Fertility differentials by religious affiliation in Vienna

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Internal WIREL meeting
VID, 7 May 2014

Vienna Institute of Demography
OAW Austrian Academy of Sciences
Wittgenstein Centre
FOR DEMOGRAPHY AND GLOBAL HUMAN CAPITAL

Issues & topics

How fertility rates differentiated by religious affiliation?

Does affiliation really make a difference? Diminishing role?

- Quantum and Tempo (timing)
- Period and cohort analysis
- Convergence between religious groups over time?
- The role of education, affiliation, country of birth (Census data)
  - *Does affiliation makes a difference when controlling for education and country of birth?*
  - *Pronatalist role of (some) religions, anti-natalist role or selectivity of being non-affiliated?*
- Developing fertility indicators based on linked and “crude” individual records from birth registry data

Background

- *Distinct demographics of Vienna, within Austria & international:* diversity, immigration, ageing (in the past), very low fertility & high childlessness (in the past)

  "*Stadt ohne Nachwuchs*?" (Weigel 2003)

- Progressive *secularisation*

Links to other research:

- *Population changes & reversals in Vienna* (Sobotka/Zeman/Winkler-Dworak and Gisser EPC 2012 (based on WIREL), Lutz & Hanika 1988, Lutz, Scherbov & Hanika 2003)
- *Geburtenbarometer Vienna*: Annual reports & analyses on fertility in Vienna (Zeman et al., VID WP 2011)
- Estimated population in Vienna by age & affiliation (WIREL / Anne Goujon)
- Other WIREL-related research

Data

Period data

- 1) Individual birth records, 1984-2012; include mother's religious affiliation (& country of birth since 2008)
- 2) Population by age & affiliation, 1971-2011
- Two types of indicators:
  - ✓ "Classic" ASFRs, TFRs etc. based on combining data 1) & 2)
  - ✓ Period parity progression ratios derived solely from 1)
- *Published vital statistics data, 1971-2012*

Cohort data: Census 1981-2001; cohorts born ca 1915-55

- Focus on affiliation, education & country of birth (2001) / citizenship (1981, 1991)
- Completed fertility, parity progression ratios by mother's denomination (+ additional dimensions)

Historical period data?

Review of WIREL – related research

1. The “big picture”: Demographic reversals in Vienna (Sobotka, Zeman, Winkler-Dworak and Gisser, EPC 2012)
2. Reconstructing period fertility by affiliation: Quantum & tempo, 1984-2011 (Zeman, Sobotka, with contribution by A. Goujon)
3. Cohort fertility: An intersection of religion, education, and country of birth (Zeman & Sobotka)
4. Estimating period parity progression ratios and other indicators from period birth records only: an exploratory study (Zeman & Sobotka)
5. Discussion, *other research considered, future plans*

Research & analyses; data issues

1. Demographic reversals in Vienna

T. Sobotka, K. Zeman, M. Winkler-Dworak and R. Gisser

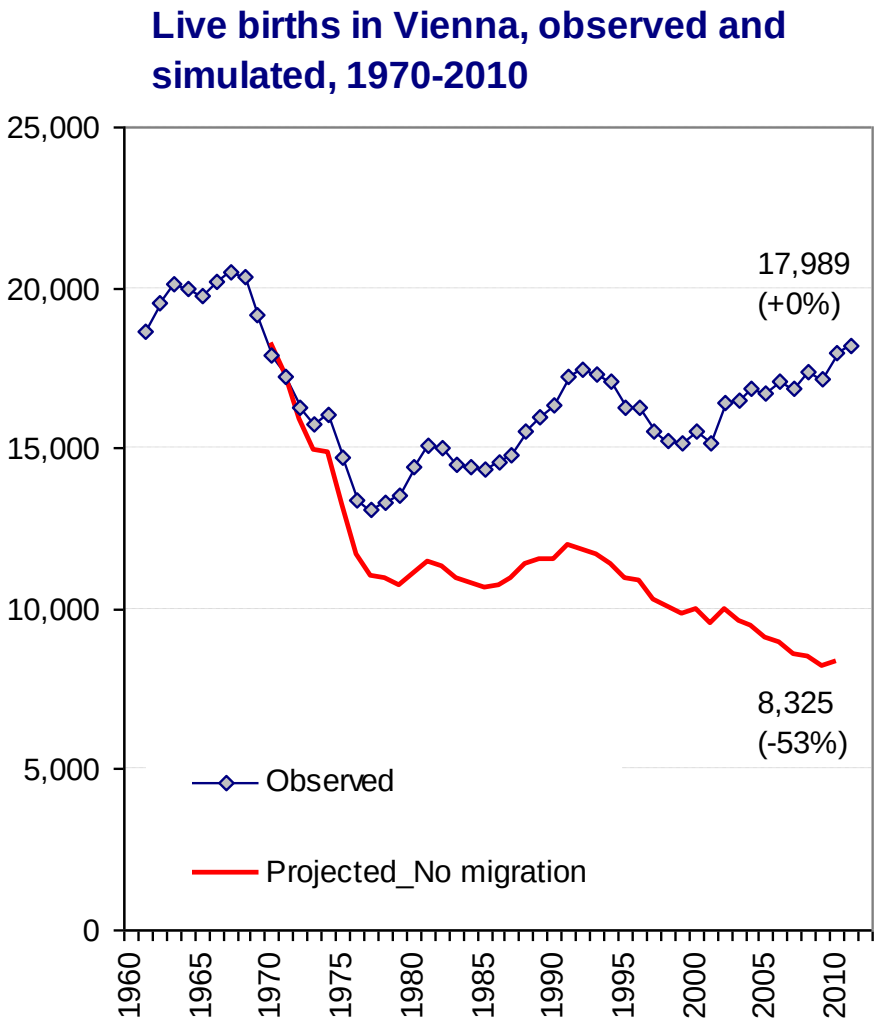
Background

The “amazing” population history of Vienna in the 20th Century

The role of migration: How would population of Vienna & its age-sex structure evolve since 1971 if Vienna had a closed population?

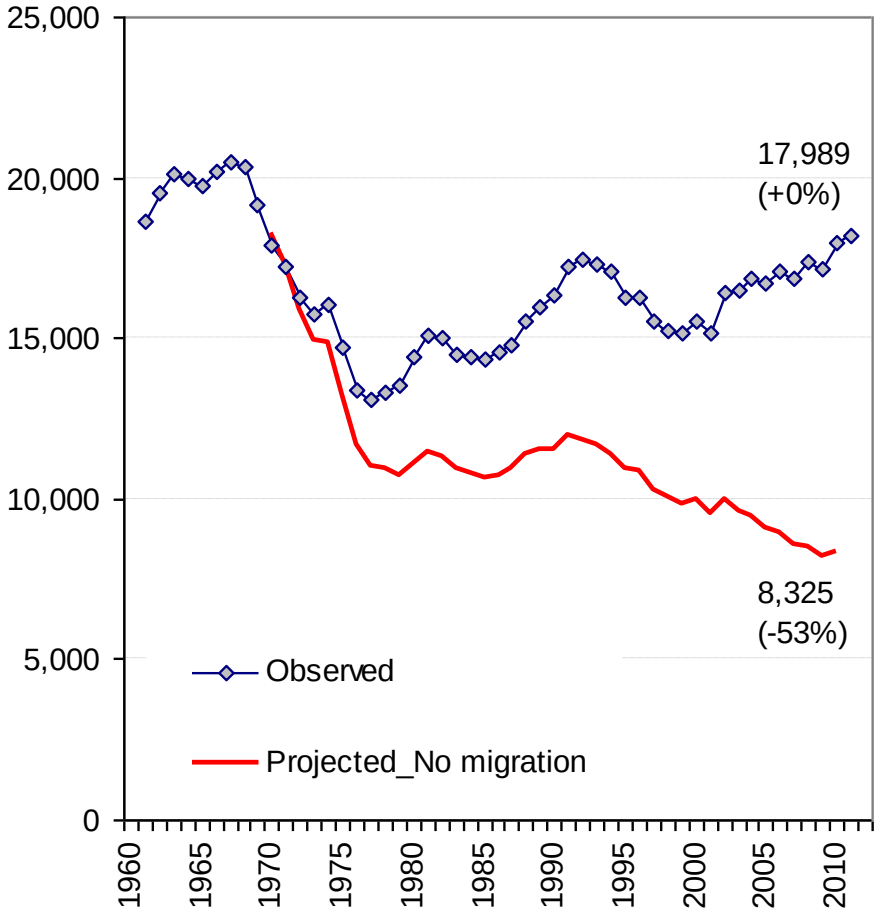
- Simple simulation exercise using starting population in 1971, observed ASFRs in Vienna and observed mortality rates by age and sex in Austria (HMD)
- Not explicitly concerned about religious affiliation / religion
- Presented at EPC 2012, short draft, detailed presentation
- Paper still to be drafted; additional analyses and revisions considered

Population trends: live births

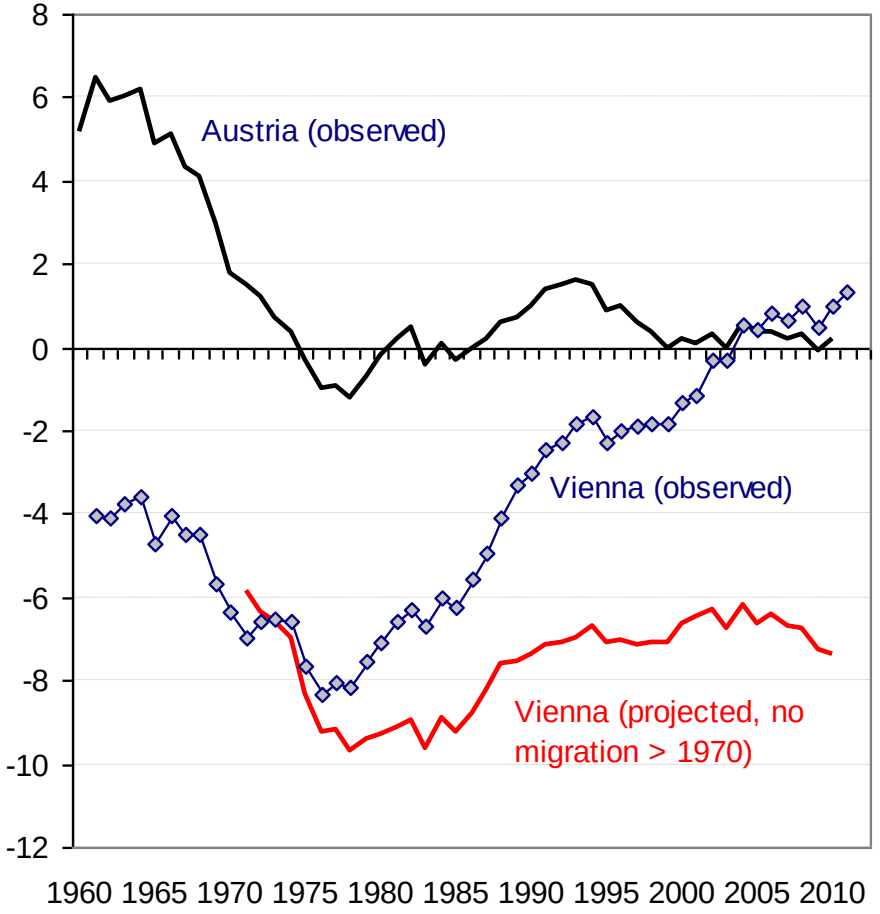


Population trends: live births, & natural population increase

Live births in Vienna, observed and simulated, 1970-2010



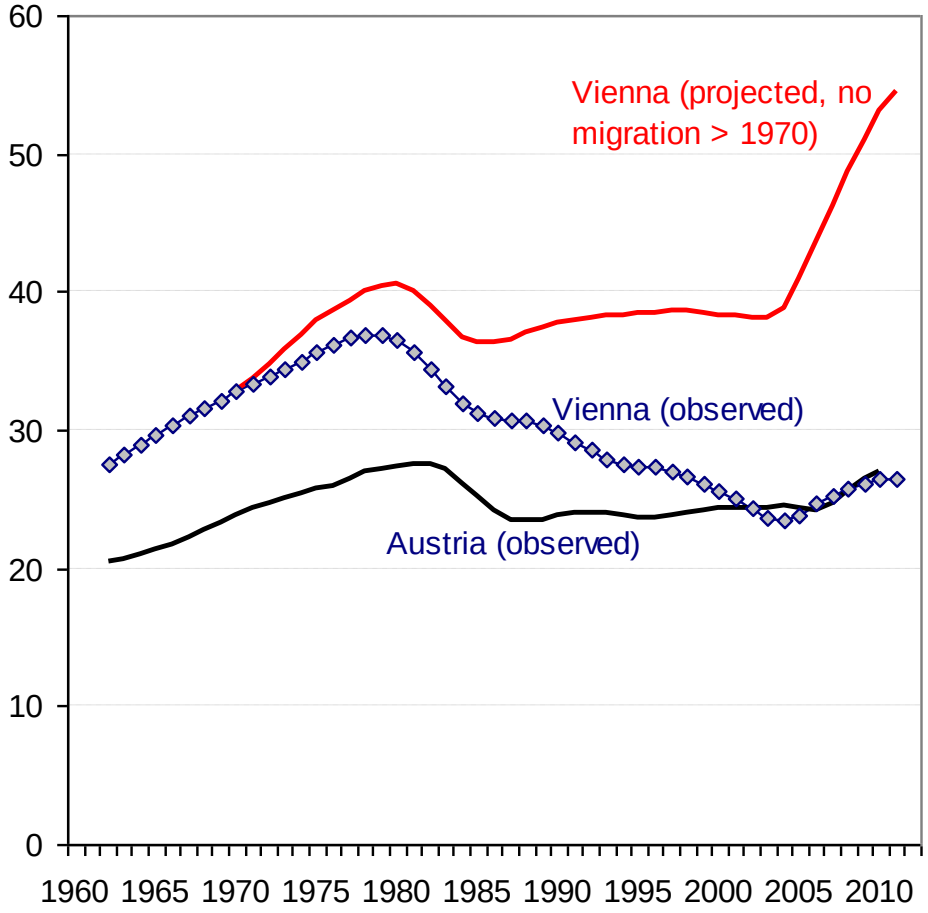
Natural population increase per thousand, observed and simulated, 1970-2010



Number of deaths stays very similar without migration

Population ageing

Old-age dependency ratio, observed and simulated, 1970-2010
(65+ / (20-64)), per 100



Trend driven by contrasting shares in population aged 65+:

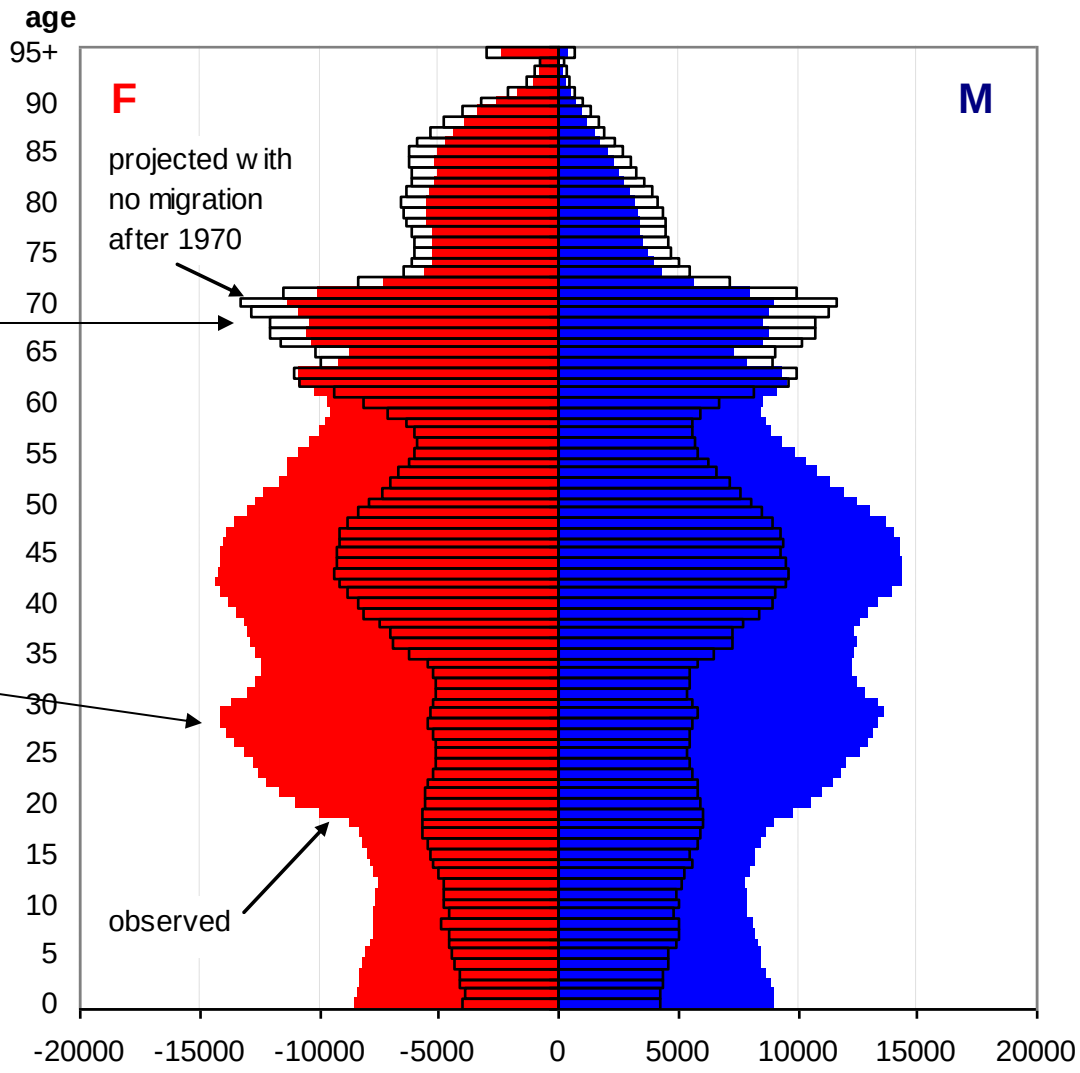
17% observed in 2010

29% projected in the absence of migration

Population „pyramid“ 2011, observed and simulated

Age 70: 15% fewer F observed than simulated

Age 30: 2.6 times more F observed than simulated



Data issues and possible extensions

- Based on relatively solid data
- Does not explicitly cover religion at present

Possible extensions & refinements

- Using mortality rates for Vienna instead of Austria
- Updating the study for 2011-2014
- Projecting the next ca. 20 years (2014-2034)
- Explicitly including religious affiliation and projecting how would it evolve after 1971 in the absence of migration?
  - Quite a complex exercise
  - Using data/estimates on affiliation, age-specific fertility by affiliation, age-specific mortality (by affiliation?), estimated conversion

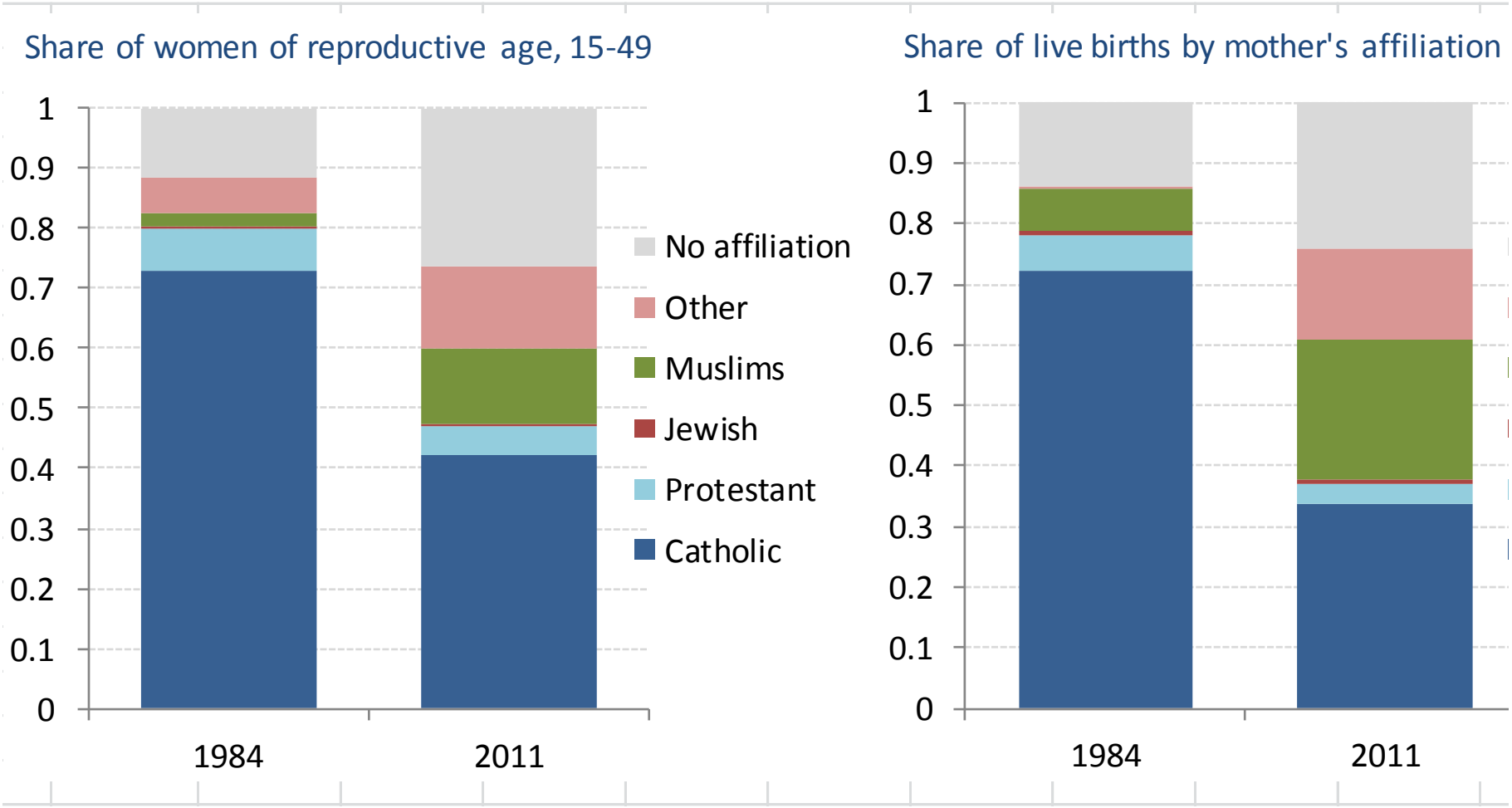
2. Reconstructing period fertility by religious affiliation, Vienna 1984-2011

K. Zeman, T. Sobotka, with contribution by A. Goujon

Background

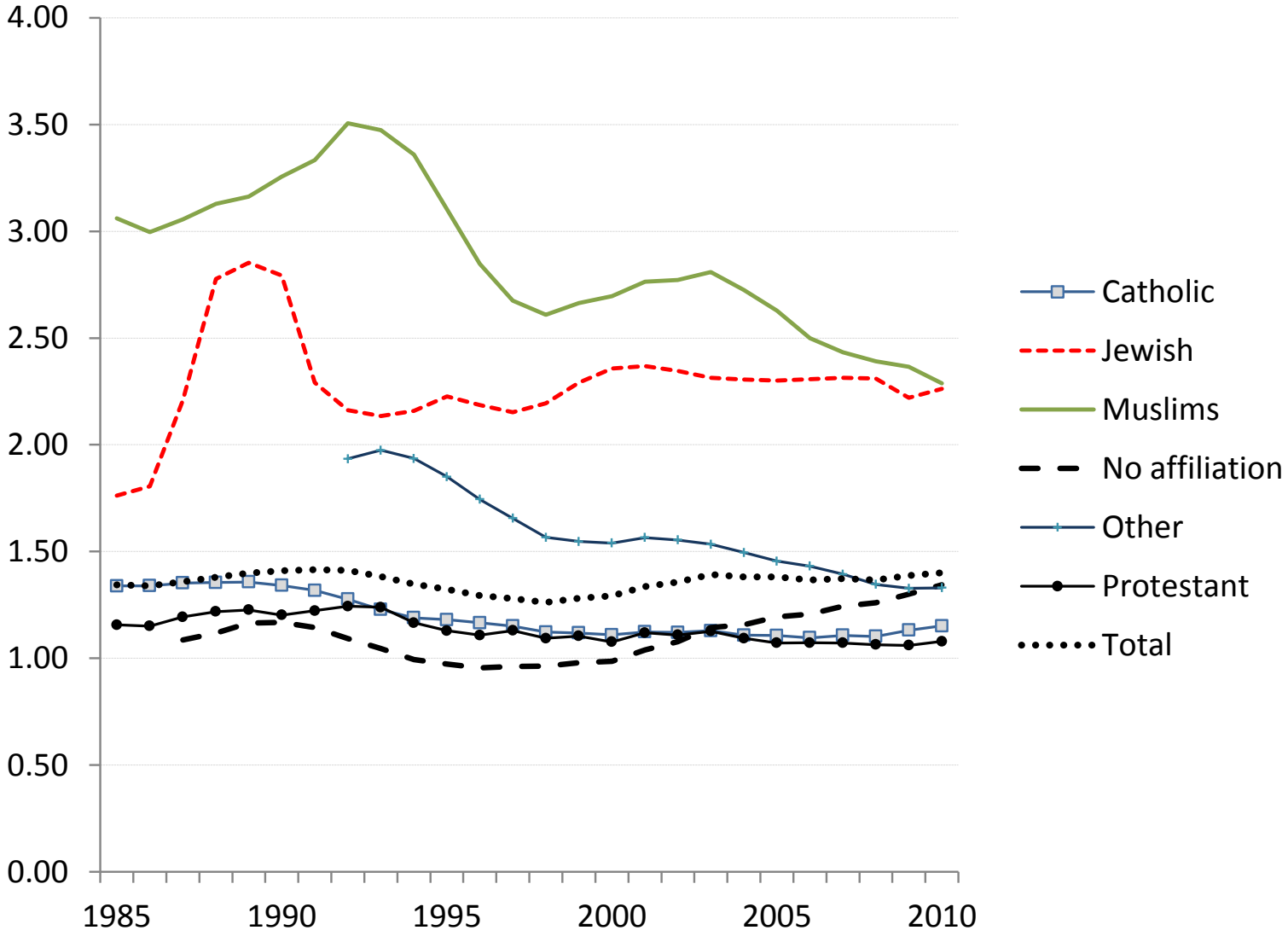
- Reconstructing period fertility by affiliation, age of mother & birth order of the child
- Making use of the estimated population by age & affiliation (A. Goujon)
- Analysing both quantum and tempo
- Limited number of religious categories to 4 religious groups (Roman Catholics, Protestants, Jews, Muslims), “Other” (incl. Christian Orthodox) and without affiliation

Changes in religious affiliation, 1984-2011: female population of reproductive age and mothers giving birth



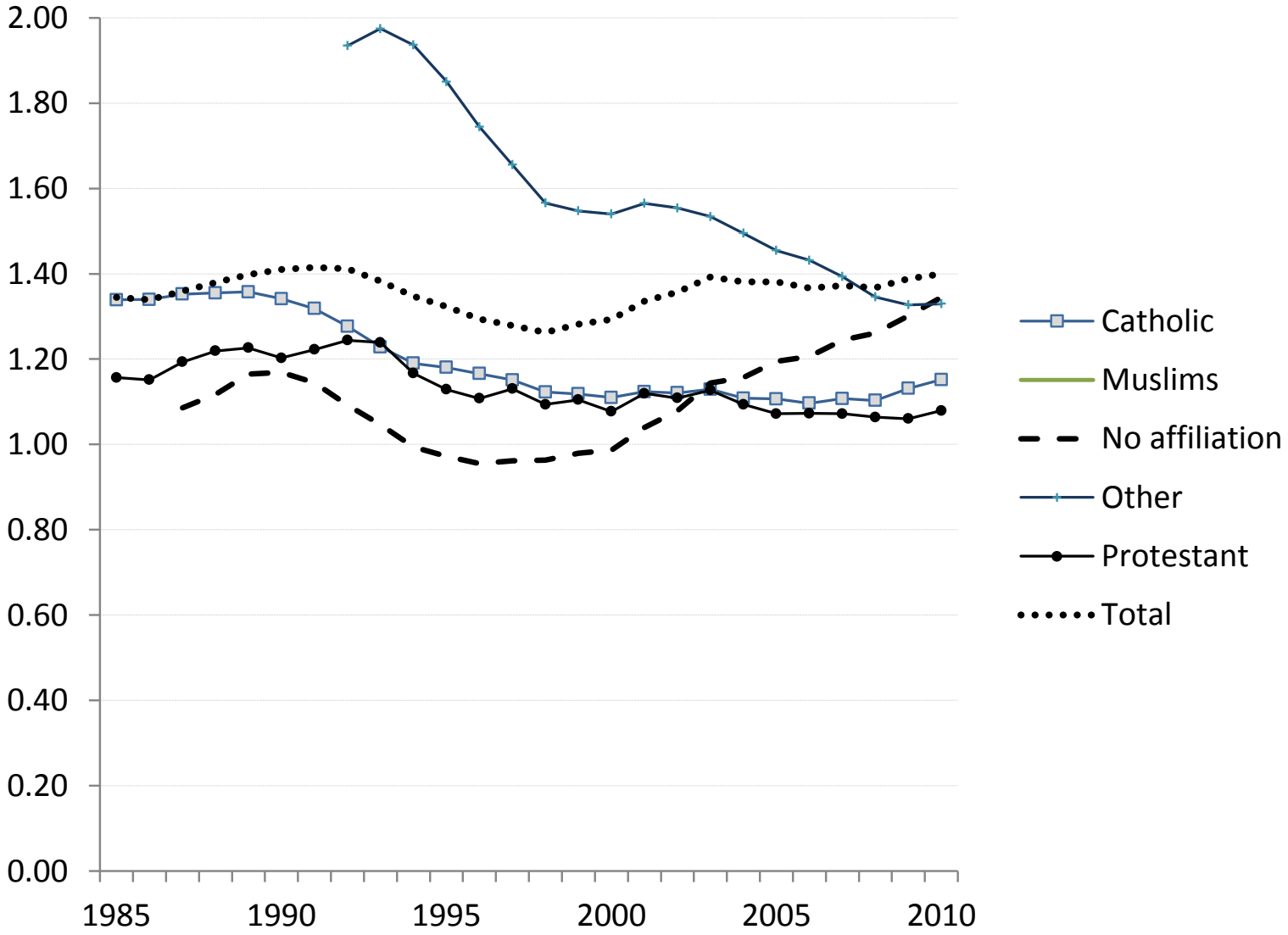
Period TFR 1985-2010

(3-yr moving averages)

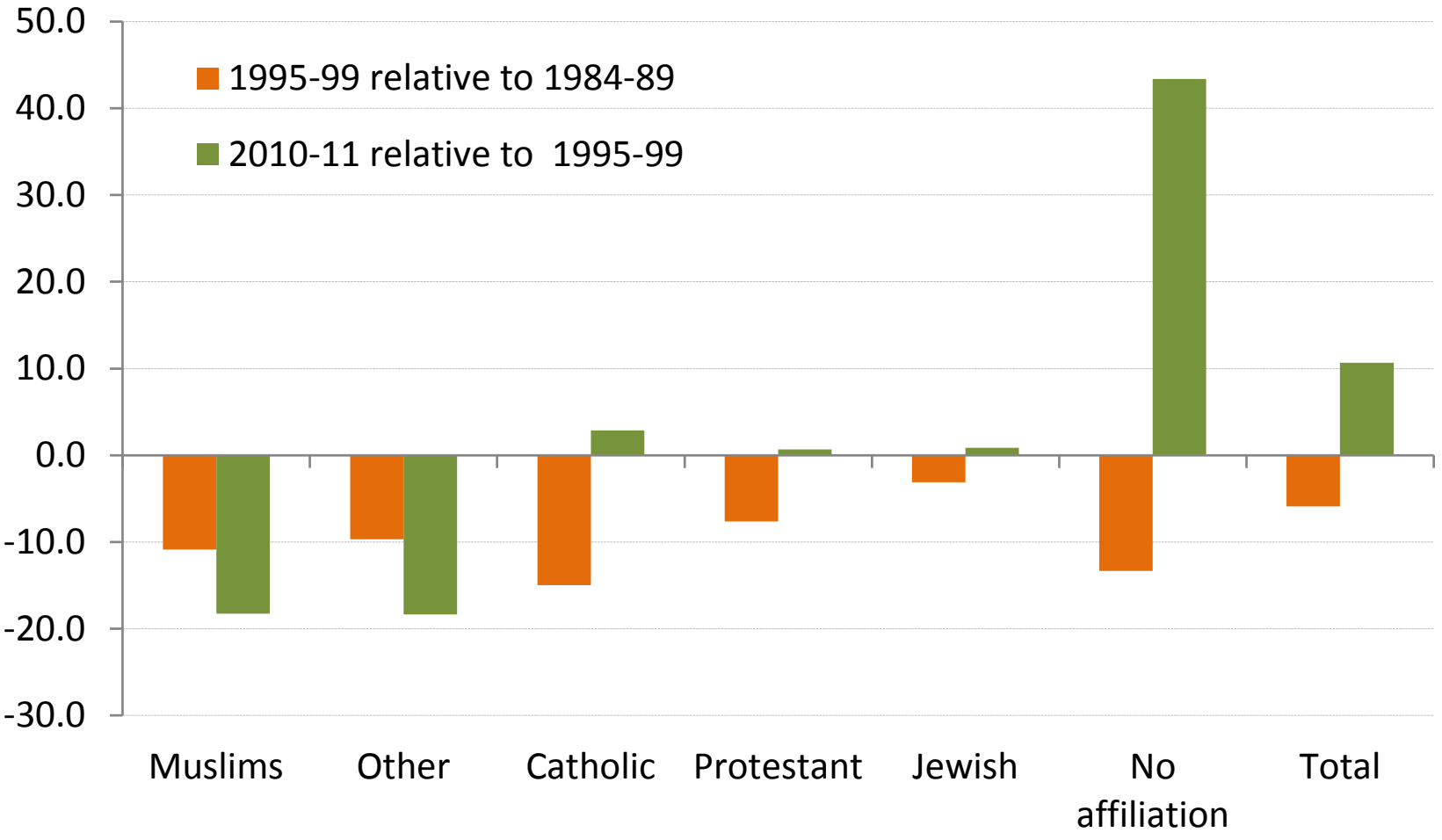


TFR 1985-2010 (focus on lower fertility groups)

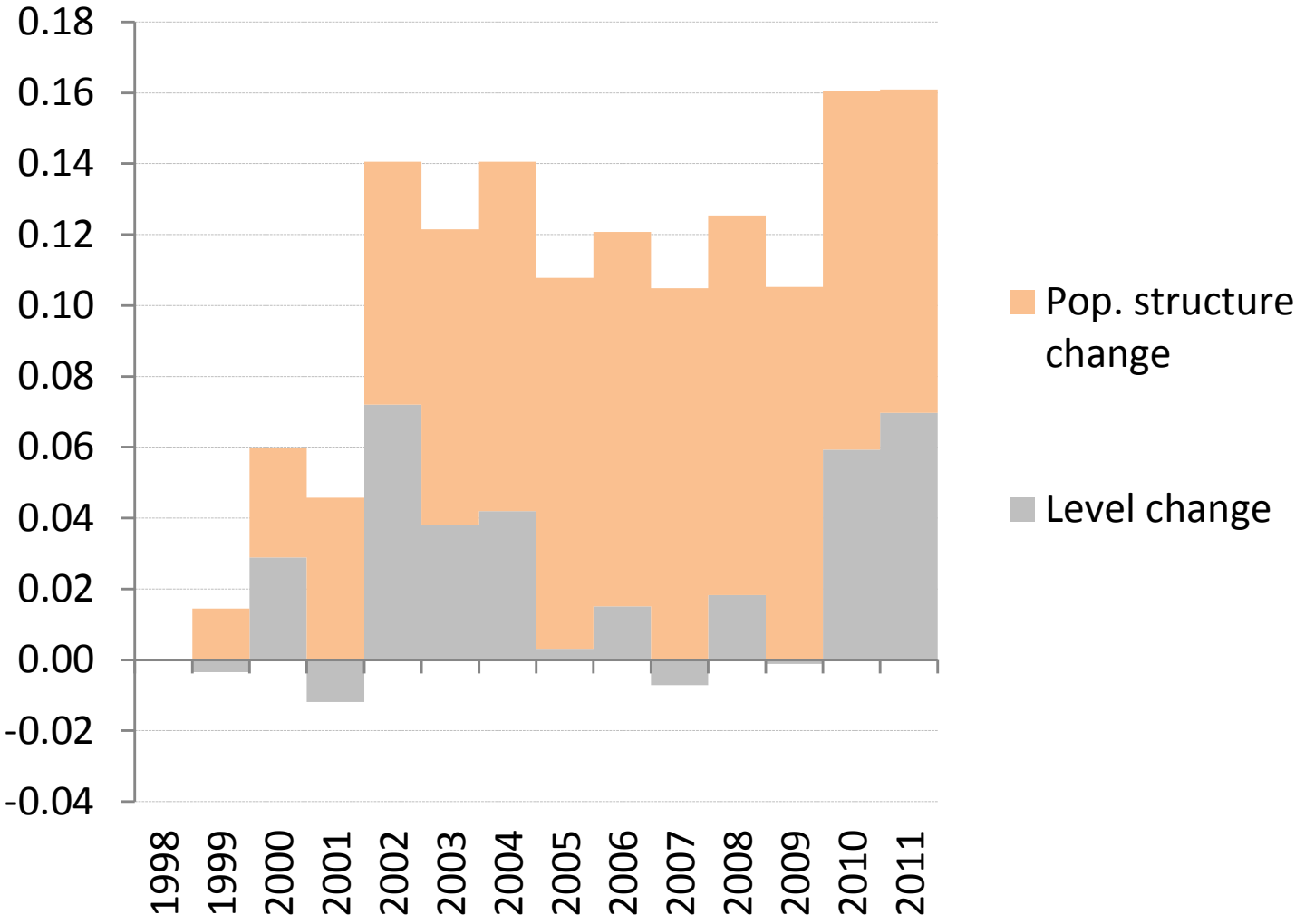
(3-yr moving averages)



Relative TFR changes in two periods

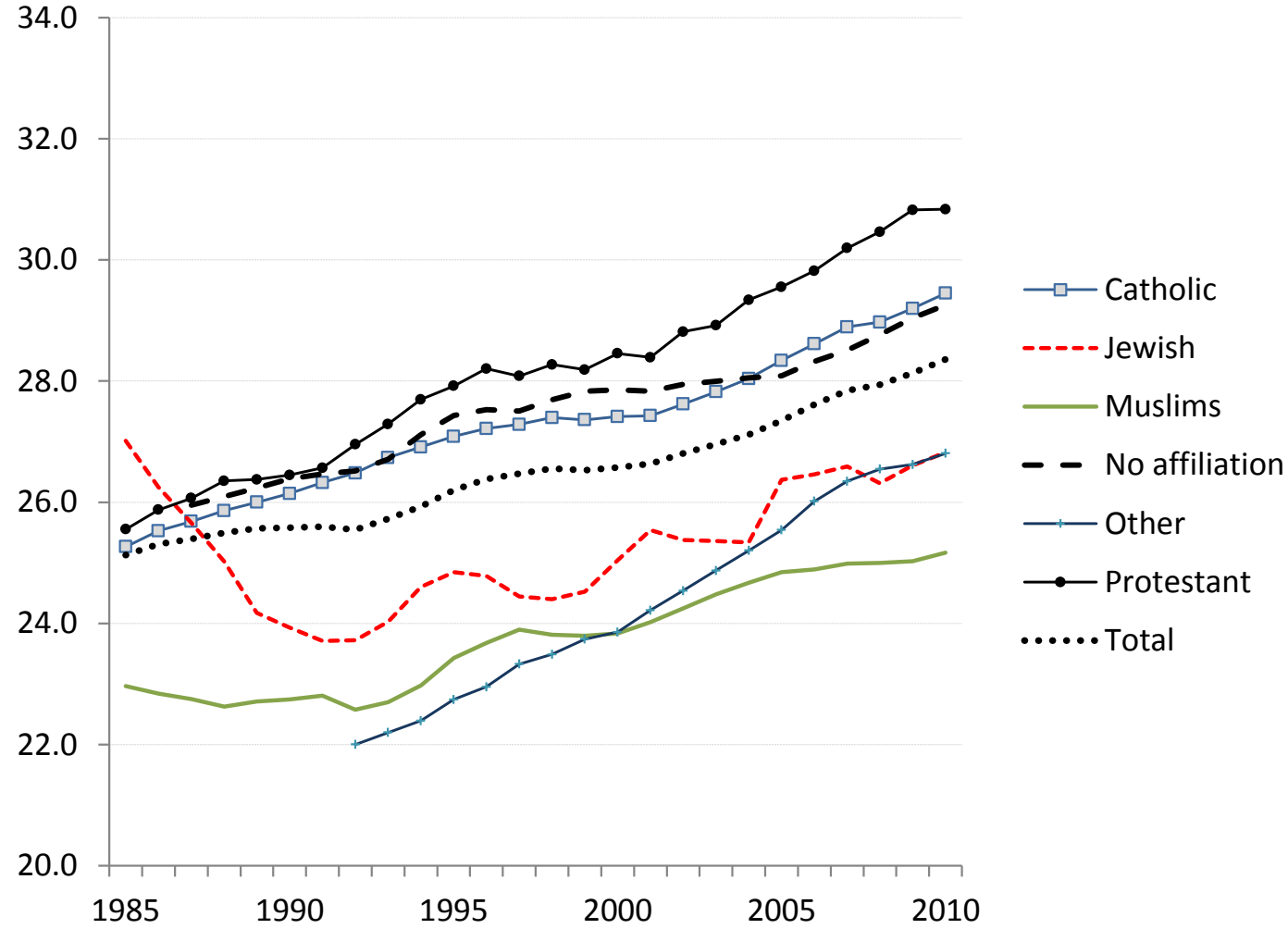


Why did the TFR rebound slightly after 1998?

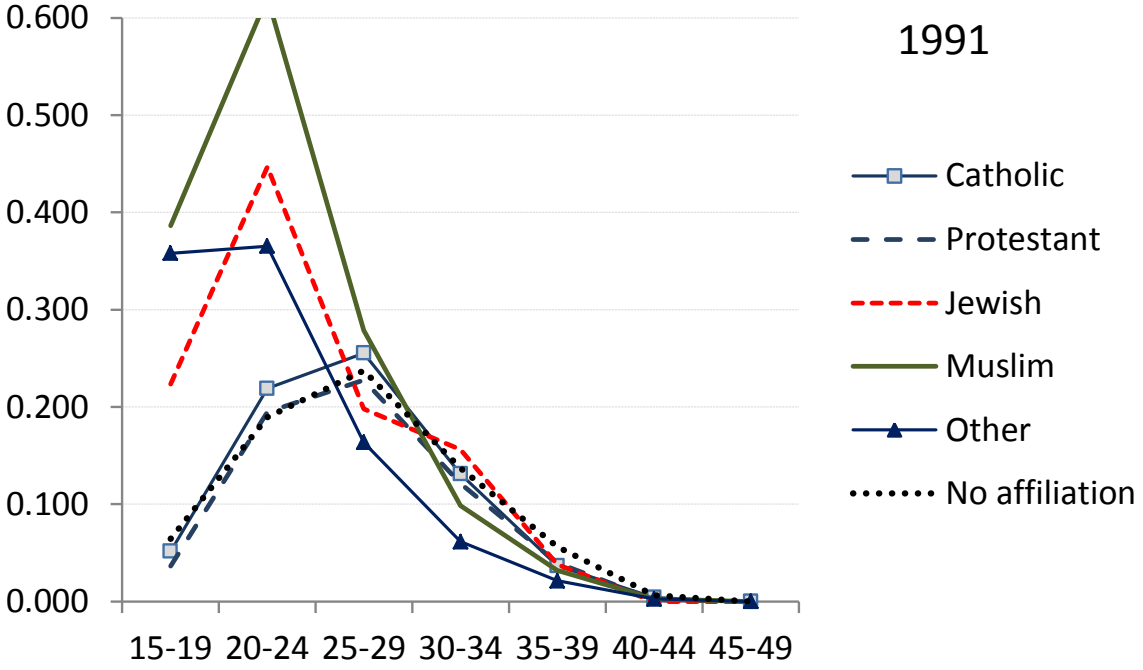


Age at family formation: Persistent contrasts

Mean age at first birth, 1985-2010 (3-yr moving averages)

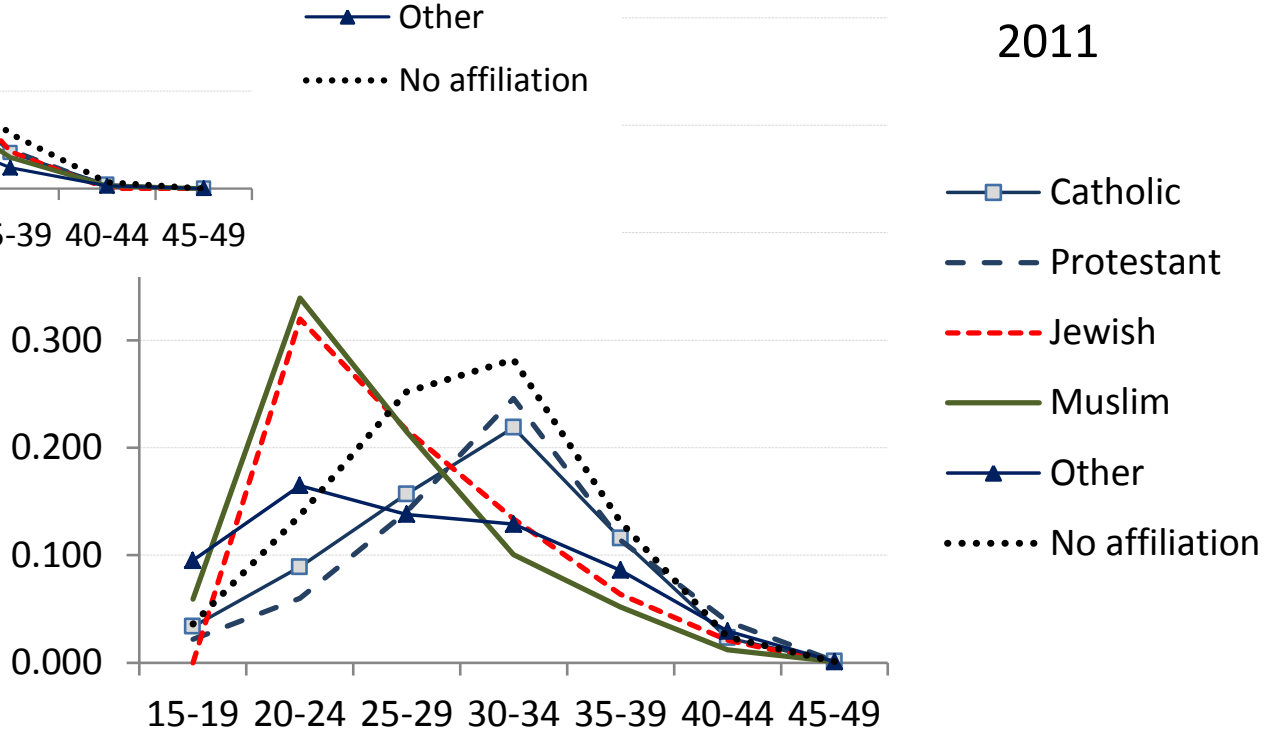


Age-specific fertility rates: first births, 1991 and 2011



Share of first birth rates < age 25 in 2011:

Protestants: 13.1%
Muslims: 51.2%



Data issues

Overall, robust results for both quantum and tempo

- Some estimates unstable, too high or low (esp. in the 1980s); data appear solid for the period >2000 (except for non-affiliated, where the recent population estimates appear too low)
- Possible mismatches between reconstructed female population by affiliation and reporting of mother's affiliation in birth records
  - *Unclear how this can be checked / verified*
- Missing data for some important categories (Christian Orthodox, but also Buddhist, Hindu)
- Data do not allow cross-combination with education, country of birth and other characteristics

3. Cohort fertility: An intersection of religion, education, and country of birth

K. Zeman & T. Sobotka

Background

- "Big data" advantage
- High level of detail & precision
- Data available also for Christian Orthodox, but not for Jews

But:

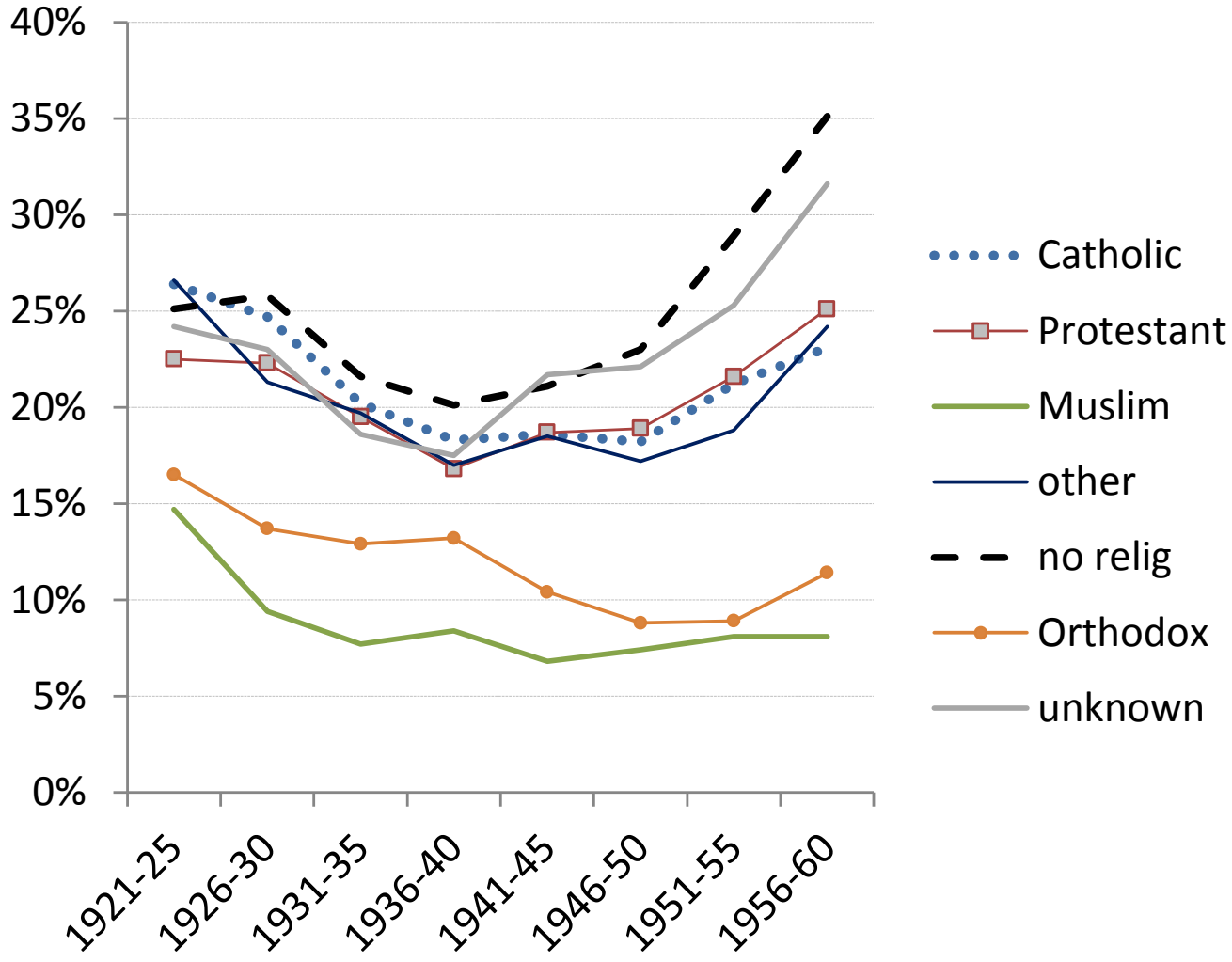
- Only cohort indicators, no timing
- No data after the 2001 Census; surveys not large enough (if they include any indicator of religious affiliation or practice)
- 2001 Census contains relatively few women of migrant origin & born in AT

Analyses: Simple descriptive & binominal model

Key categories of interest:

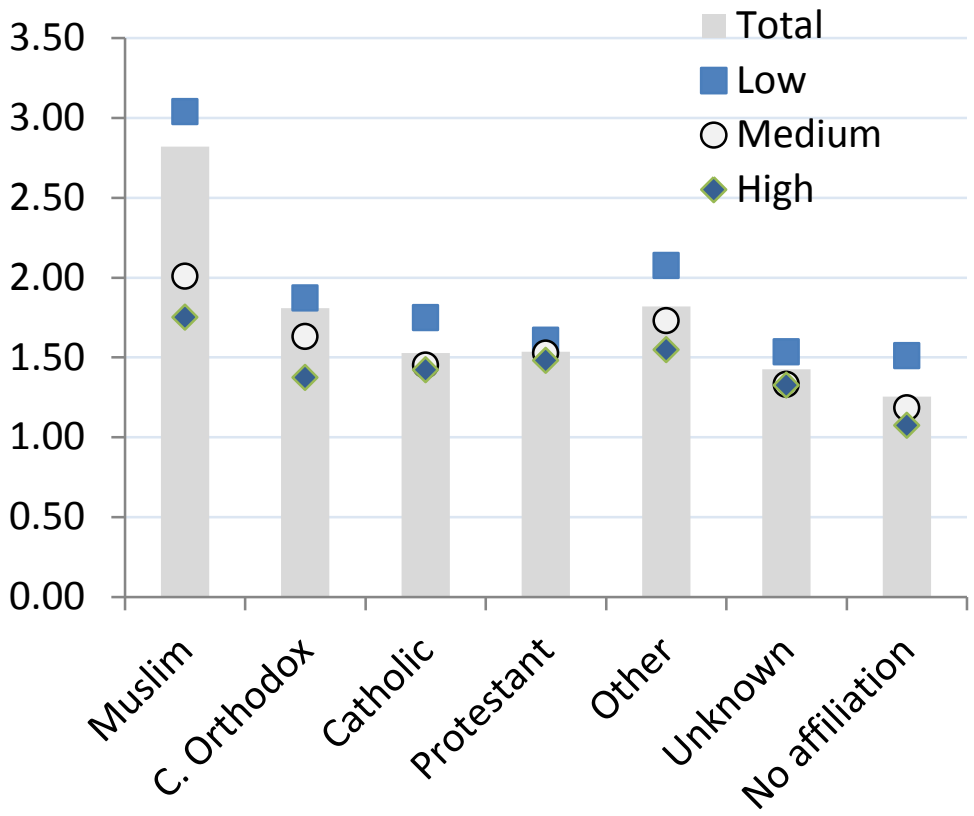
- **Cohort/age:** (most data analysed for women aged 45-54 in 2001, born around 1950)
- **Religious affiliation**: 4 categories, other, unknown, not affiliated
- **Education**: ISCED, 3 categories: Low (ISCED 012), Medium (ISCED 3), High (ISCED 456)
- **Country of birth**: Born in Austria vs. born abroad

Long-term trends: Huge contrasts in childlessness by affiliation



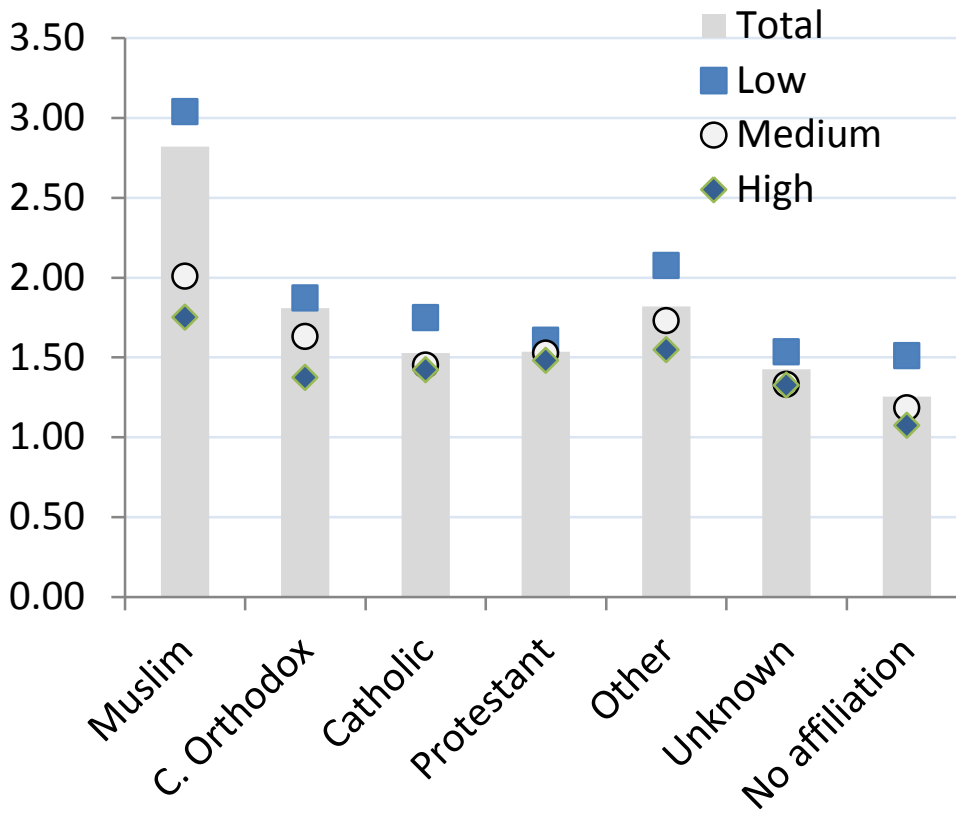
Source: Census 2001 (Statistics Austria 2006)

F aged 45-55 in 2001: education gradient in completed family size and childlessness

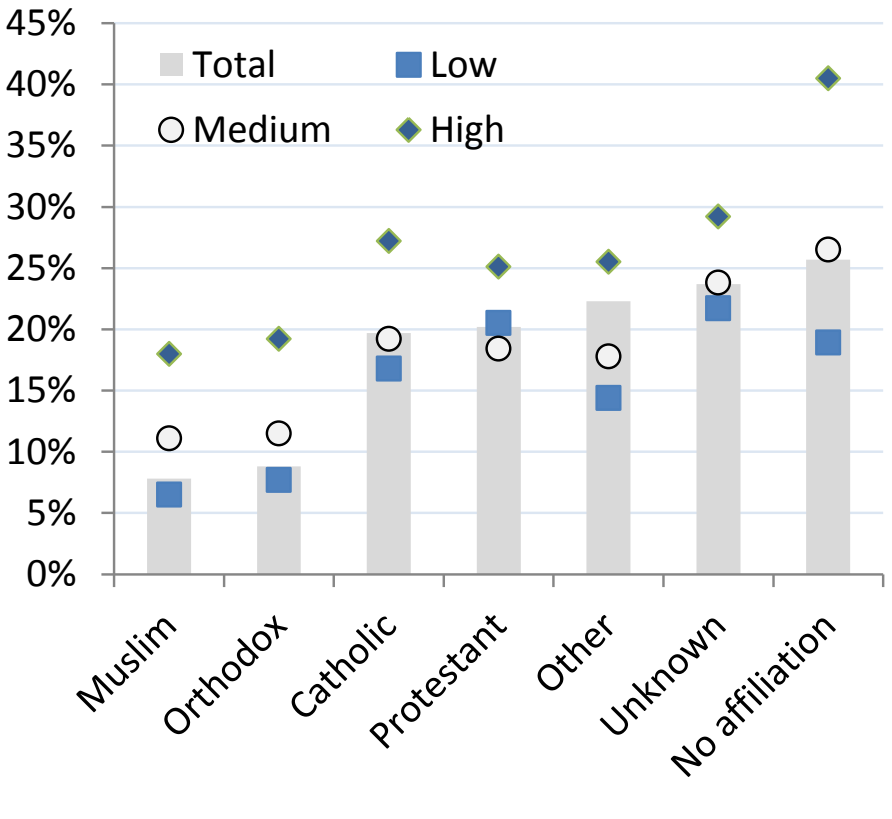


Completed fertility

F aged 45-55 in 2001: education gradient in completed family size and childlessness

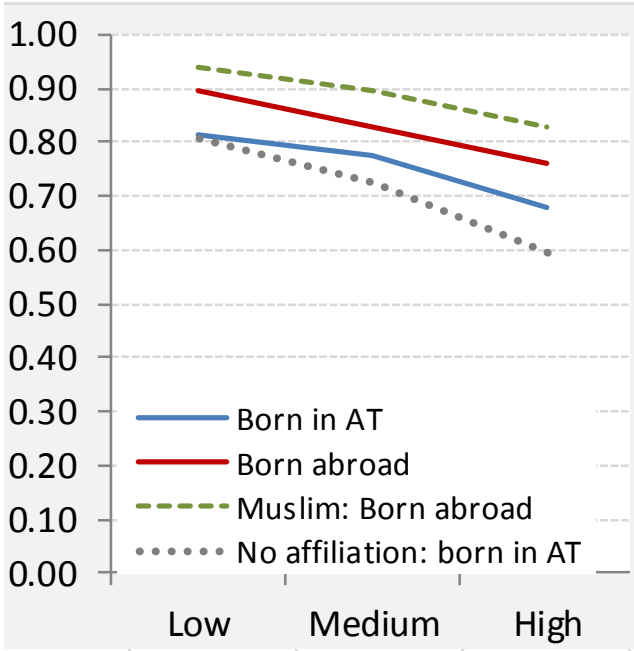


Completed fertility

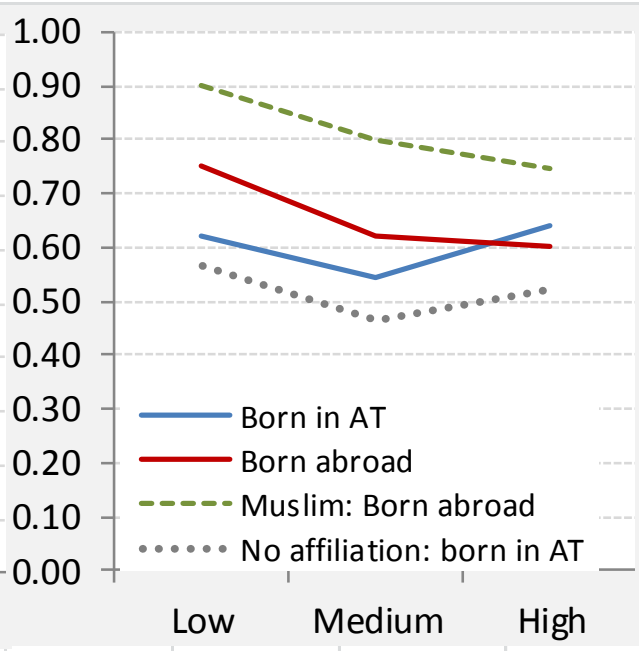


Childlessness

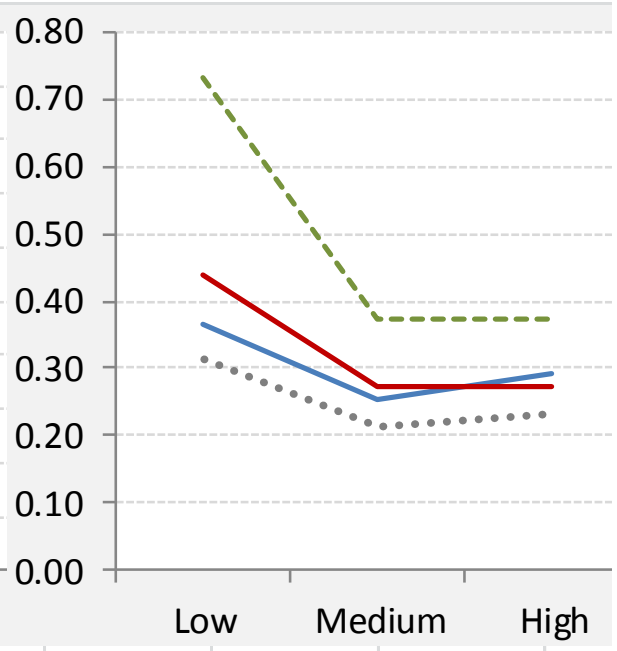
Both education and country of birth matter



First birth rate (PPR0,1)



Second birth rate (PPR1,2)



Third birth rate (PPR2,3)

Multilevel binomial model of parity progression ratios (first, second, third births)

- Based on 2001 Census, Vienna, women aged 45-54
- Additional analysis using CART model in R (Classification and Regression Trees)

First births (PPR0,1)

	LM1	LM2	LM3
Intercept	0.80	0.84	0.83
Catholic	1	1	1
Muslim	1.15***	1.11***	1.06*
No religion	0.92***	0.92***	0.92***
Orthodox	1.13***	1.10***	1.05*
Other	1.02	1.02	1.00
Protestant	0.99	1.00	1.00
Unknown	0.95*	0.94*	0.93**
Low Education		1	1
Medium education		0.95***	0.96***
High education		0.85***	0.85***
Mother born in Austria			1
Born outside Austria			1.06***

Controlling for education & country of birth reduces the positive effect

Strong effect education, country of birth

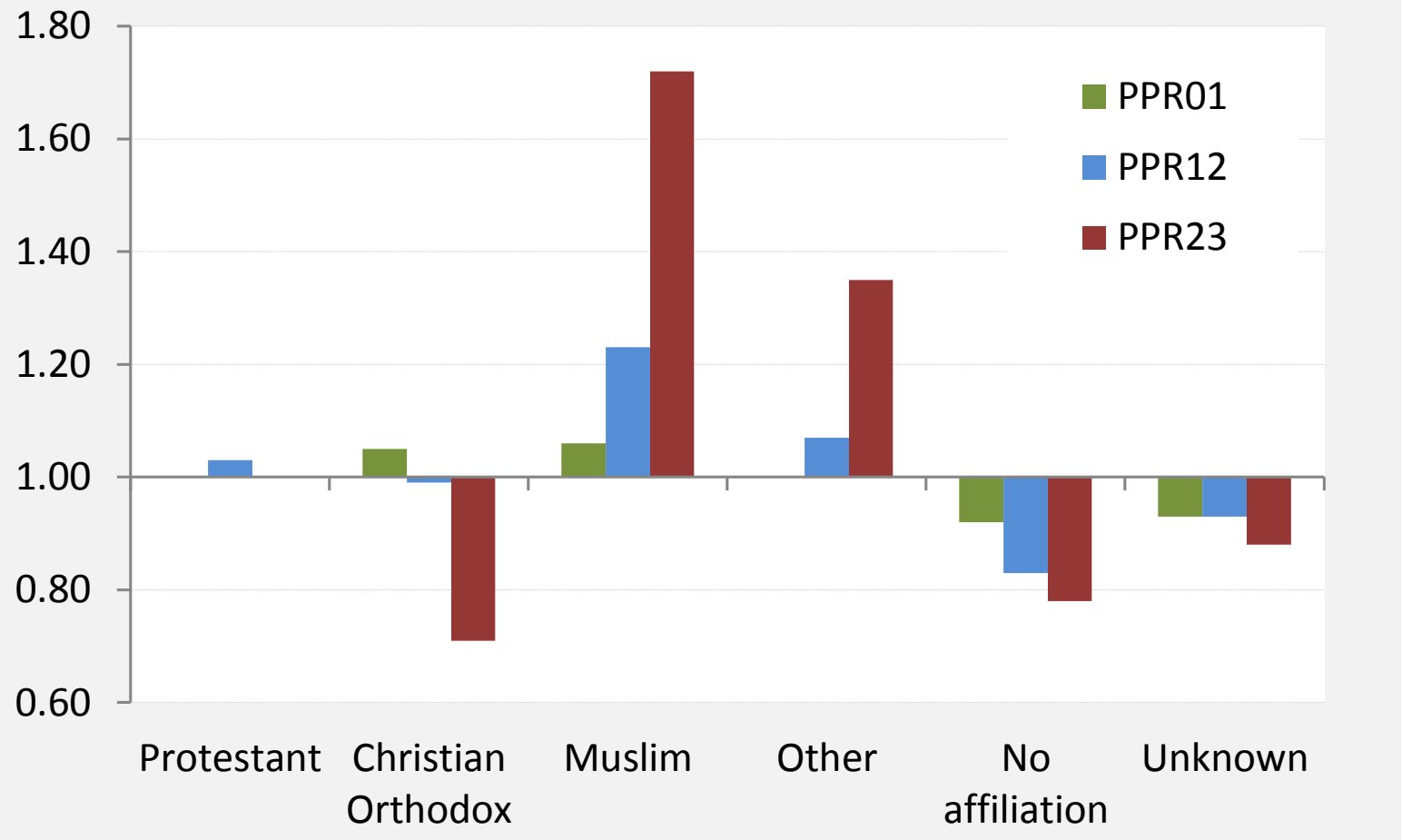
Summary: education, country of birth (based on M3)

	PPR01	PPR12	PPR23
Country of birth			
Born in Austria = 1			
Born abroad	1.06***	1.09***	1.03
Education			
Low education = 1			
Medium education	0.96***	0.87***	0.68***
High education	0.85***	0.96*	0.74***

Inverted J pattern

Summary: religious affiliation (based on M3)

Parity progression ratios (first, second and third birth) by religion, relative to Catholics; controlling for education & country of birth



Comparing 1981 vs. 2001 results

Women aged 45-54

1981: cohorts born around 1930; 2001: cohorts born around 1950

1981: citizenship, not country of birth

- Education yet more important in the 1981 census, as compared with religion
- Broader relative differences between educational groups
- Exceptionally low fertility of women with no affiliation (and unknown)
- Relative fertility of Muslims women was yet considerably higher (but small population size)

4. Estimating period indicators from birth records: An exploration

K. Zeman & T. Sobotka

Background, ideas

Making use of individual birth records 1984-2012 which contain mother's characteristics, including her date of birth, date of giving previous birth, birth order of the child, federal country, marital status, education, country of birth and religious affiliation.

- *Linking first and subsequent births*
- *Analyses of tempo (duration/birth intervals) and quantum (parity progression ratios)*

Two types of analyses:

- Linked records based on key matching criteria of the mother and her children (date of birth, date of giving previous birth, education)
- "Unlinked" analyses based on relating the number of second (third) births at time *t* and interval *d* to the number of first (second) births at *t-d*.

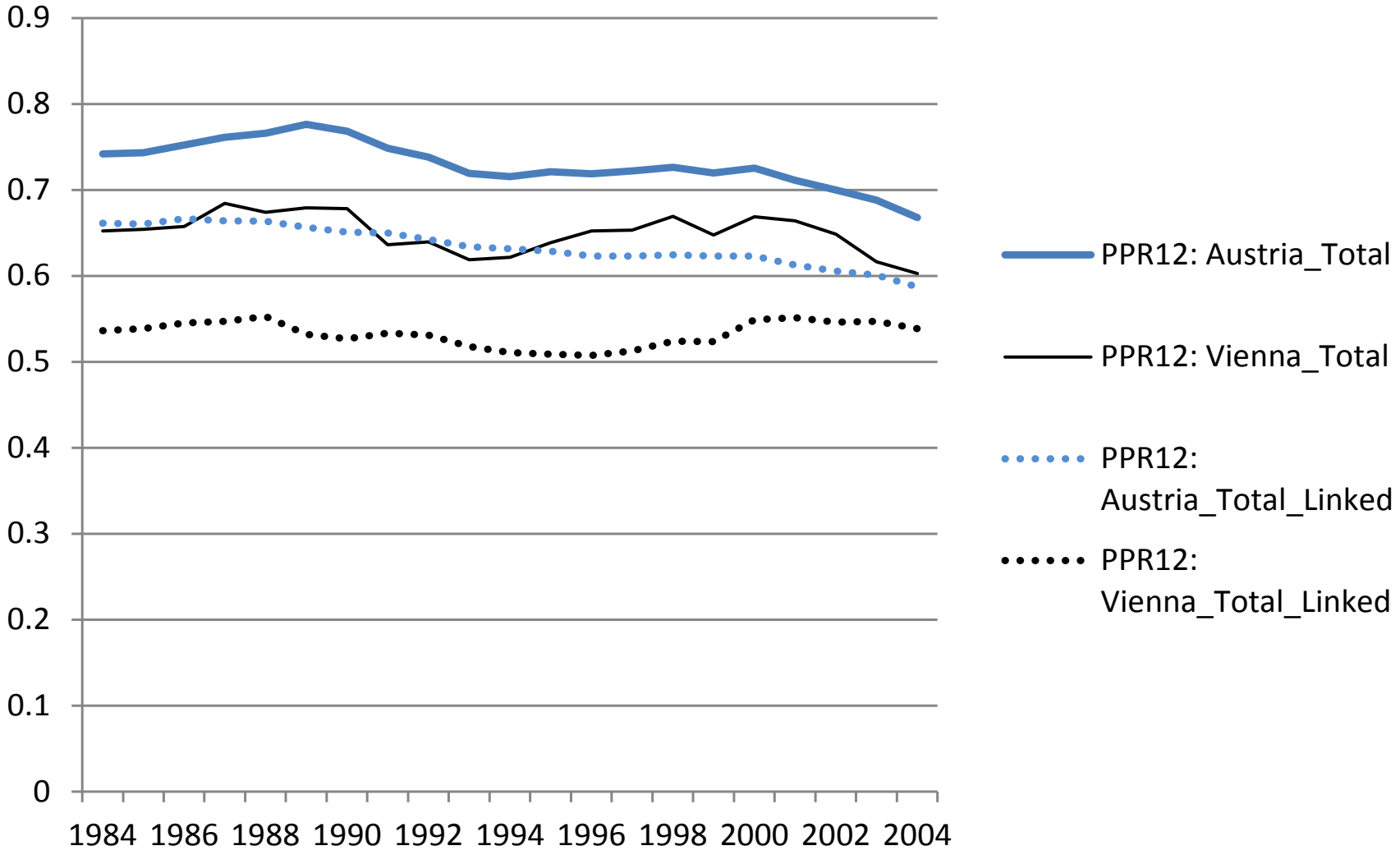
Background, ideas

Linked data more precise, but also sensitive to migration (missing records on previous or subsequent births) and errors or changes in education status, religious affiliation…

Testing the idea, exploratory analyses

- Also motivated by the inability to compute conventional indicators (earlier absence of data on population by age & affiliation)

Linked vs. “unlinked” data: estimating parity progression ratios (second birth rate in Vienna & Austria)



Data issues & obstacles

Why so much lower fertility with the linked data?

- Losing out-migrants (especially international; those leaving Vienna for another AT province can be retained)
- Filtering away in-migrants who had given previous birth abroad
- Changing or erroneous matching characteristics
- The results particularly poor (underestimation) & unstable for women born abroad
- Relatively good replication of religious differentials in fertility for Austrian-born (based on a comparison with the 2001 Census)

Linked data: Estimated mismatches, changes in categories

	Austria	Vienna
Religious affiliation		
The same	96.4	93.6
Any -> no or unknown	1.8	3.4
No or unknown -> Any	1.2	2.1
Change in affiliation	0.7	0.9
Education attainment		
The same	79.2	67.3
Increased	9.5	12.1
Decreased	7.1	8.9
Known -> Unknown	2.5	6.5
Unknown -> known	1.6	5.2

Can we still make use of this type of analysis?

5. Discussion

Key findings

Affiliation seems to matter: independent strong effect on fertility for some groups

- Differences especially for first and third birth rates
- Most distinct groups (both tempo & quantum): Muslims, Jews (but small minority) vs. non-affiliated
- Over time, some convergence in quantum, persistent contrasts in timing of first births
- Stabilization or increase in fertility in the least-fertile groups > 2000
- Unclear trends among non-affiliated: *a vigorous upturn*?

Additional topics and issues considered

Possible expansions

Exploring historical data

- Reconstructing long-term trends in cohort fertility, parity distributions (Census 1981, 91, 1971?)
- Basic period data: live birth rates, age-specific fertility based on historical yearbooks and other publications?

Contrasting results for Vienna with the data for the rest of Austria

Smaller-area studies? Links to other research within Wirel?

Exploring more on country of birth (data on specific countries, not just all other countries combined)

Additional an. with linked & unlinked birth records? More dimensions?

Interpreting the findings: why some religions distinct? What is it about some religions that make them "pronatalist" in effect? Or is the link spurious?

- *Help by Caroline, Michaela and others greatly appreciated!*

Planned dissemination: two papers