

# From Pensions to Pupils?

Schooling, Resource Constraints, and Old Age  
Pensions in Ireland 1901-11

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NERI Labour Market Conference  
May 2025

# Questions

- ▶ Can a large-scale cash transfer to the elderly affect school enrolments within multi-generational households?
- ▶ Who benefits from such an intervention?

# Questions

## Ambiguous Effect on Schooling

- ▶ Effect of income on schooling is well-established (Becker, 1992; Becker and Chiswick, 1966)
- ▶ But cash transfer effect is unclear (Marcillo et al., 2022; Haushofer and Shapiro, 2016; Baird et al., 2011)
- ▶ Effect of OAPs on schooling in multi-generational households are infrequently studied (Filho, 2012; Edmonds, 2006)

## Contribution

- ▶ Large-scale and long-term intervention with stable weekly payments
- ▶ Context of school demand constraints
  - ▶ Demand constraints overlooked (Cinnirella and Hornung, 2016)
- ▶ First household level OAP policy evaluation in Ireland



# Design

## Linear Probability and Difference-in-Difference

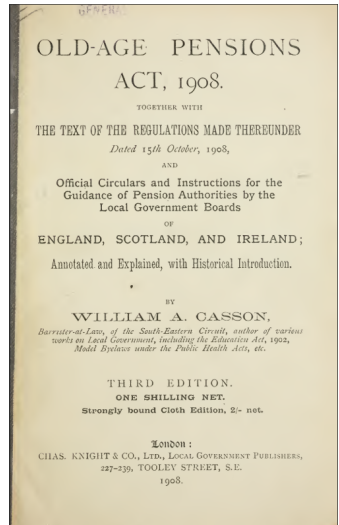
- ▶ Full-count census data 1901 & 1911 (pooled)
- ▶ New individual level income approximations
- ▶ Older children aged 13 - 16 in multi-gen households
  - ▶ Children with other elderly relative age 50
- ▶ OAPs assigned to those meeting the age and means-test criteria
- ▶ Treated children live in household with an OAP recipient in 1911
- ▶ Propensity score screening to match treated and untreated children
- ▶ Measures how living with a relative eligible for a pension affects the probability that older children are enrolled in school

# The 1908 Old Age Pension

- ▶ Means tested, non-contributory pension for over 70-year-olds
- ▶ Regulated by Local Government Board
- ▶ Standardised application form completed in local Post Office
  - ▶ Assessed by a HMT Pension Officer using age, financial means, residency status and character
- ▶ Claims passed to one of 54 pension committees or 394 sub-committees
  - ▶ Appeal possible. Rejected applicants could re-apply after 6 months
- ▶ Payments awarded on a sliding scale between 1 & 5 shillings/week
- ▶ First payments made on 1st January 1909

OAP Claims

Admin Limits



# 1901 Multi-Generational Households

## Households

- ▶ 34,204 multi-generational households
- ▶ Average household size 7.58 persons
- ▶ 77% Catholic and 25% have illiterate household head
- ▶ 56% farmers and 16% labourers
- ▶ Average income of £1.65 per week/ £0.44 (equivilised)
- ▶ Just over half contain an elderly relative over 70

## Children

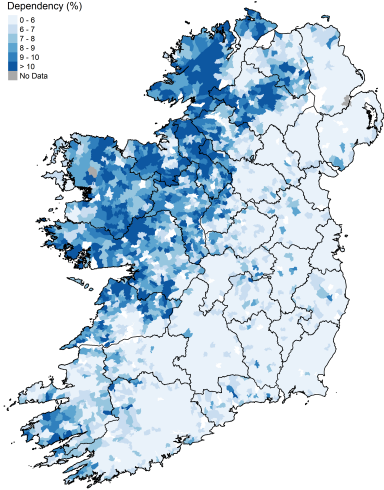
- ▶ 56% enrolled in school and 19% in employment
- ▶ 49% are female
- ▶ 3% are illiterate and 17% are bilingual

Income estimates

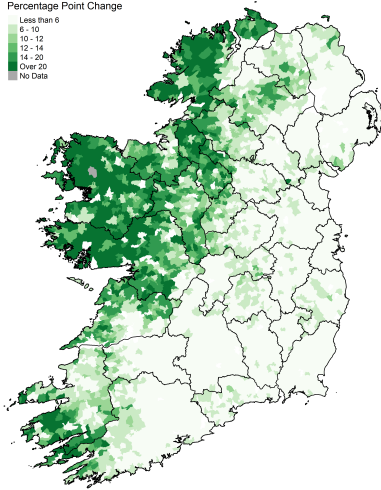
Summary stats

# OAP Dependency and Boost

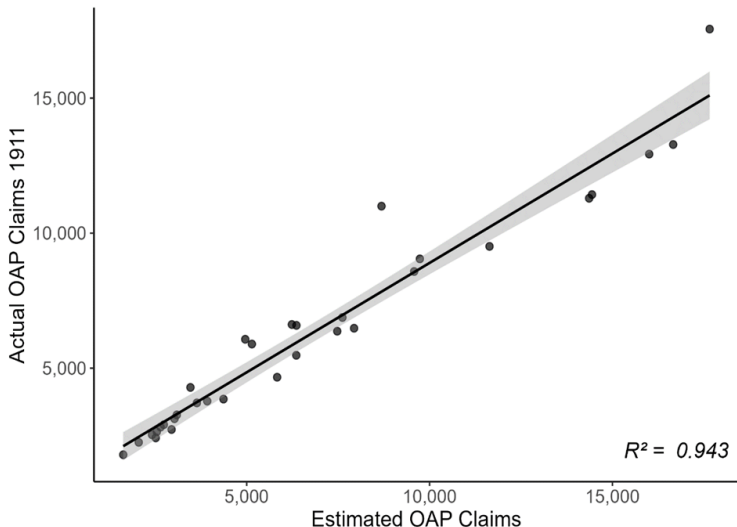
Dependency (%)



Percentage Point Change



# Sanity Check



Note: Outlier counties are Cork and Down



# Schooling Model

$$\text{School Enrolment}_{it} = \beta_1 \sum_{j \in H_{it}} \text{Pension}_{it} + \beta_2 c1911_i + X_{itk} + \delta_{DED} + \varepsilon_{it} \quad (1)$$

## Dependent Variable

- ▶ Enrolment of child  $i$  at time  $t$ . Dichotomous dummy  $\in \{0, 1\}$

## Main Outcome Variable

- ▶ Pension is total weekly amount of OAP income in the household.
  - ▶ 1 OAP claim = £0.25 (5 shillings)
- ▶ Control group are all children in 1901 and those untreated in 1911

## Covariates

- ▶  $c1911$  controls for time-specific effects and is 1 in 1911, 0 otherwise.
- ▶  $X_{itk}$  is a vector of child and household characteristics.
- ▶  $\delta_{DED}$  is a set of District Electoral Division fixed effects.
- ▶  $\varepsilon_{it}$  is the remaining error.
- ▶ Standard errors clustered at the household level.

# Baseline Results

|                           | Child enrolled in school |                      |                      |                      |
|---------------------------|--------------------------|----------------------|----------------------|----------------------|
|                           | (1)                      | (2)                  | (3)                  | (4)                  |
| Pension                   | 0.137***<br>(0.025)      | 0.096***<br>(0.029)  | 0.090***<br>(0.030)  | 0.071**<br>(0.030)   |
| Household Income          | 0.039***<br>(0.003)      | 0.034***<br>(0.004)  | 0.027***<br>(0.004)  | 0.033***<br>(0.004)  |
| 1911 Census               | 0.026***<br>(0.004)      | 0.037***<br>(0.007)  | 0.055***<br>(0.007)  | 0.051***<br>(0.007)  |
| Age 14                    | -0.193***<br>(0.004)     | -0.176***<br>(0.005) | -0.176***<br>(0.006) | -0.177***<br>(0.006) |
| Age: 15                   | -0.419***<br>(0.005)     | -0.404***<br>(0.007) | -0.404***<br>(0.006) | -0.405***<br>(0.006) |
| Age: 16                   | -0.608***<br>(0.005)     | -0.596***<br>(0.007) | -0.593***<br>(0.007) | -0.595***<br>(0.007) |
| Child Characteristics     | ✓                        | ✓                    | ✓                    | ✓                    |
| Household Characteristics |                          |                      | ✓                    | ✓                    |
| Age Trends                |                          |                      |                      | ✓                    |
| R <sup>2</sup>            | 0.245                    | 0.237                | 0.349                | 0.352                |
| Observations              | 67,472                   | 47,058               | 47,058               | 47,039               |

Enrolment rate of control group is 58%. Standard errors clustered at the household level. Significance levels: \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

Table: Female children attenuate average treatment effect

|                               | Child Enrolled in school |                    |                      |
|-------------------------------|--------------------------|--------------------|----------------------|
|                               | (1)                      | (2)                | (3)                  |
| Pension                       | 0.071**<br>(0.030)       | 0.074**<br>(0.031) | 0.139***<br>(0.033)  |
| Pension $\times$ Female OAP   |                          | -0.048<br>(0.152)  |                      |
| Pension $\times$ Female Child |                          |                    | -0.137***<br>(0.030) |
| Female Child                  | 0.006<br>(0.004)         | 0.006<br>(0.004)   | 0.024***<br>(0.006)  |
| Female OAP                    | -0.009<br>(0.008)        | 0.002<br>(0.038)   | -0.010<br>(0.008)    |
| Full Spec                     | ✓                        | ✓                  | ✓                    |
| R <sup>2</sup>                | 0.352                    | 0.352              | 0.352                |
| Observations                  | 47,039                   | 47,039             | 47,039               |

Enrolment rate of control group is 58%. Standard errors clustered at the household level. Significance levels: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .

Table: Average Treatment Effect by age

|                |                    | Child Enrolled in School |                  |                  |                  |
|----------------|--------------------|--------------------------|------------------|------------------|------------------|
|                | (1)                | (2)                      | (3)              | (4)              | (5)              |
| Pension        | 0.071**<br>(0.030) | 0.057<br>(0.045)         | 0.037<br>(0.063) | 0.101<br>(0.073) | 0.111<br>(0.072) |
| Sample         | All                | 13 y/o                   | 14 y/o           | 15 y/o           | 16 y/o           |
| Full Spec      | ✓                  | ✓                        | ✓                | ✓                | ✓                |
| R <sup>2</sup> | 0.352              | 0.307                    | 0.319            | 0.384            | 0.381            |
| Observations   | 47,039             | 12,568                   | 12,815           | 11,055           | 10,601           |

Table: Heterogeneity by age and sex

|                        |                      | Child Enrolled in School |                     |                     |                      |
|------------------------|----------------------|--------------------------|---------------------|---------------------|----------------------|
|                        | (1)                  | (2)                      | (3)                 | (4)                 | (5)                  |
| Pension                | 0.139***<br>(0.033)  | 0.110**<br>(0.049)       | 0.107<br>(0.073)    | 0.170**<br>(0.083)  | 0.231***<br>(0.083)  |
| Pension × Female Child | -0.137***<br>(0.030) | -0.106**<br>(0.050)      | -0.138**<br>(0.069) | -0.146*<br>(0.080)  | -0.232***<br>(0.076) |
| Sex: Female            | 0.024***<br>(0.006)  | 0.006<br>(0.010)         | 0.015<br>(0.013)    | 0.051***<br>(0.015) | 0.048***<br>(0.014)  |
| Sample                 | All                  | 13 y/o                   | 14 y/o              | 15 y/o              | 16 y/o               |
| Full Spec              | ✓                    | ✓                        | ✓                   | ✓                   | ✓                    |
| R <sup>2</sup>         | 0.352                | 0.308                    | 0.319               | 0.384               | 0.382                |
| Observations           | 47,039               | 12,568                   | 12,815              | 11,055              | 10,601               |

Control mean for ages 13 - 16 are 86%, 67%, 45% and 26% respectively. For both tables standard errors clustered at household level. Significance levels: \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

# Equivalised Household Income

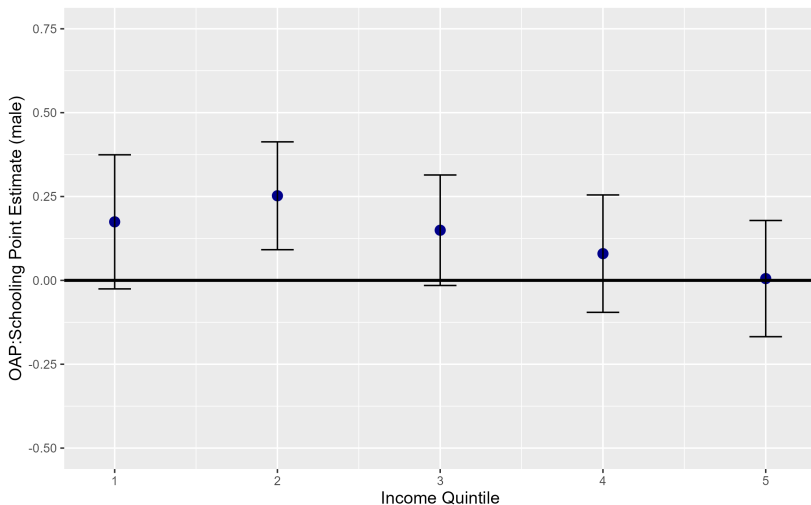
Table: Average Treatment Effect by HEI Quintile

|                  | Child Enrolled in School |                  |                     |                     |                     |                     |
|------------------|--------------------------|------------------|---------------------|---------------------|---------------------|---------------------|
|                  | (1)                      | (2)              | (3)                 | (4)                 | (5)                 | (6)                 |
| Pension          | 0.071**<br>(0.030)       | 0.141<br>(0.095) | 0.188**<br>(0.075)  | 0.110<br>(0.076)    | 0.060<br>(0.078)    | -0.104<br>(0.079)   |
| Household Income | 0.033***<br>(0.004)      | 0.010<br>(0.025) | 0.062***<br>(0.019) | 0.066***<br>(0.014) | 0.094***<br>(0.012) | 0.081***<br>(0.010) |
| Quintile         | All                      | 1 (poorest)      | 2                   | 3                   | 4                   | 5 (richest)         |
| Control Mean     | 57.6                     | 58.7             | 64.5                | 64.6                | 58.0                | 44.4                |
| Full Spec        | ✓                        | ✓                | ✓                   | ✓                   | ✓                   | ✓                   |
| R <sup>2</sup>   | 0.352                    | 0.433            | 0.490               | 0.508               | 0.525               | 0.506               |
| Observations     | 47,039                   | 9,411            | 9,408               | 9,410               | 9,408               | 9,402               |

Equivalised household income calculated using OECD Modified Scale to account for household size and demography. Standard errors clustered at the household level. Significance levels: \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

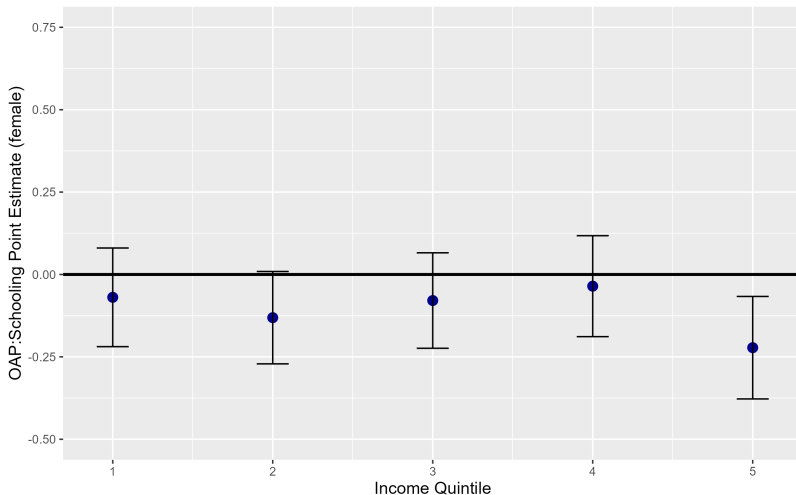
# Equivalised Household Income

Figure: OAP Treatment Effect by Quintile: Males



# Equivalised Household Income

Figure: OAP Treatment Effect by Quintile:  $I(\text{Female Child} \times \text{Pension})$



Point estimate is the interaction between the Pension and female children.

# Robustness

Table: Robustness: Alternative Matching Techniques (ATE)

|                | Child Enrolled in School |                    |                   |                   |                   |                   |
|----------------|--------------------------|--------------------|-------------------|-------------------|-------------------|-------------------|
|                | (1)                      | (2)                | (3)               | (4)               | (5)               | (6)               |
| Pension        | 0.070***<br>(0.025)      | 0.071**<br>(0.030) | 0.061*<br>(0.032) | 0.053*<br>(0.030) | 0.053*<br>(0.030) | 0.247*<br>(0.138) |
| Matching       | None                     | P-Screen           | NN                | NN + C            | Mah               | Exact             |
| Full Spec      | ✓                        | ✓                  | ✓                 | ✓                 | ✓                 | ✓                 |
| R <sup>2</sup> | 0.332                    | 0.352              | 0.355             | 0.356             | 0.355             | 0.563             |
| Observations   | 67,428                   | 47,039             | 38,084            | 38,055            | 38,058            | 3,885             |

Table: Robustness: Matching Techniques (sex)

|                        | Child Enrolled in School |                      |                      |                      |                      |                    |
|------------------------|--------------------------|----------------------|----------------------|----------------------|----------------------|--------------------|
|                        | (1)                      | (2)                  | (3)                  | (4)                  | (5)                  | (6)                |
| Pension                | 0.133***<br>(0.028)      | 0.139***<br>(0.033)  | 0.135***<br>(0.035)  | 0.125***<br>(0.034)  | 0.124***<br>(0.033)  | 0.318**<br>(0.152) |
| Pension × Female Child | -0.128***<br>(0.025)     | -0.137***<br>(0.030) | -0.149***<br>(0.031) | -0.145***<br>(0.030) | -0.142***<br>(0.030) | -0.148<br>(0.131)  |
| Female Child           | 0.022***<br>(0.004)      | 0.024***<br>(0.006)  | 0.027***<br>(0.006)  | 0.027***<br>(0.006)  | 0.026***<br>(0.006)  | 0.036<br>(0.029)   |
| Matching               | None                     | P-Screen             | NN                   | NN + C               | Mah                  | Exact              |
| Full Spec              | ✓                        | ✓                    | ✓                    | ✓                    | ✓                    | ✓                  |
| R <sup>2</sup>         | 0.332                    | 0.352                | 0.356                | 0.356                | 0.355                | 0.563              |
| Observations           | 67,428                   | 47,039               | 38,084               | 38,055               | 38,058               | 3,885              |

Matching for (2) - (5) conducted using identical observables. (6) differs and uses a dummy to indicate if an over 70 year old in household rather than age of eldest relative. Caliper is 0.01. Standard errors cluster at the household level. Significance levels: \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.



# Placebo Test

Table: Placebo OAP assigned to eligible households in 1901

|                               | Child Enrolled in School |                     |                     |                     |
|-------------------------------|--------------------------|---------------------|---------------------|---------------------|
|                               | (1)                      | (2)                 | (3)                 |                     |
| Placebo Pension               | -0.056<br>(0.035)        | -0.047<br>(0.035)   | -0.041<br>(0.036)   | -0.028<br>(0.047)   |
| Household Income              | 0.045***<br>(0.007)      | 0.044***<br>(0.007) | 0.045***<br>(0.007) | 0.046***<br>(0.007) |
| Placebo $\times$ Female Child |                          |                     |                     | -0.026<br>(0.062)   |
| Child Controls                | ✓                        | ✓                   | ✓                   | ✓                   |
| Household Controls            |                          | ✓                   | ✓                   | ✓                   |
| Age Trends                    |                          |                     | ✓                   | ✓                   |
| R <sup>2</sup>                | 0.413                    | 0.414               | 0.416               | 0.416               |
| Observations                  | 20,566                   | 20,566              | 20,553              | 20,553              |

P-screened sample in 1901 used. 13,586 placebo pensions assigned (66% of total). Attrition in (3) driven by missing household head data. Significance levels: \*\*\*p<0.01, \*\*p<0.05, \*p<0.1.

# Findings

- ▶ OAP **substantially reduced** household resource constraints
  - ▶ Transfers evaluated at 4.7% of household income on average
  - ▶ Incomes boosted by  $\approx 30\%$  for the poorest quintile
- ▶ The policy significantly **increased school enrolments** on average but did not benefit females
  - ▶ Positive but insignificant effect on poorer females and negative effect on richer females
  - ▶ Overall positive effect driven by older, poorer boys
  - ▶ Drought of economic opportunities for females, transfer possibly reinforced gender norms
- ▶ Relative effect **larger for older boys**
  - ▶ Poorer schooling outcomes for boys at baseline, particularly from agricultural backgrounds
  - ▶ Implies a dominant substitution effect as opportunity cost constraints erode

# References

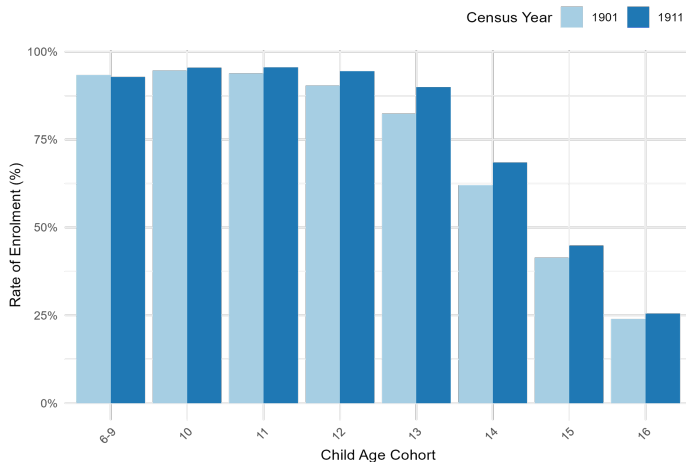
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# Summary Statistics 1

| Characteristic             | Baseline (1901)              |                         | Treated Multi-gen |                 |
|----------------------------|------------------------------|-------------------------|-------------------|-----------------|
|                            | Not Multi-gen<br>N = 237,078 | Multi-gen<br>N = 34,175 | 0<br>N = 50,546   | 1<br>N = 19,536 |
| <b>Treatment</b>           |                              |                         |                   |                 |
| Relatives Aged 70+         | 0.03 (0.18)                  | 0.53 (0.59)             | 0.40 (0.55)       | 1.14 (0.36)     |
| OAP Claimants              | 0.00 (0.00)                  | 0.00 (0.00)             | 0.00 (0.00)       | 1.09 (0.30)     |
| OAP Income                 | 0.00 (0.00)                  | 0.00 (0.00)             | 0.00 (0.00)       | 0.27 (0.08)     |
| <b>Children aged 13-16</b> |                              |                         |                   |                 |
| Enrolled in School         | 0.52 (0.50)                  | 0.54 (0.50)             | 0.55 (0.50)       | 0.62 (0.48)     |
| Employed                   | 0.19 (0.40)                  | 0.18 (0.39)             | 0.18 (0.38)       | 0.12 (0.32)     |
| Age                        | 14.51 (1.11)                 | 14.48 (1.11)            | 14.49 (1.11)      | 14.40 (1.11)    |
| Eldest Child               | 0.71 (0.45)                  | 0.75 (0.43)             | 0.76 (0.43)       | 0.73 (0.44)     |
| Female                     | 0.49 (0.50)                  | 0.49 (0.50)             | 0.49 (0.50)       | 0.49 (0.50)     |
| Illiterate                 | 0.03 (0.16)                  | 0.03 (0.17)             | 0.02 (0.15)       | 0.02 (0.13)     |
| Roman Catholic             | 0.77 (0.42)                  | 0.77 (0.42)             | 0.76 (0.43)       | 0.80 (0.40)     |
| Church of Ireland          | 0.11 (0.31)                  | 0.11 (0.31)             | 0.11 (0.31)       | 0.09 (0.28)     |
| Presbyterian               | 0.10 (0.30)                  | 0.10 (0.30)             | 0.11 (0.31)       | 0.08 (0.28)     |
| <b>Household</b>           |                              |                         |                   |                 |
| Urban                      | 0.23 (0.42)                  | 0.17 (0.38)             | 0.21 (0.40)       | 0.17 (0.37)     |
| Bilingual                  | 0.13 (0.33)                  | 0.16 (0.36)             | 0.16 (0.37)       | 0.25 (0.43)     |
| Household Size             | 6.96 (2.36)                  | 7.58 (2.68)             | 7.53 (2.64)       | 7.72 (2.73)     |
| Sibling over 16 employed   | 0.32 (0.47)                  | 0.34 (0.47)             | 0.35 (0.48)       | 0.27 (0.44)     |
| Household Income           | 1.56 (1.07)                  | 1.65 (1.11)             | 1.70 (1.14)       | 1.23 (0.93)     |
| Equivalised Income         | 0.45 (0.29)                  | 0.44 (0.29)             | 0.46 (0.29)       | 0.33 (0.23)     |
| Equivalised Income + OAP   | 0.45 (0.29)                  | 0.44 (0.29)             | 0.46 (0.29)       | 0.40 (0.24)     |
| Labourer Household         | 0.18 (0.39)                  | 0.16 (0.36)             | 0.17 (0.37)       | 0.14 (0.35)     |
| Farmer Household           | 0.49 (0.50)                  | 0.56 (0.50)             | 0.52 (0.50)       | 0.54 (0.50)     |
| Skilled Worker Household   | 0.22 (0.42)                  | 0.18 (0.38)             | 0.18 (0.39)       | 0.13 (0.34)     |
| White-Collar Household     | 0.07 (0.25)                  | 0.05 (0.23)             | 0.06 (0.24)       | 0.04 (0.19)     |
| Illiterate Household Heads | 0.20 (0.40)                  | 0.25 (0.43)             | 0.22 (0.42)       | 0.28 (0.45)     |
| Age Household Head         | 49.96 (9.48)                 | 56.37 (13.74)           | 56.46 (13.03)     | 59.97 (15.31)   |

# Summary Statistics 2

Figure: Share of children enrolled in school by age 1901 - 1911

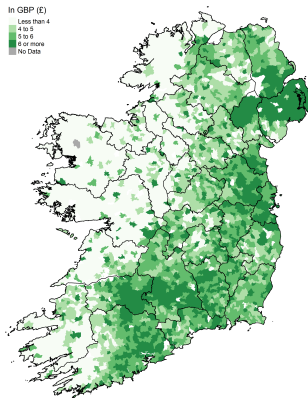


# Approximating Income

- ▶ Standardised occupations (HISCO)
- ▶ Grouped into 5 categories
  - ▶ Farm Labourers (11.4%)
  - ▶ Urban Labourers (9.6%)
  - ▶ Farmers (33.1%)
  - ▶ Skilled Workers (35.1%)
  - ▶ White-Collar (10.8%)
- ▶ Wage assigned within group (75 occs)

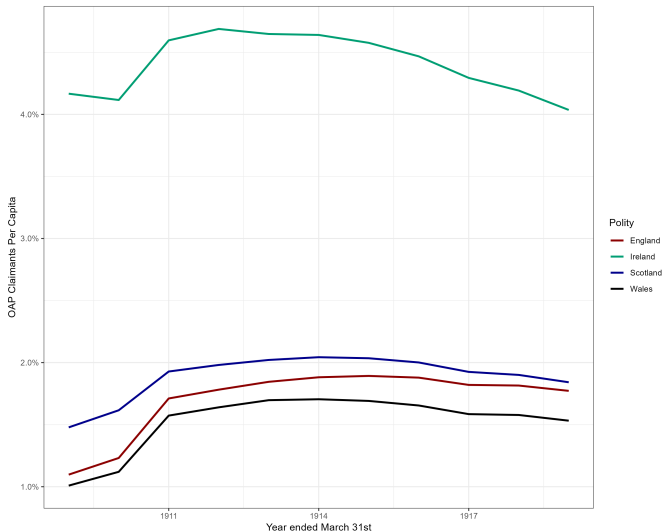
$$\text{Wage}_{it} = f(\text{occ}, \text{age}, \text{literacy}, \text{sex})$$

- ▶ Median weekly labour income 12.7s
- ▶ Median weekly household income 17.4s



**Figure:** Per Capita Income 1911 at DED level

# OAPs in Great Britain and Ireland



## Administrative Limitations

2/-  
22

Ken S/11/ 1948  
of again

Application No. 2/1525

Date of return, 23.2.16 Disposed of, 1/5/25

EXTRACT FROM CENSUS RETURN OF 1851

Full Name of Applicant, *Michael Carmockan*

Address, *Ballyglass, Ballymena, Co. Down.*

Full Names of Father and Mother of Applicant, *Lourence & Bridget Carmockan*

Name of Head of Family (if other than Father) with which Applicant resided in 18 *(continued)*

Relationship and Occupation,

Residence in 18 *0.0.0.*

County, *Down*

Barony, *Longford*

Parish, *Killemorologogue*

Townland, *Bagrove*

Street (if in a town), *My again to "Cormion"*

Place in Record Treasury, *17.0*

Return searched by *24/1/16 not found*

Extract made by *In 1876/16 not found. Only one from an O'Keefe*

Form replaced by *no 21-neted*

Form explained by *no 46-887*

Copy despatched to Applicant's Address. *Cormion family.*

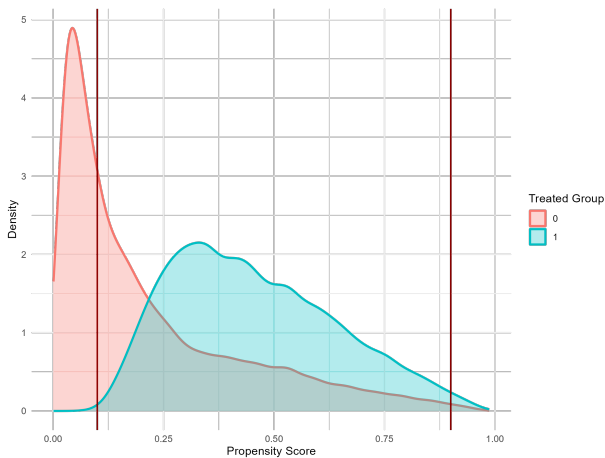
Unless you state the exact name of the 11th in which you were living in 1861, your name will not be found in the C.R. of that year. If you (noting the name by means of a C.R. form) forward the certificate 1876 Act, 1823, 2.10.

(TSB/191360-461300/9) S.A.T.A.Co.Ltd.

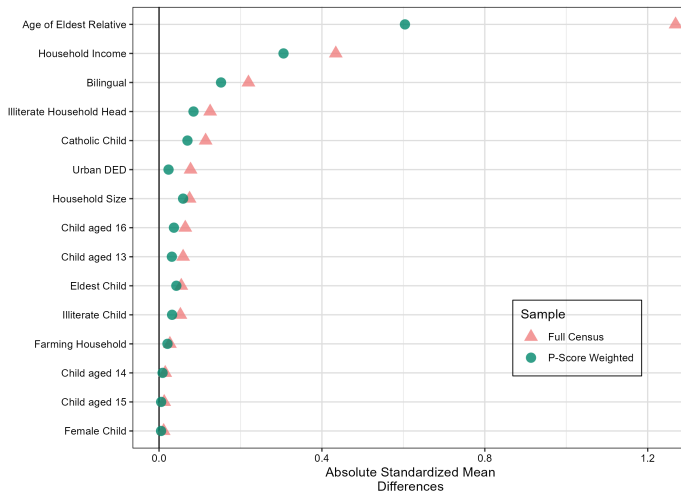


# Probability of Treatment 1

**Figure:** Density plot showing the probability that older children live with a treated pensioner by actual treatment status



# Probability of Treatment 2



# Age Misreporting, Cities and Irish

Table: Robustness: Peculiar geographies

|                              | Child in school      |                      |                      |                      |                      |                      |
|------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                              | (1)                  | (2)                  | (3)                  | (4)                  | (5)                  | (6)                  |
| Pension $\times$ Sex: Female | -0.137***<br>(0.030) | -0.107***<br>(0.036) | -0.137***<br>(0.030) | -0.109***<br>(0.033) | -0.108***<br>(0.033) | -0.112***<br>(0.036) |
| Pension                      | 0.139***<br>(0.033)  | 0.084**<br>(0.040)   | 0.131***<br>(0.034)  | 0.109***<br>(0.036)  | 0.098***<br>(0.037)  | 0.099**<br>(0.040)   |
| Sex: Female                  | 0.024***<br>(0.006)  | 0.027***<br>(0.007)  | 0.025***<br>(0.006)  | 0.018***<br>(0.006)  | 0.019***<br>(0.007)  | 0.022***<br>(0.007)  |
| Household Income             | 0.033***<br>(0.004)  | 0.033***<br>(0.005)  | 0.033***<br>(0.005)  | 0.036***<br>(0.005)  | 0.036***<br>(0.005)  | 0.034***<br>(0.006)  |
| 1911 Census                  | 0.051***<br>(0.007)  | 0.043***<br>(0.008)  | 0.051***<br>(0.007)  | 0.060***<br>(0.008)  | 0.060***<br>(0.008)  | 0.058***<br>(0.008)  |
| Sample                       | Baseline             | No Age Mis           | No Irish             | No City              | No City/Irish        | Drop all             |
| Full Spec                    | ✓                    | ✓                    | ✓                    | ✓                    | ✓                    | ✓                    |
| R <sup>2</sup>               | 0.352                | 0.353                | 0.353                | 0.353                | 0.355                | 0.354                |
| Observations                 | 47,039               | 34,715               | 46,427               | 38,822               | 38,231               | 33,966               |

Individuals in high age misreporting areas are dropped. Age misreporting is measured at Poor Law Union level ( $n = 158$ ) to smooth DED level volatility and is the difference between the count of people aged between 55-64 in 1901 and count of people aged between 65-74 in 1911. This difference is normalised between 0 and 1 and individuals living in an area where age misreporting intensity exceeds 0.7 are dropped. Significance levels: \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ .