DEMOGRAPHIC RESEARCH
A peer-reviewed, open-access journal of population sciences

DEMOGRAPHIC RESEARCH

VOLUME 50, ARTICLE 14, PAGES 393–410
PUBLISHED 1 MARCH 2024
https://www.demographic-research.org/Volumes/Vol50/14/
DOI: 10.4054/DemRes.2024.50.14

Descriptive Finding

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Demographic Research: Volume 50, Article 14
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Abstract

BACKGROUND
Previous studies have identified a link between religious affiliation and child mortality, yet the underlying factors that contributed to this association are not fully understood.

OBJECTIVE
This study investigates how religious affiliation impacted child mortality in early 20th century Ireland, controlling for socioeconomic status, literacy, and place of residence at both the individual and contextual level.

METHODS
We utilize the 1911 IPUMS Irish census, indirect techniques, and regression analysis to examine the role of religious affiliation in child mortality. We therefore perform various OLS regressions, controlling for demographic factors and socioeconomic conditions at both the individual and contextual level, as well as for the three major religious groups.

RESULTS
Our results indicate striking differences in child mortality rates among the three major religious denominations in Ireland in the early 20th century. Catholics recorded the highest child mortality rates, followed by Church of Ireland families, while Presbyterians experienced the best child mortality outcomes. These differences are explained in part by the varying socioeconomic characteristics of each religious group, but religious affiliation is also shown to have mattered. For reasons that are not altogether clear, Jewish communities had lower child mortality rates than the major religious denominations.

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CONCLUSIONS

Our study highlights the complex interplay between religious affiliation, socioeconomic factors, and child mortality in Ireland in the early 1900s. Our findings reveal a significant association between religious affiliation and child mortality, which persists even after controlling for certain individual socioeconomic characteristics and contextual factors.

CONTRIBUTION

By utilising the 1911 Irish census data and indirect estimation techniques, the study provides a new perspective on child mortality and its relationship with diverse religious affiliations.

1. Religion and child mortality in Ireland

Previous studies have shown that religious affiliation is associated with differences in child mortality, but the underlying factors are not yet fully understood (e.g., Van Poppel, Schellekens, and Liefbroer 2002). While differences in socioeconomic characteristics and lifestyle can explain some of the differences, research has also shown that religious differentials may persist even after controlling for certain socioeconomic characteristics (e.g., McQuillan 1999). Ekamper and van Poppel (2019) demonstrate that when religion and other multiple variables (related to socioeconomic, residential, environmental, and health-care characteristics) in the model are controlled for, the social class gradient tends to diminish. For the Irish case, Ó Gráda (2004) shows that in 1911, infants and children of non-Catholic faiths had lower mortality rates in the suburban township of Pembroke. For the textile town of Lurgan, Ó Gráda (2008) also finds that religious affiliation was associated with infant and child mortality, but that socioeconomic advantage was the primary determinant. Scalone, Pozzi, and Kennedy (2023) show religious affiliation to be an important factor in determining variation in infant and child mortality in Belfast in the early 20th century, even after controlling for socioeconomic conditions (namely literacy, SES, and female occupational status) and contextual factors related to the different socioeconomic characteristics of each religious group. Connor (2017) uses geographic information systems and multilevel models to show that higher Catholic mortality in Dublin was mainly driven by poverty and residential segregation (on Dublin see also Connor, Mills, and Moore-Cherry 2011). Moreover, Ó Gráda (2006) finds that Jewish children in Dublin, Cork, and Belfast experienced particularly low mortality. The better survival of Jewish children has been traditionally attributed to behaviours related to feeding practices, higher standards of hygiene and childcare, attitudes toward scientific knowledge, and community support (Condran and Preston 1994; Preston, Ewbank, and Hereward 1994; Ó Gráda 2006; Derosas 2003; Riswick, Muurling, and Buzasi 2022).

To better identify the mechanisms behind these discrepancies in child mortality between different religious groups or denominations, we employ the 1911 full-count IPUMS Irish census. The study sets out to assess the role of religious affiliation and its possible implications for child survival. Unlike previous studies that focus on specific geographic areas or samples of populations, this study is based on the full population of the entire island of Ireland. The wealth of individual-level information, including religion, in the Irish census makes the data particularly valuable. The importance of this study also lies in the fact that we utilize the last complete census of all-Ireland before it underwent political and administrative division. The country's partition was imposed a decade after the 1911 census, in the wake of revolutionary violence.

2. Expected results

We expect that religious affiliation will influence child mortality through a range of factors, including literacy, socioeconomic conditions, and other environmental and contextual factors. In particular, we expect Catholic families to experience higher child mortality rates than Presbyterian families due to socioeconomic differences between the two denominations, as widely reported in the literature (Ó Gráda 2004; Scalone, Pozzi, and Kennedy 2023). Compared to the Presbyterians, we anticipate that Church of Ireland families will have a poorer child mortality record in view of their relatively lower economic status. Conversely, we expect Jewish families to have lower child mortality rates due to their higher levels of education and adherence to hygienic practices (Ó Gráda 2006). Less obviously, we anticipate greater mortality rates among children from mixed-marriage families due to a potential lack of support from relatives and society, given the diminished social acceptance of mixed marriages (see Fernihough, Ó Gráda, and Walsh 2015).

Children of illiterate women might be expected to have higher mortality rates, assuming a limited knowledge of good hygiene and child-rearing practices. Additionally, we expect a gradient in child mortality rates based on socioeconomic status (henceforth SES), with higher mortality rates among the children of poorer labourers. Affluent families, where the mothers did not have to work, are anticipated to have lower child mortality rates.

We might also expect the mortality levels of Irish electoral divisions to differ due to varying environmental conditions, including housing quality, various kinds of health hazard, public health provision, and hygienic practices. It is worth noting, for instance, that the Registrar-General for Ireland drew attention to the higher infant mortality rates in urban as compared to rural areas (see Forty-Seventh ARRG 1910). Different locations might also have different outcomes due to their varied religious composition. We

calculate a diversity index for each location (Alesina et al. 2003; Simpson 1949; see also Scalone, Pozzi, and Kennedy 2023) that measures a population's diversity or heterogeneity in terms of religion. We anticipate an association between child mortality and the diversity index on the grounds that weaker social cohesion might negatively impact child survival.

Finally, because religious groups tend to have different socioeconomic characteristics, it is important to control for these when studying the impact of religion on child mortality.

3. Data

This study relies on a comprehensive analysis of the 1911 full-count Irish census, which provides multi-faceted insights into the lives of 4,381,018 individuals in Ireland. The micro census dataset, originally digitised by the National Archives of Ireland, was obtained from the Integrated Public Use Microdata Series (IPUMS) database (Ruggles et al. 2015). All registered individuals are grouped by household. The IPUMS census data provides individual-level information on occupation, religion, literacy, electoral division (DED), county of residence, household structure, and primary demographic characteristics such as age, sex, and marital status. An electoral division is a very small geographical area designed for electing public representatives from roughly equal populations. The census also provides personal information for each married woman, which is essential for our analysis. This includes marriage duration, the number of surviving children (CSURV), and the number of children ever born (CEB).

To examine the effect of religion on child mortality, we classified individuals according to their religious affiliation. Our analysis includes the following categories: Presbyterian, Church of Ireland, Methodist, Other Protestant, Catholic, Jewish, and Other Religion, which includes agnostics, atheists, and those of unknown affiliation.

In this study our aim is to control for SES using occupational categories, which is a long-standing approach in social stratification research (Van Leeuwen and Maas 2011). To achieve this, we utilized the 5-digit HISCO classification to construct a proxy for the husband's SES, based on the HISCLASS classification scheme (Van Leeuwen, Maas, and Miles 2002; Van Leeuwen and Maas 2011). In the analysis we employ an eight-category classification based on HISCLASS: (I) Manager and professionals (HISCLASS groupings 1 to 4); (II) Clerical and sales (5); (III) Skilled workers (6 and 7); (IV) Farmers (8); (V) Farm workers (10 and 12); (VI) Lower-skilled workers (9); (VII) Unskilled workers (11); (VIII) No occupation.

Whether women work outside the home or not is clearly germane to our analysis. We constructed a dichotomous variable by categorising women into those with or without

a stated occupation. We ran regression models in which women are classified into various occupational groups, but the numbers involved were sometimes too small to yield meaningful results, so this more refined approach was abandoned. The issue we are exploring builds on existing research. For example, various studies have demonstrated that the children of women employed in the textile industry experienced higher mortality, in part due to the women returning to work soon after childbirth, which reduced breastfeeding and childcare time and increased the risk of child death (Daly 1997; Scalone, Pozzi, and Kennedy 2023). A related practice, that of continuing to work until close to giving birth, also increased the child's mortality risk.

However, the cross-sectional nature of many census variables limits our ability to capture a comprehensive life course. The SES and female work participation variables collected in 1911 do not necessarily reflect longer-term trends. Lastly, the study distinguishes between mothers born in the county in which they were residing, and mothers born in a different county or a foreign country. However, we lack information about the timing of any migrations and the possible implications for child mortality.

4. Modelling strategy

We selected all 208,488 married women who had been married for 15 years or less and reported a valid number of CEB (685,773) greater than zero. To ensure greater data integrity, we eliminated married women whose age at the time of the census was less than 15 years, as in most cases such ages are suspiciously low.

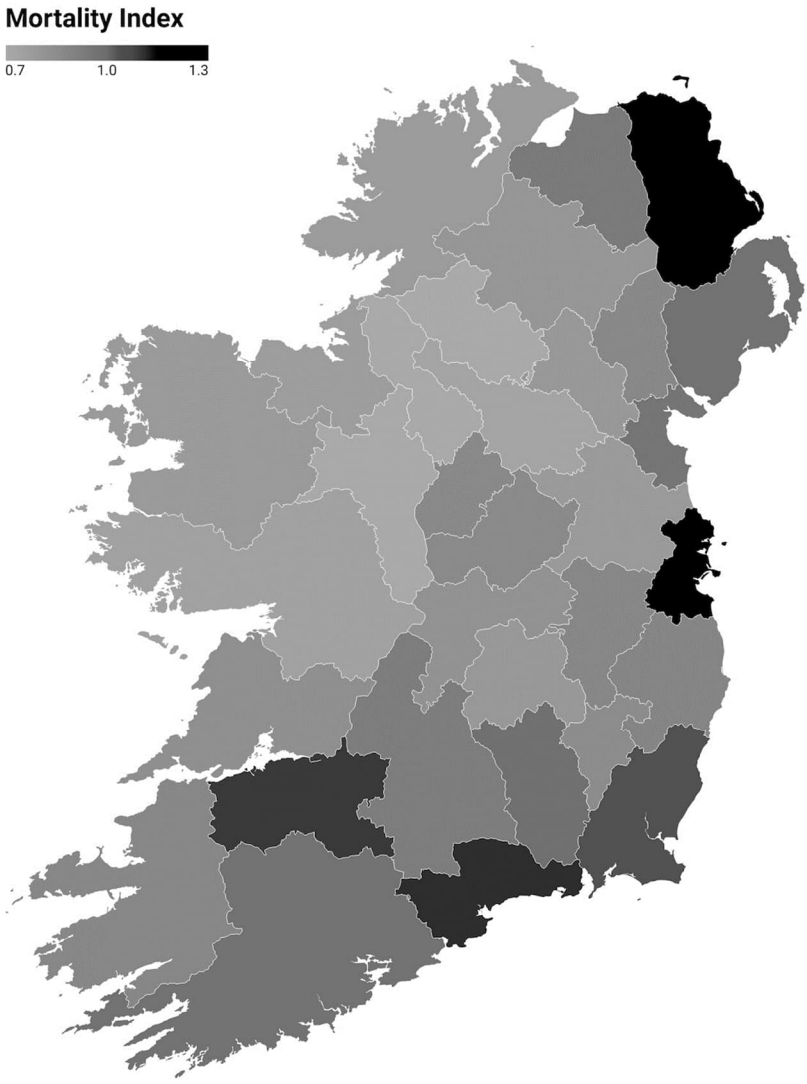
We calculated a child mortality index for each woman by dividing the actual number of dead children by the expected number of deaths based on a model life table chosen as a standard (for a full description of the method, see Preston and Haines 1991). The index summarises child mortality and can be used in multiple regression models. Referring to the Model West level 15 (Coale and Demeny 1966), which indicates an infant mortality probability ($_1q_0$) of 103 and life expectancy at birth of about 53 years, our standard index provides a mean value equal to 1 (see Table 1). Values above 1.0 suggest that children born to a particular woman (or a group of women) experienced child mortality rates above the standard model life table, while values below 1.0 indicate that children experienced mortality rates below the standard (Figure 1).

Table 1: Number and percentages of women and children, mean and standard deviations of child mortality. Ireland, 1911

	Mean	Women		Children		Child Mortality Index	
Categorical Variables		N.	%	N.	%	Mean	SD
Religion							
Presbyterian		22,986	11.0	68,904	10.0	0.855	1.496
Church of Ireland		26,306	12.6	78,018	11.4	0.938	1.571
Methodist		3,481	1.7	10,042	1.5	0.937	1.584
Other Protestant		6,548	3.1	17,618	2.6	0.861	1.582
Catholic		147,353	70.7	505,246	73.7	0.986	1.556
Jewish		353	0.2	1,162	0.2	0.515	1.221
Other Religion		1,461	0.7	4,783	0.7	0.980	1.513
Religion of spouse							
Different religion		23,945	11.5	66,154	9.6	1.164	1.847
Same religion		184,543	88.5	619,619	90.4	0.941	1.516
Literacy							
Illiterate		14,543	7.0	51,870	7.6	1.357	1.793
Literate		193,083	92.6	630,995	92.0	0.929	1.525
Unknown		862	0.4	2,908	0.4	1.230	1.844
Marriage duration							
0–4 years		57,416	27.5	92,018	13.4	0.868	2.166
5–9 years		79,479	38.1	256,848	37.5	0.898	1.507
10–14 years		71,593	34.3	336,907	49.1	1.038	1.372
Migration							
Born in another county		42,682	20.5	134,909	19.7	1.002	1.591
Born in the same county of residence		155,215	74.4	521,714	76.1	0.951	1.537
Born in a foreign country		10,591	5.1	29,150	4.3	0.978	1.633
Female occupation							
No occupation		183,177	87.9	608,413	88.7	0.927	1.508
Occupation		25,311	12.1	77,360	11.3	1.238	1.840
Socioeconomic status							
Managers and professionals		3,463	1.7	10,554	1.5	0.730	1.340
Clerical and sales		40,251	19.3	128,019	18.7	1.026	1.562
Skilled Workers		12,142	5.8	40,797	5.9	1.098	1.594
Farmers		57,057	27.4	206,615	30.1	0.710	1.296
Farm workers		21,496	10.3	68,297	10.0	0.816	1.467
Lower-skilled workers		12,862	6.2	41,514	6.1	1.116	1.627
Unskilled workers		35,974	17.3	120,229	17.5	1.237	1.714
Non-SES		25,243	12.1	69,748	10.2	1.128	1.826
Area of residence							
Rural		157,130	75.4	525,229	76.6	0.837	1.447
Urban		51,358	24.6	160,544	23.4	1.371	1.798
Numeric variables							
Children ever born	4.47						
Age	34.5						
Mean reference date	4.8						
Diversity Index	0.3						
Total		208,488	100.0	685,773	100.0	0.962	1.553

Note: Child mortality index calculated based on the Model West 15 life table (Coale and Demeny 1966).
Source: IPUMS (Ruggles et al. 2015).

Figure 1: Child mortality index by county, Ireland 1911



Note: Child mortality index calculated based on the Model West 15 life table (Coale and Demeny 1966).

Following Preston and Haines (1991) and Garrett et al. (2001), we conducted a set of Ordinary Least Squares (henceforth OLS) regressions with the mortality index as the dependent variable and currently married women as the unit of analysis (see also Dribe, Hacker, and Scalone 2020). To reflect the population of children at risk of mortality we weighted the regressions by the number of CEB, consistent with previous studies (e.g., Preston, Ewbank, and Hereward 1994). To correct potential biases arising from differences in the timing of children's deaths among women of different ages, we included the mortality reference date (MRD) as a control variable. The MRD is the midpoint of the period to which the mortality estimates refer for each woman, counting the number of years before the 1911 census (see United Nations 1983, and Haines and Preston 1997 for a full description).

To isolate the effect of religion on the child mortality index, we controlled for certain demographic factors and socioeconomic conditions at the individual and contextual levels, through the construction of the following models:

- The first, 'basic' model assesses the effect of religion on child mortality after controlling for demographic determinants such as age, age squared, CEB, and MRD.
- The second, 'individual' model includes individual-level controls such as female literacy, migration status, occupational condition, and SES based on the husband's HISCLASS group. We also control for spouse's religion, including a dummy variable for women with the same religion as their spouse.
- The third, 'contextual' model includes all the determinants in the previous models as well as the county of residence and a set of aggregate variables at the level of the electoral division: the proportion of women working among the female population aged 15 to 64, the diversity index measuring the degree of religious diversity ranging from 0 (no diversity) to 1 (complete diversity), and the mean mortality index as shown in Preston and Haines (1991) to capture the general background mortality environment. We also included two geographical controls: the county of residence and a dummy variable for the major urban centres of Ireland (Belfast, Dublin, Cork, Derry, Limerick, Waterford, and Galway). To improve the precision and statistical significance of this model, we included a random intercept at the level of the smallest administrative unit, namely electoral division.
- Finally, we ran three additional separate regressions grouping women into three broad religious groups (Catholics, Protestants, and Jews) using the same variables as the contextual model and including the same random intercepts at the level of electoral divisions.

5. Descriptive results

Table 1 provides an overview of our results by presenting the number of married women and CEB in each religious group, as well as the mean child mortality index by religion, husband's religion, female literacy, migration status, occupation, SES, and county. This analysis reveals that Catholics comprise the majority of mothers (70.7%), while 28.4% are Protestants. The distribution of children closely mirrors the percentage distributions of mothers by religion, which is consistent with existing research on the different fertility behaviours of religious groups (see Ó Gráda and Walsh 1995; Kennedy, Pozzi, and Manfredini 2010; Connor 2021). On average, Catholics experience higher child mortality than other religious groups. Interestingly, the Jewish mortality index is almost 50% lower than the mean value of the entire sample. However, the share of Jewish women in the Irish population under study is extremely low (0.2%), so we are dealing here with a tiny minority religious group.

Women who are married to a husband of a different religion, illiterate, involved in longer marriages (over 10 years), or employed have an important negative effect on child survival. Additionally, women born in the same county of residence experience lower child mortality than those born elsewhere. Analysing the husband's SES using the HISCLASS classification, we find a clear social gradient in child mortality. Professional and administrative workers register the lowest index and labourers the highest. Women married to agricultural labourers or farmers experience one of the lowest incidences of child mortality.

Child mortality varies significantly between counties, as indicated by the range of the mortality index, highlighting some spatial differences at the geographical level (Figure 1). In particular, the counties of Dublin and Antrim record high mortality indexes due to high levels of child mortality, especially infant mortality, in Ireland's two largest urban centres, Dublin and Belfast (Ó Gráda 2004). It is likely that elevated child mortality in Limerick and Waterford is also due to an urban effect. However, we need to bear in mind that there are doubts about the completeness of birth and death registration in Ireland until well into the 20th century, so differences in urban–rural mortality, as evident in the published official statistics, may partly be a statistical artefact. This may also be true of broader regional differences, with under-registration being particularly acute in the west of Ireland (Dean and Mulvihill 1972; Walsh 2017). While indirect estimates of child mortality should help overcome the limitations of the registration system, especially in rural areas, women's self-reporting of CSURV and CEB might contain its own hidden biases (caused by forgetfulness, concealment, and confusion as to the inclusion or otherwise of stillbirths and deaths immediately after birth).

Finally, we include some continuous variables at the individual and electoral division levels. Table 1 shows that the average age of mothers in the sample is 34.5 years,

while the mean number of CEB is 6.47. The mean reference date indicates that the mortality index averages 4.8 years before the census.

6. Regression results

The results of the regression models confirm significant differences in child mortality between religious groups in Ireland (Table 2). In the basic model, Church of Ireland and Methodist families have the highest child mortality and Jews the lowest, while Catholics record higher child mortality than Presbyterians. However, after including individual variables in the analysis it is apparent that part of the mortality variation among religious groups arises from differences in literacy and SES, as shown in Figure 2. The more complete contextual model confirms that Catholics are associated with the highest child mortality. By analysing Table 2 and Figure 2, it is evident that only the coefficients related to Protestant affiliations, specifically Church of Ireland, Methodist, and Other Protestant, decrease significantly when moving from the basic model to the complete model that includes contextual variables. The coefficients decrease from 0.046 to 0.038, 0.064 to 0.017, and –0.030 to –0.021 respectively. This phenomenon is not observed for Catholics and Jews, whose coefficients increase instead. Interestingly, when accounting for residential location, the Catholic mortality penalty shows a significant increase in magnitude.

The other control variables, such as female illiteracy and employment and spouses of labourers, are significantly correlated with high levels of child mortality. Migration (measured by whether the mother was born in a different county or foreign country) is also associated with higher child mortality, as children of mothers born in the same county of residence experience lower mortality (Table 2). Interestingly, more religiously mixed communities are associated with increased child mortality.

Table 2: Weighted OLS regression of mortality index: Comparison of basic, individual, and contextual models

	Basic		Individual		Contextual	
	Coef.	P>t	Coef.	P>t	Coef.	P>t
Religion						
Presbyterian [Ref.]	Ref		Ref		Ref	
Church of Ireland	0.083	0.000	0.046	0.000	0.038	0.000
Methodist	0.097	0.000	0.064	0.000	0.017	0.288
Other Protestant	0.039	0.002	–0.030	0.022	–0.021	0.104
Catholic	0.063	0.000	0.096	0.000	0.134	0.000
Jewish	–0.368	0.000	–0.568	0.000	–0.800	0.000
Other Religion	0.079	0.001	–0.028	0.228	–0.030	0.202
Religion of spouse						
Different religion [Ref.]			Ref		Ref	
Same religion			–0.104	0.000	–0.113	0.000
Literacy						
Illiterate			0.350	0.000	0.295	0.000
Literate [Ref.]			Ref		Ref	
Unknown			0.220	0.000	0.175	0.000
Migration						
Born in another county [Ref.]			Ref		Ref	
Born in the same county of residence			–0.011	0.026	0.027	0.000
Born in a foreign country			0.063	0.000	0.046	0.000
Female occupation						
No occupation [Ref.]			Ref		Ref	
Occupation			0.229	0.000	0.181	0.000
Husband's occupation						
Managers and professionals [Ref.]			Ref		Ref	
Clerical and sales personnel			0.303	0.000	0.150	0.000
Skilled Workers			0.353	0.000	0.173	0.000
Farmers			–0.092	0.000	0.062	0.000
Farm workers			0.055	0.001	0.173	0.000
Lower Skilled Workers			0.378	0.000	0.183	0.000
Unskilled Workers			0.446	0.000	0.310	0.000
Non-SES			0.281	0.000	0.211	0.000
Variable at E. Division Level						
Diversity Index					0.208	0.000
Mortality Index					0.865	0.000
Area of residence						
Rural [Ref.]					Ref	
Urban					0.120	0.000
Constant	0.742	0.000	0.314	0.000	–0.612	0.000
Number of cases	685,773		685,773		685,773	
Number of groups					3,658	
R-Square	0.0239		0.0513		0.084	
R-Square Within					0.038	
R-Square Between					0.740	
Adj. R-Square	0.0239		0.0513			
Sigma u					0.021	
Sigma e					1.485	
Rho					0.002	

Source: IPUMS (Ruggles et al. 2015).
Note: The models also include controls for age, age squared, mortality reference date, and children ever born. The contextual model also includes random effects at the electoral division level.

To assess how the effects of the individual and contextual factors might vary for each religious group, we estimate three separate models for Catholics, Protestants, and Jews, as shown in Table 3. For simplicity, we combine the Protestant affiliations into one category. Our results indicate that having the same religion as one's spouse is negatively associated with mortality rates for all three religious groups, with the Protestants experiencing the greatest advantage. Illiteracy adversely affects mortality rates for all three. Being born in the county of residence or a foreign country has a significant positive effect on mortality rates for Catholics, while for Jews this effect is reversed. Female employment at the time of the census significantly correlates with higher mortality rates among Catholics and Protestants (as has been widely reported in the literature, see for instance Garrett et al. 2001: 128), while this effect is the opposite for Jews. The results in Table 3 also confirm the urban penalty for Catholics, as shown in Connor (2017). Finally, the SES gradient is almost the same for Catholics and Protestants, while Jews record higher variability in the estimates, as also shown in Figure 2.

Figure 2: Estimated effects of religion on child mortality index for basic, individual, and contextual models (coefficients with 95% confidence interval) in the left panel and estimated effects of SES on child mortality index for Protestant, Catholic, and Jewish models (coefficients with 95% confidence interval) in the right panel

Source: IPUMS (Ruggles et al. 2015).
Note: Left Panel: The basic model includes religion as a control variable and controls for age, age squared, mortality reference date, and children ever born. The individual model includes additional control variables such as spouse's religion, literacy, migration, female occupation, and husband's profession. The contextual model also controls for county of residence and variables at the electoral division level, diversity index, and mortality index, including random effects at the electoral division level (see Table 2).
Right Panel: The models include religion as a control variable and control for age, age squared, mortality reference date, children ever born, religion of spouse, literacy, migration, female occupation, husband's profession, county of residence and variables at the electoral division level, diversity index, and mortality index, including random effects at the electoral division level (see Table 3).

Table 3: Weighted OLS regression of mortality index: Comparison of Protestant, Catholic, and Jewish models

	Protestants		Catholics		Jewish	
	Coef.	P>t	Coef.	P>t	Coef.	P>t
Religion of spouse						
Different religion [Ref.]	Ref		Ref		Ref	
Same religion	–0.131	0.000	–0.092	0.000	–1.074	0.000
Literacy						
Illiterate	0.244	0.000	0.309	0.000	0.088	0.267
Literate [Ref.]	Ref		Ref		Ref	
Unknown	0.049	0.456	0.137	0.000	0.727	0.002
Migration						
Born in another county [Ref.]	Ref		Ref		Ref	
Born in the same county of residence	0.022	0.016	0.030	0.000	–0.735	0.001
Born in a foreign country	0.045	0.001	0.098	0.000	–0.505	0.000
Female occupation						
No occupation [Ref.]	Ref		Ref		Ref	
Occupation	0.244	0.000	0.161	0.000	–0.388	0.004
Husband's occupation						
Managers and professionals [Ref.]	Ref		Ref		Ref	
Clerical and sales personnel	0.115	0.000	0.148	0.000	0.290	0.106
Skilled Workers	0.152	0.000	0.164	0.000	–0.136	0.582
Farmers	0.052	0.047	0.081	0.000		
Farm workers	0.172	0.000	0.190	0.000		
Lower-Skilled Workers	0.172	0.000	0.164	0.000	–0.455	0.430
Unskilled Workers	0.285	0.000	0.306	0.000	0.512	0.118
Non-SES	0.133	0.000	0.244	0.000	–0.153	0.540
Variable at E. Division Level						
Diversity Index	–0.206	0.135	0.178	0.000	–0.669	0.639
Mortality Index	0.677	0.000	0.851	0.000	–0.306	0.649
Area of residence						
Rural [Ref.]	Ref		Ref		Ref	
Urban	0.051	0.597	0.188	0.000	0.559	0.306
Constant	–0.220	0.052	–0.530	0.000	4.978	0.025
Number of cases	174582		505246		1162	
Number of groups	2462		3639		56	
R-Square Overall	0.069		0.088		0.072	
R-Square Within	0.040		0.034		0.066	
R-Square Between	0.064		0.559		0.360	
Sigma u	0.762		0.176		0.840	
Sigma e	1.472		1.482		1.081	
Rho	0.211		0.014		0.376	

Source: IPUMS (Ruggles et al. 2015).
Note: The models also include controls for age, age squared, mortality reference date, children ever born, and random effects at the electoral division level. For simplicity, Protestant affiliations are combined in one category.

7. Conclusions

In summary, our research highlights the complex interplay between religious affiliation, socioeconomic factors, and child mortality during the early 1900s in Ireland. We find a

strong association between religious affiliation and child mortality, with Catholic children experiencing the highest mortality rates, confirming previous findings from sample studies (Ó Gráda 2004; Scalone, Pozzi, and Kennedy 2023). It is worth emphasising that the Protestant population is not homogeneous, with the Church of Ireland showing a higher mortality rate than Presbyterians, for instance. Jewish children have the lowest mortality rates (as shown by Ó Gráda 2006 for Dublin, and also in other contexts by Condran and Preston 1994; Preston, Ewbank, and Hereward 1994; Derosas 2003) but the reasons for this are not altogether clear.

After controlling for certain individual socioeconomic characteristics and contextual factors, the relationship between religious affiliation and child mortality changes. The differences in mortality among the protestant denominations are less pronounced, indicating that SES was at least partly responsible for those differences. The opposite is true for Catholics and Jews. Controlling for SES and contextual factors, the differences in comparison with Presbyterians remain and even increase – in opposite directions. Catholics turn out to be penalised even further, while Jewish families appear more favoured. We conclude that differences in religious affiliation do indeed persist even after controlling for certain socioeconomic and demographic characteristics. This is in line with previous contributions to the literature on religion and child mortality (for example, McQuillan 1999; Ekamper and van Poppel 2019; Scalone, Pozzi, and Kennedy 2023).

The findings also reveal the effects of the challenging working conditions of employed women, who experienced the highest child mortality rates. This was no doubt due to poverty, which, among other disadvantages, forced them to work until close to the end of pregnancy, leading to premature births and poor infant survival (as discussed in Daly 1997 and Scalone, Pozzi, and Kennedy 2023). We also observe that marrying within the same religious group serves to lower child mortality compared to marrying outside one's own denomination. When examining the effects of socioeconomic factors on child mortality in different religious groups, we find that Catholics and Protestants show almost the same coefficients in terms of direction and statistical significance.

Our analysis of the complete census dataset for Ireland allows us to investigate interesting spatial aspects of child mortality, particularly interactions between religion and place of residence. Accounting for residential location within Ireland provides valuable insights into the comparative child mortality rates of Catholic couples. Catholics are more likely to reside in rural areas where mortality rates tend to be lower than in urban areas, but in urban areas Catholics experienced significantly higher child mortality levels than rural Catholics and urban non-Catholics (as also found in Dublin by Connor 2017 and Belfast by Scalone, Pozzi, and Kennedy 2023). This contribution to the literature will be further extended in a future paper once we integrate GIS shape files with the cartographic base of Irish counties in 1911 and proceed to estimate specific spatial models.

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