

# Low-pay persistence over the life-cycle

NZWRI Research Seminar

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## **Statistics NZ Disclaimer:**

- Access to the data used in this study was provided by Statistics New Zealand under conditions designed to give effect to the security and confidentiality provisions of the Statistics Act 1975.
- The results presented in this study are the work of the authors, not of Statistics NZ.

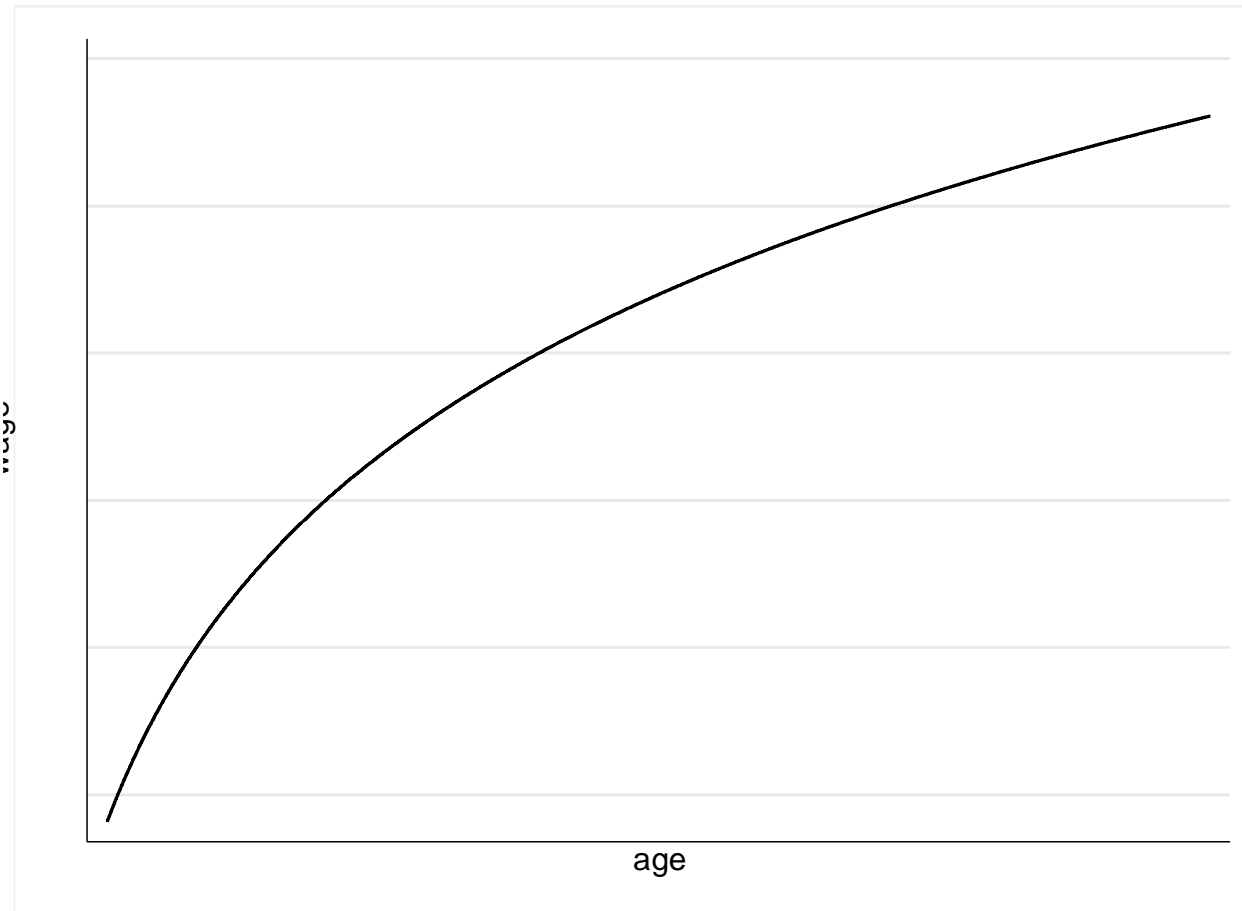
## **Motivation:**

- Studies on low-pay dynamics:
  - Persistence vs stepping-stone
  - How findings differ according to age
- Trying to answer the following two questions:
  - Why do we expect an age effect?
  - Which direction?

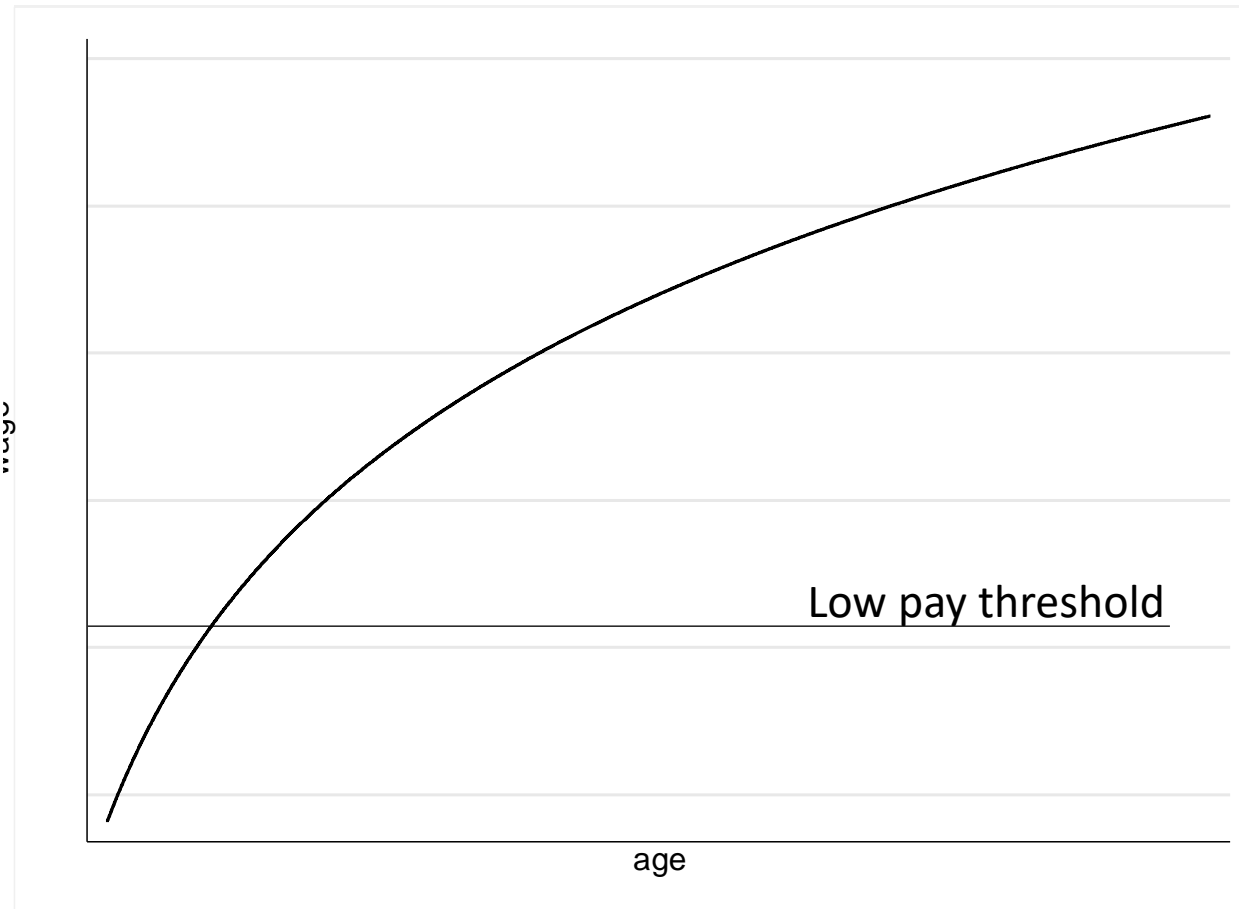
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## **Why do we expect an age effect?**

- Younger worker: lower wage but higher wage growth rate:
  - More likely to be affected by low pay
    - Extensively: higher share who work in the low-pay sector
    - Intensively: stronger attachment to the low-pay sector
  - Higher wage growth rate facilitates exiting the low pay sector

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- Based on wage growth rate: persistence should increase in age

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## **Economic literature:**

- Lagged dependent variable (binary indicator): indicator on low pay for a specific time point:
  - homogeneous across ages
  - independent of the degree of low pay attachment
- Age as covariate: level effect on low pay risk

## What is the data requirement?

| Model  | Notes  |
|--|--|
| Model (1): <i>Aggregated sample with lagged dependent variable</i> | <ul style="list-style-type: none"><li>• Average across birth cohorts and low pay attachment</li><li>• Positive relationship between birth cohort and low pay persistence</li></ul> |
|  |  |
|  |  |

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| Model (2): <i>Birth cohort sample with lagged dependent variable</i> | <ul style="list-style-type: none"><li>• Average across low pay attachment</li><li>• Binary indicator on low pay intensifies the relationship found above</li></ul>                 |
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## What is the data requirement?

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| Model (2): <i>Birth cohort sample with lagged dependent variable</i> | <ul style="list-style-type: none"><li>• Average across low pay attachment</li><li>• Binary indicator on low pay intensifies the relationship found above</li></ul>                 |
| Model (3): <i>Birth cohort sample with low pay intensity</i>         | <ul style="list-style-type: none"><li>• Negative relationship between birth cohort and low pay persistence</li></ul>   |

## Measuring the age effect

- Birth cohort specific regressions
  - Average partial effect of low pay persistence
  - Age trend across all birth cohorts
- Two types of models:
  - *Base model* that uses a binary indicator on low pay for a specific month in the previous years
  - *Intensity model* that uses the number of low paid months in the previous year

## Findings: Age trend in average partial effects

| Birth cohort regression |  | Aggregated regression       |
|-------------------------|--|-----------------------------|
| Variable                |  | Base model                  |
|                         |  | Model (1)                   |
| Birthyear               |  | 0.0024727***<br>(0.0003125) |

## Findings: Age trend in average partial effects

|           | Birth cohort regression     |  | Aggregated regression       |  |
|-----------|-----------------------------|--|-----------------------------|--|
| Variable  | Base model                  |  | Base model                  |  |
|           | Model (2)                   |  | Model (1)                   |  |
| Birthyear | 0.0048558***<br>(0.0007151) |  | 0.0024727***<br>(0.0003125) |  |

## Findings: Age trend in average partial effects

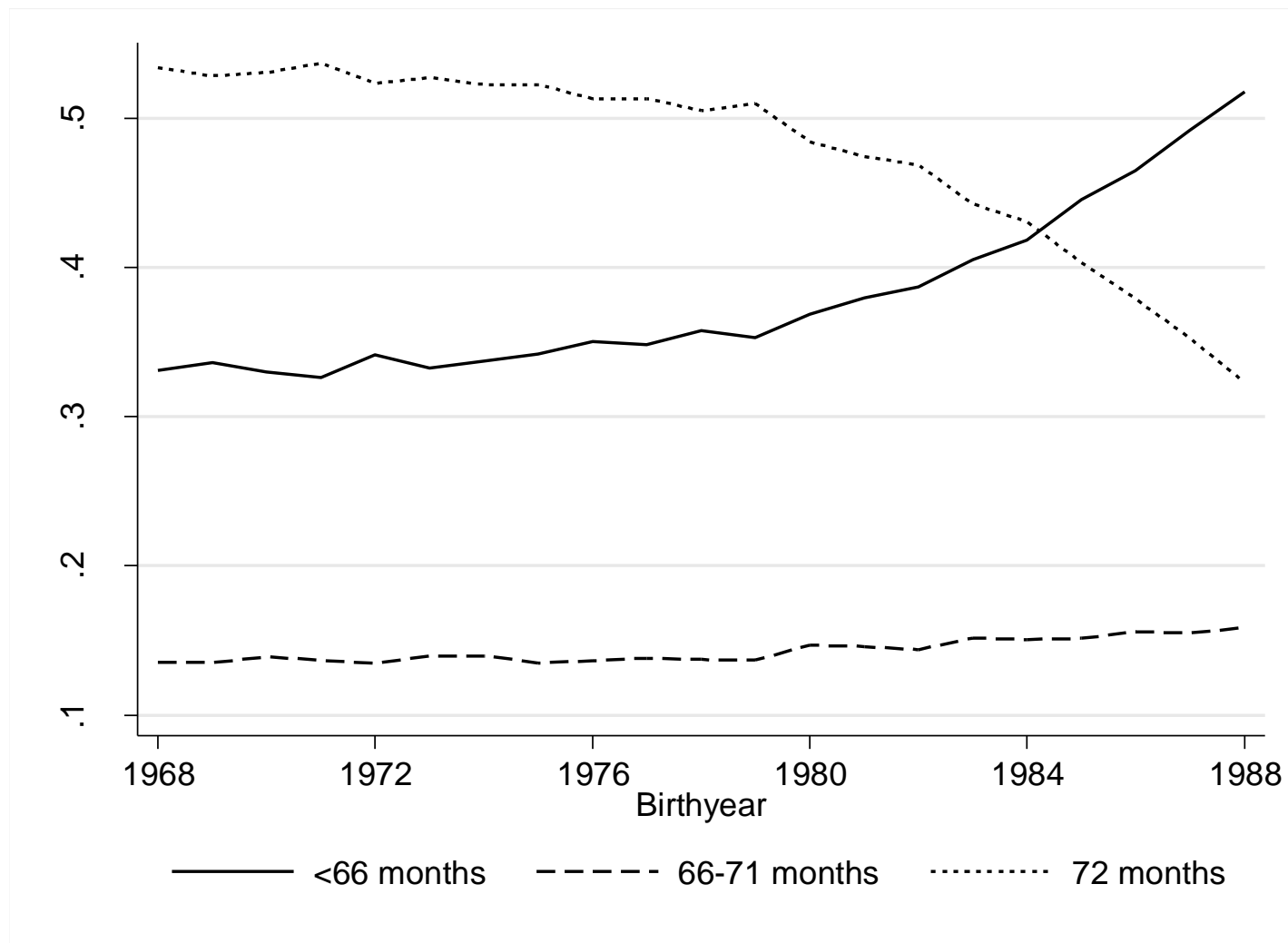
|           | Birth cohort regression     |                             | Aggregated regression       |
|-----------|-----------------------------|-----------------------------|-----------------------------|
| Variable  | Base model                  | Intensity model             | Base model                  |
|           | Model (2)                   | Model (3)                   | Model (1)                   |
| Birthyear | 0.0048558***<br>(0.0007151) | -0.0022166***<br>(0.000398) | 0.0024727***<br>(0.0003125) |



### **Data:**

- Three different data sets:
  - (1) birth record data from the Department of Internal Affairs (DIA),
  - (2) tax data from Inland Revenue (IR)
  - (3) the 2013 Census survey
- Male birth cohorts born in New Zealand between 1968 and 1988
- Ethnicity: NZ European, Māori and Pacific peoples (prioritized)
- Linking with IR income: January 2013 to December 2018
- Linking with the 2013 Census

*Distribution on months receiving income from wages and salaries*

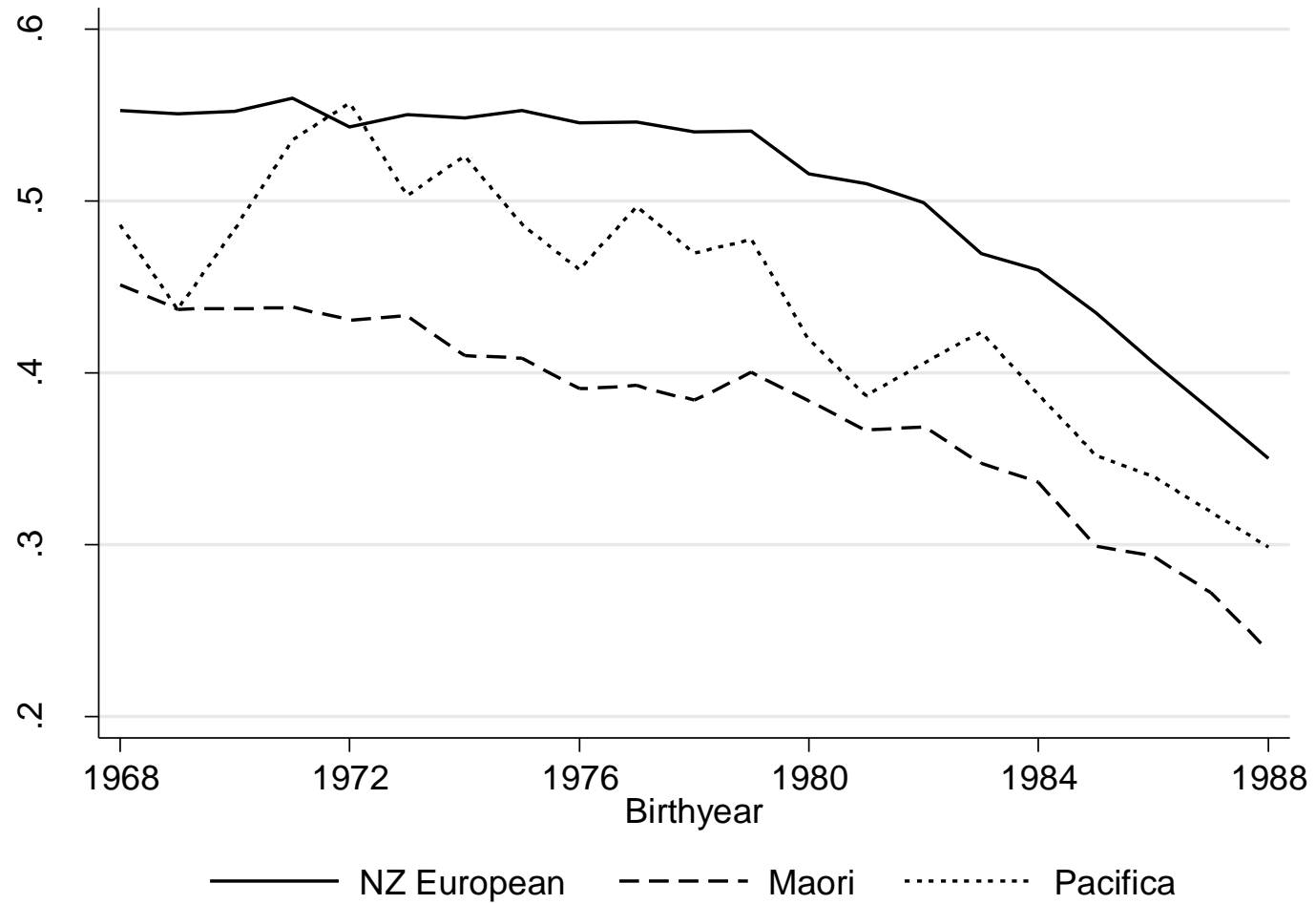


### **Data:**

- Trimming to continuously employed
- Reduced sample is not a random subsample

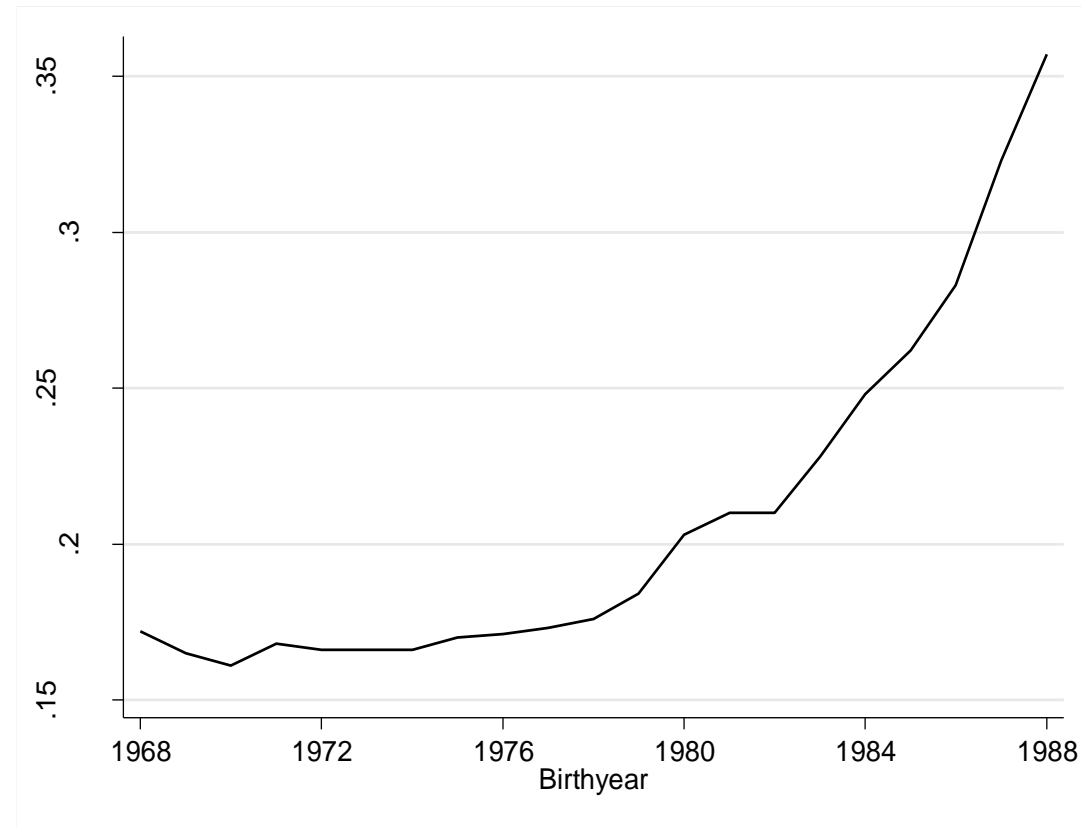
## 2. Data

*Ethnic specific share of continuously employed*

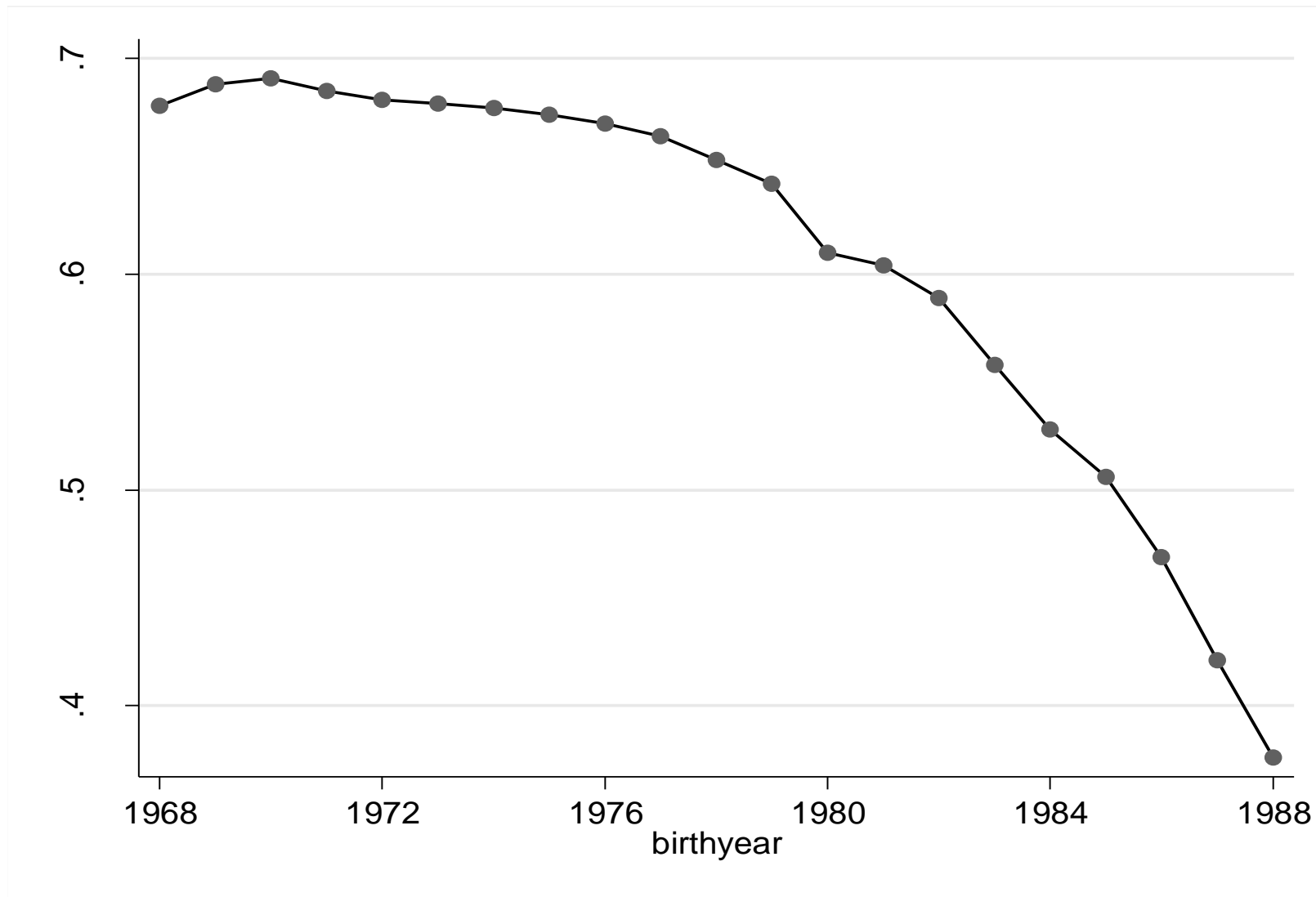


### Data:

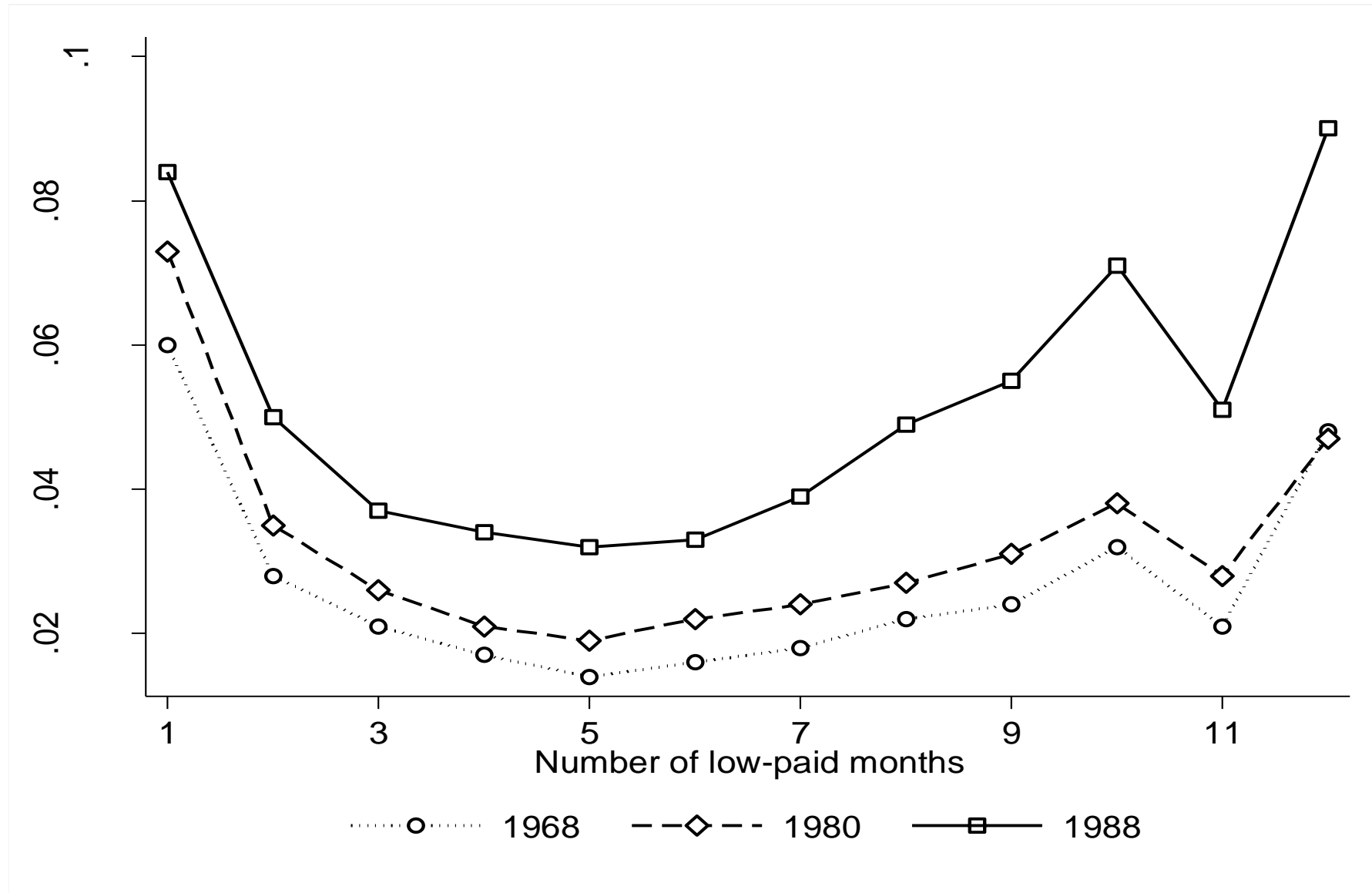
- Defining low pay (monthly basis): belongs to the lowest second percentile



### 3. Descriptives



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| Birthyear | Mean    | Std. Dev. |
|-----------|---------|-----------|
| 1968      | 0.00293 | 0.00215   |
| 1969      | 0.00306 | 0.00219   |
| 1970      | 0.00322 | 0.00222   |
| 1971      | 0.00322 | 0.00221   |
| 1972      | 0.00333 | 0.00223   |
| 1973      | 0.00341 | 0.00231   |
| 1974      | 0.00350 | 0.00238   |
| 1975      | 0.00365 | 0.00242   |
| 1976      | 0.00374 | 0.00239   |
| 1977      | 0.00385 | 0.00249   |
| 1978      | 0.00401 | 0.00260   |
| 1979      | 0.00421 | 0.00258   |
| 1980      | 0.00430 | 0.00264   |
| 1981      | 0.00449 | 0.00261   |
| 1982      | 0.00460 | 0.00272   |
| 1983      | 0.00482 | 0.00275   |
| 1984      | 0.00512 | 0.00286   |
| 1985      | 0.00529 | 0.00295   |
| 1986      | 0.00560 | 0.00308   |
| 1987      | 0.00606 | 0.00322   |
| 1988      | 0.00635 | 0.00339   |



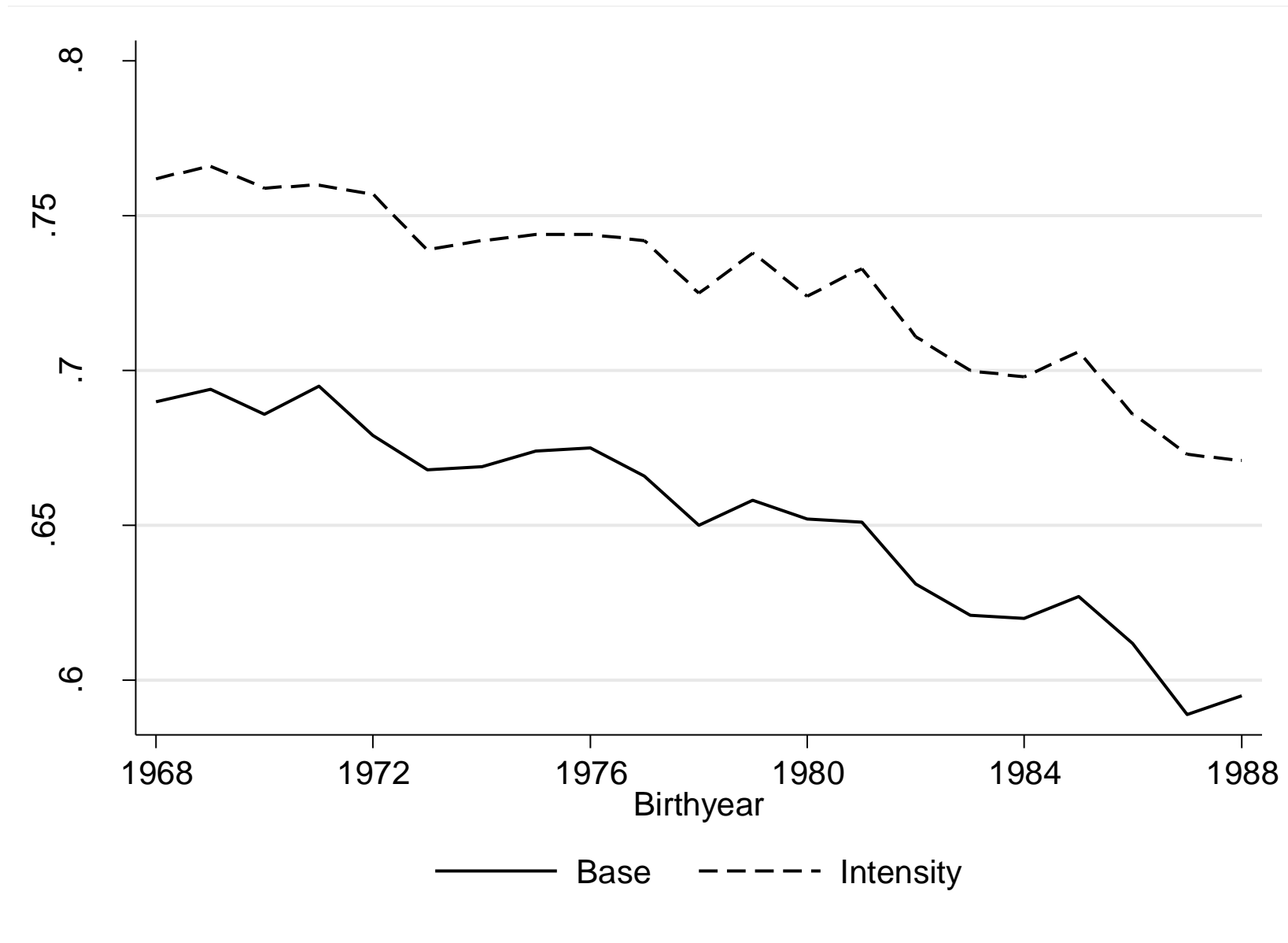
# 3. Descriptives

| Birthyear | Number of employer |      |      |            |
|-----------|--------------------|------|------|------------|
|           | 1                  | 2    | 3    | 4 and more |
| 1968      | 57.9               | 24.6 | 10.4 | 7.1        |
| 1969      | 58.2               | 24.5 | 10.3 | 7.0        |
| 1970      | 57.1               | 25.1 | 10.3 | 7.5        |
| 1971      | 56.2               | 25.6 | 10.7 | 7.6        |
| 1972      | 55.7               | 26.2 | 10.4 | 7.7        |
| 1973      | 55.3               | 25.9 | 11.1 | 7.8        |
| 1974      | 53.6               | 26.7 | 11.8 | 7.9        |
| 1975      | 52.0               | 26.7 | 12.3 | 9.1        |
| 1976      | 52.1               | 27.3 | 11.8 | 8.9        |
| 1977      | 51.4               | 27.1 | 12.5 | 9.1        |
| 1978      | 50.1               | 28.1 | 12.2 | 9.6        |
| 1979      | 47.8               | 29.2 | 13.2 | 9.7        |
| 1980      | 47.9               | 28.1 | 12.8 | 11.2       |
| 1981      | 46.9               | 28.7 | 13.3 | 11.1       |
| 1982      | 45.3               | 29.8 | 14.0 | 10.9       |
| 1983      | 44.2               | 29.1 | 14.3 | 12.5       |
| 1984      | 42.6               | 30.2 | 14.7 | 12.6       |
| 1985      | 40.8               | 29.5 | 15.6 | 14.1       |
| 1986      | 40.0               | 29.5 | 16.1 | 14.5       |
| 1987      | 37.2               | 29.6 | 17.3 | 15.9       |
| 1988      | 35.1               | 29.4 | 18.2 | 17.3       |

#### **Two marker:**

- The **base** model, which refers to being observed as on low pay in October of year  $y$  and  $y+1$
- The **intensity** model, which refers to the number of low-paid months in year  $y$  and being on low pay in October of year  $y+1$

### 3. Descriptives



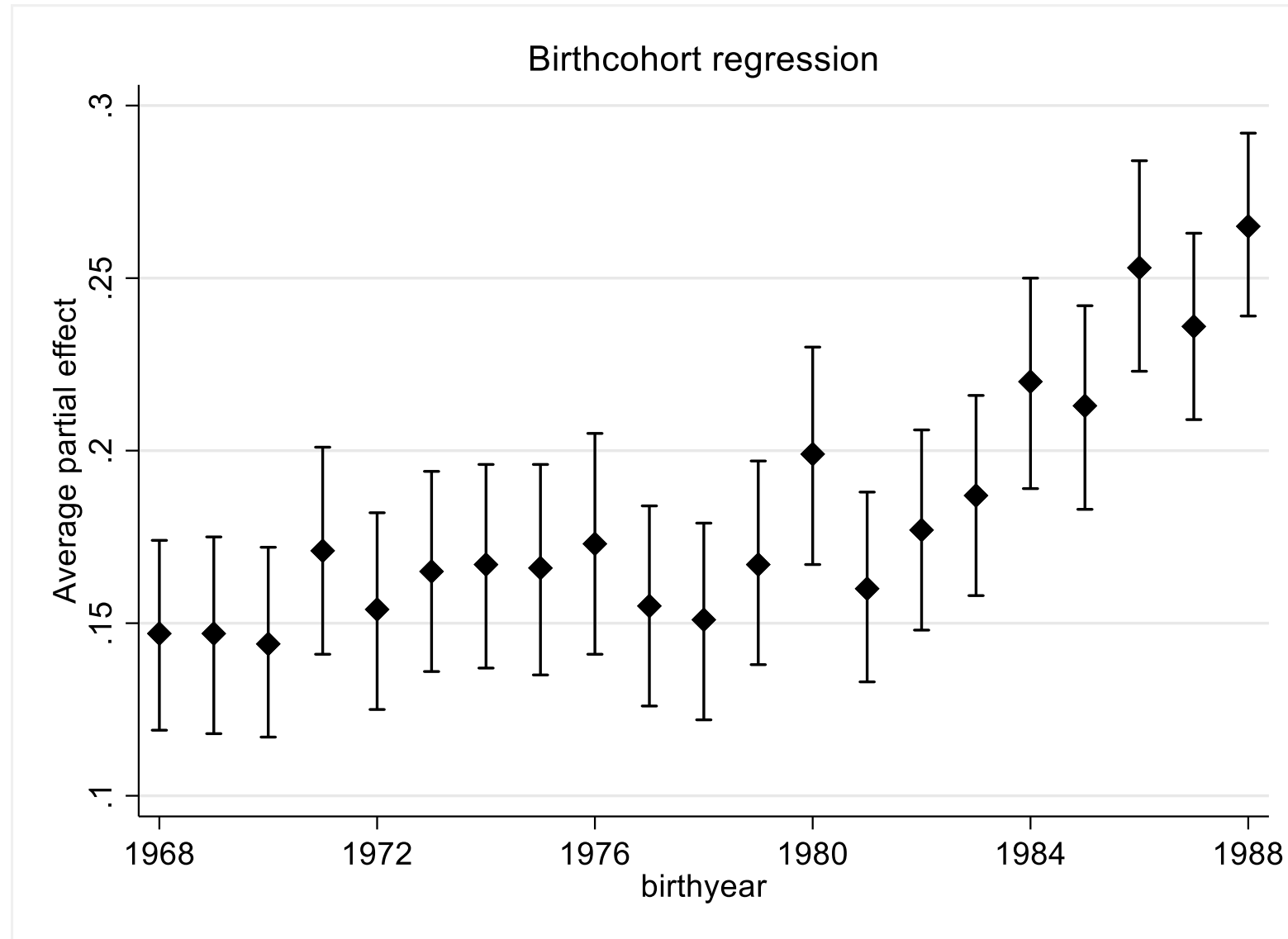
### **Econometric specification:**

- Dependent variable: low-paid employed in October
- Covariates: highest qualification, the legal marital status, their smoking behavior, the number of adults and children living in their household, the location of the residence (rural/urban identifier and whether on the North or South Island), receiving benefits, receiving ACC
- Birth cohort specific regressions
- Two specifications:
  - *Basic*: Low pay in October past year/first year
  - *Intensity*: # of low paid months in the previous year/initial year
- RE probit to control for unobserved heterogeneity

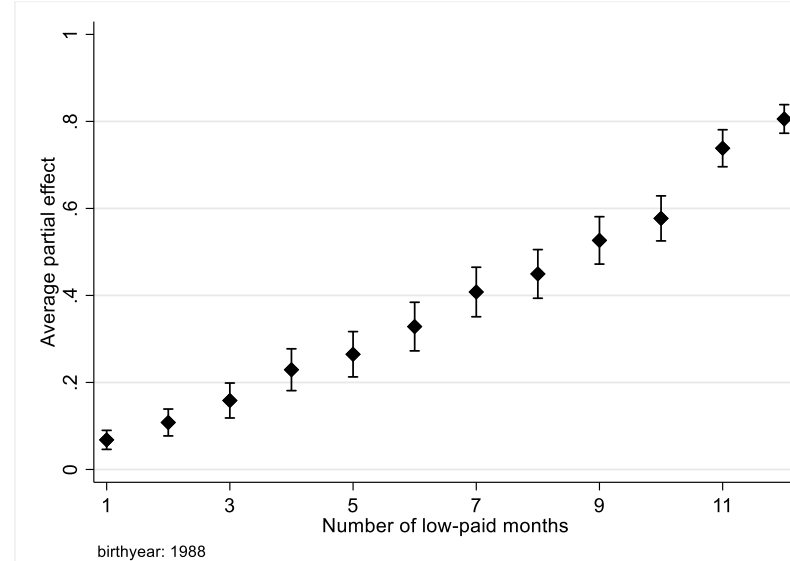
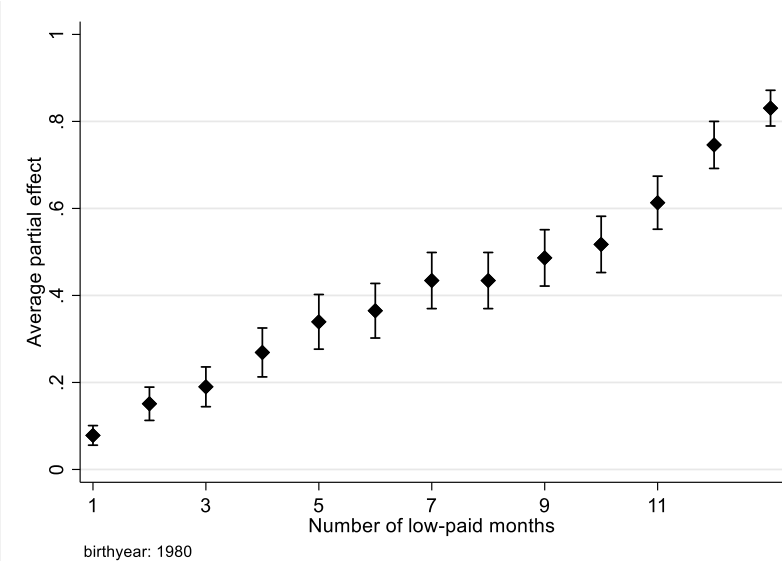
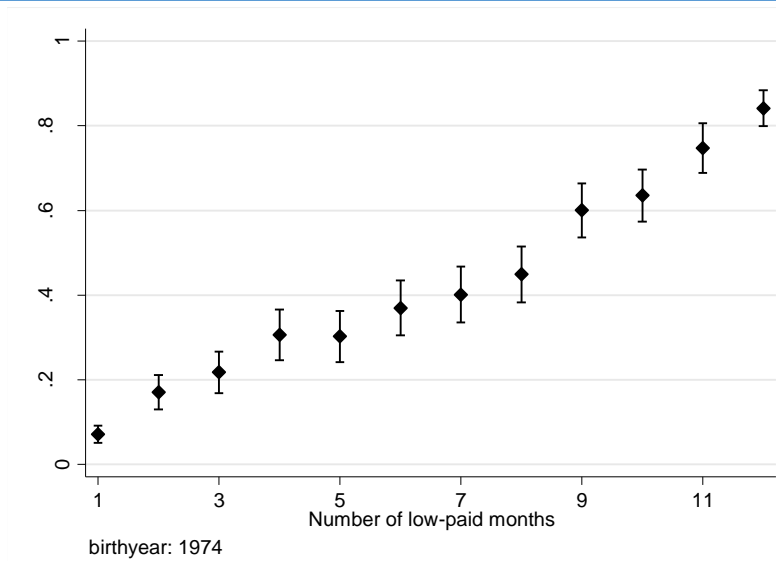
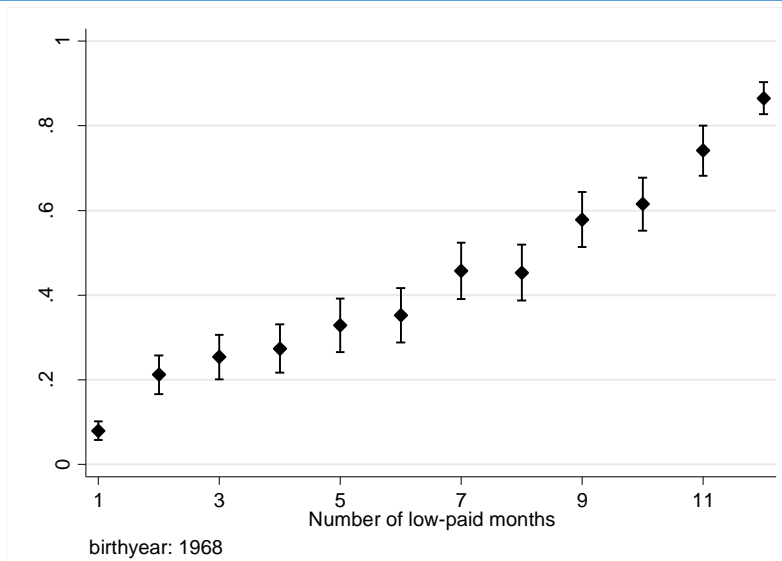
## 4. Empirical application – probability being on low pay

| Birthyear | Base Model |         | Intensity Model |         |
|-----------|------------|---------|-----------------|---------|
|           | Mean       | Std Dev | Mean            | Std Dev |
| 1968      | 0.162      | 0.227   | 0.150           | 0.273   |
| 1969      | 0.155      | 0.224   | 0.144           | 0.270   |
| 1970      | 0.149      | 0.214   | 0.140           | 0.264   |
| 1971      | 0.154      | 0.221   | 0.144           | 0.268   |
| 1972      | 0.152      | 0.215   | 0.142           | 0.267   |
| 1973      | 0.153      | 0.210   | 0.142           | 0.258   |
| 1974      | 0.152      | 0.206   | 0.142           | 0.260   |
| 1975      | 0.154      | 0.216   | 0.143           | 0.261   |
| 1976      | 0.156      | 0.216   | 0.145           | 0.263   |
| 1977      | 0.157      | 0.213   | 0.146           | 0.263   |
| 1978      | 0.157      | 0.202   | 0.146           | 0.257   |
| 1979      | 0.165      | 0.210   | 0.152           | 0.267   |
| 1980      | 0.183      | 0.220   | 0.169           | 0.272   |
| 1981      | 0.189      | 0.221   | 0.172           | 0.279   |
| 1982      | 0.187      | 0.208   | 0.170           | 0.268   |
| 1983      | 0.203      | 0.211   | 0.183           | 0.271   |
| 1984      | 0.216      | 0.217   | 0.197           | 0.281   |
| 1985      | 0.224      | 0.218   | 0.202           | 0.285   |
| 1986      | 0.242      | 0.218   | 0.218           | 0.285   |
| 1987      | 0.271      | 0.216   | 0.240           | 0.294   |
| 1988      | 0.296      | 0.218   | 0.262           | 0.299   |

## 4. Empirical application



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| <b>Birthcohort regression</b>    |                             |                             |                              |  |
|----------------------------------|-----------------------------|-----------------------------|------------------------------|--|
| <b>Variable</b>                  | Base model                  | Intensity model             |                              |  |
|                                  | Oct                         | Jan-Dec                     | w/o Nov/Dec                  |  |
| <b>Number of low-paid months</b> | -                           | 0.0636322***<br>(0.0006981) | 0.0682892***<br>(0.0008516)  |  |
| <b>Birthyear</b>                 | 0.0048558***<br>(0.0007151) | -0.0022166***<br>(0.000398) | -0.0022008***<br>(0.0004039) |  |

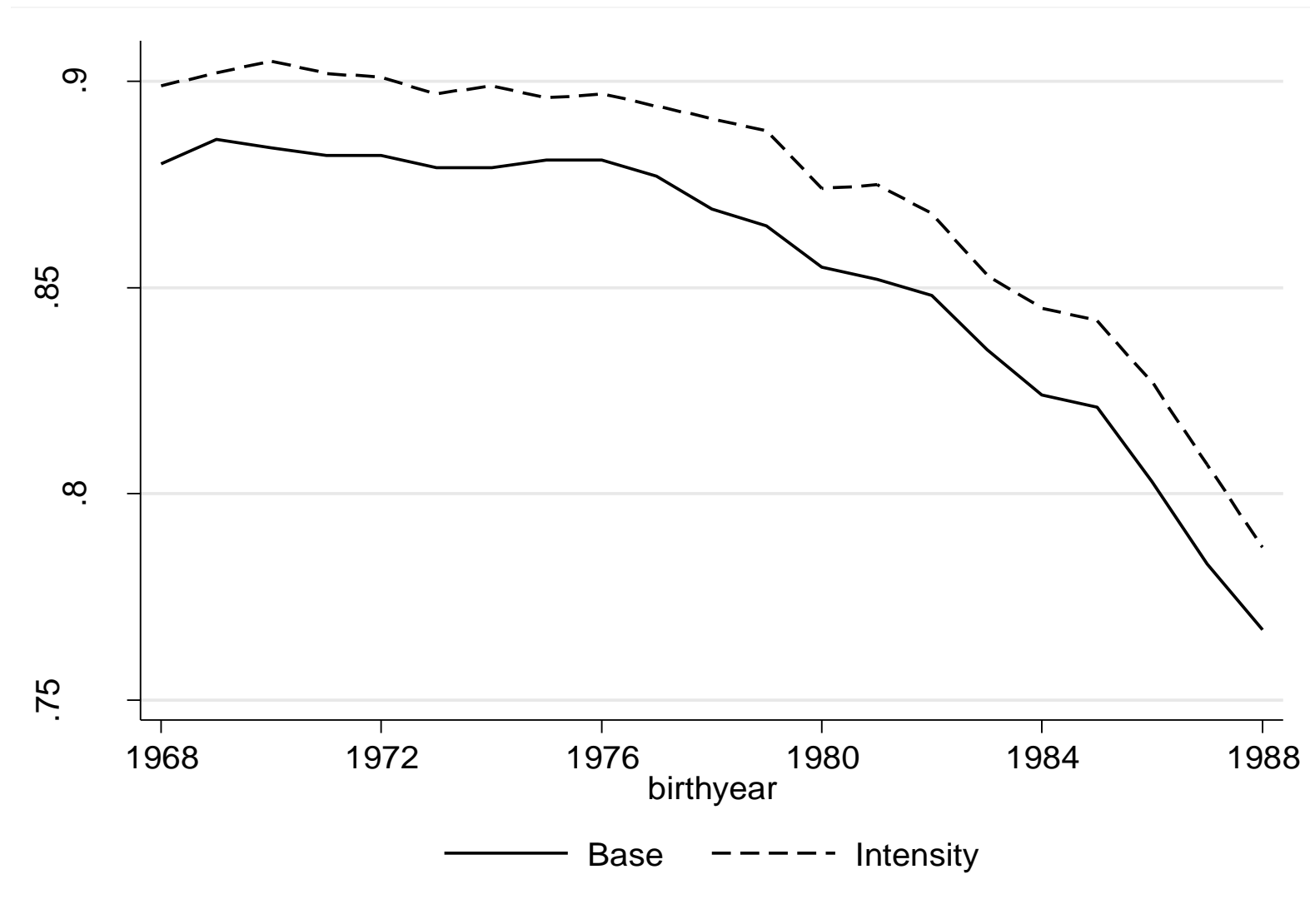
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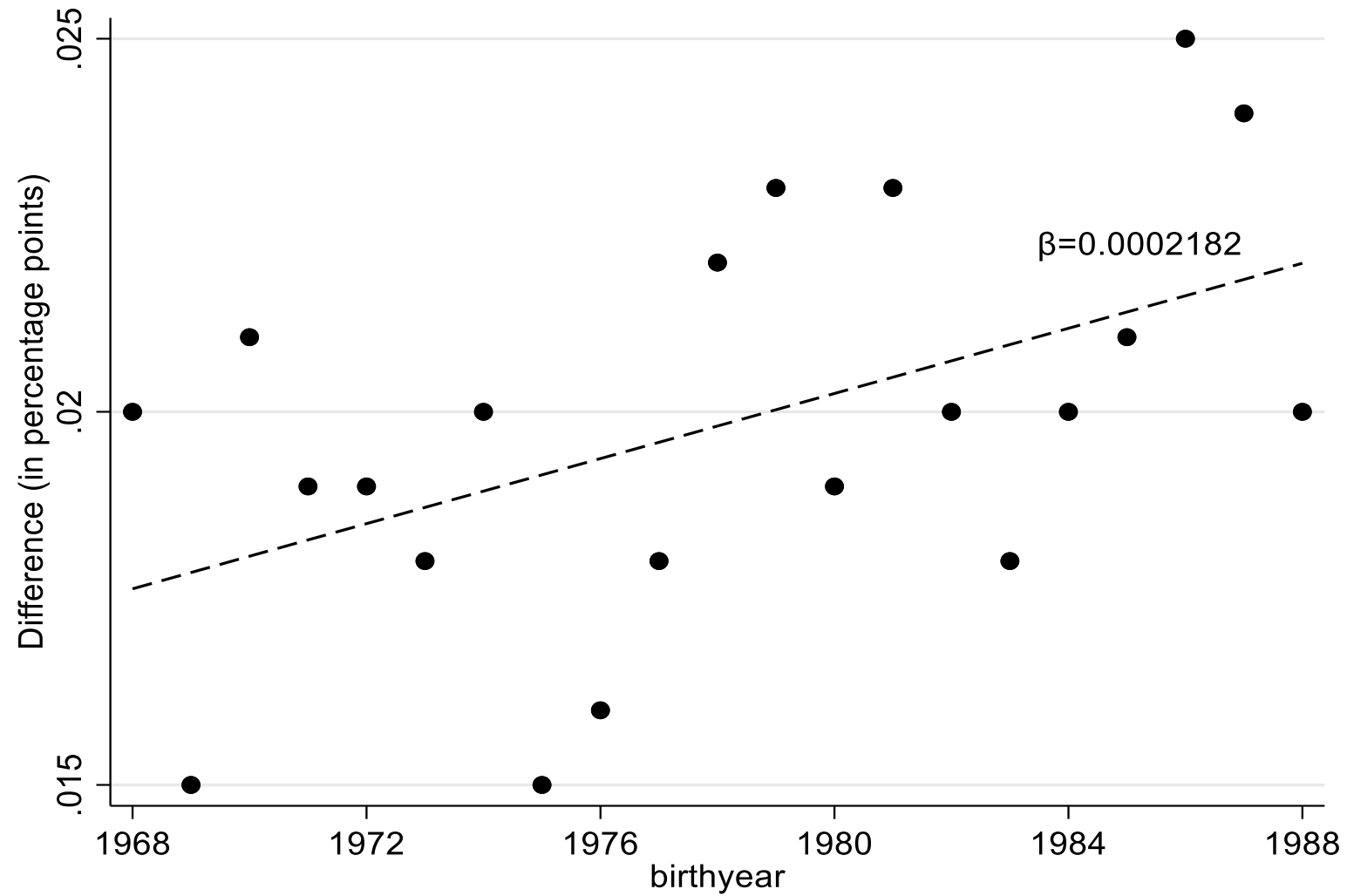
## 4. Empirical application

| Variable                         | Birthcohort regression      |                             |                              | Aggregated regression       |                             |
|----------------------------------|-----------------------------|-----------------------------|------------------------------|-----------------------------|-----------------------------|
|                                  | Base model                  | Intensity model             |                              | Base model                  | Intensity model             |
|                                  | Oct                         | Jan-Dec                     | w/o Nov/Dec                  | Oct                         | Jan-Dec                     |
| <b>Number of low-paid months</b> | -                           | 0.0636322***<br>(0.0006981) | 0.0682892***<br>(0.0008516)  | -                           | 0.0638629***<br>(0.0006054) |
| <b>Birthyear</b>                 | 0.0048558***<br>(0.0007151) | -0.0022166***<br>(0.000398) | -0.0022008***<br>(0.0004039) | 0.0024727***<br>(0.0003125) | 0.0001827<br>(0.0003452)    |

## 4. Empirical application



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|           | Base      |         | Intensity |         |
|-----------|-----------|---------|-----------|---------|
| Birthyear | $\lambda$ | Std Err | $\lambda$ | Std Err |
| 1968      | 0.471     | 0.019   | 0.034     | 0.015   |
| 1969      | 0.471     | 0.020   | 0.013     | 0.015   |
| 1970      | 0.484     | 0.019   | 0.017     | 0.015   |
| 1971      | 0.437     | 0.020   | 0.025     | 0.015   |
| 1972      | 0.449     | 0.020   | 0.005     | 0.015   |
| 1973      | 0.433     | 0.020   | 0.034     | 0.015   |
| 1974      | 0.448     | 0.020   | 0.017     | 0.015   |
| 1975      | 0.427     | 0.021   | 0.047     | 0.016   |
| 1976      | 0.412     | 0.021   | 0.020     | 0.016   |
| 1977      | 0.446     | 0.020   | 0.012     | 0.016   |
| 1978      | 0.463     | 0.020   | 0.056     | 0.017   |
| 1979      | 0.439     | 0.020   | 0.018     | 0.016   |
| 1980      | 0.391     | 0.020   | 0.037     | 0.016   |
| 1981      | 0.457     | 0.020   | 0.036     | 0.016   |
| 1982      | 0.424     | 0.020   | 0.055     | 0.016   |
| 1983      | 0.411     | 0.020   | 0.039     | 0.016   |
| 1984      | 0.366     | 0.020   | 0.010     | 0.015   |
| 1985      | 0.395     | 0.020   | 0.045     | 0.016   |
| 1986      | 0.340     | 0.020   | 0.052     | 0.015   |
| 1987      | 0.344     | 0.019   | 0.022     | 0.014   |
| 1988      | 0.342     | 0.019   | 0.073     | 0.015   |

### **Conclusion:**

- Higher share of low pay employment among young worker
- Low pay attachment is also stronger among young worker
- However: wage growth is also higher
- Controlling for both aspects in birth cohort specific regressions reveals a positive association between age and low pay persistence

**Thank you for  
your  
attention!!!**