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Catholic-Protestant Wage Differentials in Northern Ireland 2011: A Re-examination with Newly Available Data

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Abstract: Despite an extensive literature on Catholic-Protestant unemployment differentials in Northern Ireland, little is known about wage differentials. This paper provides new evidence using the Earnings and Employees Study for 2011. We find no evidence of an overall Catholic wage penalty, with unadjusted and adjusted differentials no larger than 1.4 log per cent and statistically insignificant. Slightly larger differentials are found in some models for men, 50+ workers, and private sector workers, but again these are statistically indistinguishable from zero. Similar data linkages for 2001 and 1991 would enrich our understanding of the period when other measurable labour market disparities were wider.

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I INTRODUCTION

Labour market inequality between the Catholic and Protestant communities in Northern Ireland (NI) has long been of concern to policymakers, researchers and the NI public alike. From the 1970s onwards, a 'fair employment' literature documented and sought to explain these inequalities. Early studies of the 1971 Census showed that Catholics (especially males) had much higher unemployment rates (Osborne, 1978) and lower occupational status (Aunger, 1975) than Protestants. Larger Catholic family size, which allegedly incentivised unemployment, and the concentration of the Catholic population within job-deprived areas, were both put forward as potential explanations (Compton, 1981), but these were shown to be unsatisfactory (Miller and Osborne, 1983). Human capital differences were another potential contributory factor, since Catholics typically possessed fewer qualifications (Osborne and Cormack, 1986). Although educational differences did narrow through time (Osborne *et al*., 1984), higher Catholic unemployment persisted through to the 1990s (Cormack and Osborne, 1987; Eversley, 1989). By this time, academic studies had begun to apply multivariate regression analysis to new household survey data to show that excess Catholic unemployment could not be explained by measured differences in the demographic and educational profiles of the two communities – and therefore that a significant unexplained differential existed (Smith and Chambers, 1991; Murphy and Armstrong, 1994; Borooah, 1999).

The extent to which labour market discrimination contributed to this unexplained differential was a central feature of the debate (Shirlow and Shuttleworth, 1996; Gudgin and Breen, 1996; Teague, 1997), and was closely linked with claims of discrimination in other aspects of economic and social life (Smith and Chambers, 1991; Whyte and Fitzgerald, 1991). The tension of the debate was heightened by the fact that it took place alongside the Troubles, a violent conflict over NI's constitutional position within the UK (with Protestants tending to favour the status quo and vice versa) which claimed the lives of just over 3,600 people between 1966 and 1999 (McKittrick *et al*., 1999). Rowland *et al*. (2022), which presents a more detailed overview, notes that this debate was never fully resolved.

By the time of the 2001 Census, research interest in this issue had diminished and the unemployment gap itself had largely (albeit not completely) disappeared following the ending of the Troubles, the signing of the Good Friday Agreement, successive rounds of Fair Employment legislation, and major structural changes in the NI labour market (Rowland *et al*., 2022). However, ongoing monitoring of unemployment rates and a range of other labour market statistics for the two communities has continued, with, for example, the Equality Commission for Northern Ireland (ECNI) publishing regular Fair Employment Monitoring Reports (e.g. ECNI, 2023) on company workforces. This type of monitoring is an outworking of a series of policy measures aimed at tackling the inequalities

described above. The first of these measures was the Fair Employment Act (1976), which established the Fair Employment Agency tasked with investigating claims of discrimination. However, this body was seen as largely ineffective (Graham, 1983; McCrudden, 1988), and a new iteration of this legislation came about in 1989. The revamped act created a stronger regime of oversight and enforcement of fair participation and recruitment practices, including monitoring of the religious composition of a large swathe of the workforce and reviews of employment practices when under-representation of a particular group had been identified (a policy applied symmetrically to both groups). The 1989 legislation is regarded as having been more effective, as shown by its contribution to workforce de-segregation, for example Muttarak *et al*. (2013). This legislation was amended and updated in 1998, however the institutional context has not changed substantively since.

Despite these ongoing monitoring efforts, we know little specifically about differences in wages between Catholics and Protestants in NI. It is important to analyse wage differentials, alongside unemployment, because wages summarise the returns to productive attributes and thus offer a better measure of whether (and if so to what extent) groups are treated differently in the labour market. But wage differentials are not covered by Fair Employment Monitoring Reports and the fair employment literature cited above also had little to say about wages given its focus on unemployment differentials. This reflects a historical and (to some extent) ongoing lack of suitable data with which to measure and seek to understand any such wage differentials. The closest exception in the academic literature is the Borooah *et al*. (1995) study of income differentials using data from the Family Expenditure Survey, which found lower mean Catholic household income which was not explained by differences in productive characteristics (though caution is warranted since this study considered all sources of household income). Although Borooah notes several possibilities, lower earnings arising from labour market discrimination may have been one contributory factor. Whether statistical or taste-based (Becker, 1971), discrimination was (and remains) possible in this context because religion is not only a personal expression of faith but also a marker of social identity (Mitchell, 2016). Individuals may be able to identify members of the Catholic or Protestant community by knowing their name, place of residence, or school attended (Trew, 1986), attributes that can often be observed by labour market participants (on resumés, for example). However, other contributory factors cannot be ruled out. Religious differences in values and behaviours may also lead to differences in labour market outcomes (Iannaccone, 1990), and Catholic-Protestant wage differentials (favouring Catholics) have been recorded in the United States (for example Steen, 2004). In the absence of suitable data, it is not possible to adequately separate the contribution of discrimination from the contributions of other unmeasured contributory factors, nor test for particular forms of discrimination.

Although certainty about the causes of any Catholic-Protestant earnings gap is difficult (if not impossible) to achieve, there is value to understanding how large it is and whether it is widening or narrowing through time (not least because of policy-motivated equality concerns). In terms of regular monitoring, until 2017 the NI Executive Office published annual estimates of median wage differentials based on the Quarterly Labour Force Survey (QLFS), as part of its series of LFS Religion Reports (e.g. Executive Office Northern Ireland, 2019). Although these have now been discontinued, the most recent estimate (for 2017) suggested no statistically significant median wage differential. However, it is unclear how much we can learn from these LFS Religion Report estimates given their imprecision and volatility over time, which in turn reflect the small sample sizes on which they are based (typically just over 200 observations), and measurement errors with the derived wage variable produced by the LFS (e.g. on the last point see Ormerod and Ritchie, 2007). The LFS Religion Reports also do not adjust for differences in relevant observable characteristics between Catholics and Protestants that may help to explain or even obscure wage differentials.

In summary, there remains very little specific and credible quantitative evidence on this potentially crucial aspect of labour market inequality between Catholics and Protestants in NI, whether historically or currently. Despite this lack of existing evidence, however, it is difficult to rule out ex ante that such a wage gap may have existed as late as 2011 and might perhaps even persist more recently, at least for some demographic groups, or in some parts of the labour market. The trends over time in the unemployment differential may be suggestive of this. Specifically, although there was a substantial narrowing of Catholic-Protestant unemployment differentials in the decades running up to 2011, Rowland *et al*. (2022) show that a non-trivial magnitude male unemployment gap between the two communities still existed at that point. Further, the study shows that this gap could be partly but not fully explained by differences in the observable characteristics of the two communities, including where people live.

In this paper we seek to address this important gap in our understanding of inequality between the Catholic and Protestant communities in NI by providing more precise and more detailed quantitative evidence on the wage differential, as of 2011, than has previously been possible. To do so we use newly available data, called the Earnings and Employees Study (EES), which link the 2011 Annual Survey of Hours and Earnings (ASHE) with the 2011 Census for NI. This new data linkage provides a unique opportunity because it combines gold-standard wage and employment information for a large and representative sample of employees from the ASHE – approximately 17 times larger than the sample used for LFS Religion Reports – with gold-standard individual and household characteristics information, crucially including religious denomination and community background, from the Census.

We also go beyond the LFS Religion Reports by presenting both unadjusted and adjusted wage differentials, with the latter accounting for differences in relevant observable individual, household and job characteristics between Catholics and Protestants including age, education, household structure, geography, contract type, sector, industry and occupation. The larger sample size in the EES also enables us to estimate unadjusted and adjusted wage differentials separately by sex, broad age group and sector. In further analysis we compare our EES estimates with estimates based on QLFS data pooled from 2010-2012, provide decomposition analyses which split observed wage differentials into the part that can be explained by differences in relevant observable characteristics and that part which remains unexplained by such differences, and give quantile regression estimates of wage gaps at different parts of the wage distribution.

II DATA AND METHODS

2.1 EES Data

We exploit the newly available EES data for 2011, which link the 2011 ASHE with the 2011 Census for NI (NISRA, 2021). The ASHE is a UK-wide annual survey of employers that collects information on a 1 per cent sample of all Pay As You Earn (PAYE) employees who are randomly selected based on National Insurance numbers. The 2011 ASHE for NI contains 5,770 records, each with detailed information on the employer and the characteristics of the job held. Crucially, the earnings information contained in the ASHE is widely viewed as being superior to that in LFS because employer response with reference to payrolls is required in the ASHE questionnaire whereas the LFS relies on self-reports (Elsby *et al*., 2016; Fongoni *et al*., 2023). The Census link provides detailed information on individual and household characteristics for the ASHE sample. Crucially, this includes information on both current religion and the religious denomination individuals were brought up in. Given very high response rates in the ASHE and very high linkage rates between the ASHE and the Census (89 per cent of the ASHE sample were linked deterministically with the remainder linked via donor imputation), the EES provides a rich source of matched employer-employee data for a large and representative sample – 5,528 Census individuals given that a small number of ASHE records relate to multiple jobs for the same individuals – of NI employees as of 2011. At the time of writing there were no equivalent EES datasets for other Census years, although there were plans in place to construct a 2021 EES. There is a 2011 sister dataset for England and Wales, which is part of the Wage and Employment Dynamics project (Forth *et al*., 2022).

Our analysis sample is restricted to those of working age (16-64 for males, 16-59 for females), who were identifiable as either Catholic or Protestant, and excludes those not born in NI, full-time students, those who had a loss of pay

because of absence due to ill health in the pay reference period, those who were earning less than the adult minimum wage rate (£6.08 in 2011),[1] and those with hourly pay above £99 (to maintain consistency with the QLFS analysis, as described later in Section 2.2). After implementing these exclusions, we are left with a sample of 3,998 employees.

The main outcome variable in the analysis is gross hourly earnings, which is an ASHE variable derived by dividing gross pay by total paid hours (ONS, 2021).[2] We construct our religion variable following the approach of Rowland *et al*. (2022), with Catholics distinguished from Protestants by their current religion (where stated) or by the denomination they were brought up in (where current religion is not stated). Both questions are asked as part of the Census, with respondents asked about the religion, religious denomination or body they belonged to. Individuals who responded 'none' to this question were then directed to a follow-up question about the religion, religious denomination or body they were brought up in (so-called community background). Protestants include all members of the Presbyterian faith, Church of Ireland, Methodists, and all smaller denominations of Christianity. The variable is specified as a binary dummy equal to 1 for Catholics and 0 for Protestants. Those with no stated Protestant or Catholic religion and neither a Catholic nor Protestant community background are excluded from the sample. Using current religion instead of our preferred measure did not influence the results.

Drawing on Borooah *et al*. (1995), Rowland *et al*. (2022) and Jones and Kaya (2022), our wage regressions control for the following individual and household characteristics: sex, age group,[3] qualification level, marital status, activity-limiting disability, long-term health condition, dependent children in household and unpaid carer status. We also control for the following job characteristics: occupation, industry (both 1-digit), public/private sector, covered by collective agreement, contract type (temporary or casual versus permanent), part-time status, and work location as given by 2014 Local Government District (LGD).[4] Variable definitions are given in Table A.1 in the Appendix.

[1] These restrictions are suggested by ONS (2021) and are made for consistency with published headline ASHE statistics. Our conclusions are robust to their exclusion or inclusion.

[2] Our conclusions are robust to using hourly earnings excluding overtime. We also estimate a model using stated hourly rate in place of derived earnings, which only covers the subset of the sample paid on an hourly rate (see Appendix Table A.14).

[3] We include age group dummies rather than a potential experience quadratic in our main models because EES data on qualification level is not as disaggregated as that in the LFS and we do not observe age at completion of full-time education. In particular, the EES aggregates all qualifications at Level 4 and above into a single category. Nevertheless, our conclusions are robust to replacing age group dummies with a quadratic in potential experience in the model. Conclusions are also robust to specifying narrower age groups (five years rather than ten years).

[4] Conclusions are also robust to inclusion of a proxy for job tenure (tenure with employer) variable.

2.2 QLFS Data

As a point of comparison to the EES analysis we also estimate Catholic-Protestant wage gaps using data from the QLFS (ONS, 2023). The QLFS is the UK's largest nationally representative household survey and contains detailed information on earnings, individual, household and employment-related characteristics. Sample size is a major constraint, however, when focussing specifically on NI. Also, because earnings information is only collected in Waves 1 and 5 of the QLFS – the QLFS is a five-wave rotating panel with data collected quarterly – the available sample for *wage* analysis in each quarter is further reduced. The 2017 version of the LFS Religion Report, for example, presented wage gap analysis based on a sample of just over 200 observations drawn from Wave 1 in a single quarter (Q2 2017). To mitigate this, we follow Jones and Kaya (2022) by pooling Wave 1 data across quarters from several years, in our case three full years of the QLFS (2010-2012), into a single cross-section (ONS and NISRA, 2014a–2019f).

As in the EES analysis, our QLFS sample is similarly restricted to those of working age, who identified as Catholic or Protestant, and excludes those not born in NI, full-time students, those with loss of pay information because of absence due to illness in the reference period, and those paid below the adult minimum wage at the time. We also exclude the self-employed given a lack of earnings data and given they are not covered by the ASHE. After implementing these restrictions, removing a small number of observations with missing values on some model variables, and applying the filter described in the next paragraph, we are left with a sample size of 1,563 individuals. The advantage of the EES in terms of a larger sample size is immediately apparent.

As for the EES analysis our outcome variable is gross hourly earnings (HOURPAY). This is a derived LFS variable generated by dividing gross weekly pay by total hours usually worked, including overtime, in the last pay period (ONS, 2023). Following Jones and Kaya (2022), the standard ONS HOURPAY filter is applied, which removes observations with hourly earnings above £99 to reduce measurement error that exists in the variable (e.g. Ormerod and Ritchie, 2007). We distinguish Catholics from Protestants using the IREND2 variable. A point of difference with the EES analysis is that there is no community background variable in the LFS, so we are unable to assign a Catholic-Protestant indicator to those who do not report a religion in IREND2. The control variables are specified as similarly as possible to those in the EES analysis, with the exception of unpaid carer and collective agreement status, which are not included in the QLFS models. The QLFS controls include sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children in household, occupation, industry (both 1-digit), public/private sector, contract type (temporary in some way versus permanent), and part-time status. Note the standard release QLFS for NI does not contain any sub-regional geography indicators, so we are unable to control for LGD of employment as we do in the EES. Because we are pooling over several

years and quarters, we also include year/quarter dummies. Variable definitions are given in Table A.2 in the Appendix.

2.3 Estimation

We estimate earnings equations of the following form by ordinary least squares (OLS):

$$\ln E_i = \alpha + \delta c_i + \boldsymbol{X_i\beta} + \varepsilon_i, \;\; i = \mathbf{1,\ldots, n}. \tag{1}$$

In (1) the log of hourly earnings of individual i ($\ln E_i$) is regressed on the religion indicator c_i (1 if Catholic, 0 if Protestant) and the observable individual, household and job characteristics listed above, $\boldsymbol{X_i}$. ε_i denotes the error term. The estimated wage gap between Catholics and Protestants is given by the estimated coefficient on the religion indicator ($\hat{\delta}$), which, given hourly earnings are expressed in natural logs, is interpretable as the log per cent gap between Catholic and Protestant gross hourly wages (this approximates the percentage gap between Catholic and Protestant gross hourly wages). We begin by estimating an unadjusted version of (1) which omits $\boldsymbol{X_i}$, labelled 'Model 1' in the relevant tables of estimates. We then estimate a version of (1) which includes all individual and household components of $\boldsymbol{X_i}$ but omits job characteristics (Model 2), and a version of (1) in which we include all components of $\boldsymbol{X_i}$ (Model 3). We also estimate these three versions of (1) separately for men and women, under and over 50s, and public and private sector workers, as there is evidence for variation in inequalities across these subgroups (Sheehan and Tomlinson 1999; Rowland *et al*. 2022). We then repeat the exercise using the QLFS data. In an extension, we use the EES to estimate a quantile regression version of (1) to present estimates of adjusted (Model 3) wage gaps at the 10th, 25th, 50th (median), 75th and 90th percentiles of the wage distribution.

In addition to estimating (1), we conduct Oaxaca-Blinder decomposition analyses of the estimated EES wage gaps for each sample (Oaxaca, 1973; Blinder, 1973). This method splits the unadjusted (raw) Catholic-Protestant wage gap (raw earnings differential) into two parts: an 'explained' part due to differences in the observed characteristics between Catholics and Protestants, and an 'unexplained' part due to differences in the regression coefficients (the returns to the characteristics). Following the approach of Rowland. *et al*. (2022) we estimate the following decomposition:

$$\begin{aligned}\overline{\ln E_c} - \overline{\ln E_p} &= (\bar{\boldsymbol{X}}_{\boldsymbol{c}} - \bar{\boldsymbol{X}}_{\boldsymbol{p}})\hat{\boldsymbol{\beta}}^* + \bar{\boldsymbol{X}}_{\boldsymbol{c}}(\hat{\boldsymbol{\beta}}_{\boldsymbol{c}} - \hat{\boldsymbol{\beta}}^*) + \bar{\boldsymbol{X}}_{\boldsymbol{p}}(\hat{\boldsymbol{\beta}}^* - \hat{\boldsymbol{\beta}}_{\boldsymbol{p}}) + \\ &\quad + (\hat{\alpha}_c - \hat{\alpha}^*) + (\hat{\alpha}^* - \hat{\alpha}_p)\end{aligned} \tag{2}$$

In (2), subscript c(p) denotes Catholics (Protestants) and the overbars denote means/proportions.[5] The asterisked parameters, $\boldsymbol{\beta^*}$ and α^*, represent the returns

[5] Individual i subscripts are suppressed for clarity.

assumed in a 'non-discriminatory' labour market ('non-discriminatory' coefficients). As suggested by Fortin (2008) the estimates of α and $\boldsymbol{\beta}$ from Equation (1) are used for this purpose. The total unexplained component is equal to the estimated wage gap $\hat{\delta}$ – the fully adjusted differential – on being Catholic from Equation (1) with the full set of controls. The explained component is equal to the gap between the unadjusted (raw) estimated wage gap and the adjusted (i.e. conditioned on $\boldsymbol{X_i}$) estimated wage gap. We can further split the explained component of the unadjusted wage gap into parts explained by differences in the means of each individual/household/job characteristic (or differences in the distribution across sets of categories for age, qualifications etc.) following Gelbach (2016).

III RESULTS

In what follows we focus on the EES analysis, with QLFS analysis presented in the Appendix, although we draw attention in the text to any important points of difference between the EES and QLFS analysis.

3.1 Descriptive Statistics

Table 1 gives descriptive statistics for our main analysis sample, both overall and split by religion. There is very little difference in mean wages for the two groups, or in wages at the 10th or 25th percentiles of the respective wage distributions. Median wages are slightly higher for Catholics than Protestants in our sample,[6] with the gap wider at the 75th percentile. The gap is reversed, with higher wages for Protestants compared to Catholics, at the 90th percentile. This pattern is reflected in Figure 1, which plots the wage distributions for Catholics and Protestants. The two distributions initially track each other very closely until the Catholic distribution peaks at a slightly lower wage rate than the Protestant distribution. The Protestant distribution continues to the right of the Catholic distribution until they cross again, with Catholic wages higher than Protestant wages in a range around the 75th percentile. They then converge to track each other closely in the right-hand tails. Figures A.1-A.6 in the Appendix present similar distributions separately by sex, broad age group and sector. In each case these distributions follow broadly similar patterns, with the main exceptions being for males and for private sector employees, where in both cases the Catholic wage distribution tracks (rather than falls to the right of) the Protestant distribution around the 75th percentile.

The remainder of Table 1 highlights some potentially relevant differences in the observed individual, household and job characteristics of the two communities. For example, Catholics in our sample are: younger and have higher qualification

[6] The 2011 Religion Report also reports a higher Catholic than Protestant median wage in 2011, although this is (substantially) reversed in the 2012 Religion Report (Executive Office Northern Ireland, 2013; 2014).

levels than their Protestant counterparts on average; more likely to be female; less likely to be married; more likely to have dependent children in the household; more likely to work in the public sector; more likely to work in temporary or casual employment; more likely to work in construction or public administration, education and health and less likely to work in manufacturing or distribution, hotels and restaurants; more likely to work in a professional job and less likely to work in skilled trades. There are also marked geographical differences, with Catholics more likely to work in the west and south of NI (e.g. Derry City and Strabane; Newry, Mourne and Down) and Protestants more likely to work in the east of NI (e.g. Mid and East Antrim; Ards and North Down). Many of these patterns have been present in NI for decades (e.g. see Aunger, 1975).

Table A.3 presents similar descriptive statistics for our QLFS sample. As for the EES there is very little difference in mean wages for the two communities. In contrast to the EES, however, the QLFS suggests wages are higher for Catholics than for Protestants in the bottom half of the distribution. In the top half of the QLFS distribution there are no religious differences, unlike in the EES where a mixed picture was evident. Demographic patterns are similar in the two samples, e.g. in terms of age and qualifications, although note the higher proportion of Protestants than Catholics reporting a long-term health condition in the QLFS sample. Patterns in terms of job characteristics are also similar in the two samples, e.g. with a higher proportion of Catholics than Protestants in the public sector, in professional occupations, and in public administration, education and health.

Table 1: Gross Hourly Wages, Individual, Household and Job Characteristics, EES2011

	All	*Catholic*	*Protestant*
Average Hourly Earnings (£)			
Mean	12.88	12.85	12.91
10th Percentile	6.25	6.20	6.28
25th Percentile	7.60	7.57	7.65
50th Percentile	10.39	10.47	10.33
75th Percentile	15.81	16.02	15.59
90th Percentile	22.48	22.20	22.62
Individual and Household Characteristics			
Age group (%)			
16-24	9	9	10
25-34	25	29	21
35-44	27	27	28
45-54	27	25	28
55-64(male)/55-59(female)	12	10	13
Qualifications (%)			

Table 1: Gross Hourly Wages, Individual, Household and Job Characteristics, EES2011 (Contd.)

	All	*Catholic*	*Protestant*
Level 4 or Higher	39	41	36
Level 3	15	14	15
Level 2	16	16	16
Level 1	12	12	12
Other	7	6	8
None	11	11	12
Female (%)	50	53	48
Married (%)	57	54	59
Dependent child/children in household (%)	48	52	44
Activity-limiting disability (%)	6	6	6
Long-term health condition (%)	19	18	20
Unpaid carer (%)	16	16	16
Job Characteristics (%)			
Public Sector	39	42	36
Part time	26	27	26
Temporary or casual	7	8	6
Collective agreement	54	54	54
Industry (SIC07) (%)			
A – Agriculture, forestry and fishing	1	<1	1
B, D, E – Energy and water	1	<1	1
C – Manufacturing	11	9	13
F – Construction	5	6	4
G, I – Distribution, hotels and restaurants	18	17	19
H, J – Transport and communication	5	5	6
K, L, M, N – Banking and finance	10	10	10
O, P, Q – Public administration, education, and health	44	47	42
R, S, T, U – Other services	3	3	4
Occupation (SOC10) (%)			
Elementary occupations	10	11	10
Process, plant, and machine operatives	7	7	8
Sales and customer services	8	8	8
Personal service occupation	9	9	9
Skilled trades	10	8	12
Administrative and secretarial	14	14	14
Associate professionals and technical	12	12	12
Professional occupations	22	24	19
Managers and senior positions	8	7	8

Table 1: Gross Hourly Wages, Individual, Household and Job Characteristics, EES2011 (Contd.)

	All	*Catholic*	*Protestant*
Local Government District of job (%)			
Belfast	31	31	30
Armagh City, Banbridge and Craigavon	10	11	10
Antrim and Newtownabbey	6	4	7
Causeway Coast and Glens	5	4	6
Derry City and Strabane	10	15	6
Fermanagh and Omagh	4	6	3
Lisburn and Castlereagh	6	4	8
Mid and East Antrim	6	3	9
Mid Ulster	6	7	5
Newry, Mourne and Down	6	10	3
Ards and North Down	5	2	7
Missing	5	3	6
No. obs	3,998	1,800	2,198

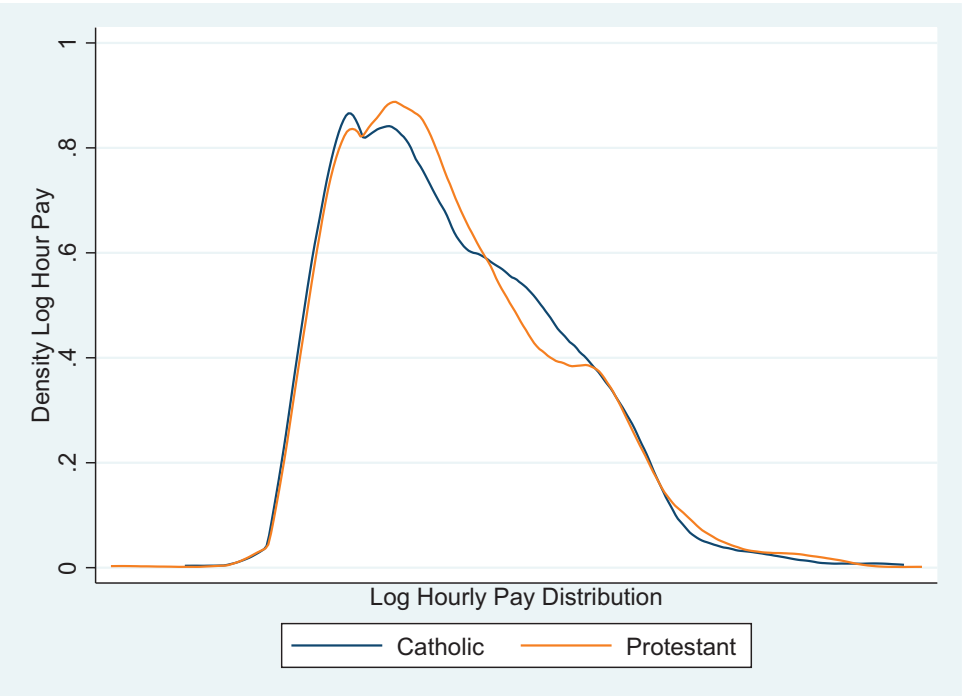
Source: Authors' analysis of EES2011 data.
Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Statistics are weighted (using Calwght) to make them more representative of the population of employees in NI.

Where the 2011 NI Executive Religion Report reports similar individual, household and job characteristics by community, the patterns we report here for both the EES and QLFS are broadly consistent, e.g. in terms of age profile, qualifications, occupation and industry. An exception is for sector, where the Religion Report reports no difference in employment shares in the public sector by community.

3.2 Main Regression Results

Table 2 presents the key estimates from (1) for the full EES analysis sample. Coefficients show the estimated log per cent difference between Catholic and Protestant wages at the mean. In both the unadjusted model (Model 1) and the model adjusted for individual and household characteristics but not job characteristics (Model 2) the estimated wage gap is zero. The point estimate is slightly larger in the fully adjusted model (Model 3), suggesting an imprecisely estimated Catholic wage penalty of 1.4 log per cent, but because this estimate is nowhere near statistically significant at conventional levels, we cannot be confident it is not zero (the 95 per cent confidence interval contains zero). In other words, regardless of the extent to which we control for differences in observable

Figure 1: Gross Hourly Wage Distribution by Denomination, EES, All Employees



Source: Authors' analysis of EES2011 data.
Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. N=3,998. X-axis labels have been suppressed for disclosure reasons.

characteristics between Catholics and Protestants in the EES sample, we find no clear evidence of a Catholic-Protestant wage differential in NI as of 2011. Full regression results for this model are reported in Appendix Table A.4. As we would expect these show, for example, that wages are positively associated with age and education. They also show statistically significant gender and disability wage gaps of 8.5 log per cent and 7.2 log per cent respectively. The equivalent QLFS estimates paint a similar picture, with no statistically significant Catholic-Protestant wage differential at the mean in the overall QLFS sample (see Table A.5). Also note the wider confidence intervals in the QLFS case.

Table 2: Regression Estimates of the Catholic Wage Gap, EES, All Employees

Model	*1*	*2*	*3*
Catholic	–.002	–.003	–.014
Robust SE	(.015)	(.012)	(.011)
95% Confidence Interval	[–.032, .028]	[–.027, .021]	[–.035, .007]
Individual and Household Characteristics	No	Yes	Yes
Job Characteristics	No	No	Yes
R^2	0	0.37	0.59
No. obs	3,998	3,998	3,998

Source: Authors' analysis of EES2011 data.
Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95 per cent confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children and unpaid carer status. Job characteristic controls include occupation, industry, public/private sector, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District).

3.3 Wage Gap Estimates by Sex, Age Group and Sector

Table 3 presents EES estimates separately by sex. There is an interesting contrast in the unadjusted regression coefficients, which suggest a small but imprecisely estimated wage penalty for Catholic males and the opposite for Catholic females. As for the overall sample, however, neither estimate is statistically significant at conventional levels, so we cannot be confident that either is non-zero. Fully adjusted estimates are small and negative for both males and females, but again because they are statistically insignificant, we cannot be confident that they are not zero. QLFS estimates by sex are similar in that there are no statistically significant wage gaps for either men or women in any of the models (see Table A.6). At –.037, the fully adjusted QLFS point estimate for men is larger than the EES estimate, but again too imprecisely estimated to be statistically significant at conventional levels.

Table 4 presents EES estimates separately by broad age group. We separate two groups here: those aged 50+ years, who most likely entered the labour market prior to the mid-1990s when the unemployment differential between Catholic and Protestants was high; and those aged under 50 years who most likely entered the labour market since the substantial narrowing of the unemployment gap (Rowland

Table 3: Regression Estimates of the Catholic Wage Gap, EES, by Sex

	Male			*Female*		
Model	1	2	3	1	2	3
Catholic	–.035	–.022	–.018	.033	.013	–.011
Robust SE	(.023)	(.019)	(.017)	(.020)	(.016)	(.013)
95% Confidence Interval	[–.080, .010]	[–.059, .016]	[–.052, .017]	[–.006, .073]	[–.018, .044]	[–.036, .014]
Individual and Household Characteristics	No	Yes	Yes	No	Yes	Yes
Job Characteristics	No	No	Yes	No	No	Yes
R^2	.001	.33	.54	.001	.41	.65
No. obs	1,897	1,897	1,897	2,101	2,101	2,101

Source: Authors' analysis of EES2011 data.

Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95 per cent confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children and unpaid carer status. Job characteristic controls include occupation, industry, public/private sector, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District).

Table 4: Regression Estimates of the Catholic Wage Gap, EES, by Age Group

	<50 years			*50+ years*		
Model	1	2	3	1	2	3
Catholic	.009	.008	–.006	–.022	–.035	–.036
Robust SE	(.017)	(.014)	(.012)	(.033)	(.027)	(.023)
95% Confidence Interval	[–.025, .042]	[–.019, .035]	[–.029, .018]	[–.086, .042]	[–.088, .018]	[–.082, .010]
Individual and Household Characteristics	No	Yes	Yes	No	Yes	Yes
Job Characteristics	No	No	Yes	No	No	Yes
R^2	.0001	.37	.59	.0005	.35	.59
No. obs	3,034	3,034	3,034	964	964	964

Source: Authors' analysis of EES2011 data.

Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95 per cent confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children and unpaid carer status. Job characteristic controls include occupation, industry, public/private sector, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District).

et al., 2022). For the younger group the estimated differentials from all three models are essentially zero: they fall either side but very close to zero and are nowhere near conventional levels of statistical significance. For the older age group estimated differentials are larger than those for the younger age group (albeit not statistically significantly so) and consistently negative, with the fully adjusted model suggesting a wage differential of 3.6 log per cent in favour of Protestants. However, even this estimate falls short of statistical significance at conventional levels, so we cannot be confident that it is not zero. QLFS estimates are similar in magnitude, and they too suggest no statistically significant wage differential for either age group (Table A.7).

Table 5 presents EES estimates separately by sector. Here there is a borderline statistically significant unadjusted differential in the private sector of 3.4 log per cent in favour of Protestants (statistically significant at the 90 per cent level but not the 95 per cent level), but no such differential in the public sector. This contrast does not survive conditioning on individual, household and job characteristics, however, with both private and public sector estimated wage differentials being small and well outside conventional levels of statistical significance. The QLFS estimates similarly suggest no statistically significant wage gap for either sector in any model, although in this case the magnitude of the private sector wage gap increases with adjustment for individual, household and job characteristics (Table A.8).

3.4 Extensions and Sensitivity Analysis

If wage penalties vary across the distribution, as suggested by Table 1 in the unadjusted case, then the estimates provided by Equation (1) – estimates at the mean – will only give part of the picture and may under- or over-estimate wage penalties at different points in the distribution. We therefore use quantile regression to estimate distributional analogues of (1) – Model 3 – at the 10th, 25th, 50th, 75th and 90th percentiles of the wage distribution using the EES, following the approach of Koenker and Hallock (2001). Results are presented in Table A.9. The estimated wage gaps at each point in the distribution are close to zero in magnitude and nowhere near statistical significance. In other words, our conclusion of no wage gap at the mean is reflected at the median and across the distribution.

Although none of the estimated wage gaps presented in Tables 2-5 (or their QLFS counterparts in Tables A.5-A.8) are statistically significant at conventional levels, decomposition analysis can still provide a potentially informative split of these close-to-zero differentials into their explained and unexplained elements, as well as highlighting the differences in characteristics between the two communities that are most important in driving wage differences. These estimates are presented in Tables A.10-A.13.

Table A.10 suggests that the overall zero unadjusted wage gap between Catholics and Protestants consists of a small explained gap in favour of Catholics

Table 5: Regression Estimates of the Catholic Wage Gap, EES, by Sector

	Public			*Private*		
Model	1	2	3	1	2	3
Catholic	–.002	–.002	–.015	–.034	–.019	–.007
Robust SE	(.022)	(.018)	(.015)	(.019)	(.016)	(.015)
95% Confidence Interval	[–.046, .042]	[–.038, .033]	[–.044, .014]	[–.071, .003]	[–.051, .012]	[–.035, .022]
Individual and Household Characteristics	No	Yes	Yes	No	Yes	Yes
Job Characteristics	No	No	Yes	No	No	Yes
R^2	.000	.39	.63	.001	.31	.52
No. obs	1,552	1,552	1,552	2,446	2,446	2,446

Source: Authors' analysis of EES2011 data.

Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95 per cent confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children and unpaid carer status. Job characteristic controls include occupation, industry, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District).

offset by a small unexplained gap in favour of Protestants, with neither near conventional levels of statistical significance. The key characteristics driving up Catholic wages relative to Protestants are differences in qualification levels, occupational and sectoral distribution, with the main characteristic acting in the opposite direction being the relative age distribution of the two communities. Table A.11 suggests that for males these key characteristics driving up Catholic wages are absent, so that both explained and unexplained components of the wage gap favour Protestants, although again both are statistically insignificant at conventional levels. For females, a large occupational distribution effect in favour of Catholics drives a statistically significant explained wage differential of 4.5 log per cent, which is only partly offset by a small and statistically insignificant negative unexplained differential. Table A.12 suggests small, statistically insignificant explained differentials in favour of Catholics, offset by statistically insignificant unexplained differentials in favour of Protestants, for both age groups. The unexplained component for 50+ year olds is quite large in magnitude (-3.5 log per cent) but falls just outside 90 per cent statistical significance. Finally, Table A.13 suggests small, statistically insignificant, offsetting explained and unexplained components for the public sector zero wage gap, but explained and unexplained components both acting in favour of Protestants among private sector workers. Work location appears as detrimental to Catholic private sector wages here.

We also conduct sensitivity analysis, including replacing our gross hourly wage measure with a measure for hourly wage that excludes overtime (HEXO), including job tenure in (1), replacing the ten-year age groups with five-year age groups or a quadratic in potential experience, and using a Heckman selection model to account for non-random selection into employment (Heckman, 1979). Because the EES only includes those in employment, we use the QLFS to estimate the Heckman selection model, with selection into employment modelled using a probit model, with the identifying variables being a dummy for having dependent children aged under four years, and the interaction of this dummy with the female dummy. In all these cases our conclusions remain unchanged.

There is one robustness check, however, which does suggest some sensitivity, and that is when we replace our derived gross hourly wage measure with the stated hourly rate measure of wages in the EES (HPAY). The two measures differ in terms of sample coverage (the stated rate is only reported for approximately half of our analysis sample because many employees are paid on a monthly/annual salary basis) and because the stated rate measure does not capture above-basic earnings due, for example, to overtime or shift premiums. Table A.14 shows larger magnitude estimated Catholic wage penalties for this alternative wage measure than for the derived wage measure in unadjusted and adjusted models, with the fully adjusted (Model 3) estimated wage gap using the stated rate measure (-3.0 log per cent) being statistically significant at the 95 per cent level. Given that estimates for the full analysis sample using the derived hourly pay measure that excludes overtime

(HEXO) are almost identical to those using the overtime-inclusive derived hourly pay measure, differences in sample coverage appear to be the most likely explanation for this sensitivity. For example, many of those in professional occupations are likely to be paid on a monthly/annual salary basis and therefore omitted from the HPAY sample. Because these employees tend to be comparatively well-paid and drawn disproportionately from the Catholic community, their omission will disproportionately affect Catholic wages relative to Protestants.

IV DISCUSSION

Complementary statistical analyses, plus analyses of sub-samples, are used here to assess the extent to which there were wage penalties by religion in NI in 2011. The methods used include regression, quantile regression, and Oaxaca-Blinder decomposition, undertaken on EES and QLFS data including on sub-samples by sex, broad age group, and public/private sector. Our analysis by sex is motivated by existing evidence that unemployment differentials were higher for men than for women (Rowland *et al*., 2022; Murphy and Armstrong, 1994) and that Catholic women faced twin penalties: lower labour market participation rates and, when they did participate, lower employment rates (Murphy, 1995). Young men were also more likely to be perpetrators and victims of violence (Reilly *et al*., 2004) and therefore exposed to sectarian conflict. Our analysis by age is motivated by changes in the society, politics and the labour market of NI through time that mean those aged 50 or more in 2011 (and thus born in or before 1960-61) entered the labour market during periods of high unemployment, political violence, and before the wide application of employment equality legislation, and thus might have been scarred in their early adult years (see Raffe and Willms, 1989). Our analysis by sector is motivated by literature suggesting that the public sector was seen historically as being discriminatory (Sheehan and Tomlinson, 1999) but then saw the early application of employment equality policy (Osborne and Shuttleworth, 2004). The private sector has also seen major restructuring in the type and numbers of jobs since the late 1980s, with an increasing Catholic share of employees.

Despite some tentative evidence of wage differences in the raw EES data for some groups and at some points in the distribution, there is no robust evidence for wage penalties in either direction once adjustments are made for differences in individual, household and job characteristics. Our analysis using the QLFS draws a similar conclusion. In this, the results differ somewhat from those noted by Borooah *et al*. (1995) on the related (though not identical) outcome variable of income. Based on the Family Expenditure Survey for 1989 and 1990, they conclude that there were different returns to relevant productive attributes between Catholics and Protestants and that it was therefore hard to avoid the conclusion that discrimination was an explanation for lower Catholic incomes at that time. In

contrast, we find no strong evidence of unexplained wage gaps between Catholics or Protestants as of 2011. Some of the possible reasons for this apparent change in the NI labour market are discussed below in the conclusion as are some of the limitations and future wish lists for this research agenda, but for now it is important to recognise that the linkage of the 2011 Census and ASHE has extended the range and depth of possible analyses on this under-represented topic, and that the prospect of a similar linkage of the 2021 Census and ASHE is very welcome. This will facilitate analyses of wages by religion and other Section 75 groups (e.g. by ethnicity or disability status) especially if the 2020, 2021, and 2022 ASHEs are linked to the 2021 Census to increase sample numbers and statistical power.

V CONCLUSION

The analysis presented in this paper is novel on two counts. Firstly, it makes use of ASHE data linked to Census data in NI – the EES – for the first time. Secondly, it provides the most comprehensive analysis to date of religious wage inequalities taking advantage of the larger sample size and arguably superior wage data in the EES compared to the QLFS. The results indicate that there is no reliable evidence for a Catholic-Protestant wage gap in 2011.

The null finding likely reflects the many structural changes in the society and labour market of NI since the late 1980s. The long economic boom of the 1990s and early years of the 21st Century saw a growth in employee job numbers. It also saw the transformation of the economy with the decline of manufacturing jobs, the growth of the service sector, and increased overseas investment. It witnessed the arrival of peace after the Troubles and, halting and imperfect though this transition has been, the decline in violence, personal injury, and death over the past three decades is incontrovertible. Moreover, the growing reach of equal opportunity legislation in 1989 and 1998 created a legal framework that placed employment equality at the centre of hiring practices. Given these developments, the historic easing (if not complete eradication) of Catholic-Protestant unemployment differentials, and the decline in the numbers of highly-polarised workplaces in ECNI Monitoring Returns, are not surprising. Given the lack of evidence for current systematic discrimination by religion, the absence of wage differentials by religion in 2011 is no shock.

However, there are some minor caveats to this conclusion. The largest of these concerns the cross-sectional nature of our analysis that considers wages as they were in 2011, after nearly 20 years of peace, and 35 years of equality legislation. The 2011 in-work population includes younger workers who entered the ‘new’ labour market in the 1990s and the 2000s, a period which not only saw the social and economic developments noted above but also some convergence in productive attributes, such as education, across the Catholic and Protestant communities. On

the other hand, workers aged 50 or over in 2011 – born in or before 1961 – entered the labour market before the 1980s, a period in which violence was at its height, employment equality legislation was just starting, and there were more marked differences in the distribution of productive attributes between Catholics and Protestants (Osborne and Shuttleworth, 2004). Furthermore, these workers may have been scarred through entry into the high-unemployment labour market of the 1970s and 1980s. It is for these older workers (and for men) that there is some slight suggestion of a Catholic wage penalty here, albeit tentative, and not meeting the standard of statistical significance at the 95 per cent level. Nevertheless, this observation is interesting and suggests that Catholic-Protestant wage inequalities in NI should be explored through a similar data linkage to that in 2011 to the 2001 and 1991 Censuses (when the 50s and over in our 2011 analysis would be aged respectively 40 and 30 and over), besides the planned link to the 2021 Census to inform current labour market monitoring and policy.

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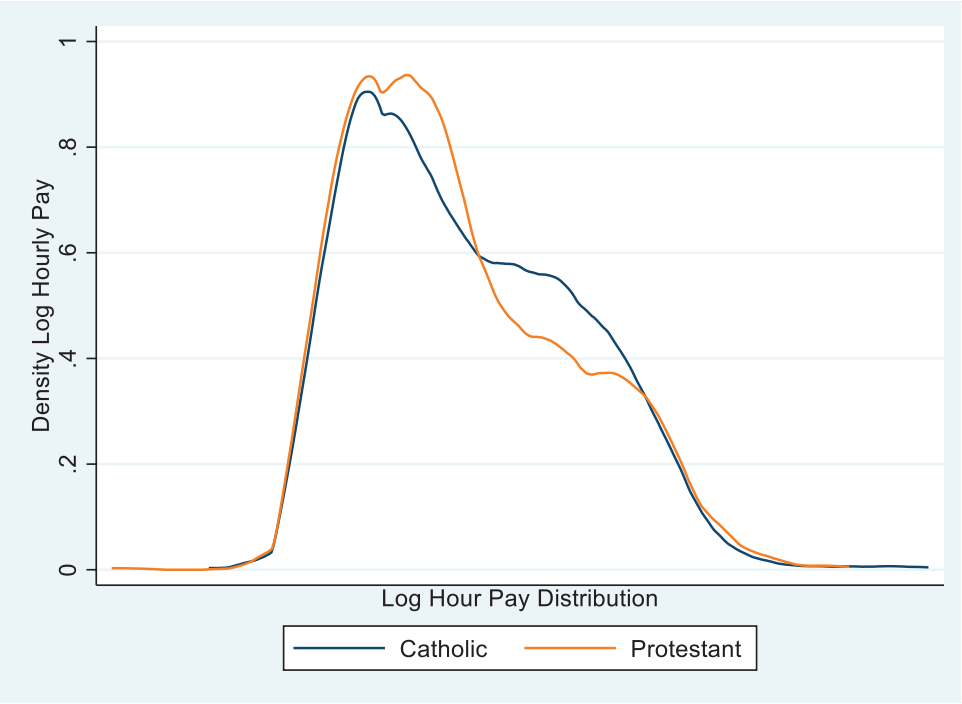
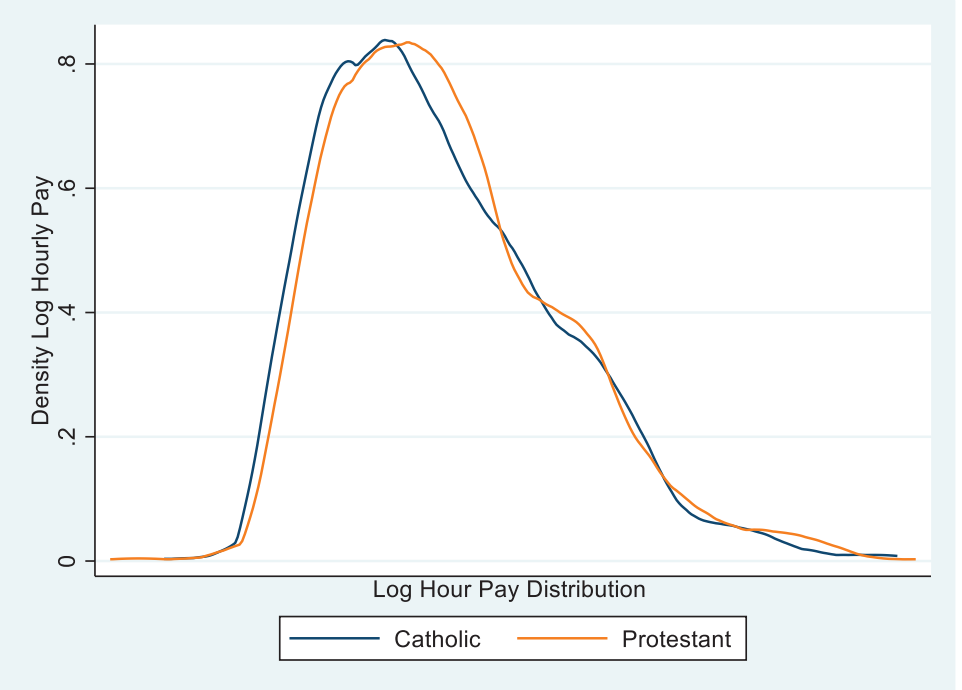
APPENDIX

Figure A1: Gross Hourly Wage Distribution by Denomination, EES, Females



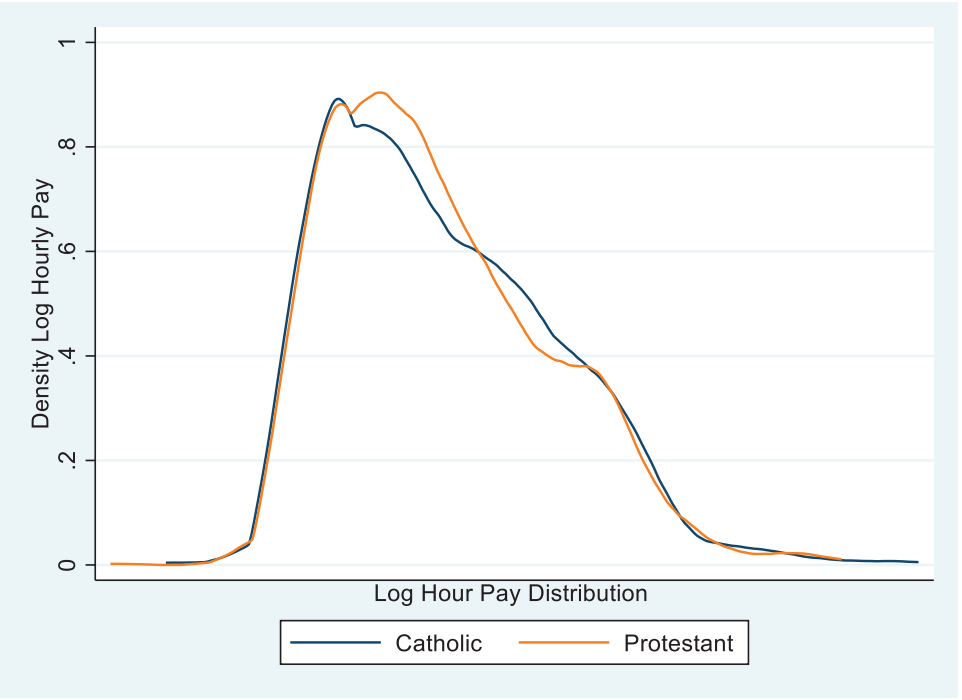
Notes: Female EES2011 working-age females, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. N = 2,101. X-axis labels have been suppressed for disclosure reasons.

Figure A2: Gross Hourly Wage Distribution by Denomination, EES, Males



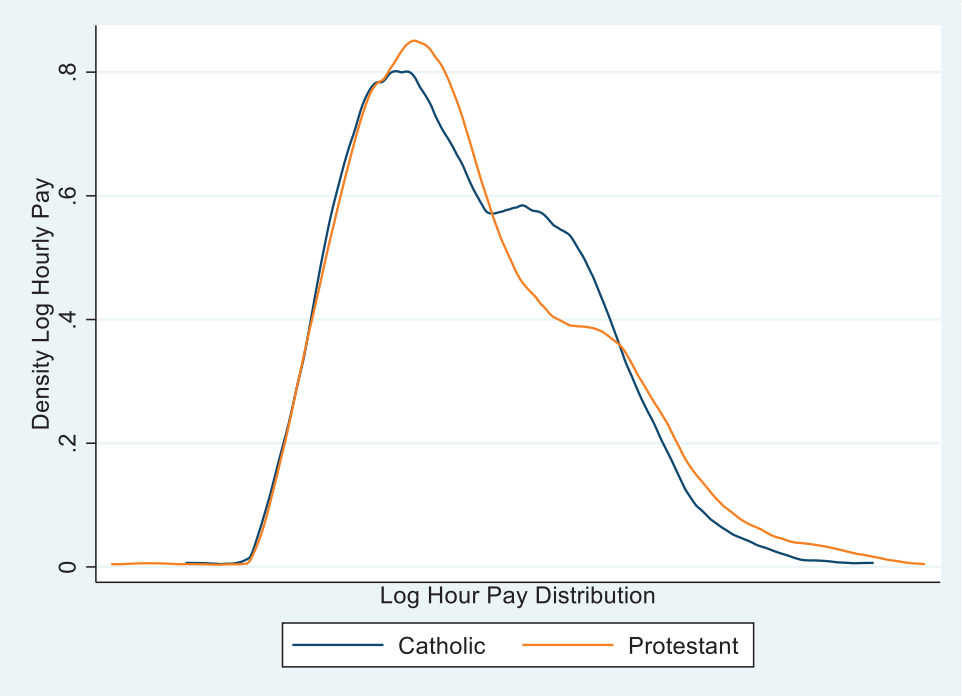
Notes: Male EES2011 working-age males, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. N = 1,897. X-axis labels have been suppressed for disclosure reasons.

Figure A3: Gross Hourly Wage Distribution by Denomination, EES, Aged <50 Years



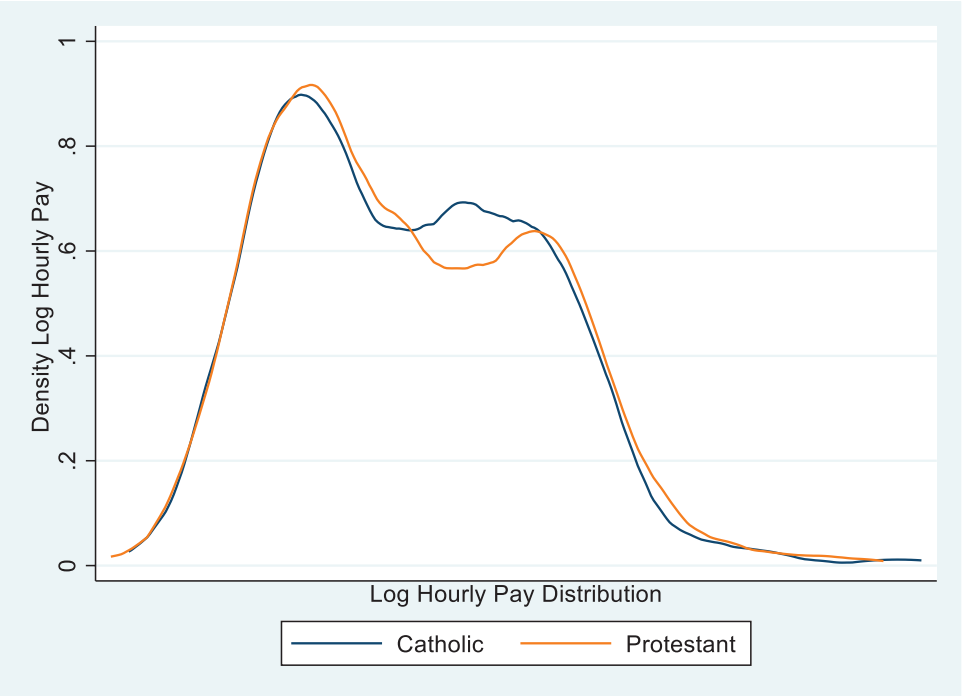
Notes: EES2011 working-age individuals aged <50 years, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. N = 3,034. X-axis labels have been suppressed for disclosure reasons.

Figure A4: Gross Hourly Wage Distribution by Denomination, EES, Aged 50+ Years



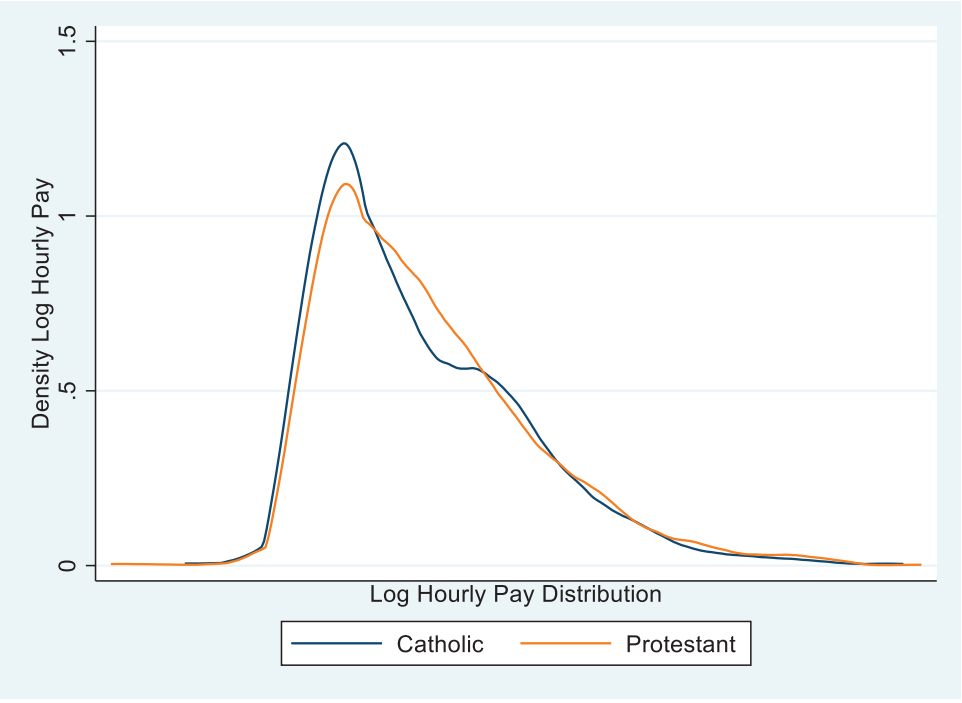
Notes: EES2011 working-age individuals aged 50+ years, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. N = 964. X-axis labels have been suppressed for disclosure reasons.

Figure A5: Gross Hourly Wage Distribution by Denomination, EES, Public Sector



Notes: EES2011 working-age public sector employees, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. N = 1,552. X-axis labels have been suppressed for disclosure reasons.

Figure A6: Gross Hourly Wage Distribution by Denomination, EES, Private Sector



Notes: EES2011 working-age private sector employees, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. N = 2,446. X-axis labels have been suppressed for disclosure reasons.

Table A1: EES Variable Definitions

Variable Name	*Variable Description*	*Further Details*
Gross hourly earnings	hourly earnings, £	Includes overtime
Catholic	1=Catholic, 0=Protestant	Defined by current religion or, where missing, community background.
Sex	1=Female, 0=Male	Sex indicator
Age bands	Binary dummies for 10-year age bands	16-24 (reference category), 25-34, 35-44, 45-54, 55-64 years
Highest qualification	Binary dummies for qualification category	No qualification (reference category), other, level 1, level 2, level 3, level 4 or above
Marital status	1=married, 0 otherwise	1=married / civil partnership, 0=single / separated / divorced / widowed
Activity-limiting disability	1=disability, 0 otherwise day to day activity either a lot or a little	Disability that has lasted or is expected to last at least 12 months and limits
Dependent children	1 = one or more dependent children in household, 0 otherwise	Dependent child aged <16 years or aged <19 years if in full-time education
Unpaid carer	1=provides unpaid care, 0 otherwise	Unpaid carer indicator
Long term health condition	1=reports one or more long-term health conditions, 0 otherwise	Health condition that has lasted or is expected to last at least 12 months

Table A1: EES Variable Definitions (Contd.)

Variable Name	*Variable Description*	*Further Details*
Temporary or casual employment	1=temporary or casual employment contract, 0 otherwise	Temporary/casual employment indicator
Collective agreement	1=covered by collective agreement, 0 otherwise	Collective agreement indicator
Occupation	SOC10 1-digit occupation dummies	1) elementary occupations (reference category); 2) process, plant and machine operatives; 3) sales and customer service occupations; 4) personal service occupations; 5) skilled trade occupations; 6) administrative and secretarial; 7) associate professionals and technical; 8) professional occupations; 9) managers and senior positions.
Industry	SIC07 1-digit dummies	1) A - agriculture, forestry and fishing (reference); 2) B,D,E - mining, energy and water; 3) C - manufacturing; 4) F - construction; 5) G,I - distribution, hotels and restaurants; 6) H,J - transport and communication; 7) K,L,M,N - banking, finance and professional activities; 8) O,P,Q - public admin, education and health; 9) R,S,T,U - other services.

Table A1: EES Variable Definitions (Contd.)

Variable Name	*Variable Description*	*Further Details*
Sector	1=public sector, 0=private sector	Public sector indicator
Work district	Dummies for LGD (2014) of work	1) Belfast (reference category); 2) Armagh city, Banbridge and Craigavon; 3) Antrim and Newtownabbey; 4) Causeway Coast and Glens; 5) Derry City and Strabane; 6) Fermanagh and Omagh; 7) Lisburn and Castlereagh; 8) Mid and East Antrim; 9) Mid Ulster; 10) Newry, Mourne and Down; 11) Ards and North Down; 12) Missing
Part-time job	1=part-time, 0 otherwise	Part-time indicator = 1 if work <30 hours per week or <25 paid hours per week in teaching professions

Table A2: QLFS Variable Definitions

Variable Name	*Variable Description*	*Further details*
Gross hourly earnings	Hourly earnings, £	HOURPAY, includes overtime. Observations with HOURPAY <£0 or >£99 set to missing
Catholic	1=Catholic, 0=Protestant	Derived from self-reported religion variable IREND2
Female	1=Female, 0=Male	Sex indicator
Age bands	Dummies for 10-year age bands	16-24 (reference), 25-34, 35-44, 45-54, 55-64
Highest qualification	Dummies for highest qualification level	No qualification (reference), other, level 1, level 2, level 3, level 4 or above. Derived from HIQUAL8D (2010) and HIQUAL11D (2011 & 2012).
Marital status	1=married, 0 otherwise	1=married/civil partnership, 0 = single/ divorced/separated/widowed
Activity limiting disability	1 = activity limiting disability, 0 otherwise	Disability that has lasted or is expected to last at least 12 months and limits day to day activity either a lot or a little
Dependent children	1 = one or more dependent children in household, 0 otherwise	Dependent child aged <16 years or aged <19 years if in full-time education
Long term health condition	1=reports one or mode long term health condition, 0 otherwise	Health condition that has lasted or is expected to last at least 12 months
Temporary work	1=temporary work, 0 otherwise	From JOBTYP, with temporary defined as ‘not permanent in some way’
Occupation	SOC10 1-digit dummies	1) elementary occupations (reference); 2) process, plant and machine operatives; 3) sales and customer service occupations;

Table A2: QLFS Variable Definitions (Contd.)

Variable Name	*Variable Description*	*Further details*
Occupation	SOC10 1-digit dummies	4) personal service occupations; 5) skilled trade occupations; 6) administrative and secretarial; 7) associate professionals and technical; 8) professional occupations; 9) managers and senior positions.
Industry	SIC07 1-digit dummies	1) A - agriculture, forestry and fishing or B,D,E -mining, energy and water (reference); 2) C – manufacturing; 3) F – construction; 4) G,I - distribution, hotels and restaurants; 5) H,J - transport and communication; 6) K,L,M,N - banking, finance and professional activities; 7) O,P,Q - public admin, education and health; 8) R,S,T,U - other services
Sector	Public sector, 0=private sector	Public sector indicator
Part-time	1=part-time employment, 0 otherwise	Part-time indicator

Table A3: Gross Hourly Wages, Individual, Household and Job Characteristics, QLFS 2010-2012

	All	*Catholic*	*Protestant*
Average Hourly Earnings (£)			
Mean	11.91	11.92	11.90
10th Percentile	6.75	6.76	6.64
25th Percentile	7.90	8.00	7.78
50th Percentile	10.07	10.15	10.00
75th Percentile	14.08	14.07	14.08
90th Percentile	19.24	19.24	19.24
Individual and Household Characteristics			
Age group (%)			
16-24	8	9	7
25-34	25	26	24
35-44	31	32	30
45-54	27	26	27
55-64(male)/55-59(female)	9	7	12
Qualifications (%)			
Level 4	29	33	26
Level 3	11	13	10
Level 2	25	23	26
Level 1	22	21	22
Other	5	3	6
No qualification	9	8	11
Female (%)	52	55	50
Married (%)	63	62	64
Dependent child/children in household (%)	52	58	47
Activity-limiting disability (%)	6	6	7
Long-term health condition (%)	18	17	20
Job Characteristics			
Public sector (%)	40	42	38
Part time (%)	21	22	21
Temporary work (%)	4	5	3
Occupation (%)			
Elementary occupations	10	7	11
Process, plant, and machine operatives	7	6	8
Sales and customer services	8	8	7
Personal service occupation	9	9	9
Skilled trades	10	8	11
Administrative and secretarial	17	17	17
Associate professionals and technical	11	11	12

Table A3: Gross Hourly Wages, Individual, Household and Job Characteristics, QLFS 2010-2012 (Contd.)

	All	*Catholic*	*Protestant*
Professional occupations	20	24	16
Managers and senior positions	9	9	9
Industry (%)			
A – Agri., forestry, fishing or B, D, E- Mining, energy, water	2	2	3
C – Manufacturing	13	10	15
F – Construction	5	6	5
G, I – Distribution, hotels and restaurants	16	17	15
H, J – Transport and communication	6	5	7
K, L, M, N – Banking and finance	11	13	10
O, P, Q – Public administration, education, and health	43	46	41
R, S, T, U – Other services	3	2	3
N weighted observations	1,526	663	863

Notes: Pooled QLFS 2010-2012, wave 1, working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Statistics are weighted using the income weights PIWT14 and PIWT18 (wage variable) and the person weights PWT14 and PWT18 (all other variables).

Table A4: Catholic-Protestant Wage Differential, EES, All Employees, Full Regression Results

	Coeff.	*Robust SE*	*95% confidence*	*interval*
Catholic	–0.014	0.011	–0.035	0.007
Age (16–24 reference)				
25–34	0.079***	0.017	0.045	0.113
35–44	0.208***	0.019	0.171	0.244
45–54	0.223***	0.019	0.186	0.260
55–64	0.257***	0.024	0.209	0.304
female	–0.085***	0.013	–0.109	–0.060
disabled	–0.072***	0.020	–0.111	–0.033
Qualifications (reference: none)				
other	0.069***	0.022	0.026	0.111
level 1	0.03*	0.017	0.006	0.073
level 2	0.094***	0.017	0.060	0.128
level 3	0.098***	0.018	0.062	0.133
level 4 or more	0.231***	0.019	0.193	0.270
married	0.051***	0.011	0.029	0.073
child	0.024*	0.011	0.002	0.046
unpaid carework	0.007	0.014	–0.019	0.035
health condition	–0.001	0.014	–0.029	0.026
temporary or casual work	–0.046*	0.022	–0.089	–0.004
Part–time	–0.051***	0.014	–0.078	–0.024
Covered by collective agreement	0.054***	0.014	0.027	0.082
Work district (reference: Belfast)				
armagh city, banbridge and craigavon	–0.036*	0.018	–0.070	–0.001
antrim and newtownabbbey	–0.039	0.023	–0.085	0.006

Table A4: Catholic-Protestant Wage Differential, EES, All Employees, Full Regression Results (Contd.)

	Coeff.	*Robust SE*	*95% confidence*	*interval*
Antrim and Newtownabbbey	–0.039	0.023	–0.085	0.006
Causeway Coast and Glens	–0.124***	0.023	–0.170	–0.079
Derry City and Strabane	–0.033	0.017	–0.067	0.0005
Fermanagh and Omagh	–0.071***	0.023	–0.116	–0.027
Lisburn and Castlereagh	–0.038	0.022	–0.081	0.005
Mid and East Antrim	–0.083***	0.020	–0.122	–0.045
Mid Ulster	–0.037	0.025	–0.086	0.011
Newry, Mourne and Down	–0.071***	0.021	–0.113	–0.029
Ards and North Down	–0.044	0.026	–0.097	0.007
Missing LGD Work	0.084***	0.024	0.037	0.132
Occupation (reference: elementary)				
Process, Plant and Machine Operatives	0.101***	0.019	0.063	0.139
Sales and Customer Service Occupations	0.072***	0.018	0.037	0.107
Personal Service Occupations	0.108***	0.018	0.071	0.144
Skilled Trade Occupations	0.215***	0.021	0.174	0.257
Administrative and Secretarial	0.178***	0.017	0.146	0.210
Associate Professionals and Technical	0.414***	0.022	0.370	0.458
Professional Occupations	0.653***	0.022	0.610	0.696
Managers and Senior Positions	0.607***	0.031	0.546	0.668
Industry (reference: A – agriculture, forestry and fishing)				
B,D,E – Mining, Energy and Water	0.165**	0.061	0.046	0.285
C – Manufacturing	0.115*	0.048	0.021	0.210
F – Construction	0.131*	0.052	0.029	0.233
G,I – Distribution, Hotels and Restaurants	–0.007	0.046	–0.098	0.084

Table A4: Catholic-Protestant Wage Differential, EES, All Employees, Full Regression Results (Contd.)

	Coeff.	*Robust SE*	*95% confidence*	*interval*
H,J – transport and Communication	0.084	0.052	–0.018	0.185
K,L,M,N – Banking, Finance and Professional Activities	0.070	0.048	–0.024	0.165
O,P,Q – Public Admin, Education and Hea	0.006	0.048	–0.087	0.099
R,S,T,U – Other Services	0.046	0.053	–0.057	0.150
Public Sector	0.127***	0.018	0.091	0.163
Constant	1.767***	0.049	1.671	1.862
R^2		0.59		
No. obs		3,998		

Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95% confidence intervals in parentheses. *p<0.05, **p<0.01, ***p<0.001. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children and unpaid carer status. Job characteristic controls include occupation, industry, public/private sector, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District).

Table A5: Regression Estimates of the Catholic Wage Gap, QLFS, All Employees

Model	*1*	*2*	*3*
Catholic	.012	–.015	–.024
Robust SE	(.021)	(.016)	(.015)
95% Confidence Interval	[–.022, .049]	[–.048, .017]	[–.053, .005]
Quarter-Year Fixed Effects	Yes	Yes	Yes
Individual and Household Characteristics	No	Yes	Yes
Job Characteristics	No	No	Yes
R^2	.005	0.43	0.53
No. obs	1,563	1,563	1,563

Notes: Pooled QLFS 2010-2012, wave 1, working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95% confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, and dependent children. Job characteristic controls include occupation, industry, public/private sector, contract type, and part-time status.

Table A6: Regression Estimates of the Catholic Wage Gap, QLFS, by Sex

	Male			*Female*		
Model	*1*	*2*	*3*	*1*	*2*	*3*
Catholic	.023	–.022	–.037	.015	–.004	–.003
Robust SE	(.034)	(.026)	(.024)	(.027)	(.021)	(.017)
95% Confidence Interval	[–.044, .090]	[–.073, .029]	[–.085, .010]	[–.037, .068]	[–.045, .037]	[–.038, .031]
Quarter-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual and Household Characteristics	No	Yes	Yes	No	Yes	Yes
Job Characteristics	No	No	Yes	No	No	Yes
R^2	.009	.44	.53	.01	.41	.57
No. obs	719	719	719	884	884	884

Notes: Pooled QLFS 2010-2012, wave 1, working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95% confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for age group, qualification level, marital status, activity-limiting disability, long-term health condition, and dependent children. Job characteristic controls include occupation, industry, public/private sector, contract type, and part-time status

Table A7: Regression Estimates of the Catholic Wage Gap, QLFS, by Age Group

	<50 years			50+ years		
Model	*1*	*2*	*3*	*1*	*2*	*3*
Catholic	.023	–.015	–.024	–0.002	0.003	–0.028
Robust SE	(.023)	(.018)	(.016)	(0.050)	(0.039)	(0.036)
95% Confidence Interval	[–.023, .069]	[–.051, .020]	[–.056, .008]	[–.099, .096]	[–.073, .080]	[–.098, .042]
Quarter-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual and Household Characteristics	No	Yes	Yes	No	Yes	Yes
Job Characteristics	No	No	Yes	No	No	Yes
R^2	.001	.45	.56	0.03	0.40	0.52
No. obs	1203	1203	1203	360	360	360

Notes: Pooled QLFS 2010-2012, wave 1, working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95% confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, and dependent children. Job characteristic controls include occupation, industry, public/private sector, contract type, and part-time status.

Table A8: Regression Estimates of the Catholic Wage Gap, QLFS, by Sector

	Public			*Private*		
Model	*1*	*2*	*3*	*1*	*2*	*3*
Catholic	0.029	–0.005	–0.015	–0.012	–0.029	–0.030
Robust SE	(0.032)	(0.025)	(0.023)	(0.028)	(0.021)	(0.020)
95% Confidence Interval	[–.034, .092]	[–.055, .045]	[–.060, .029]	[–.067, .043]	[–.071, .013]	[–.070, .009]
Quarter-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual and Household Characteristics	No	Yes	Yes	No	Yes	Yes
Job Characteristics	No	No	Yes	No	No	Yes
R^2	0.010	0.44	0.60	0.006	0.41	0.49
No. obs	630	630	630	933	933	933

Notes: Pooled QLFS 2010-2012, wave 1, working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95% confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, and dependent children. Job characteristic controls include occupation, industry, contract type, and part-time status.

Table A9: Quantile Regression Estimates of the Catholic Wage Gap, All Employees

Percentile	*10th*	*25th*	*50th*	*75th*	*90th*
Catholic	–.008	–.013	–.013	–.012	–.004
Robust SE	(.014)	(.011)	(.011)	(.013)	(.020)
95% Confidence Interval	[–.036, .019]	[–.035, .008]	[–.035, .009]	[–.038, .014]	[–.043, .035]
Individual and Household Characteristics	Yes	Yes	Yes	Yes	Yes
Job Characteristics	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	.27	.36	.42	.44	.40
No. obs			3,998		

Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Estimates show the key coefficients from OLS log wage quantile regressions, with robust standard errors and 95% confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children and unpaid carer status. Job characteristic controls include occupation, industry, public/private sector, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District).

Table A10: Decomposition of the Catholic Wage Gap, EES, All Employees

	All Employees
Raw Difference	–0.002
	(–0.14)
Explained	0.012
	(0.98)
Unexplained	–0.014
	(–1.33)
No. obs	3,998
Explained	
Female	–0.004**
Activity limiting disability	0
Age	–0.012***
Marital status	–0.003**
Dependent children	0.002*
Unpaid carer	0
Part-Time	0
Long term health condition	0
Qualification level	0.010***
Industry	–0.001
Collective Agreement	0
Occupation	0.015*
Work Location	–0.001
Temporary or Casual work	–0.001
Sector	0.008**

Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Table shows the estimated unadjusted (raw) wage gap reproduced from Table 2 model 1 and estimated explained and unexplained shares of this wage gap from Oaxaca-Blinder decomposition analysis, with the explained share further split by observed covariates (or groups or covariates). T-ratios are given in parentheses. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children and unpaid carer status. Job characteristic controls include occupation, industry, public/private sector, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District). *p<0.05, **p<0.01, ***p<0.001.

Table A11: Decomposition of the Catholic Wage Gap, EES, by Sex

	Male Employees	*Female Employees*
Raw Difference	–0.035	0.033
	(–1.51)	(1.66)
Explained	–0.017	0.045**
	(–0.94)	(2.65)
Unexplained	–0.018	–0.011
	(–1.05)	(–0.89)
No. obs	1,897	2,101
Explained		
Activity limiting disability	0	0
Age	–0.016**	–0.008*
Marital status	–0.002	–0.004*
Dependent children	0.003	0.001
Unpaid carer	0	0
Part-Time	0	0.004*
Long term health condition	0	0
Qualification level	0.005	0.011**
Industry	0.002	0.002
Collective Agreement	–0.003	0.001
Occupation	–0.003	0.026*
Work Location	–0.005	0.003
Temporary or Casual work	–0.002	0
Sector	0.003	0.009*

Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Table shows the estimated unadjusted (raw) wage gaps reproduced from Table 3 model 1 for males and females and estimated explained and unexplained shares of these wage gaps from Oaxaca-Blinder decomposition analysis, with the explained share further split by observed covariates (or groups or covariates). T-ratios are given in parentheses. Controls for individual and household characteristics include dummies for age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children and unpaid carer status. Job characteristic controls include occupation, industry, public/private sector, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District). *p<0.05, **p<0.01, ***p<0.001.

Table A12: Decomposition of the Catholic Wage Gap, EES, by Age Group

	Employees aged <50	*Employees aged 50+*
Raw Difference	0.009	–0.022
	(0.52)	(–0.67)
Explained	0.015	0.013
	(1.06)	(0.49)
Unexplained	–0.006	–0.035
	(–0.47)	(–1.52)
No. obs	3,034	964
Explained		
Female	–0.003*	–0.004
Activity limiting disability	0	–0.003
Age	–0.010***	–0.001
Marital status	–0.004**	–0.001
Dependent children	0.002*	–0.001
Unpaid carer	0	0.001
Part-Time	0	0
Long term health condition	0	0
Qualifications	0.009**	0.007
Industry	–0.004	0.005
Collective Agreement	0	–0.001
Occupation	0.019*	0
Work Location	–0.003	0.007
Temporary or Casual work	–0.001	0
Sector	0.009***	0.006

Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Table shows the estimated unadjusted (raw) wage gaps reproduced from Table 4 model 1 for employees aged <50 years and 50+ years respectively and estimated explained and unexplained shares of these wage gaps from Oaxaca-Blinder decomposition analysis, with the explained share further split by observed covariates (or groups or covariates). T-ratios are given in parentheses. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, student status, activity-limiting disability, long-term health condition, dependent children, unpaid carer status, and the multiple deprivation decile for the SOA of residence. Job characteristic controls include occupation, industry, public/private sector, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District). *p<0.05, **p<0.01, ***p<0.001.

Table A13: Decomposition of the Catholic Wage Gap, EES, by Sector

	Public Sector	*Private Sector*
Raw Difference	–0.002	–0.034
	(–0.10)	(–1.81)
Explained	0.013	–0.027
	(0.70)	(–1.88)
Unexplained	–0.015	–0.007
	(–1.04)	(–0.48)
No. obs	1,552	2,446
Explained		
Female	–0.002	–0.004
Activity limiting disability	0.001	–0.001
Age	–0.017***	–0.011**
Marital status	–0.001	–0.004*
Dependent children	0.002	0.001
Unpaid carer	0	0
Part-Time	0.001	–0.002
Long term health condition	0	0
Qualifications	0.009*	0.005
Industry	0	0.001
Collective Agreement	0.002	–0.003*
Occupation	0.015	0.003
Work Location	0.004	–0.010*
Temporary or Casual work	0	–0.002*

Notes: EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. Table shows the estimated unadjusted (raw) wage gaps reproduced from Table 5 model 1 for public and private sector employees respectively and estimated explained and unexplained shares of these wage gaps from Oaxaca-Blinder decomposition analysis, with the explained share further split by observed covariates (or groups or covariates). T-ratios are given in parentheses. Controls for individual and household characteristics include dummies for gender, age group, qualification level, marital status, student status, activity-limiting disability, long-term health condition, dependent children, unpaid carer status, and the multiple deprivation decile for the SOA of residence. Job characteristic controls include occupation, industry, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District). *p<0.05, **p<0.01, ***p<0.001.

Table A14: EES Regression Estimate Sensitivity to Wage Measure & Sample

	Derived Gross Hourly Pay, £, All Employees			*Stated Hourly Rate (HPAY), £*		
Model	*1*	*2*	*3*	*1*	*2*	*3*
Catholic	–.002	–.003	–.014	–.022	–.020	–.030*
Robust SE	(.015)	(.012)	(.011)	(.016)	(.014)	(.012)
95% Confidence Interval	[–.032, .028]	[–.027, .021]	[–.035, .007]	[–.054, .011]	[–.048, .007]	[–.053, –.006]
Individual and Household Characteristics	No	Yes	Yes	No	Yes	Yes
Job Characteristics	No	No	Yes	No	No	Yes
R^2	0	.37	.59	.001	.31	.60
No. obs	3,998	3,998	3,998	1,942	1,942	1,942

Notes: The main sample (N=3998) is EES2011 working-age individuals, born in NI, identifiable as either Catholic or Protestant, excluding those with loss of pay in the reference period, those earning less than the adult minimum wage rate at the time, and those with hourly pay above £99. The HPAY sample (N=1942) is constructed in the same way but limited to those employees with a stated hourly rate reported in the data. Estimates show the key coefficients from OLS log wage regressions, with robust standard errors and 95% confidence intervals in parentheses. *p<0.05. Controls for individual and household characteristics include dummies for sex, age group, qualification level, marital status, activity-limiting disability, long-term health condition, dependent children and unpaid carer status. Job characteristic controls include occupation, industry, public/private sector, covered by collective agreement, contract type, part-time status, and work location (2014 Local Government District).