate is lower at 5.6% while mean and median equivalised disposable income are higher at €22,505 and €19,597 respectively. In summary, poverty and deprivation rates are significantly lower than the original values in 2011 while mean and median income are significantly higher.

3.3.3 Time series of results for key indicators[3], 2010-2013

The results show the impact of changes to the calibration methodology on key indicators of poverty and social exclusion over time. The main results are highlighted below;

1. The *at-risk-of-poverty-rate* maintained the same trend across all three alternative population weights between 2010 and 2013 inclusive. All three showed an increase up to and including 2012 before dropping back somewhat in 2013. There is some difference in the level of these changes by population weight. For example, in 2013 the *at-risk-of-poverty-rate* was 15.2% under the original weight, 14.2% using the Census revision and QNHS age group weight (C) and it was 12.7% when the Census revision, QNHS age group and PES weight was used. (*See Fig 3A)*

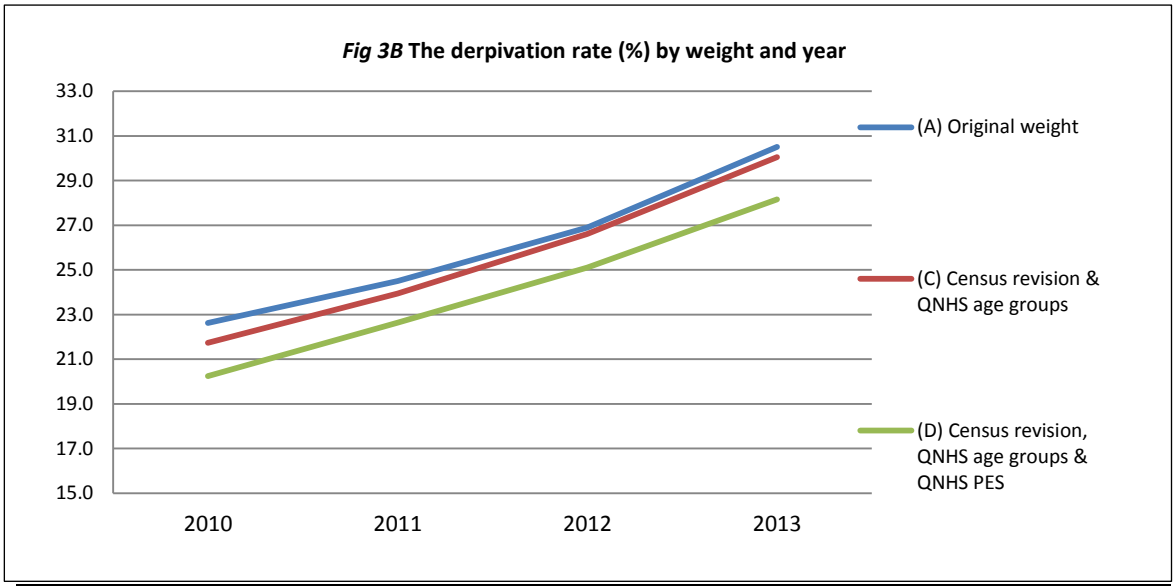
Fig 3A **The at risk of poverty rate (%) by weight and year**



Year	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES
2010	14.7	14.6	13.5	12.2
2011	16.0	15.9	14.5	13.3
2012	16.5	NA	15.9	14.6
2013	15.2	NA	14.2	12.7

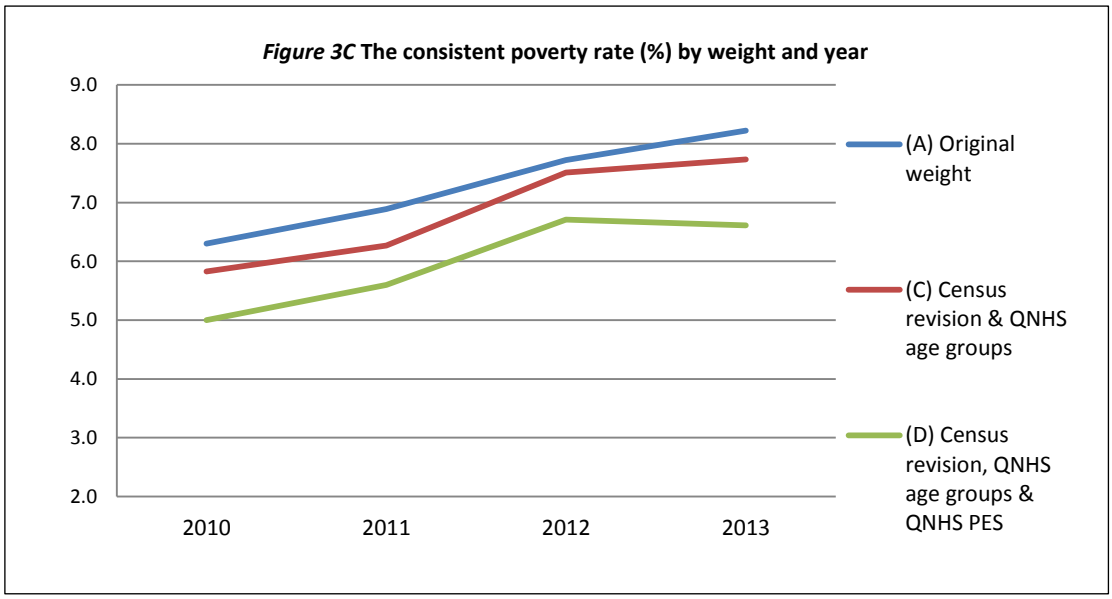
2. The deprivation rate increased steadily between 2010 and 2013 from 22.6% to 30.5% respectively using the original weights. This trend was closely followed by results produced using the population weight adjusted for Census results and QNHS age-groups. Results showed that the rate increased from 21.7% in 2010 to 30.1% in 2013. The trend remained the same for the final weight but results were recorded at a slightly lower level, 20.3% in 2010 and 28.2% in 2013. *(See Fig 3B)*

[3] See the Background Notes for an explanation of the indicators discussed.



Year	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES
2010	22.6	22.6	21.7	20.3
2011	24.5	24.5	23.9	22.6
2012	26.9	NA	26.6	25.1
2013	30.5	NA	30.1	28.2

2. The results for consistent poverty were similar to other indicators in that the values exhibited the same general trend over time. However, the results did not map as closely as we have seen with other indicators using the same weights. Changes in the *at-risk-of-poverty-rate* and deprivation rate under the alternative weights may have contributed to this. The consistent poverty rate is the proportion of those who are both at risk of poverty and experiencing deprivation. (See Fig 3C)



Year	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES
2010	6.3	6.3	5.8	5.0
2011	6.9	6.9	6.3	5.6
2012	7.7	NA	7.5	6.7
2013	8.2	NA	7.7	6.6

4. Mean and median equivalised disposable income held the same trend over time using each of the three population weights though the level of income differed by population weight. In general mean and median equivalised disposable income decreased between 2010 and 2012 before increasing again in 2013. *(See Table 3E and Fig 3D)*

Figure 3D **Mean and median equivalised disposable income by weight and year**

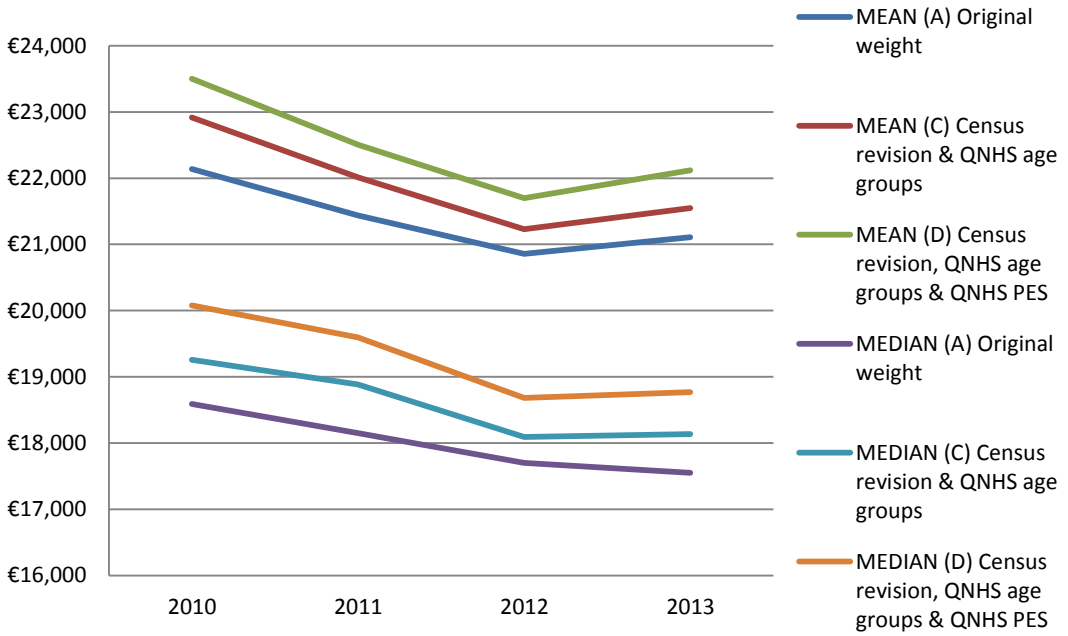


Table 3E **Mean and median equivalised disposable income by population weight and year, SILC 2010-2013**

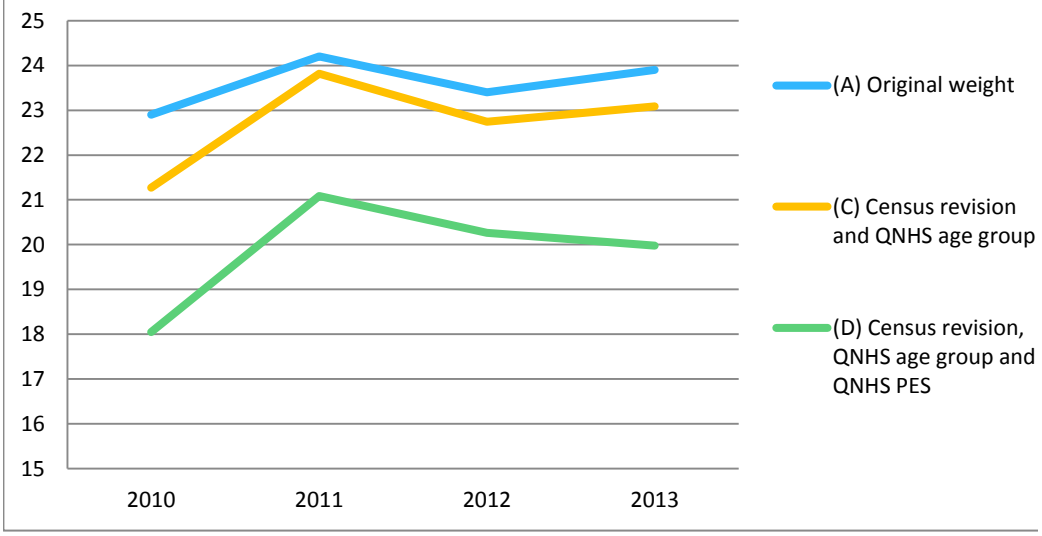
			Weight	
Year	(A) Original weight	(B) Census revision[1]	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES
Mean equivalised disposable income €				
2010	€22,138	€22,270	€22,916	€23,502
2011	€21,440	€21,479	€22,015	€22,505
2012	€20,856	NA	€21,232	€21,699
2013	€21,106	NA	€21,546	€22,121
Median equivalised disposable income €				
2010	€18,591	€18,611	€19,256	€20,081
2011	€18,148	€18,171	€18,887	€19,597
2012	€17,702	NA	€18,090	€18,682
2013	€17,551	NA	€18,135	€18,770

[1] NA (not applicable) refers to 2012 and 2013 values as no census revision was necessary

3.3.4 Very low work intensity (jobless households)

In 2013, 23.9% of those aged less than 60 years old lived in households with very low work intensity or jobless households in Ireland. This was the highest rate reported among EU countries taking part in EU-SILC in 2013. When calculated using the using the Census revision and QNHS age-group weight this figure was 23.1% and when PES is included in the calibration the figure fell to 20.0%. Under either of these two alternative weights Ireland would remain the country with the highest level of household joblessness in 2013 when compared to its EU counterparts. A time series of the results is shown in *Fig 3E below and Appendix H:*

Fig 3E The percentage of the population aged less than 60 living in households with very low work intensity by population weight and year



Year	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES
2010	22.9	NA	21.3	18.1
2011	24.2	NA	23.8	21.1
2012	23.4	NA	22.7	20.3
2013	23.9	NA	23.1	20.0

3.4 Conclusion

This section of the paper began by reviewing the calibration methodology followed by other EU countries taking part in the EU-SILC. This review showed that the methodology currently followed by Ireland was consistent with that of its EU counterparts.

The next step involved replicating the methodology followed by the QNHS. This was carried out in a step by step way with results at each stage being presented. The final population weight presented

incorporated the QNHS PES variable as part of the calibration. This ensured that the proportion of those at work matched the QNHS figures.

The analysis showed that changes in key indicators as a result of a change in the methodology remained within the upper and lower bound of the confidence interval for changes relating to Census 2011, signalling no statistically significant change in the indicators. However, the introduction of the expanded QNHS age groups and QNHS PES variable to the calibration methodology resulted in a significant change in the key indicators. In summary, the at risk of poverty rate, consistent poverty rate and deprivation rate are significantly lower and the mean and median income are significantly higher than the values calculated under the original weight.

A time series of the results from 2010 to 2013 showed that the impact of the changes to the calibration methodology has been consistent across key indicators of poverty and social exclusion. The results show poverty and deprivation have been recorded at a lower level using the alternative weights but more importantly the data trend has held using the alternative weights. Mean and median income are at a higher level under the alternative methodologies but again the data trend has mostly held. The very low work intensity indicator showed a similar trend over time across each of the alternative weights. In 2013 the QNHS PES weight resulted in a lower rate of household joblessness. However, Ireland continued to have the highest level of household joblessness among its EU counterparts using any of the alternative weights.

To conclude, in order to match the proportion of those with a PES of 'at work' in the QNHS, the calibration methodology currently followed for the EU-SILC in Ireland would need to be changed to incorporate the PES variable. This would result in significant changes to key indicators of income, poverty and deprivation over time and set us apart from our EU counterparts in terms of our calibration methodologies.

The above approach demonstrates that calibration can be applied to any survey to match the outputs of another. The appropriateness of this approach is discussed in Section 4.

4 Consultation with EUROSTAT

In order to comprehensively address all matters raised by the ESRI in their technical paper the CSO arranged a mission to EUROSTAT in August 2015. EUROSTAT is responsible for setting the regulation under which the Survey on Income and Living Conditions operates. It provides a comprehensive set of operating guidelines which cover data collection, editing, validation, weighting and results. Therefore, it was considered important that their views on the outcome of this research paper were sought and acted upon.

The following extract summarises the views of EUROSTAT on the issues raised in the ESRI Technical Paper and the research already presented in this paper:

- *According to the SILC regulation on sampling and imputation, as a rule, substitutions should not happen. In case the response rate is below 60%, they can be applied but with strict control. The analysis you provide, give some hints that substitutions may not be the source of discrepancy with other surveys.*
- *Discrepancies may occur for a series of reasons: differences in the questionnaires and in the survey environments, high sampling and non-sampling error, etc. It is difficult to find a comprehensive explanation without having an idea on the whole process behind the two surveys.*
- *Calibrating one survey on another is not a good way to solve the problem. While you may have consistent figures on one indicator, you may provoke bias on the rest of the survey. Furthermore calibrating a survey on another survey, which is subject to sampling and non-sampling error is not methodologically sound. Other surveys may be used to compare results, but the solution is not in calibrating on surveys.*

The EUROSTAT team also added that it was inappropriate to use PES or an ILO variable as a calibration variable for the EU-SILC.

EUROSTAT recommended that a population weight excluding substitute households be created and results across key indicators produced. These results could then be compared with the results including all households and individuals. If the results of the analysis did not show significant differences in the value of the indicators then it could be concluded that the use of a tightly controlled substitution approach does not lead to significantly different results than if substitution had not been used. Table 4A shows the results of this calibration:

Table 4A **Key indicators of poverty and social exclusion for all individuals interviewed and just individuals from sample households (excluding substitute households), SILC 2013**

		Original weight		Census revision & QNHS age groups		Census revision, QNHS age groups & QNHS PES	
	Year	*All individuals*	*Original sample (excluding substitutes)*	*All individuals*	*Original sample (excluding substitutes)*	*All individuals*	*Original sample (excluding substitutes)*
At risk of poverty %							
	2013	15.2	15.3	14.2	14.2	12.7	12.4
Deprivation rate %							
	2013	30.5	30.0	30.1	29.4	28.2	27.7
Consistent poverty rate %							
	2013	8.2	8.0	7.7	7.5	6.6	6.3
Mean equivalised disposable income €							
	2013	€21,106	€20,968	€21,546	€21,460	€22,121	€22,021
Median equivalised disposable income €							
	2013	€17,551	€17,355	€18,135	€17,992	€18,770	€18,551
Principal Economic Status (PES) %							
At work		35.6	35.7	37.3	37.5	39.5	39.5
Unemployed		8.5	8.7	8.9	9.2	7.1	7.1
Student		8.2	8.2	7.2	7.1	7.2	7.4
Home duties		10.8	10.9	10.4	10.5	10.2	10.4
Retired		8.9	8.7	8.3	8.1	8.3	8.2
Not at work due to illness or disability		3.7	3.6	3.7	3.5	3.6	3.5
Other		1.0	0.9	0.9	0.9	0.9	0.8
Aged under 16		23.3	23.3	23.2	23.2	23.2	23.2

The analysis shows that the results generated including substitute households do not differ significantly from those excluding substitute households for 2013. This is true for the original 2013 weight and for each of the weights created using an alternative calibration methodology. These results indicate that the use of sample substitution in SILC has not impacted the key indicators.

5. Evidence from other sources

5.1 Household Budget Survey (HBS) 2010 and SILC 2010

In 2015 the CSO SILC team produced a technical note providing a comparison between five EU-SILC indicators compiled from two independent data sources, i.e. the 2010 EU-SILC data and the 2010 Household Budget Survey (HBS) data. The aim of this comparison was to evaluate the performance of Ireland's EU-SILC data when compared with other EU countries taking part in EU-SILC. See Table A below for results of the analysis for key indicators:

Table A: Comparison HBS 2010/EU-SILC 2010

	At-risk-of-poverty		At-risk-of-poverty		Relative at-risk-of		Income quintile		Gini Coefficient	
	EU-SILC	HBS	EU-SILC	HBS	EU-SILC	HBS	EU-SILC	HBS	EU-SILC	HBS
Austria	12,635	12,213	14.7	13.5	21.8	17.9	4.3	3.5	28.3	24.5
Belgium	11,678	12,129	14.5	14.8	18	19.2	3.9	4	26.6	27.2
Bulgaria	1,810	1,326	20.7	15.9	29.6	19.6	5.9	4	33.2	26.8
Cyprus	9,708	9,881	15.6	14.3	18	18	4.5	4.2	30.1	28.7
Germany	11,278	11,211	15.7	14.5	20.7	16.9	4.5	4.3	29.3	29.2
Denmark	15,401	18,836	13.3	16.4	21.6	14.2	4.4	3.9	26.9	26.6
Czech Rep	4,235	4,626	9	6	21.1	14.9	3.5	2.8	24.9	20.6
Estonia	3,436	2,914	15.9	15.6	23.2	24.8	5	4.7	31.3	30.6
Spain	7,600	6,732	21.4	18.1	32.3	22.2	7.2	4.9	34.4	30.6
Finland	12,809	13,305	13.1	13.1	13.8	15.9	3.6	3.6	25.4	25.1
France	11,976	11,395	13.2	16.5	19.5	22.5	4.4	5	29.8	31.3
Greece	7,178	7,486	20.1	20.5	23.4	19.8	5.6	5.5	32.9	32.8
Croatia	3,486	3,358	20.6	17.7	27.6	27.2	5.5	4.7	31.6	29.3
Hungary	7,178	2,678	12.3	12.6	16.5	17.2	3.4	3.8	24.1	26.3
Ireland	**12,307**	**12,836**	**15.2**	**16.7**	**15.5**	**16.7**	**4.7**	**4.9**	**30.7**	**31.4**
Lithuania	2,418	2,698	20.5	19	32.6	22.9	7.3	5.1	37	30.8
Latvia	2,682	1,486	20.9	19	28.9	27.8	6.8	6.4	35.9	35.4
Malta	6,261	6,299	15.5	15.8	17.3	18.4	4.3	4	28.6	27.2
Poland	2,643	2,623	17.7	17.8	22.2	24.1	5	5.4	31.1	32.6
Portugal	5,207	5,132	17.9	17.3	22.7	21.9	5.6	6.1	33.7	36.2
Romania	1,222	1,254	21	22.3	30.6	27.3	6	5.9	33.3	33.4
Sweden	11,825	12,303	12.9	12	19.7	19.9	3.5	3.7	24.1	25.3
Slovenia	7,042	6,412	12.7	16.3	20.2	22.3	3.4	4.1	23.8	26.1
Slovakia	3,670	3,586	12	9	25.7	16.1	3.8	3.1	25.9	22.3
United Ki	10,263	10,875	17.1	19.9	21.4	26	5.4	6.1	32.9	35.1

Source: Eurostat 'Household Budget Survey 2010 Wave EU Quality Report'. Doc. LC/142/15/EN

The results in Table A show that:

1. For the *at-risk-of-poverty* threshold and the *at-risk-of-poverty-rate* the difference between the two survey estimates for Ireland is very similar to those experienced by other European countries, on average.

2. The overall consistency between the two surveys is more evident for the 'at risk of poverty threshold' and the 'at risk of poverty rate' than for 'relative at risk of poverty gap'. However, Ireland performs particularly well in providing a consistent measure of the 'relative at risk of poverty gap' using the HBS and EU-SILC 2010 datasets.
3. For the Income Quintile Share Ratio and the Gini coefficient the HBS data tends to underestimate the value of these indicators in many countries. However Ireland provides very consistent results for both measures.

5.2 Household Finance and Consumption Survey (HFCS) 2013 and SILC 2013

The Household Finance and Consumption Survey (HFCS) was carried out in Ireland between March and September 2013. The HFCS was designed to collect detailed information on household assets and liabilities, income, consumption and credit constraints.

While the primary focus of the HFCS survey was on the assets and liabilities of households, data was also collected on income and used as an important classification variable. The income figures measured by the HFCS were compared with the income figures from the EU SILC (Survey on Income and Living Conditions) survey. In other countries which have conducted both the HFCS and SILC survey, estimates of HFCS gross income per household as a percentage of SILC income per household have ranged from 81% for Slovenia to 112% for Belgium but most countries are reasonably close to 100%. In the case of Ireland the average gross weekly equivalised household income was €538.06 for the HFCS while the equivalent figure for SILC 2013 was €537.66, a difference of only 40 cents.

5.3 SILC Labour Market Estimates compared with the QNHS and Earnings and Labour Cost Survey 2013

In July 2015 Micheal Collins of the Nevin Economic Research Institute (NERI) published a working paper which profiled those on the minimum wage. The paper, *A Profile of Those on the Minimum Wage*, contained a section relating to the representativeness of SILC labour market estimates. The paper acknowledged the challenges in comparing the SILC data with the QNHS data given the different ways each survey captures those at work. Someone considered at work according to the ILO definition in the QNHS may describe themselves as a student in SILC and so on. Given this the author acknowledges that the two approaches are likely to differ substantially. In order to accurately compare the two sources of data the author compares the number of people with an employee

income in SILC with the QNHS measure of employees. Information from the Earnings and Labour Costs Survey are also included in the analysis shown in Table 5B below:

Table 5B Extract from M.Collins (NERI) paper		
Indicator	**CSO Labour Market Data 2013**	**SILC Analysis 2013**
Annual average earnings	€35,830	€35,487
Average hourly earnings	€20.75	€20.63
Average weekly hours	31.55hrs	33.22hrs
Employees/Any employee income	1,555,775	1,530,624
Employees % male	49.0%	47.5%
Employees % female	51.0%	52.5%

Source Table 2 A Profile of those on the Minimum Wage, Collins M, NERI working paper[4]

5.4 Conclusion

The comparisons outlined in this section of the paper provide evidence that the Irish EU-SILC yields robust and reliable measures of income, poverty, social exclusion and living conditions. The comparison of HFCS with the SILC further reinforces the accuracy of the income data. Labour market estimates from the SILC compare favourably with those of both the QNHS and the Earnings and Labour Cost Survey. The cumulative effect of such strong evidence is to confirm that that SILC more than adequately captures income data and indicators of poverty and social exclusion.

[4] CSO labour market data is for 2013 and where data is quarterly it is averaged over the four quarters to provide an annual figure. Average annual earnings is from the *Earnings and Labour Costs Annual 2013*. Hourly earnings and hours worked data is from the *Earnings and Labour Costs Quarterly Survey*. Employee estimates are from the *Quarterly National Household Survey*. SILC values for annual average earnings and hourly earnings are calculated for the sample of employees for whom hourly earnings data is calculable.

6. Summary and Conclusion

6.1 Introduction

This paper is a response to a Technical paper published by the ESRI on behalf of the Department of Social Protection (DSP) in May 2015. The ESRI paper examined figures on household joblessness (very low work intensity) from two different sources, the QNHS and the SILC, and set about explaining the difference in the measured level of household joblessness between the SILC and the QNHS. The authors of the paper concluded that the bulk of the difference between the indicators could be attributed to an under-representation of busy working households. They recommended re-calibration and a review of the practice of sample substitution as the solution to the perceived issue of under-representation. This paper took a step by step approach to examining potential issues raised in the ESRI paper.

6.2 Summary of each section

Section 1 of this paper gave a brief background to both the SILC and the QNHS and then compared them across key dimensions. The analysis showed that the surveys differed across all dimensions discussed. From the purpose of the surveys to the target population, length of time in the field etc. there were significant yet unquantifiable differences between the two data sources. A simple yet powerful example of a recorded difference between the SILC and the QNHS outputs on the same domain was given. The example demonstrated to researchers the limitations of comparing data from different surveys.

Section 2 reviewed the practice of sample substitution and its effect on key characteristics of the household. This section of the paper also examined the results of a non-response questionnaire completed by interviewers at the time of the household recruitment. It compared the characteristics of non-responding households with those of responding households, both types, sample and substitute households. The results of both analyses showed the SILC sampling methodology to be robust and not unduly affected by the practice of sample substitution. There was no evidence to support the assertion made by the authors of the ESRI paper that sample substitution leads to an under-representation of busy working households.

In section 3 calibration is discussed. The first step was to review the practices of some other countries taking part in EU-SILC. This was followed by a step by step construction of population weights using alternative calibration methodologies. A time series of the data from 2010 to 2013 is also presented. The results showed the methodology currently followed by Ireland to be consistent

with other EU countries taking part in EU-SILC. As the calibration variables were altered, to replicate the QNHS methodology and the proposal made in the ESRI paper, the impact on key indicators is more pronounced. In summary, the at-risk-of-poverty-rate, consistent poverty rate and the deprivation rate were significantly lower and mean and median incomes were significantly higher as a result of the changes in the calibration variables. There was no significant change to the Low Work Intensity variable until the QNHS PES variable was added to the calibration methodology. However despite a reduction of just over three percentage points in the rate, Ireland continued to have the highest level of Low Work intensity among its EU counterparts. To conclude, in order to match the proportion of those with a PES of 'at work' in the QNHS, the calibration methodology currently followed for the EU-SILC in Ireland would need to be changed to incorporate the PES variable. This would result in significant changes to key indicators of income, poverty and deprivation over time and set us apart from our EU counterparts in terms of our calibration methodologies.

Section 4 of the paper focussed on the mission to EUROSTAT in August 2015. EUROSTAT is responsible for setting the regulation and guidelines under which the SILC survey operates. After presenting the potential issues raised by the ESRI paper and the analysis included in this paper EUROSTAT concluded the following:

1. Sample substitution is unlikely to be the source of the difference in the measured level of household joblessness between the SILC and the QNHS.
2. Discrepancies between sources can occur for a series of reasons including differences in surveying environments, different questionnaires etc. It is difficult to find a comprehensive explanation without examining each element of the survey process in detail.
3. Calibrating one survey to another is not a methodologically sound way to solve the discrepancy between the two indicators. The inclusion of PES or an ILO variable in the calibration is not appropriate for EU-SILC.
4. A further analysis should be conducted. This should involve excluding substitutes from the sample and calculating an alternative weight.

The results of the further work suggested by Eurostat showed no statistically significant difference between the values of key indicators when substitutes were included and the results excluding substitutes. Results show, the use of sample substitution has not impacted the key SILC indicators as proposed by the authors of the ESRI paper.

Section 5 reviews other sources to evaluate the robustness of key SILC indicators. HBS 2010, the HFCS 2013, the QNHS and the Earnings and Labour Cost Surveys 2013 are all used for comparison

purposes. Results show that SILC compares positively to all other sources referenced. Most notably, labour market estimates from the QNHS and the Labour Cost Survey when compared with SILC gave very similar outcomes. The cumulative effect of such strong evidence is to confirm that the SILC more than adequately captures income data and indicators of poverty and social exclusion. This is again contrary to the proposition made by the authors of the ESRI paper.

6.3 Conclusion

The Survey on Income and Living Conditions (SILC) is an important source of information, both nationally and at EU level, for policy makers, interest groups etc. Any quality concerns raised are important to the CSO, however, it is essential that the CSO is given appropriate time to investigate such concerns before they are put into the public domain. This paper is a response to a Technical Paper published by the ESRI in May 2015 where the authors explicitly stated in its conclusion that the underrepresentation of working households in SILC:

> *…has potentially serious consequences, not only for the indicator of household joblessness calculated on the SILC data, but also because it raises questions about the adequacy of the SILC data in representing the income distribution in Ireland*[5]*.*

The authors later go on to question the validity of key indicators of income, poverty and social inclusion which they say are likely to be understated.

This paper has shown the following:

1. There are significant yet unquantifiable differences between the QNHS and the SILC which could contribute to differences in the measured level of any indicator common to both.
2. There is no evidence to support the proposition that the practice of sample substitution leads to an under-representation of busy working households.
3. Sample substitution has not impacted significantly on key indicators of income, poverty and social inclusion calculated using SILC.
4. Calibration tools must be used appropriately otherwise the data provided through the application of such tools will not be reflective of the population under survey.

[5] Watson, D., Maître, B. and Russell, H. (2015). "The Measurement of Household Joblessness in SILC and QNHS, 2004-2012: An Analysis of the CSO Survey on Income and Living Conditions (SILC) and the Quarterly National Household Survey (QNHS)", ESRI and Social Inclusion Division of Department of Social Protection, Social Inclusion, Technical Paper No. 6. P.34

5. The use of an employment related variable as a calibration variable is not a methodologically correct way to solve differences between the SILC and QNHS values of the Jobless household indicator, as supported by EUROSTAT.
6. A comparison of SILC data with other sources confirms that the SILC more than adequately captures income data and indicators of poverty and social exclusion.

To conclude, this paper has shown that SILC is a robust and reliable source of information on income, poverty and social inclusion. It gives reassurance to users of SILC data that the practices and methodology followed by the CSO in relation to SILC are sound and do not adversely impact on the results.

Appendices

Appendix A

Type of dwelling by households that responded, households that refused and substitute households, SILC 2010-2012

Appendix B

Households with or without children broken down by households that responded, households that refused and substitute households, SILC 2010-2012

Appendix C

The number of rooms in the household broken down by households that responded, households that refused and substitute households, SILC 2010-2012

Appendix D

Number of households by type of household selection, SILC 2010-2013 (Wave 1)

Appendix E

Key indicators of poverty and social inclusion and PES by weight, SILC 2013

Appendix F

Key indicators of poverty and social inclusion and PES by weight, SILC 2012

Appendix G

Key indicators of poverty and social inclusion and PES by weight, SILC 2010

Appendix H

Percentage of people living in households with very low work intensity (population aged 0 to 59 years)

Appendix A Type of dwelling by households that responded, households that refused and substitute households, SILC 2010-2012

Fig A1 Type of dwelling by households that responded, refused or were substitute households, SIL C 2010 (%)

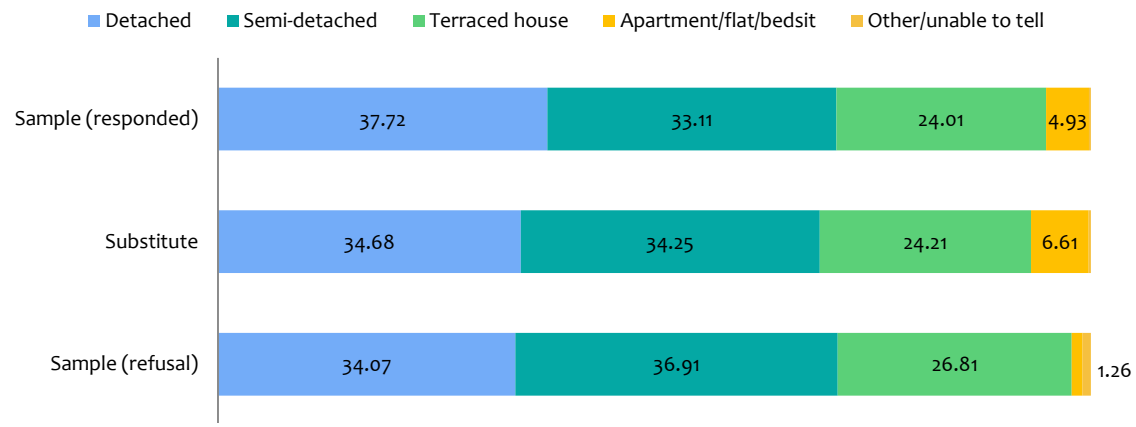


Fig A2 Type of dwelling by households that responded, refused or were substitute households , SILC 2011 (%)

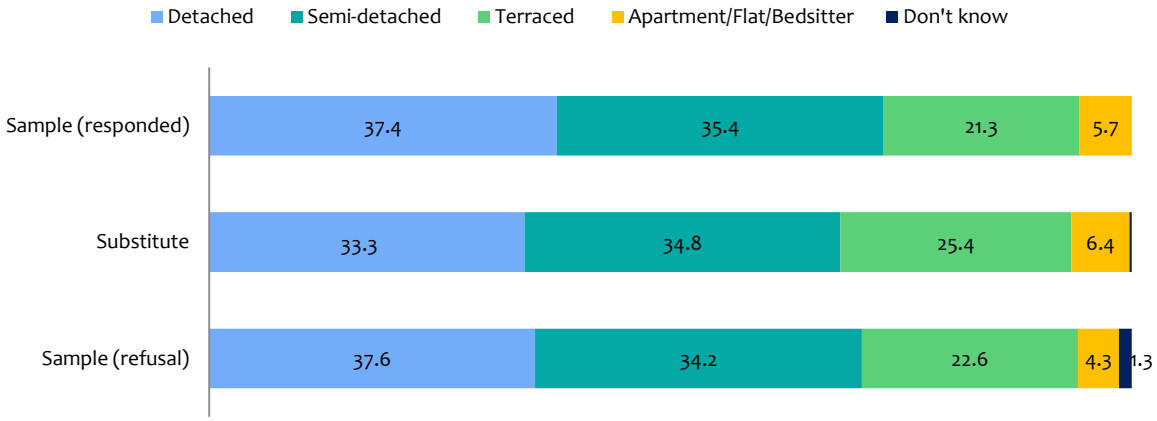
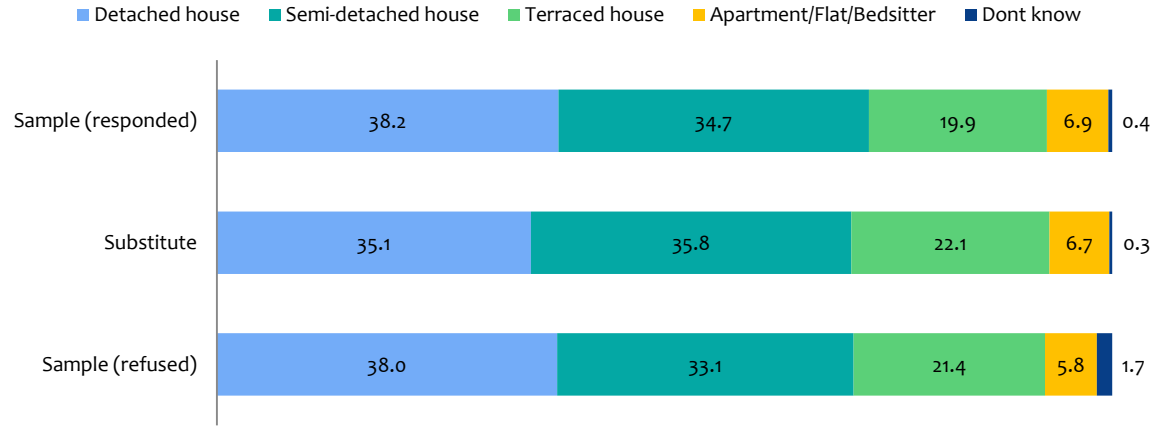


Fig A3 Type of dwelling by households that responded, refused or were substitute households, SILC 2012 (%)



Appendix B Households with or without children broken down by households that responded, households that refused and substitute households, SILC 2010-2012

Fig B1 A breakdown of households with/without children by households that responded, refused or were substitute households,SILC 2010 (%)

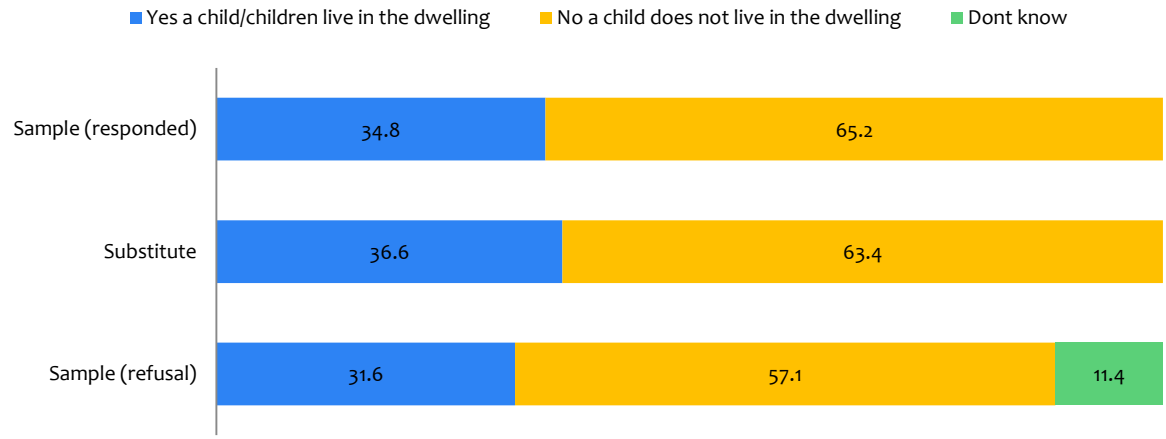


Fig B2 A breakdown of households with/without children by households that responded, refused or were substitute households, SILC 2011 (%)

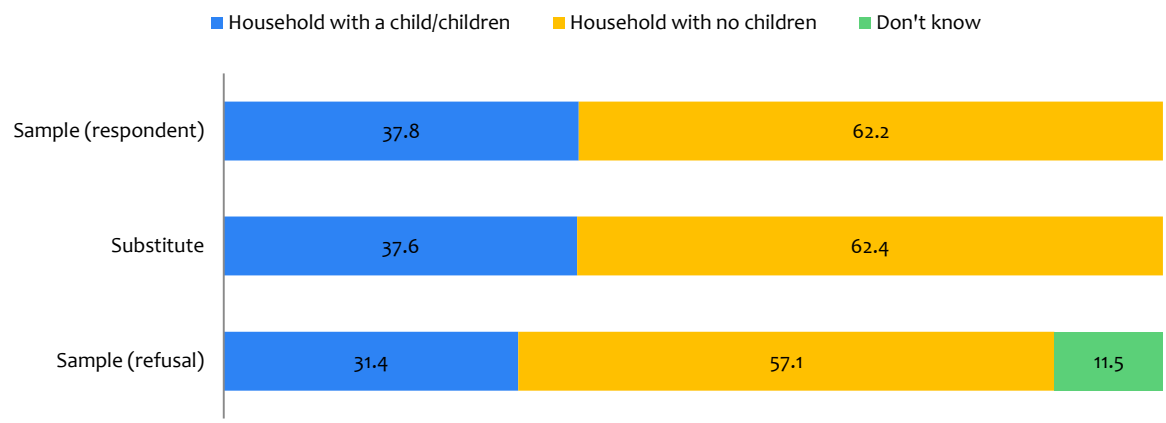
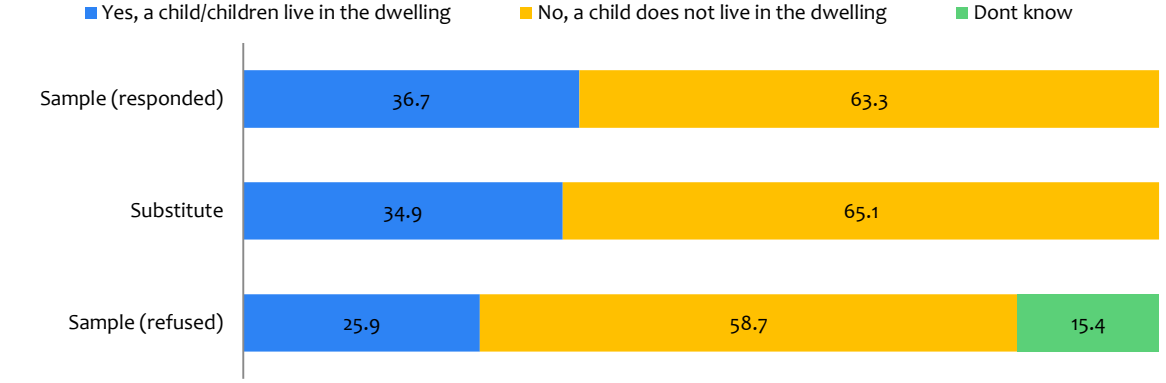


Fig B3 A breakdown of households with/without children by households that responded, refused or were substitute households, SILC 2012 (%)



Appendix C The number of rooms in the household broken down by households that responded, households that refused and substitute households, SILC 2010-2012

Fig C1 Number of rooms in a sample dwelling that refused compared with that of substitute and sample households, SILC 2010 (%)

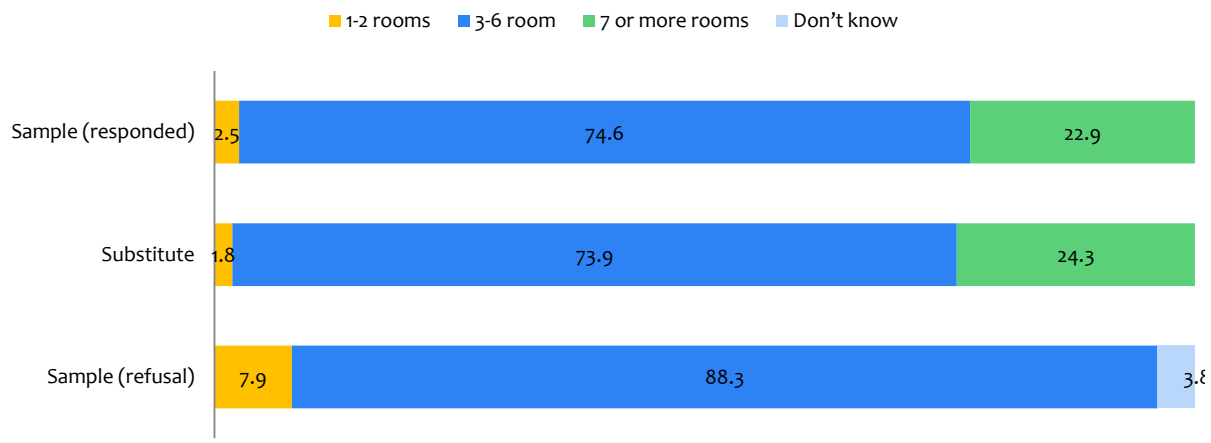


Fig C2 Number of rooms in a sample dwelling that refused compared with that of substitiute and sample households, SILC 2011 (%)

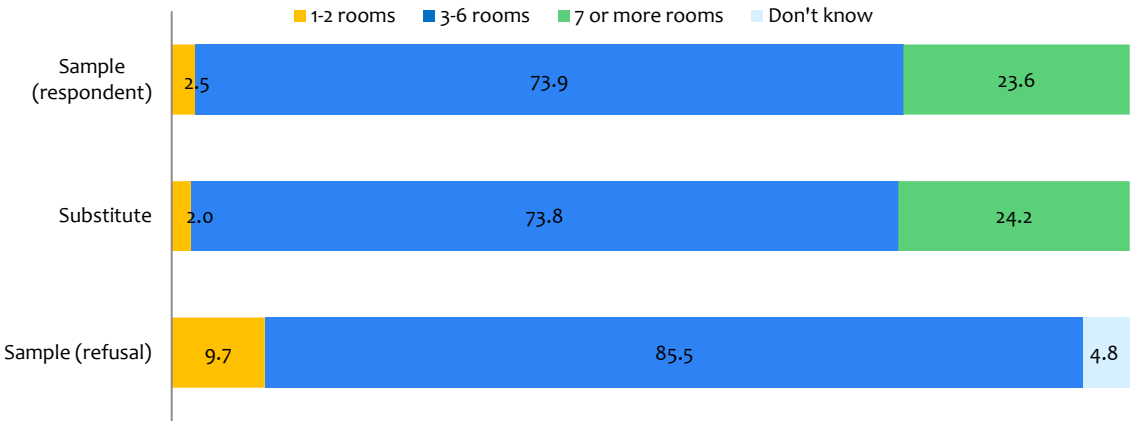
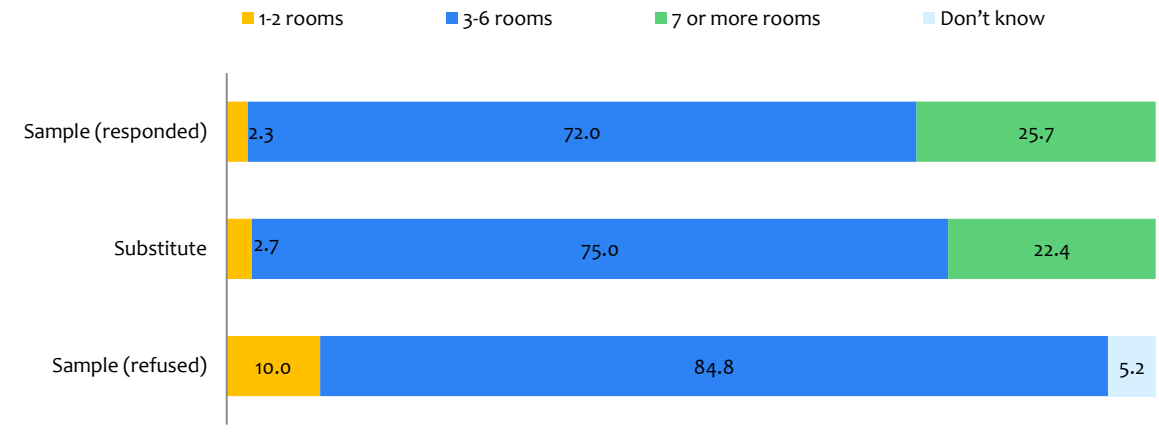


Fig C3 A breakdown of the number of rooms in households that responded, refused and were substitute hosueholds, SILC 2012 (%)



Appendix D Number of households by type of household selection, SILC 2010-2013 (Wave 1)

Table D1 Number of households by type of household selection, SILC 2010-2013 (Wave 1)

Type of household	Sample	Substitute	Refused[1]
Number of households			
2010	912	1,165	317
2011	847	1,047	606
2012	975	1,126	758
2013	965	1,505	934

[1] Households that did not participate in the survey and had a non-response questionnaire completed by the interviewer

Appendix E Key indicators of poverty and social inclusion and PES by weight, SILC 2013

Table E1 Key indicators of poverty and social inclusion and PES by weight, SILC 2013

2013 SILC Data

	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES	(E) QNHS (PES)	
PES (%)						
At work	35.58	NA	37.34	39.46	39.46	
Unemployed	8.49	NA	8.93	7.06	7.07	
Student	8.23	NA	7.19	7.22	7.76	
Home duties	10.83	NA	10.42	10.23	10.47	
Retired	8.90	NA	8.33	8.33	8.78	
Not at work due to Illness/disability	3.74	NA	3.66	3.58	N/A	
Other inactive person	0.96	NA	0.93	0.94	3.26	
Under 16	23.27	NA	23.20	23.18	23.20	
					Confidence Interval lower limit	***Confidence Interval Upper limit***
At risk of poverty Rate (%)	15.24	NA	14.21	12.67	***13.80***	***16.70***
Deprivation rate (%)	30.51	NA	30.05	28.16	***28.50***	***32.50***
Consistent Poverty rate (%)	8.22	NA	7.73	6.61	***7.00***	***9.40***
Equivalised disposable income (€)						
Mean	€21,106	NA	€21,546	€22,121	***€20,556***	***€21,656***
Median	€17,551	NA	€18,135	€18,770	***€16,970***	***€18,131***

PES for weighting purposes = at work ,not at work, not in the labour force

Appendix F Key indicators of poverty and social inclusion and PES by weight, SILC 2012

Table F1 Key indicators of poverty and social inclusion and PES by weight, SILC 2012

	2012 SILC Data					
	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES	(E) QNHS (PES)	
PES (%)						
At work	35.46	NA	36.91	38.69	38.68	
Unemployed	9.04	NA	9.48	8.01	8.02	
Student	7.77	NA	7.00	7.02	7.53	
Home duties	11.38	NA	10.94	10.75	8.38	
Retired	8.65	NA	8.14	8.15	8.38	
Not at work due to Illness/disability	3.73	NA	3.67	3.54	NA	
Other inactive person	0.75	NA	0.79	0.78	3.20	
Under 16	23.22	NA	23.07	23.05	23.01	
					Confidence Interval lower limit	**Confidence Interval Upper limit**
At risk of poverty Rate (%)	16.50	NA	15.89	14.61	**15.20**	**17.80**
Deprivation rate (%)	26.90	NA	26.61	25.11	**25.30**	**28.60**
Consistent Poverty rate (%)	7.72	NA	7.51	6.71	**6.80**	**8.70**
Equivalised disposable income (€)						
Mean	€20,856	NA	€21,232	€21,699	**€20,402**	**€21,309**
Median	€17,702	NA	€18,090	€18,682	**€17,219**	**€18,179**

PES for weighting purposes = at work ,not at work, not in the labour force

Appendix G Key indicators of poverty and social inclusion and PES by weight, SILC 2010

Table G1 Key indicators of poverty and social inclusion and PES by weight, SILC 2010

	2010 SILC Data					
	(A) Original weight	(B) Census revision	(C) Census revision & QNHS age groups	(D) Census revision, QNHS age groups & QNHS PES	(E) QNHS (PES)	
PES (%)						
At work	35.01	35.32	37.12	39.83	39.83	
Unemployed	8.1	8.2	8.95	7.9	7.91	
Student	7.95	8.15	7.37	7.08	7.49	
Home duties	13.04	12.89	12.21	11.57	11.84	
Retired	7.36	7.32	6.78	6.63	7.43	
Not at work due to Illness/disability	4.02	3.96	3.85	3.41		
Other inactive person	0.97	0.97	1.01	0.93	3.11	
Under 16	23.54	23.2	22.70	22.66	22.39	
					Confidence Interval lower limit	**Confidence Interval Upper limit**
At risk of poverty Rate (%)	14.68	14.62	13.54	12.23	**13.20**	**16.20**
Deprivation rate (%)	22.62	22.58	21.74	20.25	**20.90**	**24.30**
Consistent Poverty rate (%)	6.30	6.34	5.83	5.00	**5.30**	**7.30**
Equivalised disposabe income (€)						
Mean	€22,138	€22,270	€22,916	€23,502	**€21,550**	**€22,726**
Median	€18,591	€18,611	€19,256	€20,081	**€17,998**	**€19,182**

PES for weighting purposes = at work ,not at work, not in the labour force

Appendix H Percentage of people living in households with very low work intensity (population aged 0 to 59 years)

Table H1Percentage of people living in households with very low work intensity (population aged 0 to 59 years) by country and year, SILC 2010-2013

Country/Area	2010	2011	2012	2013
European Union (28 countries)	10.2	10.4	10.5	10.8
European Union (27 countries)	10.1	10.4	10.4	10.8
European Union (15 countries)	10.8	11.0	11.0	11.5
New Member States (12 countries)	7.8	8.0	8.2	8.1
Euro area (18 countries)	10.4	10.9	10.6	11.1
Euro area (17 countries)	10.4	10.9	10.6	11.1
Belgium	12.7	13.8	13.9	14.0
Bulgaria	8.0	11.0	12.5	13.0
Czech Republic	6.4	6.6	6.8	6.9
Denmark	10.6	11.7	11.3	12.9
Germany (until 1990 former territory of the FRG)	11.2	11.2	9.9	9.9
Estonia	9.0	10.0	9.1	8.4
Ireland	**22.9**	**24.2**	**23.4**	**23.9**
Greece	7.6	12.0	14.2	18.2
Spain	10.8	13.4	14.3	15.7
France	9.9	9.4	8.4	7.9
Croatia	13.9	15.9	16.8	14.8
Italy	10.2	10.4	10.3	11.0
Cyprus	4.9	4.9	6.5	7.9
Latvia	12.6	12.6	11.7	10.0
Lithuania	9.5	12.7	11.4	11.0
Luxembourg	5.5	5.8	6.1	6.6
Hungary	11.9	12.2	12.8	12.6
Malta	9.2	8.9	9.0	9.0
Netherlands	8.4	8.9	8.9	9.3
Austria	7.8	8.6	7.7	7.8
Poland	7.3	6.9	6.9	7.2
Portugal	8.6	8.3	10.1	12.2
Romania	6.9	6.7	7.4	6.4
Slovenia	7.0	7.6	7.5	8.0
Slovakia	7.9	7.7	7.2	7.6
Finland	9.3	10.0	9.3	9.0
Sweden	6.0	6.9	5.7	7.1
United Kingdom	13.2	11.5	13.0	13.2
Iceland	5.7	6.2	6.1	6.2
Norway	7.5	7.1	7.1	6.4
Switzerland	4.1	4.7	3.5	4.1
Former Yugoslav Republic of Macedonia, the	24.5	20.0	19.9	17.6
Serbia	:	:	:	18.1
Turkey	:	:	:	:

Source http://ec.europa.eu/eurostat/web/products-datasets/-/t2020_51

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Background notes

Definitions of Income

Gross Income

Income details are collected at both a household and individual level in SILC. In analysis, each individual's income is summed up to household level and in turn added to household level income components to calculate *gross household income*. The components of gross household income are:

Direct Income:

Employee income:

Gross employee cash or near cash income

Gross non-cash employee income

Employer's social insurance contributions

Gross cash benefits or losses from self-employment

Other direct income:

Value of goods produced for own consumption

Pension from individual private plans

Income from rental of property or land

Regular inter-household cash transfers received

Interests, dividends, profit from capital investments in unincorporated business

Income received by people aged under 16

Social Transfers:

Unemployment related payments

Old-age related payments

Family/children related allowances:

Maternity/adoptive benefit

Child benefit

Single parent allowances

Carers' benefit

Housing allowances:

Rent supplement

Free phone/electricity etc

Fuel allowances

Exceptional needs payments

Other social transfers:

Survivors' benefits

Sickness benefits

Disability benefits

Education-related allowances

Social exclusion not elsewhere classified

Disposable income

Tax and social insurance contributions are also summed to household level and subtracted from the gross household income to calculate the *total disposable household income*. The components of disposable household income are gross household income *less*:

Employer's social insurance contributions

Regular inter-household cash transfer paid

Tax on income and social insurance contributions

Tax deducted at source from individual private pension plans

Equivalence scales

Equivalence scales are used to calculate the *equivalised household size* in a household. Although there are numerous scales, we focus on the national scale in this release. The national scale attributes a weight of 1 to the first adult, 0.66 to each subsequent adult (aged 14+ living in the household) and 0.33 to each child aged less than 14. The weights for each household are then summed to calculate the *equivalised household size*.

Equivalised disposable household Income

Disposable household income is divided by the *equivalised household size* to calculate equivalised disposable income for each person, which essentially is an approximate measure of how much of the income can be attributed to each member of the household. This *equivalised income* is then applied to each member of the household.

At risk of poverty rate

This is the share of persons with an equivalised income below a given percentage (usually 60%) of the national median income. The rate is calculated by ranking persons by equivalised income from smallest to largest and then extracting the median or middle value. Anyone with an equivalised income of less than 60% of the median is considered *at risk of poverty at a 60% level.*

Deprivation rate

Households that are excluded and marginalised from consuming goods and services which are considered the norm for other people in society, due to an inability to afford them, are considered to be deprived. The identification of the marginalised or deprived is currently achieved on the basis of a set of eleven basic deprivation indicators:

1. Two pairs of strong shoes

2. A warm waterproof overcoat

3. Buy new (not second-hand) clothes

4. Eat meat with meat, chicken, fish (or vegetarian equivalent) every second day

5. Have a roast joint or its equivalent once a week

6. Had to go without heating during the last year through lack of money

7. Keep the home adequately warm

8. Buy presents for family or friends at least once a year

9. Replace any worn out furniture

10. Have family or friends for a drink or meal once a month

11. Have a morning, afternoon or evening out in the last fortnight for entertainment

Individuals who experience two or more of the eleven listed items are considered to be experiencing enforced deprivation. This is the basis for calculating the deprivation rate.

Consistent poverty

The consistent poverty measure looks at those persons who are defined as being at risk of poverty and experiencing enforced deprivation (experiencing two or more types of deprivation).

An individual is defined as being in 'consistent poverty' if they are:

- Identified as being at risk of poverty and

- Living in a household deprived of two or more of the eleven basic deprivation items listed above.

(Note that it is enforced deprivation that is relevant in this context. For example, a household may not have a roast once a week. The household is classified as deprived of this basic indicator only if the reason they didn't have it was because they could not afford it.)

Very low work intensity (Jobless households)

In SILC Work Intensity of the household refers to the number of months that all working age household members have been working during the income reference year as a proportion of the total number of months that could theoretically be worked within the household.

A working age person is defined as a person aged 18-64, not being a dependent child. Dependent children include all persons aged below 18 as well as those aged 18-24 years, living with at least one parent and economically inactive.

A household with a work intensity of less than or equal to 0.2 is considered to have a very low work intensity or be classified as a jobless household.