Neighbourhoods and workplaces:
Do they affect the fertility of immigrants and their descendants?

Allan Puur[1], Leen Rahnu[1], Tiit Tannaru[2]

[1]*Talinn University, Estonian Institute for Population Studies,* [2]*University of Tartu*

1. Introduction

Previous research indicates that migrant fertility levels tend to converge with those of the host population, although for some immigrant groups the process may take several generations (Garssen and Nicolaas 2008; Milewski 2010; Dubuc 2012; Krapf and Wolf 2015; Kulu et al. 2017). However, despite a large body of literature on the fertility dynamics of immigrants in a wide range of settings, there is a lack of research into the deeper mechanisms that may underlie the observed shifts.

It has been demonstrated that the likelihood of ethnic intermarriage depends on opportunities to meet members of other groups on a regular basis, and that residential neighbourhoods, workplaces, schools, and leisure activity settings are important venues for finding potential out-group partners (Kalmijn and Flap 2001; Houston et al. 2005; Gabriel 2018; Rahnu, Puur, and Tammaru 2019). Evidence from the United States (Lopez and Sabah 1978; Fischer and Marcum 1984; Brewster, Billy and Grady 1993; Brewster 1994; Hill and Johnson 2004) and the results of a few European studies (Puur et al. 2017; Puur, Vseviov and Abuladze 2018; Wilson and Kuha 2018) suggest that a similar relationship may exist between immigrant fertility and opportunities for first-hand inter-ethnic encounters with the host population.

In the present study, we expand the previous research on migrant fertility by considering the ethnic contexts in two major domains of daily life – residential neighbourhoods and workplaces – as potential determinants of childbearing behaviour. The main contribution of this study is an improved understanding of the role of different ethnic contexts in transforming the fertility patterns of immigrants and their descendants. To the best of our knowledge, our study is the first to analyse the association between the ethnic composition of workplaces and fertility outcomes among immigrants and their descendants. While previous empirical studies of the effects of residential neighbourhoods on migrant fertility have drawn on surveys or samples of longitudinal data, this study relies on data from Finnish administrative registers.

2. Research questions

Focussing on migrant groups originating from high-fertility settings, we formulate five hypotheses to be tested empirically. First, we expect that the proportion of immigrants in residential neighbourhoods would be positively associated with the propensity to have a(nother) child (Hypothesis 1). We further assume that a similar association would exist for the proportion of immigrants in the workplace (Hypothesis 2). Given the separation of residential and workplace contexts in contemporary societies, we anticipate that the effects associated with the proportion of immigrants in either domain would be independent of each other (Hypothesis 3). A separate analysis will be conducted for the transition to first, second, and third births. We expect that the effects of the residential and workplace contexts would

increase towards higher parities in which the contrast between the fertility patterns of the origin and host countries is larger (hypothesis 4)

3. Methodology

The individual-level register data employed in this study is longitudinal and spatially detailed, which allows us to track immigrants and their descendants on an annual basis and link them with their partners, neighbours and co-workers, i.e., to consider the ethnic composition of the key contexts in which individuals' daily interactions and encounters take place. We focus on transitions to first, second and third births among women in Finland during the period 1999–2014.

The childbearing transitions examined in the study include entry into motherhood, progression from first to second birth, and from second to third birth. We estimated discrete time proportional hazards models separately for first, second and third births. The models are based on time (in years) to birth; in order to measure the effect of the covariates on births, and to avoid reverse causality, the values of the covariates are backdated by one year.

In order to measure exposure to the immigrant population in residential neighbourhoods, we opted to use the time-varying proportion of immigrants in the age group 18–40, which focusses on individuals who are most active in family formation. Neighbourhoods were defined according to more than 1600 postal service codes (zip areas). The data used in the study provided employment information on all currently-employed individuals, including the encrypted identification numbers of the enterprise or establishment. This enabled us to calculate the time-varying share of immigrants in the workplace. Individuals who were currently unemployed were classified as students or included in the residual category.

We followed a two-stage modelling strategy. In the first stage, we estimated a series of parity-specific models for the entire study population, with neighbourhood and workplace characteristics not included. These models provide us with estimates of first, second and third births for different migrant groups. In the second stage, we focussed on migrant groups whose fertility markedly exceeds that of the host population. We estimated parity-specific models for this group with the neighbourhood and workplace characteristics included.

4. Results

Table 1 displays the modelling results in the form of hazard ratios, produced as maximum likelihood estimates of parameter effects. The results indicate that in Finland the most distinct ancestral group with regard to fertility levels is comprised of immigrants from Africa and the Middle East. After adjustment for the control variables, they have first-, second- and third-birth risks 102%, 34% and 54% higher than the native population, respectively. In the second stage of the analysis, we concentrate on this high-fertility group because its members experience the greatest challenge in adapting their childbearing behaviour to the patterns prevailing in the host society. The degree of adaptation offers a good opportunity for us to investigate the role of neighbourhood and workplace ethnic contexts in this process.

Table 2 shows the estimates from a second set of models indicating the first-, second- and third-birth risks for women of African or Middle-Eastern origin. In the adjusted model (Model 1.4), living in areas where immigrants constitute more than one tenth of the

population relates to a 16% increase in the hazard of entering parenthood, compared with the reference group. At higher parities, the association between neighbourhood ethnic composition and fertility outcomes is pronounced. In areas with a 10% or higher proportion of immigrants, the hazard of having a second child increases by almost a quarter relative to the reference category (Model 2.4). Among mothers of two children (Model 3.4), an increase in the proportion of immigrants in the residential neighbourhood to the levels of five to nine per cent, and ten per cent and above, is associated with a 35% and 42% increase in the hazard of a third birth, respectively.

As evident from the estimates presented in Table 2 (Panel 2), the proportion of immigrant-origin coworkers does not make a significant difference to entry into parenthood, neither before nor after adjustment for the influence of the control variables (Models 1.5 and 1.6). We think that the lack of difference in first births may stem from the fact that women of African and Middle-Eastern origin tend to have their first child at a relatively young age, and a comparatively small proportion of them are employed before motherhood. For second births, however, the results follow the expected pattern (Models 2.5 and 2.6). Two-child mothers who work in establishments where at least one in ten employees is an immigrant exhibit third-birth risks 70% higher than that of their counterparts in the reference group (Model 3.6).

The marginal change in the hazard ratios in the joint model presented in Table 2 (Panel 3), compared with the separate models, suggests that the effects associated with residential neighbourhoods and workplaces operate to a large extent independently of each other.

5. Conclusions

These results lend further support to the notion that the composition of the population in both domains considered in the study is significantly associated with the adaptation of the fertility patterns of immigrants to those of the host country. Among immigrants and their descendants originating from high-fertility settings, reduced exposure to immigrants in residential neighbourhoods and workplaces is found to be associated with lower risks of first, second and third births.

Table 1. Hazard ratios for the transition to first, second and third birth, women by group of origin, Finland, 1999-2004.

| | First birth | | Second birth | | Thisrd birth | |
	Model 1.1	Model 1.2	Model 1.1	Model 1.2	Model 1.1	Model 1.2
Finland	1	1	1	1	1	1
Western country	0.74***	0.66***	1.02	1.10***	1.16***	1.12**
Eastern Europe	1.36***	1.23***	0.74***	0.78***	0.76***	0.73***
Asia	1.15***	0.94***	0.70***	0.74***	0.82***	0.78***
Africa or Middle East	1.86***	2.02***	1.14***	1.34***	1.59***	1.54***
Other	1.18***	0.87***	0.74***	0.82***	0.83*	0.80**

p<0.01, ** p<0.05, * p<0.1

Definition of risk set: Childless women from age 16 or from age at arrival in Finland (first birth), women with one child from age at first birth or age at arrival in Finland (second birth), women with two children from age at

second birth or age at arrival in Finland (third birth). Censoring occurs at time of event, end of observation period at year 2014, emigration, or death, whichever occurred first.

Non-adjusted models: no controls, but baseline (age or time since previous birth) is held constant for two-year intervals (varies between the intervals).

Adjusted models: control for (calendar period, partnership status, educational attainment, economic activity, region of residence, and time elapsed since arrival in Finland.

Source: Finnish register data, authors' calculations.

Table 2. Hazard ratios for the transition to first, second and third birth by share of migrants in the neighbourhood or at workplace, women with African or Middle Eastern origin, Finland, 1999-2004.

	First birth		Second birth		Third birth	
PANEL 1: Neighbourhood effect						
	Non-adjusted model 1.3	Adjusted model 1.4	Non-adjusted model 2.3	Adjusted model 2.4	Non-adjusted model 3.3	Adjusted model 3.4
Migrants' share in zip, lag 1y: 0-4%	1	1	1	1	1	1
Migrants' share in zip, lag 1y: 5-9%	0.98	1.06	1.17***	1.17***	1.30***	1.35***
Migrants' share in zip, lag 1y: 10+%	1.05	1.16***	1.21***	1.24***	1.28***	1.42***
Constant	0.475***	0.0674***	0.398***	0.174***	0.200***	0.103***
PANEL 2: Workplace effect						
	Non-adjusted model 1.5	Adjusted model 1.6	Non-adjusted model 2.5	Adjusted model 2.6	Non-adjusted model 3.5	Adjusted model 3.6
Migrants' share at work, lag 1y: 0-4%	1	1	1	1	1	1
Migrants' share at work, lag 1y: 5-9%	0.92	0.91	1.13	1.09	1.49*	1.44
Migrants' share at work, lag 1y: 10+%	0.94	0.91	1.28**	1.26*	1.78***	1.73***
Constant	0.0654***	0.0382***	0.138***	0.0775***	0.0797***	0.0619***
PANEL 3: Neighbourhood and workplace joint effect						
	Non-adjusted model 1.7	Adjusted model 1.8	Non-adjusted model 2.7	Adjusted model 2.8	Non-adjusted model 3.7	Adjusted model 3.8
Migrants' share in zip, lag 1y: 0-4%	1	1	1	1	1	1
Migrants' share in zip, lag 1y: 5-9%	1.04	1.06	1.18***	1.17***	1.31***	1.34***
Migrants' share in zip, lag 1y: 10+%	1.15***	1.17***	1.25***	1.23***	1.30***	1.42***
Migrants' share at work, lag 1y: 0-4%	1	1	1	1	1	1
Migrants' share at work, lag 1y: 5-9%	0.93	0.90	1.10	1.08	1.43	1.41
Migrants' share at work, lag 1y: 10+%	0.97	0.90	1.25*	1.25*	1.71***	1.69***
Constant	0.386***	0.0702***	0.226***	0.113***	0.0996***	0.0619***
Number of events	4 239		3 720		2 168	
Person years	50 275		16 854		15 987	

p<0.01, ** p<0.05, * p<0.1

Definition of risk set same as in Table 1.

Non-adjusted models: baseline (age or time since previous birth) is held constant for two-year intervals (varies between the intervals), controls the size of neighbourhood and workplace.

Adjusted models: non-adjusted models additionally controlled for (calendar period, partnership status, educational attainment, economic activity, region of residence, and time elapsed since arrival in Finland.

Source: Finnish register data, authors' calculations.

References

Brewster, K. L. (1994). Neighborhood context and the transition to sexual activity among young black women. Demography, 31(4), 603–614.

Brewster, K. L., Billy, J.O. G., & Grady, W. R.(1993). Social context and adolescent behavior: The impact of community on the transition to sexual activity. Social Forces, 71(3), 713–740.

Dubuc, S., & Haskey, J. (2010). Ethnicity and fertility in the United Kingdom. In J. Stillwell, & M. Ham (Eds.), Ethnicity and integration (pp. 63–81). Dordrecht: Springer Netherlands.

Fischer, N. A., & Marcum, J. P. (1984). Ethnic integration, socioeconomic status, and fertility among Mexican Americans. Social Science Quarterly, 65(2), 583–593.

Gabriel , R. (2018). Gender and the residential mobility and neighborhood attainment of black-white couples. *Demography*, *55* (2), 459–484.

Garssen, J. and Nicolaas, H. (2008). Fertility of Turkish and Moroccan women in the Netherlands: Adjustment to native level within one generation. Demographic Research 19(33): 1249–1280.

Hill, L. E., & Johnson, H. P. (2004). Fertility changes among immigrants: Generations, neighborhoods, and personal characteristics. *Social Science Quarterly*, **85**(3), 811–827.

Houston, S., Wright, R., Ellis, M., Holloway, s., & Hudson, M. (2005). Places of possibility: where mixed-race partners meet. *Progress in Human Geography*, *29* (6), 700–717.

Kalmijn, M., & Flap, M. (2001). Assortative meeting and mating: Unintended consequences of organized settings for partner choices. *Social Forces, 79* (4), 1289–1312.

Krapf, S. and Wolf, K. (2015). Persisting differences or adaptation to German fertility patterns? First and second birth behavior of the 1.5 and second generation Turkish migrants in Germany. Kölner Zeitschrift für Soziologie und Sozialpsychologie 67(1): 137–164

Kulu, H., Hannemann, T., Pailhé, A., Neels, K., Krapf, S., González-Ferrer, A., and Andersson, G. (2017). Fertility by birth order among the descendants of immigrants in selected European countries. Population and Development Review 43(1): 31–60

Lopez, D. E., & Sabagh, G. (1978). Untangling structural and normative aspects of the minority status-fertility hypothesis. American Journal of Sociology, 83(6), 1491–1497.

Milewski, N. (2010b). Fertility of immigrants. A two-generational approach in Germany. Demographic Research Monographs. Hamburg: Springer

Puur, A., Rahnu, L., Abuladze, L., Sakkeus, L., and Zakharov, S. (2017). Childbearing among first- and second-generation Russians in Estonia against the background of the sending and host countries. Demographic Research 36(41): 1209–1254.

Puur, Vseviov and Abuladze 2018). Fertility Intentions and Views on Gender Roles: Russian Women in Estonia from an Origin-destination Perspective. *Comparative Population Studies*, 43: 275–306.

Rahnu, L., Puur, A., and Tammaru, T. (2019). What is the Role of the Ethnic Composition of Neighborhoods, Workplaces, and Schools on the Formation of Mixed-Ethnic Unions? A Register-Based Study of Migrants and Their Descendants in Finland (Forthcoming).

Wilson, B. and Kuha, J. (2018). Residential segregation and the fertility of immigrants and their descendants. Population, Space and Place 24(3): e2098.