Reconstructing the Past Using Multistate Population Projections: The Example of Religious Denominations in the City of Vienna from 1971 to 2011

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Extended Abstract

<u>Background</u>

The article is based on the WIREL[1] project (WI for Wien (Vienna) and REL for religion) addressing the role of religions in shaping the social and demographic structure of the population of Vienna. Secularisation and international migration have been the main factors shaping Vienna's changing religious landscape. Only a century ago, Vienna was one of the most populous cities of the world. Today, the Austrian capital is nowhere near the top in global urban population rankings; however it is still the third largest German-speaking city. After centuries of almost continuous growth, the population of Vienna peaked in the early 1900s, followed by nearly a century of decline and stagnation. Not until the late 1980s, Vienna's population numbers started to rise again and recently increasing growth rates made Vienna one of the strongest growing European cities during the first decade of the 21st century.

In 1971, more than a quarter of the population (27.7 %) were above age 60, and two thirds of them were women (Lutz and Hanika 1989). During the 1990s, international migration had become the undisputed driver of Vienna's regained population growth. The 2001 census count for Vienna was 1.55 million and thus significantly above the 1988 projections. As a result of the persistent inflow of international immigrants and - for the first time since nearly a century - natural increases, Vienna reached a population of 1.71 million in 2011. In only ten years, the population increased by more than ten per cent – a growth rate that was not achieved in nearly a century. Beyond that, the accelerated globalisation established new migration regimes and further diversified the geographic origins of the new immigrants and, hence, also stimulated the ethnical, cultural and religious heterogeneity of today's population of Vienna.

In 1951, the religious landscape of Vienna was characterised by the dominance of the Roman Catholic Church. About 82% of the population were Catholics and, adding the 8% Protestants as well as a few members of Eastern Orthodox Churches, more than 90% of Vienna's population was Christian by denomination. The rest of the population split up between 2% with other religions – including a small Jewish community that survived the *Shoa* and stayed in Vienna, the former third largest Jewish city in Europe where more than 10% of the total population were Jews in 1923 (Lappin 1996) - and a considerable share of up to 8% without any religious denomination. This distribution remained rather stable over course of the 1950s and 1960s, although Catholics lost a few percentage points, while the share of secular people with no religious denomination increased slightly. Besides those rather small shifts – the share of Orthodox (included in "other" in Figure 1) and Muslims slightly increased and a Muslim community re-emerged since the arrival of the first *Gastarbeiter* from Yugoslavia and Turkey in the late 1950s. The 1971 census clearly revealed that Vienna was still a largely Catholic city: almost four out of five professed to be Roman Catholic.

Between the 1971 and the 2001 census – when the religious denomination was surveyed for the last time – the previously rather homogeneous religious landscape of Vienna became considerably more

diverse. By 2001, Catholics became a minority in Vienna (49.2%), while the secularised population without any religious denomination strongly increased (from 10.5% in 1971 to 29.5%) and is about to become the strongest group. Like the Catholics, also the share of Protestants decreased by more than a third during the last three decades of the 20th century (from 6.9% to 4.7%). Besides those major shifts, the share of Muslims increased from less than a half per cent in 1971 (0.4%) to nearly eight per cent (7.8%) and, hence, already outnumbered the city's Orthodox population (6%). All in all, the 2001 census distinguished between 47 different religious denominations, including some established religions like Jews and Old Catholics (around 0.45% each) and many previously unseen or unrepresented religions like Buddhism (0.3%), Hinduism and Sikhism (both together 0.27%) and also Mormonism and Baha'ism (both below 0.1%) among others. At the turn of the millennium, Vienna had truly become a city of religious diversity.

Aim and Method

The study describes the procedure to reconstruct the single year population in single year steps using multistate population projections, making use of the wealth of information on religious denominations available through censuses on the city of Vienna in Austria: population by age (5-year age groups), sex, and religious denomination every ten year from 1971 to 2011, absolute numbers of Church 'leavers', births by woman's religion). Estimates are produced for the different parameters: splitting 5-year age-groups into single year, estimating migration by religion, and defining age-schedules of most events i.e. fertility and migration. We do not assume any mortality differentials by religious denominations. The methodology proceeds by iteration using multistate projections and allows reconstructing the detailed landscape of the religious denominations in the last 40 years together with the main determinants of change in terms of migration and fertility. The method can be extended to other historical reconstruction with partial data.

We consider the population divided according to six religious denominations: Roman Catholic, Protestant, Jewish, Orthodox, Muslim, Other denominations and a category of those who report having no religious affiliation.

The reconstruction follows the steps described roughly below:

Step 1: Disaggregate the Vienna Census Population for census years 1971, 1981, 1991, 2001 for each religion and sex separately from 5-year age groups into single year age groups.

Step 2: Disaggregate the "Other religions" into the required categories. For instance in 1971, the "Other religion" category includes the Jewish denomination, the Orthodox and other "Others"; in 1981 and 1991, it includes the Orthodox and the other "Others". Only in 2001 are all the religious categories represented. The disaggregation is based on data on the country of origin from the census (for the Orthodox population) and on the archive of the ity of Vienna for the population with the Jewish denomination.

Step 3: Calculate the TFR by religion and year between 1971 and 2001 using the number of births by mothers' religion and exposure based on interpolation between censuses. Derive the ASFR based on the data for Austria from the Human Fertility Database

Step 4: Take the age specific mortality rates from the Human Mortality Database. We consider no differentials by religious denominations and apply the rates calculated for Austria to Vienna.

Step 5: Based on number of entrants and exists from and to the two religious denominations Roman Catholics and Protestants (available yearly, by sex) and by age until 1982, estimate an age schedule of secularization.

Step 6: Run a first set of projections without migration in three year steps (1971-1974, 1974-1977, 1977-1980, …) from 1971 to 1981. At each step, based on the exposure, calculate the transition probabilities from Roman Catholics and Protestants to the "no religion" group.

Step 7: Run a second set of projections including the secularization rates up to 1981.

Step 8: By comparing the downscaled 1981 population by single year and the 1981 projected population, estimate the net number of migrants overall and its share between religious categories

Step 9: Run a third set of projections including the migration rates in three year steps up to 1981

[Repeat those steps from 1981 to 1991 and from 1991 up to 2001]

From 2001 to 2011: Use multistate projections based on the available data on fertility, migrants by country of birth (random migrant hypothesis), secularization rates and other indicators available.

The 2011 data will serve as a base for the projections of the religious landscape of Vienna until mid-century.

Figure1: Population pyramid by religious denominations of Vienna, 1971 (Authors' calculations based on reconstruction from several data source)
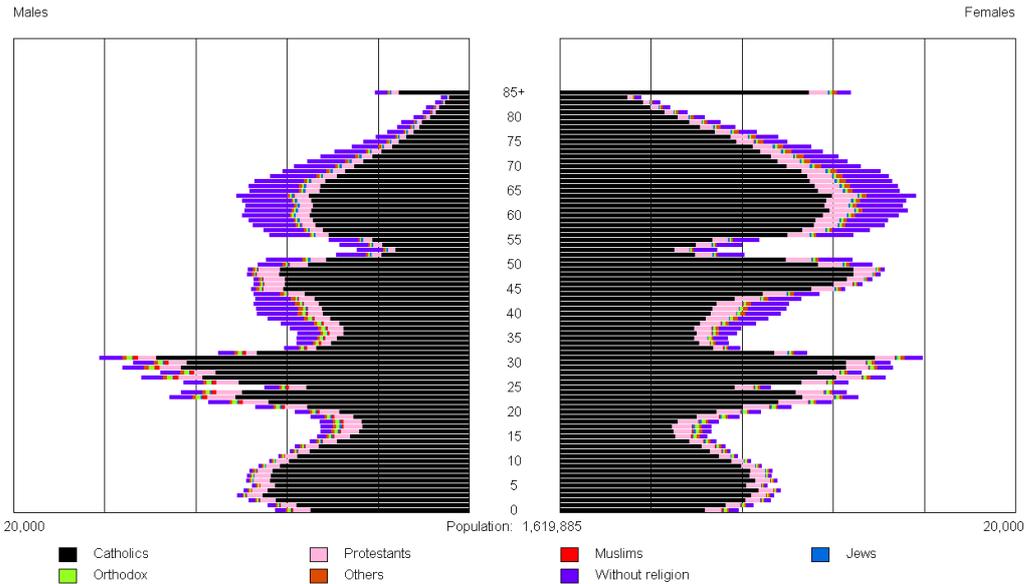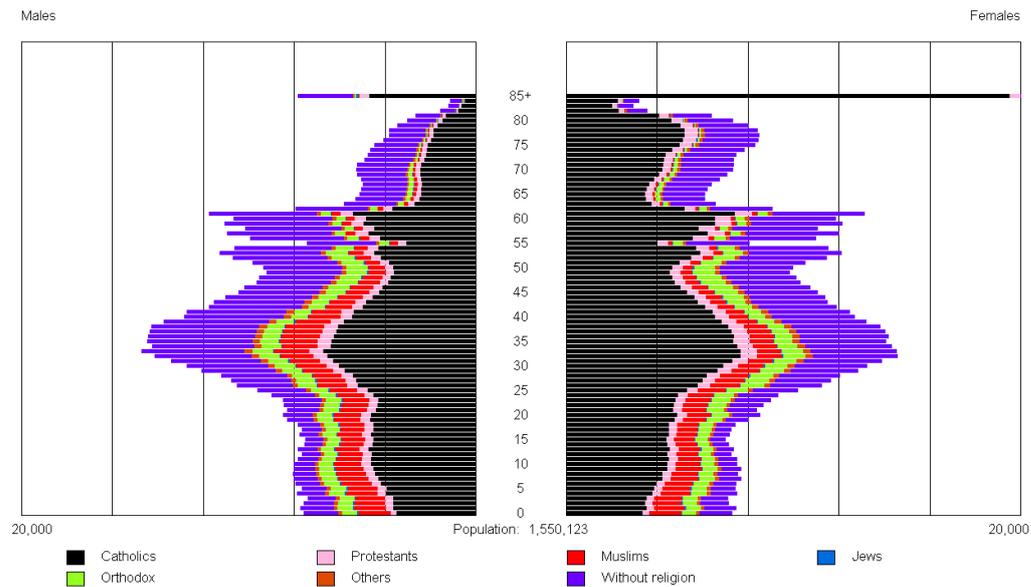
Figure 2: Population pyramid by religious denominations of Vienna, 2001 (Authors' calculations based on reconstruction from several data source)

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