



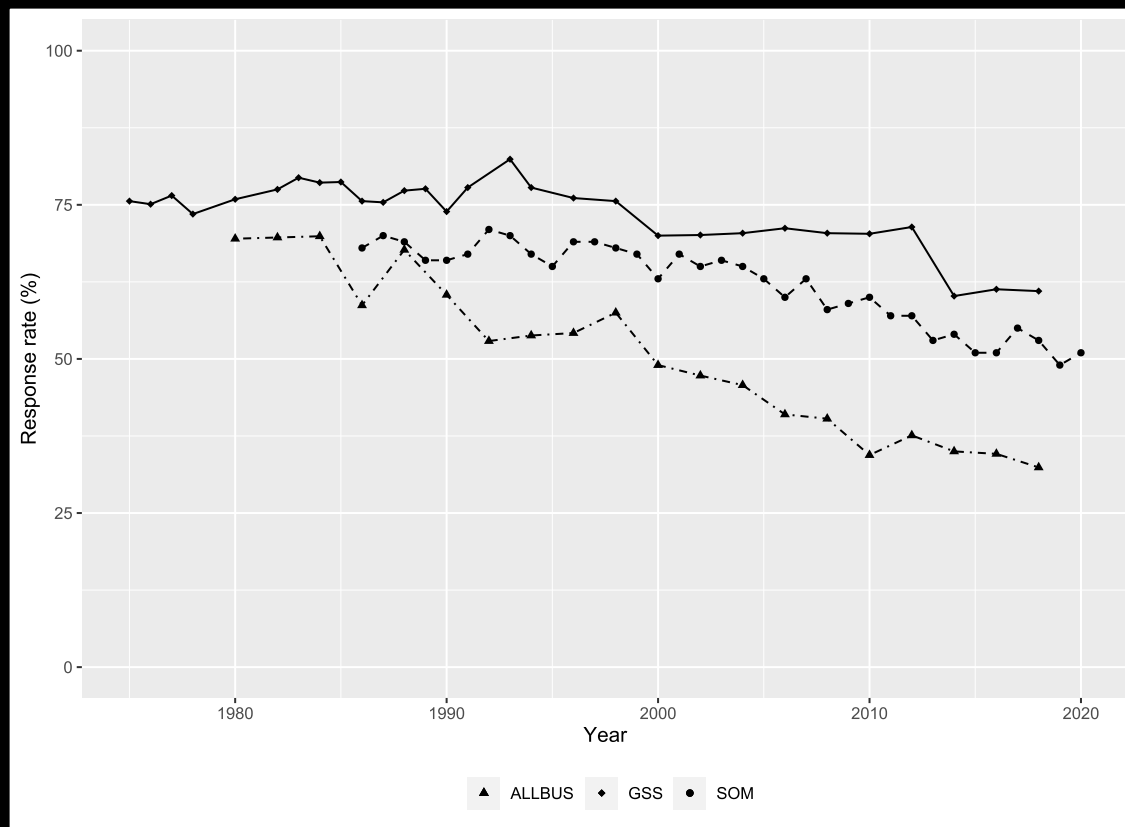
# **PREDICTING SURVEY NONRESPONSE WITH REGISTRY DATA IN SWEDEN BETWEEN 1992 TO 2022: COHORT REPLACEMENT OR A DETERIORATING SURVEY CLIMATE?**

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# The problem: Declining response rates in Western societies

- Shows no signs of stopping
- Uniformly distributed non-response is a prerequisite for accurate inferences and generalizations



## Mapping nonresponse

- A better understanding of what is associated with survey nonresponse and its impact on nonresponse bias enables better statistical modeling
- Aid in designing interventions that counteract the trend of increasing nonresponse (e.g., for whom to tailor the survey requests) (Lynn, 2016; Schouten et al., 2017; Tourangeau et al., 2017; Brick & Tourangeau, 2017; Christensen et al., 2019)
- Understanding whether the decline is due to a changing survey climate or cohort replacement ensure preparation for combating nonresponse in the near future

# Individual predictors of response propensities

- **Educational attainment** (Keeter et al., 2006; Keeter et al., 2017; Piekut, 2021; Rogelberg & Luong, 1998; van Wees et al., 2019)
- **Age** (Bates, 2017; Eisile, 2017; Shaghaghi et al., 2011; van Loom et al., 2003; van Wees et al., 2019)
- **Sex** (van Loon et al. 2003)
- **Household characteristics** (Abraham et al., 2006; Bergstrand et al., 1983; Groves 2006; Eisile, 2017)
- **Marital status** (Abraham et al., 2006)
- **Migrant status** (Bates, 2017; Bates et al., 2019; Eisile, 2017; Shaghaghi et al., 2011; van Wees et al., 2019)
- **Citizenship** (Kreuter, Müller, and Trappman, 2010)
- **Economic status** (Abraham et al., 2006; Bates & Mulry, 2011; Brick & Williams, 2013; Groves & Couper, 1998; Kreuter, Müller, and Trappman, 2010; Shaghaghi et al., 2011)
- **Language proficiencies** (Bates, 2017; Bates & Mulry, 2011; Brick & Williams, 2013; Couper & de Leeuw; Japac et al., 1997)

# Contextual predictors of response propensities

- Commuting distance (Groves and Couper, 1998; Brick and Williams, 2013)
- Proportion of rental apartments (Bates & Mulry, 2011)
- Proportion of single households (Bates & Mulry, 2011)
- Income levels (Bates & Mulry, 2011)
- Proportion of welfare dependence (Bates & Mulry, 2011)
- Crime rates (Brick and Williams, 2013)
- Proportion of educational attainment (Bates & Mulry, 2011)
- Proportion of women in the workforce (Brick and Williams, 2013)
- Proportion of unemployment (Brick and Williams, 2013)
- Proportion of families with young children (Brick and Williams, 2013; Bates & Mulry, 2011)
- Population density (Groves and Couper, 1998; Bates & Mulry, 2011)

# The Case: Response rates in Sweden

- Response rates in the Swedish: a middle-ground between the high response rate in the GSS and the slightly lower the ALLBUS
- Capitalizing on the reliable registry data in Sweden, theories on response propensities should likely be accurately assessed
- The long-time series of our data allow for the assessment of a deteriorating survey climate or cohort replacement as causes increasing non-response bias  
(Gummer, 2019)

## New contextual factor: Socially disadvantaged areas in Sweden

The Swedish Police identified socially disadvantaged areas.

- A greater proportion of crimes (especially organized crime) than other areas in Sweden (Swedish Police, 2015)
- Parallel societies with own rules and parallel enforcement of rules and law (not the police)
- Inhabitants show lower trust in authorities

# Contextual predictors that coincide with socially disadvantaged areas in Sweden

- Commuting distance (Groves and Couper, 1998; Brick and Williams, 2013)
- **Proportion of rental apartments** (Bates & Mulry, 2011)
- Proportion of single households (Bates & Mulry, 2011)
- **Income levels** (Bates & Mulry, 2011)
- **Proportion of welfare dependence** (Bates & Mulry, 2011)
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- **Population density** (Groves and Couper, 1998; Bates & Mulry, 2011)



# Sample 1: The SOM Institute 1992-2022

- Annual surveys since 1986 administered every fall
- Paper-and-pencil questionnaires
- Administered to simple random sample of people living in Sweden
- Omnibus style, broad topics on media, society, politics, behavior
- Since 2012, respondents have been offered to complete the questionnaire both online and on paper
- Since 2017 been offered a lottery scratcher ticket incentive with no incentive before that

# Sample 2: The Swedish National Election Studies (SNES) 2022

- Every national parliamentary election since 1956
- Face-to-face but paper-and-pencil/web since 2018
- Topics on voting behavior, politics, and political media consumption
- Administered to a random sample of people eligible to vote, 18+ and citizen, and living in Sweden
- Administered by Statistics Sweden (two versions) or the SOM Institute (one version)
- No incentives for Statistics Sweden versions but scratcher ticket for the SOM Institute version

# Predicting Response Propensities

OLS regression for each year separately

$y_i$  Responded =  $\beta_1$  sex dummy +  $\beta_2$  age dummies +  $\beta_3$  foreign-born dummies +  $\beta_4$  marital status dummies +  $\beta_5$  citizenship dummy + ( $\beta_6$  education dummies) +  $\beta_7$  socially disadvantaged area dummies +  $\epsilon$

Meta-analytical regression analysis for the years 2015-2022

# Sample 1: Response Propensities

## Strongest predictors:

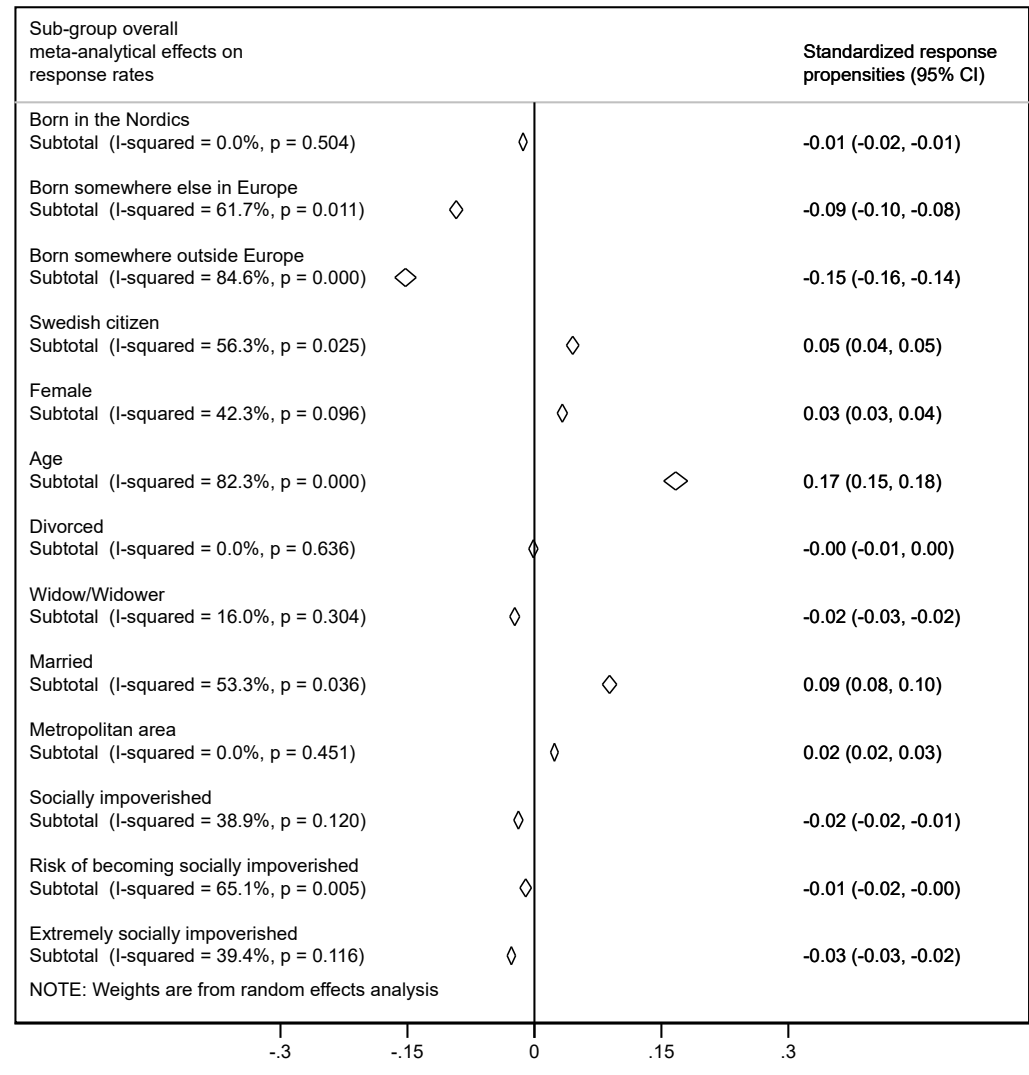
- Age
- Migrant status

## Individual, weaker, predictors:

- Sex, Marital status, citizenship

## Contextual, weaker, predictors:

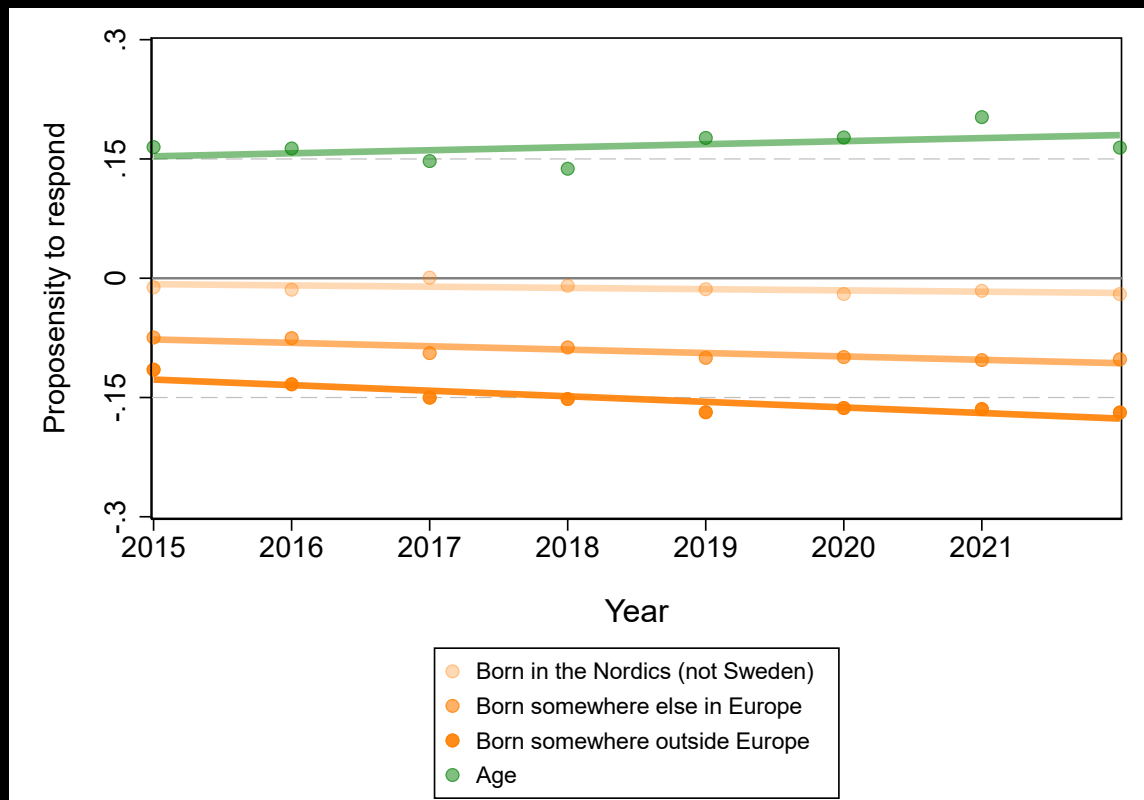
- Socially disadvantaged areas, metropolitan areas



# Sample 1: Response Propensities

Increasing predictors over time

- Age
- Migrant status



# Sample 2: Response Propensities

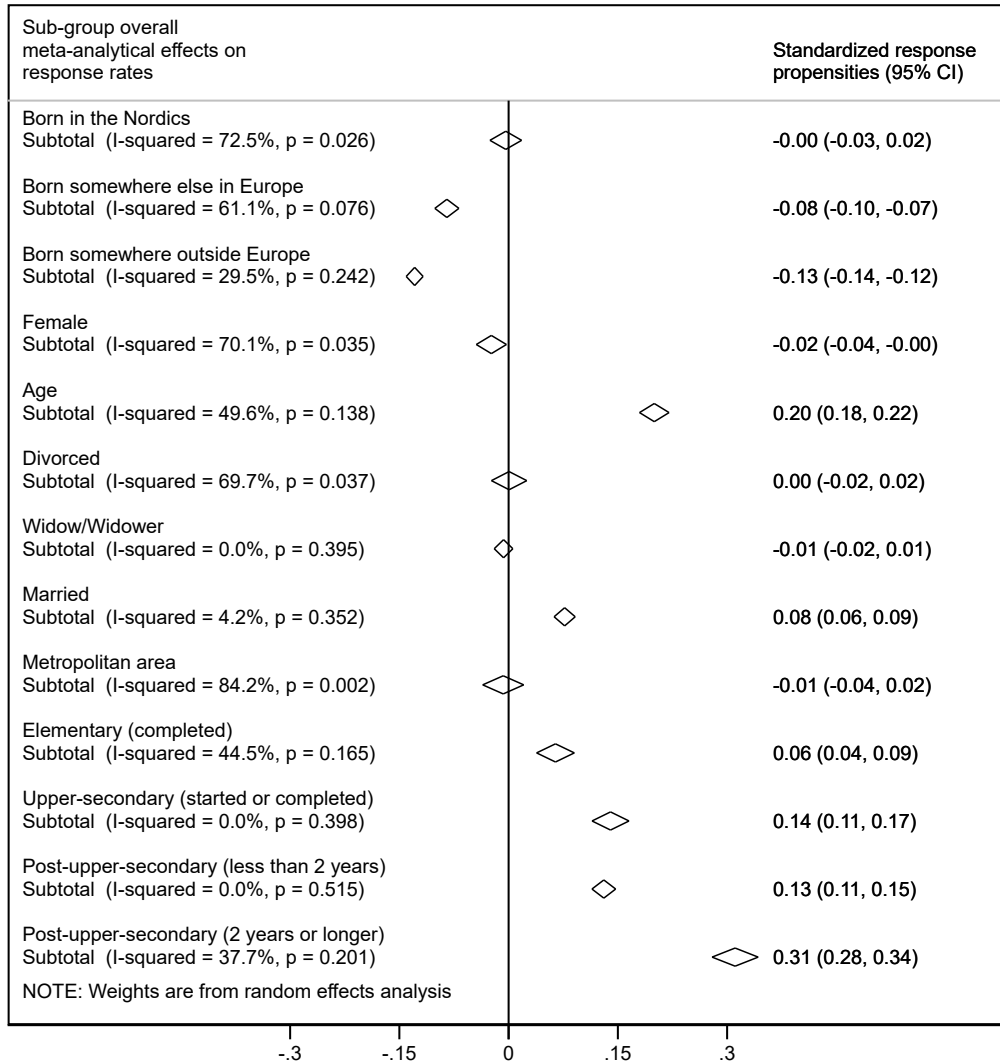
Education a very strong predictor

## Replicated predictors:

- Age
- Migrant Status
- Married

## Not replicating

- Sex
- Widow/Widower



# Non-response bias: *R* indicators

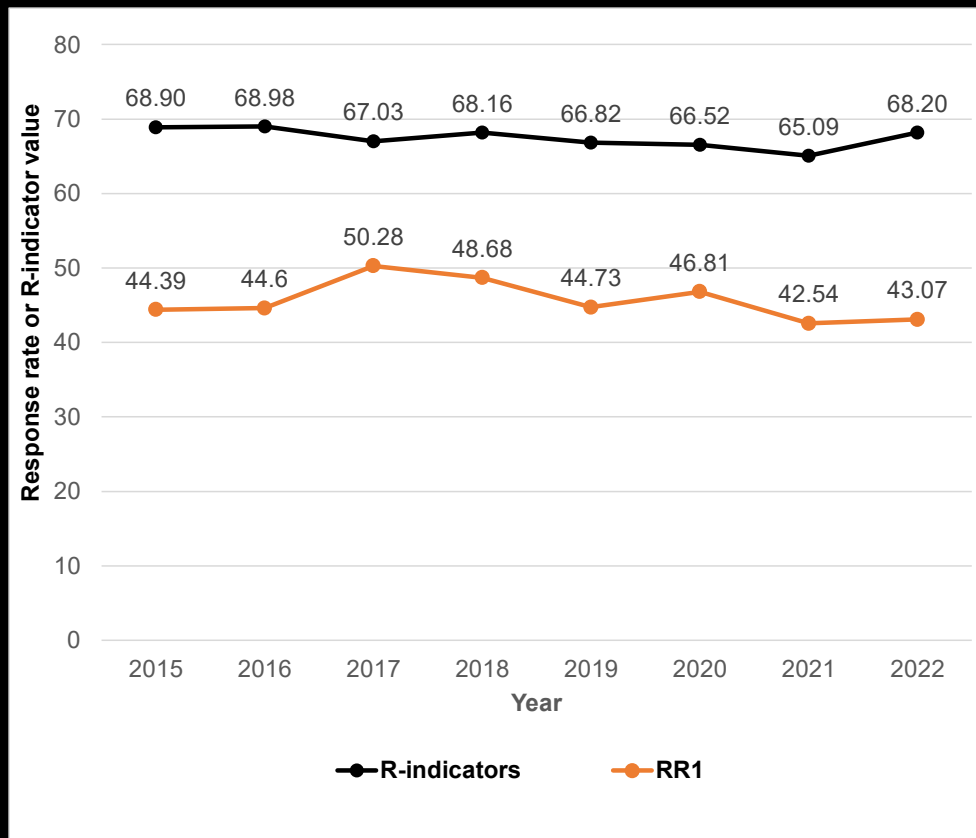
- The standard deviation (SD) of probabilities of responses of units in the population.
- Estimated by fitting a probit regression equation of the parameters of response propensities
- Then estimating (Eq. 5. in Schouten et al. 2009, and the unadjusted *R* indicators in the R script created by de Heij, Schouten, and Shlomo, 2015).

$$1 - 2 \sqrt{\frac{1}{N-1} \sum_{i=1}^N (\rho_i - \bar{\rho})^2}$$

# Sample 1: Non-response bias

No relationship between  
Response Rate (RR1) and  
Nonresponse Bias (R Indicators)

$r = .07$

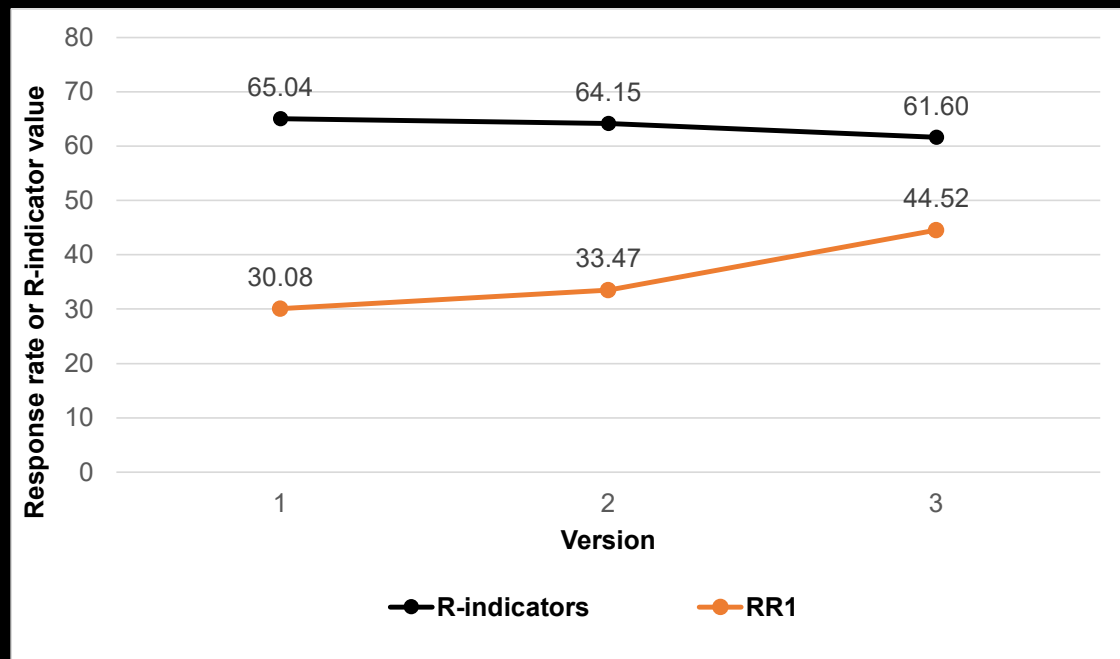




# Sample 2: Non-response bias

Again, no relationship between Response Rate (RR1) and Nonresponse Bias (R Indicators)

Almost reversed relationship



# Survey Climate: Corrected Dissimilarity Indices and Decomposition (Gummer, 2019)

- Estimate how much the difference between the responding sample (r) and the population (p) changed between two specified years within specific cohorts (e.g., among those born 1910-1919, how much did the difference between respondents and the population increase/decrease between the two specified survey years).
- Estimate a cohort-specific dissimilarity index (d), the dissimilarity can be decomposed into changes within and between cohorts

Eq.4.

$$\Delta D = \underbrace{\sum_1^c \frac{p_{c1} + p_{c0}}{2} \times \Delta d_c}_{WCC} + \underbrace{\sum_1^c \frac{d_{c1} + d_{c0}}{2} \times \Delta p_c}_{BCC}$$

# Survey Climate: Corrected Dissimilarity Indices and Decomposition (Gummer, 2019)

*Within Cohort Changes (WCC):* deteriorating survey climate

*Between Cohort Changes (BCC):* cohort replacement

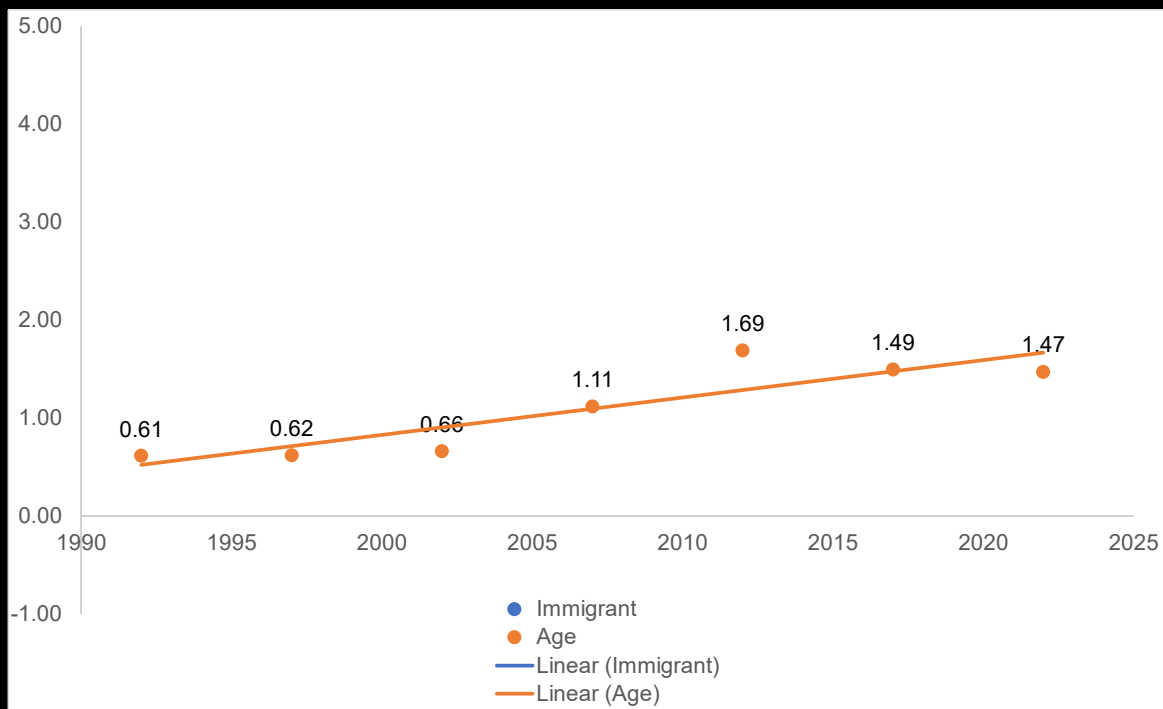
- A positive WCC indicates that cohorts became more reluctant to complete the questionnaire
- A positive BCC indicates that some cohorts (e.g., older birth cohorts) with a higher response propensity left the population, while cohorts with a lower response propensity (e.g., younger birth cohorts) remained or joined

# Sample 1: Survey Climate or Cohort Replacement?

Dissimilarity of birth cohorts increased

$D_{1992} = 0.61$  doubled to  $D_{2022} = 1.47$

$b_{year} = 0.04, p < .01, CI[0.02, 0.06]$

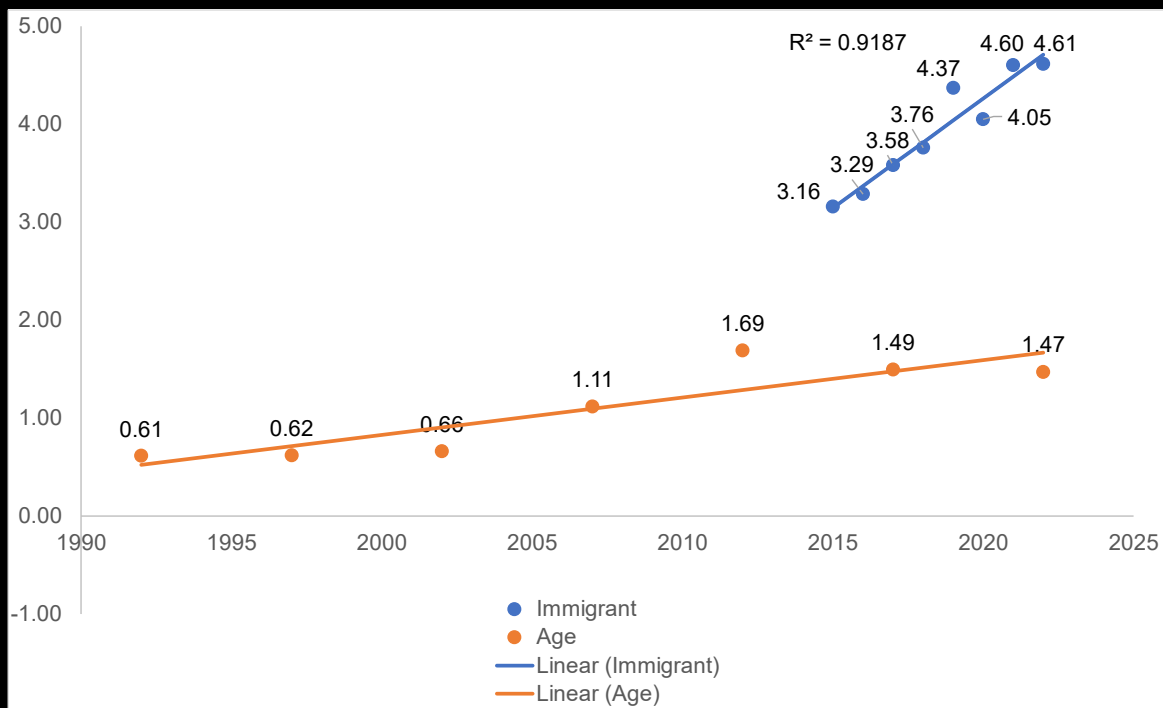


# Sample 1: Survey Climate or Cohort Replacement?

Dissimilarity of immigrant cohorts increased rapidly (blue line)

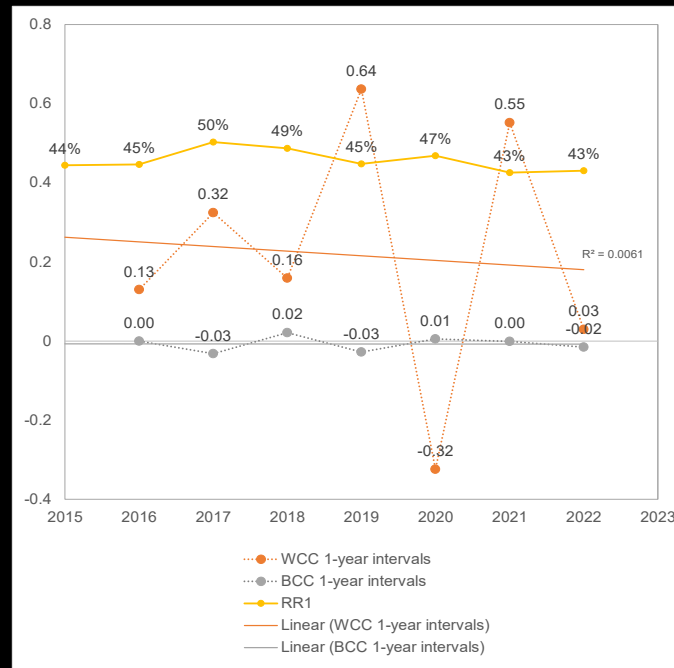
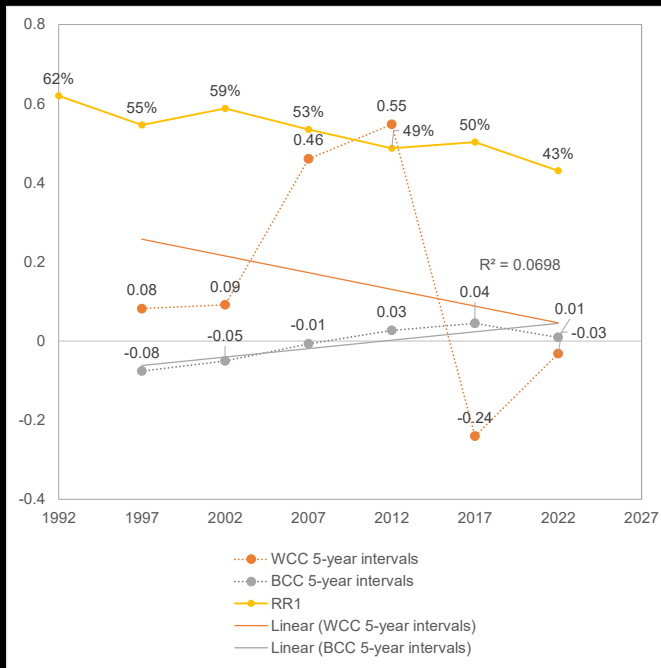
$$D_{2015} = 3.61 \text{ to } D_{2022} = 4.61$$

$$b_{\text{year}} = 0.22, p < .001, CI[0.16, 0.29]$$



# Sample 1: Survey Climate or Cohort Replacement?

The increased dissimilarity was wholly attributable to *Within Cohort Change* (survey climate) rather than *Between Cohort Change* (cohort replacement)



# Summary

- Declining response rates does not seem to be a product of birth cohort replacement or influx of immigrant from different regions
- The survey climate has deteriorated in Sweden and seems responsible for the declining response rates (deteriorated rapidly 2002 to 2012)
- Education level, age, and migrant status are strong predictors of response propensities
- Individual predictors appear superior to contextual factors
- Nonresponse bias did not correlate with response rate
- Increasing nonresponse bias seem safe from strong influence of declining response rates (simulation studies show a safe-area when RR exceed 20%; Hedlin, 2020)

**European Survey Research Association**  
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2023

**Predicting Survey Nonresponse with  
Registry Data in Sweden between 1992  
to 2022: Cohort Replacement or a  
Deteriorating Survey Climate?**

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Kim Backström**

**Working paper available at:  
[psyarxiv.com/8xsyb](https://psyarxiv.com/8xsyb)**

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