Childlessness and the Skewed Regional Sex Ratios in Finland

LASSI LAINIALA
ANNELI MIETTINEN
The Population Research Institute, Väestöliitto, Helsinki, Finland

Abstract

This article studies variation in regional sex ratios in Finland and outlines potential implications of the skewed sex ratios for family formation patterns. Difficulties in finding a suitable partner are typically mentioned as one of the most important reasons for remaining childless, and we explore if this reason is apparent structurally at the regional macro level. We found significant variation in sex ratios in age-groups 18–30 at the regional and sub-regional levels. Of the whole 20–29-year old population in Finland, almost 50 percent live in sub-region areas with a male surplus. As expected, a higher proportion of men compared to women appears to increase fertility of women in younger age groups. Contrary to expectations, high male-female ratios were not related to higher proportion of women living with a partner.

Key words: sex ratios, mating markets, mating squeeze, family formation, childlessness, Finland

Introduction

In Finland relatively high overall fertility (total fertility rate of 1.80 in 2012, Statistics Finland 2013) coexists with high childlessness (Andersson et al. 2009; Ruokolainen and Notkola 2007). In 2011, 21 percent of 40-year-old women resident in Finland had not given birth to a child; this proportion was 15 percent in 1990 (Statistics Finland 2011). Even if the prevalence of childlessness at age 30 has significantly increased all over Europe, Finland appears to be a special case in terms of high expected life-time childlessness combined with relatively high fertility desires and a low preference for childlessness (Goldstein et al. 2003; Miettinen and Rotkirch 2008).

In recent surveys among Finnish young adults, difficulties in finding a suitable partner are frequently mentioned as one of the most important reasons for not considering childbearing (Miettinen and Rotkirch 2008; Paajanen 2002). For many, the search for a partner is not a life-long project and most Finns tend to form a couple relationship at a relatively early age. There is nevertheless considerable variation in union formation patterns according to socio-economic status and education, contributing to differential reproductive behaviour (Jalovaara 2012). Most existing studies have explored changes in gender roles, and in particular, women's educational attainment

and economic independence as plausible explanations for the decline in partnership formation, postponement of childbearing and increase in childlessness. Additionally, there is now a renewed interest in how macro-level demographic contexts, such as the availability of potential partners, shape family formation and other family processes in contemporary populations (van Bavel 2012; Lyngstadt 2011; Harknett 2008; Crowder and Tolnay 2000; Lewis and Oppenheimer 2000).

Here, we present the first study of regional marriage markets in Finland and outline potential implications of skewed sex ratios for family formation patterns and child-bearing. We apply notions from sex ratio hypothesis, which relates shortages of either sex of appropriate ages to a variety of family-related outcomes. The article provides descriptive statistics on regional sex ratios in Finland, and links gender asymmetry at early adulthood to various macro-level indicators of family formation, which in turn can be expected to affect fertility behaviour and childlessness. The focus is on regions and sub-regions since gender-selective internal migration or emigration is likely to cause asymmetry in the young age groups, which can be particularly acute at regional level or in local communities.

Theoretical background: Sex ratios and fertility

Suitable mating partners may theoretically be found anywhere in the world, as increases in educational participation, wealth, social and spatial mobility, and internet access, have reduced the obstacles previously caused by geographical (and socio-economic) distance (Haandrikman and al. 2011). In reality, studies on assortative mating have shown that around the world, individuals tend to pair up with a partner with similar characteristics (Breen and Andersen 2012; Shafer and Qian 2010; Celikaksoy et al. 2010) which are often found amongst peers living close by (Haandrikman and al. 2010; 2011). Local "marriage markets" and the availability of suitable partners can thus af-fect the timing as well as the probability of union formation among young adults, and, eventually, their childbearing behaviour.

Sex ratio hypothesis holds that skewed male to female ratios are associated with lower rates of marrying (Schoen 1983; Lichter et al. 1992; South and Lloyd 1992), although the predicted links between unbalanced age-sex ratios and marriages remain debated. A shortage of eligible partners does not necessarily always lead to fewer marriages, as men and women may adapt their preferences and marital behaviour to cope with a demographic "marriage squeeze" (Ni Bhrolchain 2001; Birkelund and Heldal 2003). The implications of sex ratio imbalance for individuals' fertility are even less clear and, besides affecting directly marriage levels, likely to operate through various mechanisms.

Studies on sex ratios often implicitly assume that disturbances in mate availability will eventually translate into lower fertility. Research that directly studies effects on

fertility remain surprisingly rare, however (for exceptions, see Inoue, Umezaki and Watanabe 2012; Chipman and Morrison 2013).

The most immediate mechanism linking sex ratio to fertility concerns decreasing marriage rate, so that a proportion of the abundant sex is not able to find a partner and consequently remains childless. However, we can think of other ways in which skewed sex ratios in early adulthood can interfere with individuals' and couples' childbearing. First, shortages of appropriate partners can affect the timing and stability of partnerships – whether individuals choose to cohabit or marry, when they do so, and how long lasting the relationships are (South and Lloyd 1992; Fossett and Kiecolt 1993; Lichter and al. 1995) – which in turn affect the age at onset of childbearing, intervals between subsequent births, and decisions not to bear any (or more) children.

Second, the rarer sex can also exploit his/her power to attract better partners in terms of socioeconomic or other resources. Higher resources of each partner are expected to be associated with higher fertility, the male partner's economic resources being in general more important than the female partner's for a couple's childbearing decisions (cf. Chipman and Morrison 2013). In a situation where men outnumber eligible women, men may need to acquire greater social status and resources to be considered marriageable, and more women will end up marrying (or cohabiting) a resourceful partner.

Imbalanced sex ratios can also influence fertility through couples' reproductive decision making. Skewed sex ratios are presumed to affect the dyadic power in personal relationships between men and women (South and Trent 1988). Guttentag and Secord (1983) hold that members of the "scarce" sex are less dependent on their partners as they can easier form new relationships, and can therefore use dyadic power to their advantage. Consequently, a shortage of marriageable men would imply that women have less power to influence childbearing decisions in unions, for instance. Accordingly, low fertility and childlessness among highly educated women could be driven not only by the lack of suitable partners, but also by the higher bargaining power to say "no" to (further) childbearing exercised by men in these unions.

Women and men are expected to hold partly different preferences regarding sexual relationships and reproduction, and it is assumed that responses to sex ratio imbalance vary between sexes. When women are scarce in a population relative to men, they are assumed to have greater bargaining power in romantic relationships and thus to be able to secure male commitment at earlier ages. In such a situations, male motivation for long-term relationships commitment may also be higher, in conjunction with the motivation to secure a prospective partner before another male retains her (Kruger and Schlemmer 2009; Angrist 2002). A relative "oversupply" of men would then imply lower age at first marriage (or at first union), and an increased likelihood of either direct marriages, or transition from cohabiting unions to marriages, all of which would also contribute to earlier onset of childbearing and less childlessness for men and women,

conditional on entry into a union (Fossett and Kiecolt 1991; 1993). In contrast, a lower sex ratio (deficit of men) is presumed to be associated with less stable relationships, later age at marriage, and increase in divorce rates (South et al. 2001; Lichter et al 1995; Fossett and Kiecolt 1993).

Research questions, data and methods

Based on previous research on sex ratios we assume that higher sex ratios (i.e., a higher male-female ratio or an "oversupply" of men) will

(i)   increase men's likelihood of remaining without a partner;

(ii)   influence the type and stability of the unions, here measured as a proportion of married persons of all persons in a union; and

(iii) raise fertility.

Population statistics provided by Statistics Finland (StatFin database) are used to illustrate variation in regional sex ratios among Finnish young adults. We combine these with regional data on union formation and dissolutions (also by Statistics Finland, see freely available map of local sex ratios at http://www.vaestoliitto.fi/tilastot/StatPlanet. html). Although municipalities would be one logical candidate for the geographical unit to use as the local pool from which individuals choose their partners, we use sub-regional units which comprise several municipalities (N=67 mean=80549 inhabitants, median=34567, min=5671, max, 1446798, Ahvenanmaa sub-regions excluded) to guarantee a sufficient amount of observations with large enough populations to provide feasible demographic indicators of family formation processes.

In tables, figures and regression analysis we use following indicators:

Sex ratio = number of men / number of women [in a certain age group]

Persons in union = (cohabiting partner, no children + cohabiting partner with children + married, no children + married, with children) / total population [by gender in each age group]

Persons in marriage = (spouse, no children + spouse, with children) / total population in unions [by gender in each age group]

Women or men with children = (married, with children + cohabiting, with children) /total population in unions[by gender in each age group]

We focus at sex ratios at age groups in early adulthood (20–29 years), although heterosexual union formation and search for eligible partners is obviously not restricted to these ages. However, since most Finns tend to form intimate relationships at a relatively early age (Pitkänen and Jalovaara 2007; Nikander 1992; 1995), we presumed that the availability of eligible partners in these age groups is crucial for individuals' subsequent marital and fertility behaviour. We did not take into account the typical

2–3-years age difference between partners in unions but calculated male-female ratios using the same age groups for both sexes. However, we do not think that using different age groups for men and women would have affected our results very much.

Results: Variations in regional sex ratios

To describe regional sex ratio variations in Finland, we calculated sex ratios for 1-year age groups for the whole country, regions, municipality types, and sub-regional units. At the national level, sex ratios are quite stable in all ages (Figure 1, upper left corner). However, a significant variation in sex ratios is apparent at the regional level (*maakunta*) in age-groups 18–30 years (Figure 1, upper right corner) ranging from 0.96 to 1.29. Smaller sub-regional units (*seutukunta*) show even stronger variation in sex ratios for the ages 18–30 (Figure 1, lower right corner), ranging from 0.88 to 1.72. At the sub-regional level, the mean sex ratio was 1.20 (standard deviation 0.017) in the age group 20–24 years, and 1.16 (sd 0.014) for the age group 25–29 years.

Sub-regional variation is most likely caused by female educational migration to cities (Figure 1, lower left corner). Due to obligatory military and civil service of Finnish men, women move earlier and men tend to follow them a couple of years later, making regional sex ratios more balanced in the age groups towards age 30.
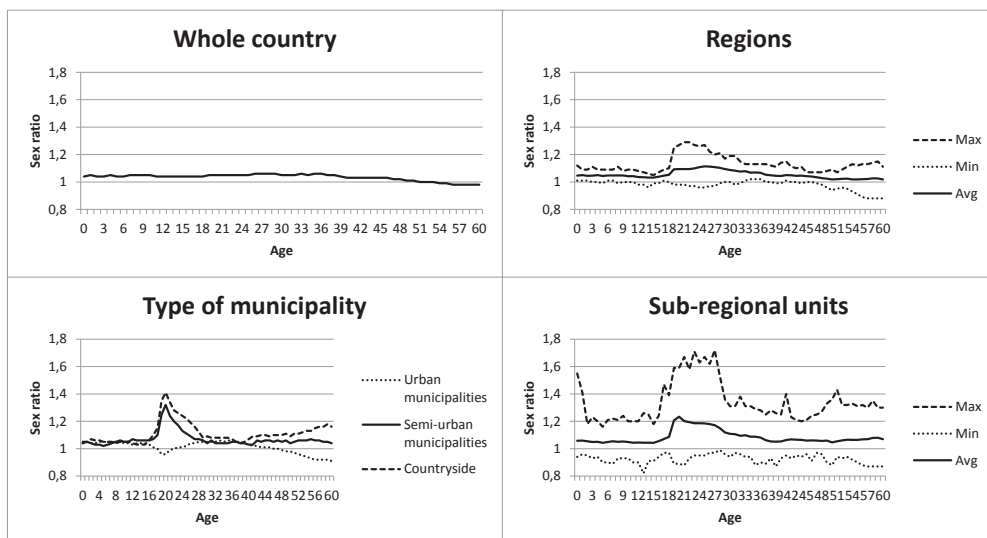

Figure 1. Sex ratios by age in different geographical areas (2009–2011).

Source: StatFin, authors' calculations
Note: Regions = Uusimaa, Satakunta etc. (N=18, Ahvenanmaa excluded); Sub regional units = Pohjois-Satakunta, Oulunkaari, Kotka-Hamina, Kuusiokunnat etc. (N=67, Ahvenanmaa sub regional units excluded).

The lowest sex ratios can be observed in the most populated county capitals, and in Helsinki in particular (Table 1). In other words, big cities absorb sexes differently, so that the sub-regional sex-ratio imbalance remains high during the period of early adulthood. Also geographically, the picture of imbalanced sex ratios is quite clear (illustrated here with the age group 20–29 years, and using municipalities as the geographical unit) (Figure 2). A high male surplus among the population in their twenties can be observed in the countryside and in the eastern and northern parts of Finland. In contrast, sex ratios are lower in the biggest cities and in southern Finland. Of the whole 20–29-year old population in Finland, almost 50 percent live in sub-region areas with a male surplus.

Table 1. Age-specific sex ratios (20–29 years) in Finnish regions (counties).

County	Population	Sex ratio	County capital	Population	Sex ratio
WHOLE COUNTRY	678319	1,05	Helsinki	104422	0,88
Uusimaa Region	214312	0,98	Helsinki	104422	0,88
Varsinais-Suomi Region	59425	1,01	Turku	34373	0,94
Satakunta Region	24510	1,11	Pori	10514	1,09
Kanta-Häme Region	18653	1,06	Hämeenlinna	8056	1,02
Pirkanmaa Region	66942	1,05	Tampere	42596	1,02
Päijät-Häme Region	22281	1,04	Lahti	14499	0,99
Kymenlaakso Region	18295	1,16	Kotka	6134	1,2
South Karelia Region	14520	1,25	Lappeenranta	9786	1,26
Etelä-Savo Region	15188	1,14	Mikkeli	6171	1,14
Pohjois-Savo Region	29161	1,07	Kuopio	15811	0,99
North-Karelia Region	19894	1,11	Joensuu	12573	1,05
Central Finland Region	36373	1,06	Jyväskylä	24668	1,01
South Ostrobothnia Region	21718	1,12	Seinäjoki	8554	1,01
Ostrobothnia Region	22902	1,15	Vaasa	10514	1,13
Central Ostrobothnia Region	8136	1,09	Kokkola	5741	1,07
North Ostrobothnia Region	52897	1,12	Oulu	27672	1,07
Kainuu Region	8335	1,22	Kajaani	5105	1,13
Lapland Region	21709	1,11	Rovaniemi	9496	0,97

Source: StatFin, authors' calculations
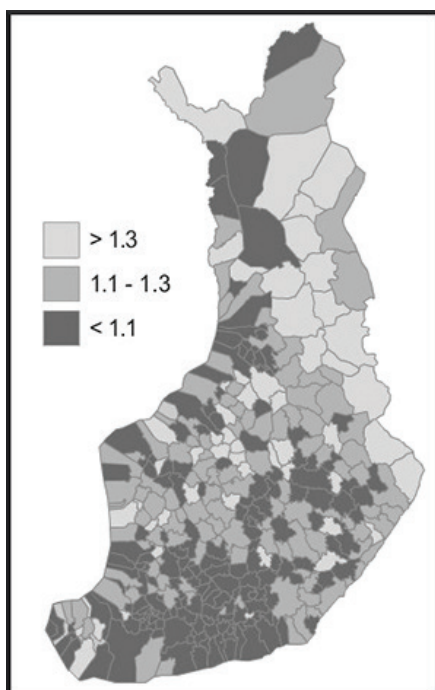Note: Population = population in age group 20-29

Figure 2. Age-specific sex ratios (20–29y) in Finnish municipalities.

Source: StatFin, own calculations

Note: Map built with online map software. Available at www.vaestoliitto.fi/tilastot

Sex ratios and family formation

Next, we test some of the assumptions regarding the mechanisms linking sex ratios to fertility presented above. We focus here on sex ratios in the age groups 20–24 years and 25–29 years. In this study, we do not consider other factors, such as the level of urbanization, size of the population, proportion of farming population, or local unemployment rates, which could influence sub-regional variation in the outcome measures in regression analyses.

If shortages of appropriate partners can affect the timing of partnerships, we can expect that being in a union at a specific age is associated with regional sex ratio variations. Male surplus will also have different effects for men's and women's entry into unions. As expected, scarcity of women in a certain area is associated with men having elevated difficulties in finding a partner with whom to form a union at young ages (Figure 3, p<0.001 and 0.001). For women, however, we cannot find any statistically significant association between sex ratio and proportion of women in union at age groups 20–29 years (Figure 4). Thus, in terms of available partners, even in relatively favourable marriage market situations women's likelihood of entering into unions does not visibly increase when studied with macro-level data.

Second, we assumed that the male-female ratio would influence the type and stability of the unions, here measured as a proportion of married persons of all persons in a union. Contrary to our expectations, we find that sex ratio is not associated with the proportion of married persons among all men/women in a union (Figures 5 and 6). Only among the younger age group (20–24 years) there appears to be a slight but not statistically significant positive association.

Third, we studied indicators of fertility. There is a positive association between sex ratio and childbearing for women, when considering the proportion of women with children of all women (Figure 7, $p<0.01$). Given that childbearing is in general conditional on entry into a union, we also examined the association between sex ratio and the percentage of men/women with children among men/women living in a union. This can be used to indicate age at onset of childbearing as well as childlessness at certain ages.

Figures 8 and 9 show the expected associations. The proportions of men and women with children of all men/women living in a union increase in line with increasing sex ratio (i.e., a male surplus). The association is relatively strong for both sexes and in the two age groups.
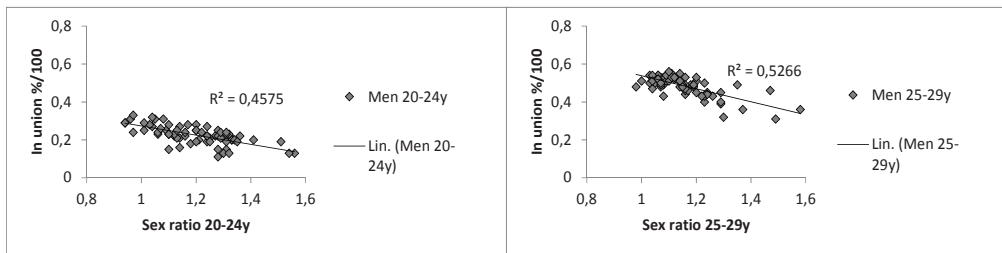

Figure 3. Linear regression analysis: Men in a union (married + cohabiting) and sex ratio by sub-regions (N=67).
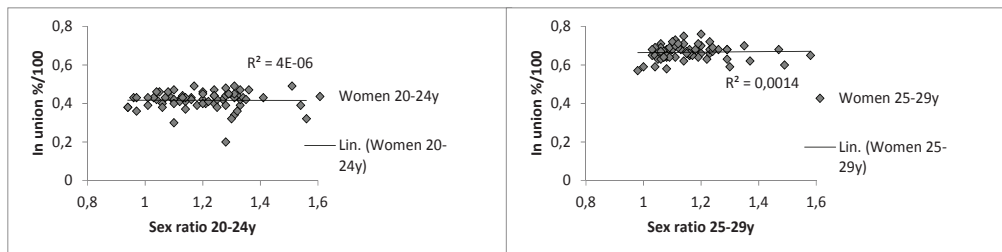

Figure 4. Linear regression analysis: Women in union (married + cohabiting) and sex ratio by sub-regions (N=67).
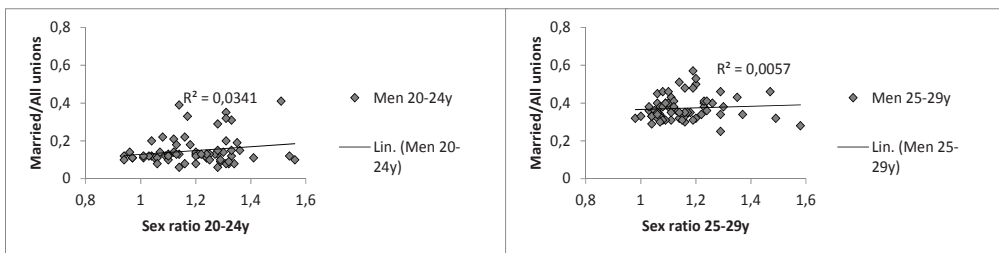
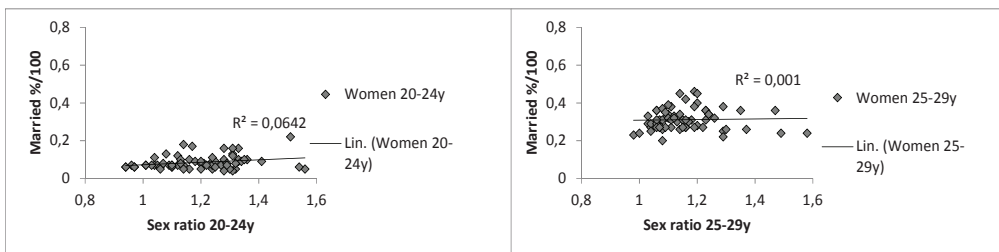**Figure 5.** Linear regression analysis: Married men of all men in unions and sex ratio by sub-regions (N=67).

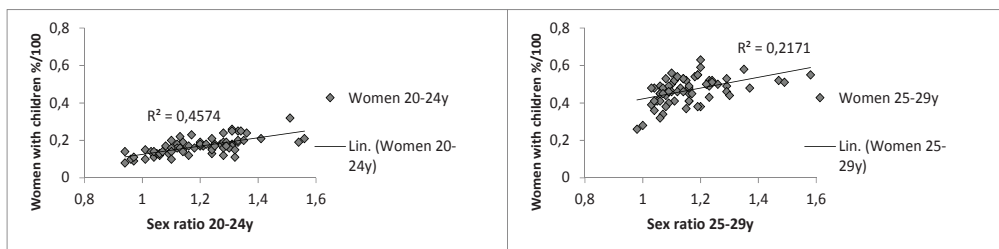**Figure 6.** Linear regression analysis: Married women of all women in unions and sex ratio by sub-regions (N=67).

Figure 7. Linear regression analysis: Women with children of all women and sex ratio by sub-regions (N=67).
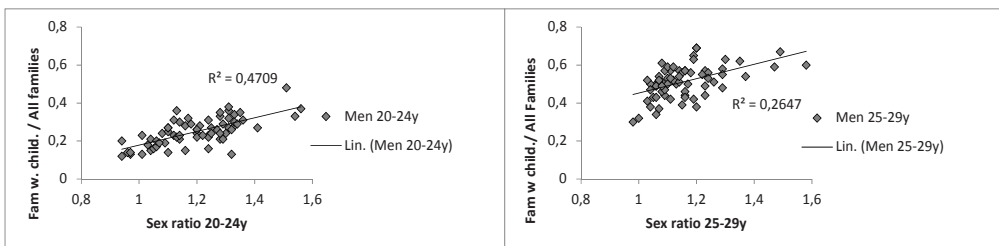

Figure 8. Linear regression analysis: Men with children of all men in unions and sex ratio by sub-regions (N=67).
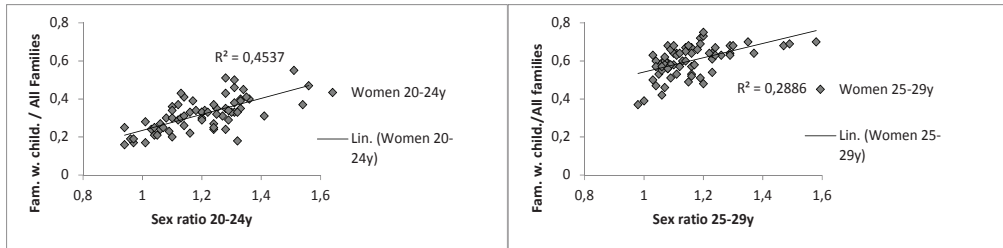
Figure 9. Linear regression analysis: Women with children of all women in unions and sex ratio by sub-regions (N=67).

Conclusions

There is notable regional variation in sex ratios in the younger age groups in Finland and this is associated with family formation in early adulthood. Our results indicate that the regional sex ratios may contribute to the high levels of childlessness in Finland, which is often assumed but has not been previously investigated. However the analysis and conclusions are at this stage only tentative.

Union formation patterns influence individuals' childbearing, and the inability to find a partner with whom to have children is an obvious obstacle to childbearing. However, studying marriage levels is not sufficient if we wish to understand how sex ratios are linked with fertility, and we have to look at other mechanisms too.

In this article we investigated if regional sex ratios were associated with various family formation indicators. Interestingly, an oversupply of men was not associated with the extent of union formation for women, nor with the type of the union. Although our preliminary regressions did not account for other potential sources for the variation it seems that women do not (or cannot) take that kind of advantage of the favourable marriage market situation. Our expectations were confirmed, however, in that an oversupply of men does seem to increase fertility of women in younger age groups. This result can be interpreted at least in the following ways: If there is considerably more men than women, women have greater pool to select a partner she prefers (the bargaining power hypothesis, Kruger and Schlemmer 2009). For men, intra-male competition may make it more difficult to secure a partner to have children with (attraction by resources hypothesis, ibid). Given that a higher male-female ratio was not related to higher proportion of women living in a union, the strong positive association between sex ratio and fertility among men and women living in unions was somewhat surprising.

Among the limitations of our analysis is the fact that there are only a few sub-regions with low sex ratio (surplus of women), and they mainly comprise areas around large (university) cities. Our results concern thus more or less the impact of sex ratio in less densely populated rural areas and smaller towns in Finland. Inclusion of other marriage

market conditions, such as educational attainment, would presumably show markedly higher variation in regional sex ratios and add strength to our analyses.

Our preliminary study on sex ratios and family formation patterns is able to suggest some links between marriage market characteristics and fertility. At the next stage of analysis, combining contextual marriage market indicators with micro-level data on individuals' marital and fertility behaviour as well as including a temporal dimension to analyses, we aim to investigate more thoroughly if and how age-sex ratio and local marriage markets influence fertility.

Acknowledgements

References

Andersson, G., M. Rönsen, L. Knudsen, T. Lappegård, G. Neyer, K. Skrede and A. Vikat. 2009. Cohort fertility patterns in the Nordic countries.*Demographic Research* 20(14): 313–352.

Angrist, J. 2002. How do sex ratios affect marriage and labor markets? Evidence from America's second generation. *The Quarterly Journal of Economics*, 117(3): 997–1038.

Birkelund, G. E. and J. Heldal. 2003. Who marries whom? Educational homogamy in Norway. *Demographic Research* 8(1): 1–30.

Breen, R. and S. H. Andersen. 2012. Educational Assortative Mating and Income Inequality in Denmark. *Demography* 49(3): 867–887.

Bhrolchain, M. N. 2001. Flexibility in the marriage market. *Population: An English Selection*: 9–47.

Çelikaksoy, A., L. Nekby and S. Rashid. 2010. Assortative mating by ethnic background and education among individuals with an immigrant background in Sweden. *Zeitschrift für Familienforschung-Journal of Family Research* 22(1).

Chipman, A. and E. Morrison. 2013. The impact of sex ratio and economic status on local birth rates. *Biology letters* 9.

Crowder, K. D. and S. E. Tolnay. 2000. A new marriage squeeze for black women: The role of racial intermarriage by black men. *Journal of Marriage and Family* 62(3): 792–807.

Fossett, M. A. and K. J. Kiecolt. 1991. A methodological review of the sex ratio: Alternatives for comparative research. *Journal of Marriage and the Family* 53(4): 941–957.

Fossett, M. A. and K. J. Kiecolt. 1993. Mate availability and family structure among African Americans in US metropolitan areas. *Journal of Marriage and the Family* 59(1): 288–302.

Goldstein, J., W. Lutz, and M.R. Testa. 2003. The emergence of sub-replacement family size ideals in Europe. *Population Research and Policy Review* (22): 479–462.

Guttentag, M. and P. F. Secord. 1983. *Too many women?: The sex ratio question* (Vol. 10). Beverly Hills: Sage Publications.

Haandrikman, K. 2010. Waar ontmoeten partners elkaar? Sociale differentiatie in ontmoetingsplaatsen.[Where do partners meet? Social differentiation in meeting places]. *Mens en Maatschappij* 85(2):176–195.

Haandrikman, K., L. J. van Wissen and C. N. Harmsen. 2011. Explaining spatial homogamy. Compositional, spatial and regional cultural determinants of regional patterns of spatial homogamy in the Netherlands. *Applied Spatial Analysis and Policy* 4(2): 75–93.

Harknett, K. 2008. Mate availability and unmarried parent relationships.*Demography* 45(3): 555–571.

Kruger, D. J. and E. Schlemmer. 2009. When men are scarce, good men are even harder to find: Life history, the sex ratio, and the proportion of men married. *Journal of Social, Evolutionary, and Cultural Psychology* 3: 93–104.

Lewis, S. K. and V. K. Oppenheimer. 2000. Educational assortative mating across marriage markets: Nonhispanic whites in the United States. *Demography* 37(1): 29–40.

Lichter, D. T., D. K. McLaughlin, G. Kephart and D. J. Landry. 1992. Race and the retreat from marriage: A shortage of marriageable men? *American Sociological Review* 57(6): 781–799.

Lichter, D. T., R. N. Anderson and M. D. Hayward. 1995. Marriage markets and marital choice. *Journal of Family Issues* 16(4): 412–431.

Lyngstad, T. H. 2011. Does community context have an important impact on divorce risk? A fixed-effects study of twenty Norwegian first-marriage cohorts.*European Journal of Population/Revue européenne de Démographie* 27(1): 57–77.

Inoue, Y., M. Umezaki and C. Watanabe. 2012. Geographic Clustering of the Secondary Sex Ratio in Japan: Association With Demographic Attributes. *Journal of Biosocial Science* 45(02): 279–284.

Jalovaara, M. 2012. Socio-economic resources and first-union formation in Finland, cohorts born 1969–81. *Population studies* 66(1): 69–85.

Miettinen, A. and A. Rotkirch (2008) Milloin on lapsen aika? Lastenhankinnan toiveet ja esteet. Perhebarometri. Väestöntutkimuslaitoksen Katsauksia E34. Helsinki: Väestöliitto.

Nikander, T. 1992. Naisen elämänkulku ja perheellistyminen. [Women's life course and family formation]. Väestö 1992:1. Helsinki: Statistics Finland.

Nikander, T. 1995. Suomalaismiehen perheellistyminen. [Family formation among Finnish men]. Väestö 1995.1. Helsinki: Statistics Finland.

Paajanen, P. 2002. *Saako haikara tulla käymään. Suomalaisten lastenhankinnan ihanteet ja todellisuus. Perhebarometri*. Väestöntutkimuslaitoksen Katsauksia E14. Helsinki: Väestöliitto.

Pitkänen, K. and M. Jalovaara. 2007. Perheet ja perheenmuodostus. [Family formation]. In S. Koskinen, T. Martelin, I-L. Notkola, V. Notkola, K. Pitkänen, M. Jalovaara,

E. Mäenpää, A. Ruokolainen, M. Ryynänen and I. Söderling (eds), *Suomen väestö*, 2nd renewed edition, pp. 115–168. Helsinki: Gaudeamus.

Ruokolainen, A. and I-L. Notkola. 2007. Hedelmällisyys. [Fertility]. In S. Koskinen, T. Martelin, I-L. Notkola, V. Notkola, K. Pitkänen, M. Jalovaara, E. Mäenpää, A. Ruokolainen, M. Ryynänen and I. Söderling (eds), *Suomen väestö*, 2nd renewed edition, pp. 77–113. Helsinki: Gaudeamus.

Shafer, K. and Z. Qian. 2010. Marriage timing and educational assortative mating. *Journal of Comparative Family Studies* 41(5): 661–691.

Schoen, R. 1983. Measuring the tightness of a marriage squeeze. *Demography* 20(1): 61–78.

South, S. J. and K. M. Lloyd. 1992. Marriage markets and nonmarital fertility in the United States. *Demography* 29(2): 247–264.

South, S. J. and K. Trent. 1988. Sex ratios and women's roles: A cross-national analysis. *American Journal of Sociology* 93(5): 1096–1115.

South, S. J. 2001. The variable effects of family background on the timing of first marriage: United States, 1969–1993. *Social Science Research* 30(4): 606–626.

Statistics Finland. 2011. Population structure and vital statistics 2010. Helsinki: Statistics Finland.

Van Bavel, J. 2012. The reversal of gender inequality in education, union formation and fertility in Europe. *Vienna Yearbook of Population Research* 10: 127–154.