FORS

explore.understand.share.

Ursina Kuhn and Laura Ravazzini

The impact of assortative mating on income inequality in Switzerland

Lausanne, April 2017

FORS Working Papers 2017-1

FORS Working Paper series

The FORS Working Paper series presents findings related to survey research, focusing on methodological aspects of survey research or substantive research. Manuscripts submitted are papers that represent work-in-progress. This series is intended to provide an early and relatively fast means of publication prior to further development of the work. A revised version might be requested from the author directly.

Further information on the FORS Working Paper Series can be found on www.forscenter.ch

How to cite this document:
Kuhn, U. & Ravazzini, L. (2017). The impact of assortative mating on income inequality in Switzerland. *FORS Working Paper Series, paper 2017-1*. Lausanne: FORS.

Acknowledgements
This study has been realized using the data collected by the Swiss Household Panel (SHP), which is based at the Swiss Centre of Expertise in the Social Sciences FORS. The project is supported by the Swiss National Science Foundation. We thank our colleagues Florence Lebert and Marieke Heers for their valuable comments.

ISSN 1663-523x (online)

FORS
c/o University of Lausanne, Géopolis
1015 Lausanne
Switzerland
E-mail: paperseries@fors.unil.ch

Summary

Homogamy is one of the possible drivers of income inequality in society. This study analyses the influence of homogamy in partners' earnings on income inequality in Switzerland using data of the Swiss Household Panel from 1999 to 2015. The first part monitors homogamy in educational levels, parental education, hourly wages and realised yearly earnings using correlation coefficients. The second part estimates the impact of assortative mating on income inequality using counterfactual simulations. By focusing not only on realised earnings but also on hourly wages, we can distinguish between the effect of homogamy from the effects of labour supply adjustments. In addition, we take into account the selection into partnership. Results show a very weak correlation between partners' realised earnings. The observed Gini coefficient of realised earnings is not different from the Gini in a scenario where partners match independently of their earnings. Two processes explain these results. First, there is relatively little homogamy in hourly wages. Second, adjustments of labour supply to partner's characteristics have an equalising effect that can offset the impact of homogamy.

Keywords: Income inequality, homogamy, labour supply, education, earnings, Switzerland

The impact of assortative mating on income inequality in Switzerland

Ursina Kuhn[1] and Laura Ravazzini[2]

1. Introduction

Income inequality is a rising concern of our societies. There is an extensive body of research that addresses the causes of income inequality. More recently, the role of socio-demographic changes, such as aging or the increasing number of single households has received growing attention. In this paper, we address homogamy in Switzerland and study how the similarity in partners' earnings at the micro level affects income inequality at the macro level.

Homogamy represents the preference to choose a similar partner over other potential partners. There have been claims that homogamy in terms of education, occupation and earnings has become stronger over time. Homogamy in earnings is relevant for the income distribution because societies in which similar earners intermarry are more unequal than those in which high earners marry low earners (Lam 1997; Schwartz 2010). Homogamy refers to equality *within* couples and is associated with a higher inequality *between* couples. Homogamy can result both from assortative mating (the preference to choose a similar partner over other possible partners) and from changed composition of the population. Both processes might be responsible for rising homogamy. A first possible reason for increasing homogamy in earnings is that economic success might have become more relevant in the selection of a partner (Kalmijn 1998; Sweeney and Cancian 2004). According to the status attainment hypothesis, modernisation gives more importance to achieved characteristics such as education or income than to ascribed characteristics such as ethnicity or social origin (Schwartz 2013; Goode 1963). Second, the educational expansion among women increased the opportunities to meet the future partner among schoolmates or among

[1] FORS, Ursina.kuhn@fors.unil.ch
[2] University of Neuchâtel and FORS, laura.ravazzini@unine.ch

colleagues. Third, the gap between women and men in terms of educational levels, wages and labour force participation has declined at the macro level. This may have translated into smaller differences in earnings within couples at the micro level. Even if mating patterns do not change, educational expansion leads to more couples in which both partners have a tertiary education degree.

Several previous studies have estimated the impact of homogamy on inequality. Whereas some see rising homogamy as a driver of income inequality (Aslaksen, Wennemo, and Aaberge 2005; Esping-Andersen 2007; Schwartz 2010), others find only a limited influence of homogamy on rising income inequalities (Kremer 1997; Breen and Andersen 2012; Greenwood et al. 2014). In this contribution, we measure the impact of homogamy among cohabiting couples on earnings inequality at the societal level using data of the Swiss Household Panel. As methodological approach, we compare the observed earnings inequality to counterfactual distributions assuming different mating patterns. To the best of our knowledge, the effect of homogamy on income inequality has never been investigated in Switzerland before.

There are a few particularities with respect to earnings of couples, which make Switzerland an interesting case study. First, previous research has revealed a markedly weak correlation between spouses' earnings in Switzerland (Cancian and Schoeni 1998; Gerfin 1993; Kuhn and Ravazzini 2017). Second, Switzerland's household income inequality has remained stable since 2000 (Suter et al. 2016) and, since 2010, it is slightly below the European average. Third, Switzerland has a particular labour force from a gender perspective. Female labour force participation is high (79.8% in 2015) and, according to national definitions, part-time work is more common among women than in any other OECD country. In addition, there is no general wage-penalty for part-time work (Schmid 2016). It may be of interest to analyse the relation between these different facts. A previous study demonstrated that the rising female labour supply contributed to stable income inequality in Switzerland (Kuhn and Ravazzini 2017). In this contribution, we test whether the weak correlation between spouses' earnings and the modest income inequality is also the result of a weak homogamy in earnings.

Besides providing evidence on a new and interesting case, our study overcomes two major shortcomings of most previous analyses. The first is that most studies neglect the fact that the relationship between partner's earnings is not only determined by the formation of couples (assortative mating), but also by decisions taken during the

relationship. Most importantly, women have shown to adapt their labour supply to their partner's earnings and to their family situation (Aaberge, Dagsvik, and Strøm 1995; Gerfin and Leu 2007; Pestel 2017). If women with high earning partners work fewer hours than women with low earning partners, the correlation in realised earnings will be considerably weaker than the correlation in hourly wage. Many studies on homogamy neglect the effect of labour supply when interpreting the relationship between partners' earnings (see Pestel 2017 for an exception). To distinguish effects resulting from mating patterns from effects resulting from labour supply adjustments, we will analyse not only observed earnings but also hourly wage, which do not depend directly on working hours. The second shortcoming of many previous studies is the ignorance of single households (see Breen and Salazar 2011 for an exception). Not only the choice of the partner, but also the selection into partnership, is likely to have an impact on income inequality between households.[3]

In the next section, we discuss the links between homogamy and income inequality and present literature on this subject. We then proceed with the data and methods, before presenting our results and conclusions.

2. Assortative mating and income inequality

The sociological literature has a long tradition in studying homogamy as an indicator of openness or closure of societies. Homogamy can hinder mobility across social classes and strengthen inequalities between households (e.g. Kalmijn 1998). This sociological strand of literature has focused strongly on education and occupation.
Given that our interest is earnings inequality, we will focus on homogamy in earnings rather than on homogamy in education. On the one hand, homogeneity in earnings can be seen as a consequence of homogamy in educational levels, age, social background or other characteristics. Homogamy in these characteristics will translate into earnings inequality between couples to the extent to which they are related to earnings. If the relationship between education and earnings is only weak, a high educational homogamy will have only little effects on homogamy in earnings and earnings inequality (Breen and Salazar 2011; Schwartz 2013). On the other hand, earnings and wage potentials might play a role in the selection of a partner beyond such socio-demographic characteristics. Even if homogamy in education is weak,

[3] A body of literature focuses on household size and in particular on single households as a driver of income inequality, but does not address the selection into partnership (Western et al. 2008; Kollmeyer 2012).

there might be a considerable homogamy in earnings. Several studies claim that, due to the educational expansion, tertiary education has lost its signalling effect for high earnings and prestige (Collins 1971). Wage differentials within tertiary educated individuals have indeed increased strongly over time in many countries (Lemieux 2006; Autor, Katz, and Kearney 2008 for the USA, Budría and Telhado-Pereira 2011 for European countries). The empirical evidence about economic returns to education more in general (the impact of education on earnings) is mixed. Several studies argue that economic returns to education have increased, suggesting that educational assortative mating has become more important for income inequality even if mating patterns have not changed (Eika, Mogstad, and Zafar 2014).

There is an important difference between homogamy in earnings and homogamy in education: homogamy in earnings varies considerably over the life course. In addition, partnership and family situation are known to change labour supply and hourly wages through intra-couple decisions (e.g. division of labour) and the labour market (e.g. through motherhood wage penalty). In Switzerland, we know that the gap in earning within couples tends to widen over the duration of the relationship (Ravazzini and Kuhn, 2017).

A popular approach to measure homogamy in earnings is the income correlation among dual-earner couples (Cancian, Danziger, and Gottschalk 1993; Cancian and Reed 1999; Reed and Cancian 2001; Blackburn and Bloom 1995). Schwartz (2010) estimated that the growing association between spouses' earnings explained between 17 to 51% of the increase in earnings inequality among married couples in the USA. Larrimore (2014) specified that the correlation of spouses' earnings accounted for 17% of the increase in income inequality in the 1980s, but no longer contributed to this rise between 2000 and 2007. Labour supply decisions rather than changes in assortative mating explain this change. In the 1980s, mainly women married to high-earning men entered the labour market. Later on, mainly women married to non-working men increased their employment. Larrimore attributes this behavioural change to public policies (e.g. the 1996 Welfare Reform Act and the reform of the Earned Income Tax Credit between 1993 and 1996).

It is important to clarify that the correlation in partners' incomes is not sufficient to measure the role of assortative mating on income inequality. Apart from the selection of the partner, the correlation between spouses' earnings is determined by many other factors (e.g.: labour supply decisions, segregation, motherhood-wage penalty, levels of education of women and men in the population). Considering that previous studies have documented a very weak correlation of spouse's earnings in Switzerland, possible explanations for this are a weak homogamy in education or wage levels,

gender segregation and labour supply of individuals.[4] Instead of correlations, most recent studies rely on a more elaborated methodology to measure the impact of assortative mating on income inequality. Most frequently, the observed income distribution is compared to a counterfactual distribution assuming random mating patters. Most analyses found indeed that assortative mating is not a driver of the increased income inequality in the US (Breen and Salazar 2011; Greenwood et al. 2014; Hryshko, Juhn, and McCue 2015; Kremer 1997) and in some European countries (Breen and Andersen 2012 for Denmark; Breen and Salazar 2010 for the UK; Eika, Mogstad, and Zafar 2014 for Norway; Frémeaux and Lefranc 2015 for France; Pestel 2017 for Germany). They conclude that the impact of assortative mating on income inequality has remained rather stable over time. For example in Norway, the Gini coefficient in 2007 is only 4% higher compared to a situation where spouses are randomly matched (Eika, Mogstad, and Zafar 2014). An exception is Aslaksen et al. (2005) who claim that "flocking together" (defined as the disequalising effect of assortative mating on family income inequality) has been stronger in the 1990s than in the 1980s in Norway.

3. Data and methods

We study the link between homogamy in socio-economic characteristics and earnings inequality using data from the Swiss Household Panel (SHP) 1999-2015. The SHP follows households on a yearly basis and includes three samples (SHP I since 1999, SHP II since 2004, SHP III since 2013). There are individual interviews with each household member older than 14 years. We select individuals within the classical working age range (25-64 years old) who are able to work. Couples, where at least one partner is outside this age range have been excluded from the analysis.

We start our empirical analysis by monitoring and comparing the evolution of different types of homogamy over time. For this first part, we focus on heterosexual couples and compare correlation coefficients of four socio-economic characteristics: education, education of parents, hourly wage and yearly earnings. The sample size ranges from 1674 couples (in 2003) to 3402 couples (in 2014).

[4] We do not think that measurement error explains the weak correlation of spouses' earnings in Switzerland because there is no reason to believe that measurement error is more pronounced in the Swiss data compared to other data. Furthermore, the very weak correlation has been found in different data sources.

The comparability of correlation coefficients across such different variables as educational levels and yearly earnings is limited because measurement units for education (either educational levels or years of education) differ from measurement units for earnings (CHF per hour, CHF per year). Considering the dual educational system, it is even problematic to impose an ordinal measure of education. For example, it is not clear whether a maturity degree is superior or inferior to a finished apprenticeship. Although this could be resolved by grouping different educational levels together (e.g. according to the ISCED classification), such an approach brings a considerable loss of information. The correlation is even more problematic for parental education, where any combination of father's and mother's education would need to be translated into an ordinal scale.

To avoid assumptions on the rank-ordering of education and to maintain the fine-grained categories of educational levels, we will order educational categories by wage levels. For parental education, we predict hourly wages at the basis of father's and mother's education for each survey year. The rank-order necessary for correlations is therefore obtained through the data rather than through theoretical assumptions. We will compute rank-order correlations (Spearman correlation) not only for education, but also for earnings. This approach limits the effect of outliers, does not assume a linear relationship between partner's earnings and refers to relative homogamy rather than absolute homogamy.

For educational levels, the SHP distinguishes the following categories: compulsory school or less (1), elementary vocational training (2), domestic science course, 1 year school of commerce or general training school (3), apprenticeship (4), full-time vocational school (5), vocational maturity, teacher training college , maturity (6), vocational high school with federal master certificate (7), technical or vocational high school (8), university of applied science or university of teacher education (9), academic university (10), PhD (11).

Hourly wages have been computed at the basis of hourly wages and weekly working hours, but this information is often missing. Some respondents did not respond to the respective questions (13% of men and 15.8% of women participating in the individual interview). In addition, 5.9% of men and 21% of women participating in the individual interview did not work at the moment of the interview. We imputed hourly wages for both types of missing values. For inactive individuals, the imputed hourly wages do not represent realised earnings, but a simulated wage potential. It is important to

include these individuals into the analysis to avoid important selection bias. The SHP provides a very good basis for such imputations because it includes information on earnings from other panel waves and asks inactive individuals about their last job (e.g. self-employment, profession, hierarchical position and economic sector). The simulated hourly wages of non-working individuals are indeed considerably lower than hourly wages of active individuals, which illustrates the selection bias when this group is excluded from the analysis. [5] We have top-coded earnings to exclude implausible values and limit the influence of outliers.[6]

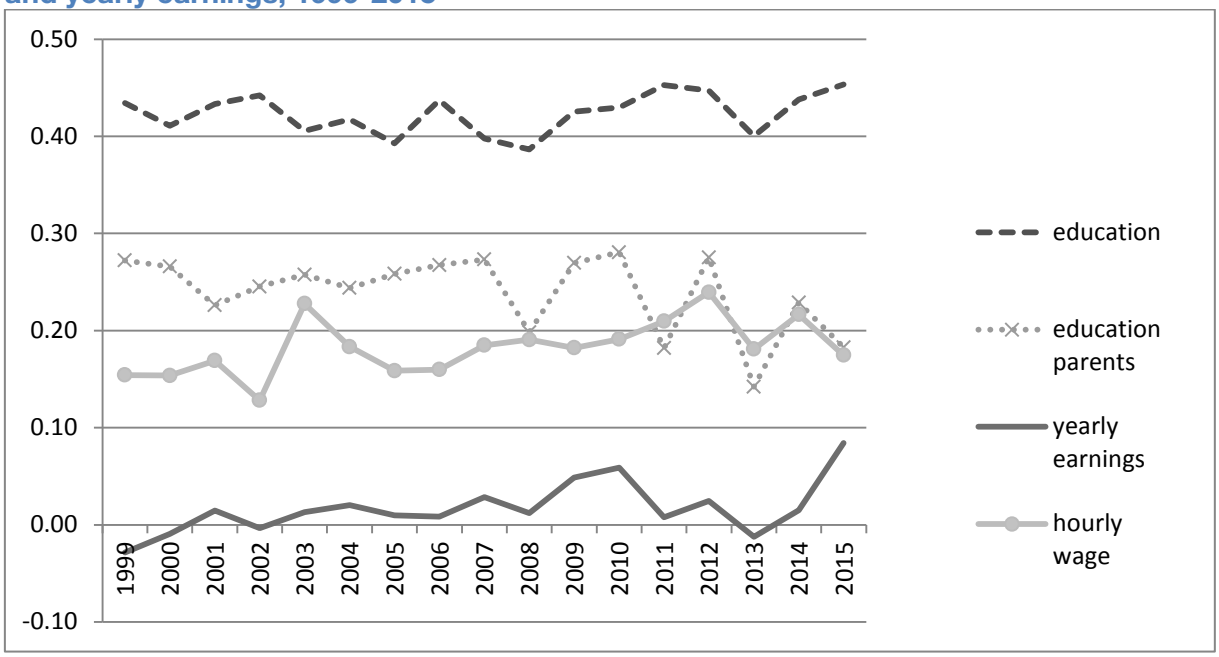
In the second analysis, we estimate the impact of assortative mating on earnings inequality. We compare actual Gini coefficients with counterfactual scenarios assuming that assortative mating is maximal (e.g. the highest earning woman cohabitates with the highest earning man), minimal (e.g. the highest earning woman cohabitates with the lowest earning man) or random assignment of partners. Gini coefficients are the most commonly used indices of inequality and they range from a minimum of 0, where inequality does not exist, to a maximum of 1, where there is perfect inequality. As other index-based approaches (see Breen and Salazar 2010), this methodology is not able to capture precise individual changes in labour supply for which more-sophisticated labour supply models are required (see Bredemeier and Juessen 2013; Pestel 2017). To address the fact that working hours might change with different partners, we estimate counterfactual distributions not only for yearly earnings but also for hourly wage.

[5] We used a sequential procedure for the imputation. If information on the hourly wage of an individual was available in a previous wave, we impute this with this former value adjusted for inflation. This was possible for 51% of individuals with missing hourly wage and for 29% of inactive individuals. If no such information was available, we used information from the next wave if possible (11% of individuals with missing hourly wage, 4% of inactive). The remaining missing information has been imputed using the iterative algorithm from« mi impute chained » in Stata separately for men and women.
The regression included many variables on the employment situation from the current or previous job (self-employment, ISCO code, hierarchical position, economic sector), as well as region, education, age, civil status, children, residence permit and fluency in national language. The R-squared for the imputation of hourly wage is 0.35 for men and 0.28 for women.
[6] Hourly wages have been top-coded at 10 times their median value of each survey year. For realised earnings, we top-coded the 0.25 percent wages.

4. Homogamy in education, hourly wages, and yearly earnings

We compare partners' rank-order correlations in their educational levels, their parents' educational level, hourly wages and yearly earnings (realised earnings). This is illustrated in Figure 1.

Figure 1: Correlation in spouses' education, parental education, hourly wages and yearly earnings, 1999-2015



Notes: Authors' computations with the SHP 1999-2015. Number of observations (couples): 39'685 (1962-3402 per year). The correlation coefficients of education (own education and parental education) is based on predicted yearly earnings and 11 educational levels. Hourly wage has been imputed for missing values and inactive individuals. Source: SHP 1999-2015. Data have been weighted using cross-sectional individual weights.

Figure 1 shows that the correlation is strongest for educational homogamy with coefficients ranging between .39 and .45. The correlation created with parental education ranges between .18 and .28 and is clearly weaker, but substantial. We can therefore affirm that parental education is still an important characteristic for couple formation and represents a channel of transmission of social status through generations. Educational homogamy has remained rather stable over time, but the homogamy in parental education seems to have declined slightly.[7]

[7] To test the possible impact of panel attrition, we compared the first waves of the different SHP samples (SHP I in 1999, SHP II in 2004, SHP III in 2014). For own education, the correlation coefficient was 0.44 in 1999 and 2004 and amounted to 0.46 in 2015. For parental education, the correlation amounted to 0.27 in 1999, 0.24 in 2004 and 0.28 in 2014. Considering the limited sample size of these analyses, we can confirm relatively stable correlation for education from 1999 to 2015.

Hourly wages of partners are positively correlated with values ranging between .15 and .24, which reveals sorting on ability to generate labour income. The fact that the correlation of hourly wages is clearly weaker than the correlation of educational levels shows that wages are only partly determined by education. In other words, the level of education is only one among many components explaining hourly wages. Different fields of study, different career paths and the gender-wage gap are the most probable causes for this dissonance in correlation levels. Interestingly, wage homogeneity seems to have increased slightly over time, suggesting that economic aspects played a more important role for mating patterns in 2015 as they did in 1999. The average correlation from 1999-2007 amounted to .17, while the average correlation from 2008-2015 reached .20.[8]

Finally, we turn to yearly earnings, which are hardly correlated between spouses. Considering that the correlation for hourly wage is clearly positive and stronger than for yearly earnings, it becomes clear that labour supply is responsible for the absent correlation of realised earnings in Switzerland. Even if there is no strong time trend, the correlation seems to have become stronger in recent years. The average correlation from 1999-2007 amounted to .01, while the average correlation from 2008-2015 reached .02.[9]

The fact that the different types of economic homogamy (captured by correlation coefficients) have evolved differently over time reveals two interesting conclusions. First, the increasing correlation for earnings cannot be explained by increasing educational homogamy. Second, the stronger correlation of partners' realised earnings in recent years can be explained neither by stronger educational assortative mating nor by stronger sorting on wage potentials. Rather, women seem to adjust their labour supply less strongly to their partner's characteristics. Therefore, rising female labour force participation is responsible for the increasing correlation of realised earnings over time. Women have increased both their participation rates and their work percentages (see e.g. Kuhn and Ravazzini 2017). Nevertheless, the correlation of yearly earnings is close to zero and therefore considerably weaker than in other countries. Harkness (2013) compared 17 industrialised countries for a

[8] To assure that the time trend is significant, we have also estimated a linear regression of hourly wages on partner's hourly wages and an interaction with the time trend. Pearson correlation coefficients are slightly weaker than the rank-order correlations in Figure 1 (average of 0.12 from 1999-20015 compared to average of 0.18).

[9] Pearson correlation coefficients are slightly higher (average of 0.03 from 1999-2007, average of 0.05 from 2008-2015, average of 0.04 from 1999-2015). The average of the Spearman correlation coefficients from 1999-2015 amount to 0.02.

comparable sample selection as in the current study. She reported values between .09 in the Netherlands and .42 in Sweden for 2005. A comparison with recent correlations for France (Frémeaux and Lefranc 2015), which are around .35 for earnings potentials, confirms that assortative mating appears to be relatively low in Switzerland. The situation in West Germany is however not so different. Pestel (2017) finds that correlation of spouses' realised earnings have changed from slightly negative to slightly positive in 2000. The values of the correlation in East Germany are always positive and approximately range between .05 and .15. The absent correlation in Switzerland is most likely due to predominant part-time work among working women and the adaptation of women's working hours to their partners' situation. Women with highly earning partners tend to work less than women with low earning partners (Gerfin and Leu 2007; Kuhn and Ravazzini 2017). Weak assortative mating on earnings and earnings potential, as well as strong gender segregation might further contribute to this weak correlation. Finally and despite these small changes, the situation in Switzerland since 1999 can be considered as rather stable.

We performed some sensitivity analysis to test whether methodological aspects are responsible for the different time-trends for education and for earnings. A first point that deserves a closer look is the impact of imputation of earnings. In contrast to random noise in the data, imputed values could affect correlation coefficients in both directions. To have an idea of this effect in our data, we compared the correlation coefficients of our data including and excluding imputations. Our findings for yearly earnings are hardly affected by the imputed values, but point to even weaker correlations without imputations (pooling all years together, we measure Pearson correlation coefficients of .02 for all couples and of .00 for observed couples only). In contrast, the correlation of observed hourly wages yields slightly stronger correlation coefficients (.17) than the correlation for all hourly wages (.11, including imputed values). The difference originates mainly from the imputation of inactive individuals because the correlation of observed hourly earnings limits the sample to double-earner couples. Since inactive individuals have relatively low hourly wages, the inclusion of inactive individuals weakens the correlation of hourly wages. If we consider imputed values for inactive individuals, but exclude imputations for non-respondents, the correlation coefficient over all survey years' pooled together amounts to .13 (compared to .17 for double earning couples). Despite this small difference, we maintain that the weak correlation of spouses' yearly earnings and hourly wages are therefore not produced by the imputation procedure.

A second methodological aspect is the duration of cohabitation. While parental education and, to a lesser extent, own education are stable characteristics, earnings vary over time. Through aging of individuals in the SHP-sample and attrition of separated individuals, long-term couples might be overestimated in more recent years of the panel. But since wage-gaps within couples tend to widen over the course of the relationship (Ravazzini and Kuhn 2017), we can exclude that the overrepresentation of long-term couples explains the stronger correlation of spouses in later years compared to earlier years.

5. Homogamy in earnings and income inequality

We now focus on the impact of assortative mating on income inequality. Even if assortative mating in Switzerland has changed only little over time, the consequences in terms of income inequality might have changed to a larger extent. This is because the correlation of earnings is only one among several factors explaining income inequality (see e.g. Harkness 2013).

Following the methodology developed by Aslaksen et al. (2005), we proceed in three steps. First, we separate women and men and sort them according to their realised earnings. Second, we reassign partners assuming extreme assortative mating scenarios: maximum assortative mating (highest earning woman is the partner of the highest earning man), minimum assortative mating (highest earning woman is the partner of the least earning) and random assortative mating. Third, we compute Gini indices for these different mating patterns and compare their levels to the observed level of inequality.[10] This approach is a direct way to estimate the potential and actual impact of assortative mating on earnings inequality.

To address two possible problems, we extend this approach for our application. First, measuring income inequality with random partners assumes that there are no labour supply adjustments according to partners' earnings (Pestel 2017). As mentioned above, this assumption does not hold in Switzerland. We therefore compute the Gini index both for realised earnings and for hourly wage. Given that there is no general part-time wage penalty in Switzerland (Schmid 2016), we do not expect that labour supply affects hourly wages. The second problem of previous studies is that they have focused on couples only. By construction, potential effects of selection into

[10] We have computed results also for the Theil index obtaining extremely similar results.

partnership are therefore ignored. To address this issue, we provide two estimates for random mating. The first estimate follows the approach of previous studies and reassigns partners among couple households. The second estimate includes also single households into the random mating process and keeps the share of single and couple households constant. The Gini index is computed for couples only to avoid distortion from different household sizes.

Results of this simulation exercise are presented in the upper part of Table 1 for realised annual earnings, which are determined both by the wage level and by working hours. We only show results for 2000, 2008 and 2015, but the main results hold for other years as well. The most important finding is that the observed earnings inequality does not differ from the counterfactual inequality assuming random mating. This suggests that assortative mating does not contribute to earnings inequality, but only under the (implausible) assumption that working hours do not depend on the partner. Such an interpretation assumes that working hours do not change with a different partner and this is not always the case. If random mating includes also the probability to live with a partner instead of remaining single, we still do not observe a difference between observed and random mating patterns. This means that the selection into partnership does not have consequences in terms of earnings inequality among couples. Another interesting aspect in Table 1 is the minimum and maximum inequality measures. We notice that assortative mating has a high potential impact on income inequality. Assuming that the highest earning woman is living with the lowest earning man, the Gini index would only amount to .1 in 2015. In the opposite scenario, where the highest earning man lives with the highest earning woman, we would observe a Gini index of .37. The minimum and maximum values show that observed inequality is closer to the maximum than to the minimum. This is not the result of assortative mating because the same is true for random mating patters. Inequality is closer to the maximum level than the minimum level because earnings do not follow a normal distribution, but are right skewed.

To separate the aspect of labour supply from the aspect of hourly wages, we now address inequality in hourly wages. Results are presented in the lower part of Table 1. We note that the Gini coefficient for hourly (.19 in 2015) is lower than Gini-coefficient for realised yearly earnings (.28 in 2015). This is because there is no variation and thus no inequality in working hours. For random mating patterns, findings are also slightly different than for annual earnings. The observed inequality is always higher than for random mating patterns, but the 95% confidence intervals are at the margin of being

significant.[11] This suggests that assortative mating has a slight disequalising effect on the income distribution. The same holds when we include a random selection into partnership. This documents that it is not the selection into partnership, but the selection of the partner that plays a role for income inequality. We find that assortative mating slightly increases inequality in hourly wages, but this disequalising effect is reduced or even offset by the adaptation of labour supply. Apparently, Switzerland has remained within traditional division of labour within couples and this has limited the effect of assortative mating on income inequality.

Table 1: Gini index of couples' earnings measured with different paths of assortative mating

Realised earnings (Yearly earnings)					
	Observed	Random among couples	Random among couples and singles	Minimum among couples	Maximum among all
2000	.294 [.281 .306]	.300 [.287 .313]	.296 [.285 .307]	.127 [.116 .137]	.387 [.372 .401]
2008	.286 [.266 .305]	.281 [.265 .296]	.275 [.261 .288]	.101 [.085 .117]	.363 [.345 .380]
2015	.278 [.263 .292]	.273 [.256 .289]	.286 [.272 .299]	.090 [.076 .103]	.363 [.344 .381]
Hourly wage					
	Observed	Random among couples	Random among couples and singles	Minimum among couples	Maximum among all
2000	.188 [.181 .196]	.182 [.174 .189]	.183 [.174 .192]	.073 [.066 .079]	.236 [.226 .247]
2008	.187 [.176 .198]	.171 [.161 .180]	.170 [.161 .179]	.067 [.057 .078]	.232 [.218 .246]
2015	.189 [.179 198]	.173 [.163 .183]	.174 [.165 .182]	.071 [.060 .082]	.239 [.224 .253]

Source: Authors' computations with the SHP 2000-2015. Number of couples: 2449 in 2000, 2167 in 2008, 2960 in 2015, Gini coefficients have been computed from the sum of partners' earnings. Gini coefficients, 95% confidence intervals in brackets. Data have been weighted using cross-sectional individual weights.

6. Conclusions

In the context of public debates on rising income inequality, it is important to understand the main drivers of this evolution. This contribution is the first to address the impact of assortative mating on earnings inequality in Switzerland. It addresses claims that individuals live more frequently with partners with similar earnings, and that homogamy contributes to earnings inequality between households. Our analyses are based on the Swiss Household Panel from 1999 to 2015 and focus on earnings.

[11] We computed the different Gini coefficients for all available years (1999-2015). The confidence intervals of observed inequality and inequality with random mating patterns overlapped in all years.

Because earnings represent the most important income component, the earnings inequality between household directly affect household income inequality.

In line with previous studies, we find a strong potential impact of assortative mating on income inequality. However, the observed inequality in yearly earnings is very close to the inequality we would observe if mating patterns were independent of annual earnings. The main finding of the analysis for realised earnings is thus that assortative mating does not contribute to earnings inequality between 2000 and 2015. This result is in line with results from other countries and namely the US (Breen and Salazar 2011; Greenwood et al. 2014; Hryshko, Juhn, and McCue 2015; Kremer 1997), Denmark (Breen and Andersen 2012 for Denmark; Breen and Salazar 2010 for the UK; Eika, Mogstad, and Zafar 2014 for Norway; Frémeaux and Lefranc 2015 for France; Pestel 2017 for Germany).

A distinction between hourly wages and realised yearly earnings reveals however a more refined picture. Most importantly, there is considerable assortative mating on hourly wages. The rank-order correlation of partners' wage levels is positive with an average of .18 over all the years. Nevertheless, the correlation of hourly wages seems relatively weak compared to studies based on other countries. Homogamy in wage levels is therefore modest in Switzerland. Modest levels of educational homogamy and modest influence of education on the wage level are the most likely explanations. For hourly wage, we found that assortative mating increases earnings inequality between households slightly but not significantly. However, this small disequalising effect of assortative mating in Switzerland is offset by labour supply adjustments. Other studies have shown that, in Switzerland, women with high earning partners work fewer hours than women with low earning partners (Gerfin and Leu 2007). Also studies for Germany and France (Pestel 2017, Frémeaux and Lefranc 2015), have found that the adaptation of labour supply to the earnings of the partner mitigates inequality at a societal level. It is however to remark that this process amplifies inequality within couples by a traditional division of labour. In this case, inequality within couples brings more equality between couples. We found however some indications that this adaptation might have declined over time. Further increases in women's working hours, particularly for women with high earning partners, are likely to increase income inequality in the future. Considering everything, the small effects of assortative mating on hourly wage and labour supply adjustments explain why we did not find any impact of assortative mating on inequality of yearly earnings. We can conclude by saying that homogamy in earnings has so far not contribute to household income inequality in Switzerland.

We also addressed some additional points, which are worth mentioning. First, we dealt with the potential impact of selection into partnership on income inequality. Our analysis reveals that the process of who remains single and who lives in a partnership does not mitigate or aggravate earnings inequality. Second, we looked at the evolution of educational assortative mating, which seemed stable over the period of observation both for the education of the two partners and for parental education. The slight increase of homogamy in hourly wages can therefore not be attributed to stronger educational homogamy. A possible loss of signalling effect in terms of earnings and prestige attached to the level of education through the educational expansion is a possible explanation. It would be interesting to include other characteristics of education, such as the prestige of the university or fields of study into the analysis. The diverging trends in the correlations in educational levels, hourly wages and yearly earnings illustrate that studies on one of these aspects alone cannot be used to infer on others.

7. Literature

Aaberge, Rolf, John K. Dagsvik, and Steinar Strøm. 1995. 'Labor Supply Responses and Welfare Effects of Tax Reforms'. *The Scandinavian Journal of Economics* 97 (4): 635–59. doi:10.2307/3440547.

Aslaksen, Iulie, Tom Wennemo, and Rolf Aaberge. 2005. '"Birds of a Feather Flock Together": The Impact of Choice of Spouse on Family Labor Income Inequality'. *LABOUR* 19 (3): 491–515. doi:10.1111/j.1467-9914.2005.00311.x.

Autor, David H., Lawrecne F. Katz, and Melissa S. Kearney. 2008. 'Trends in U.S. Wage Inequality: Revising the Revisionists'. *Review of Economics and Statistics* 90 (2): 300–323.

Blackburn, McKinley L., and David E. Bloom. 1995. 'Changes in the Structure of Family Income Inequality in the United States and Other Industrial Nations during the 1980s'. In *Research in Labor Economics*, edited by Polacheck, 14:141–70. Greenwich, Conn.: JAI.

Bredemeier, Christian, and Falko Juessen. 2013. 'Assortative Mating and Female Labor Supply'. *Journal of Labor Economics* 31 (3): 603–31. doi:10.1086/669820.

Breen, Richard, and Signe Hald Andersen. 2012. 'Educational Assortative Mating and Income Inequality in Denmark'. *Demography* 49 (3): 867–87. doi:10.1007/s13524-012-0111-2.

Breen, Richard, and Leire Salazar. 2010. 'Has Increased Women's Educational Attainment Led to Greater Earnings Inequality in the United Kingdom? A Multivariate Decomposition Analysis'. *European Sociological Review* 26 (2): 143–57. doi:10.1093/esr/jcp011.

———. 2011. 'Educational Assortative Mating and Earnings Inequality in the United States'. *American Journal of Sociology* 117 (3): 808–43. doi:10.1086/661778.

Budría, Santiago, and Pedro Telhado-Pereira. 2011. 'Educational Qualifications And Wage Inequality: Evidence For Europe'. *Revista de Economia Aplicada* 19 (2): 5–34.

Cancian, Maria, Sheldon Danziger, and Peter Gottschalk. 1993. 'Working Wives and Family Income Inequality among Married Couples.' In . [Unpublished] 1992. Presented at the Annual Meeting of the Population Association of America Denver Colorado April 30-May 2 1992.

Cancian, Maria, and Deborah Reed. 1999. 'The Impact of Wives' Earnings on Income Inequality: Issues and Estimates'. *Demography* 36 (2): 173–84. doi:10.2307/2648106.

Cancian, Maria, and Robert F. Schoeni. 1998. 'Wives' Earnings and the Level and Distribution of Married Couples' Earnings in Developed Countries'. *Journal of Income Distribution* 8 (1): 45–64.

Collins, Randall. 1971. 'Functional and Conflict Theories of Educational Stratification'. *American Sociological Review* 36 (6): 1002–19. doi:10.2307/2093761.

Eika, Lasse, Magne Mogstad, and Basit Zafar. 2014. 'Educational Assortative Mating and Household Income Inequality'. Working Paper 20271. National Bureau of Economic Research. http://www.nber.org/papers/w20271.

Esping-Andersen, Gøsta. 2007. 'Sociological Explanations of Changing Income Distributions'. *American Behavioral Scientist* 50 (5): 639–58. doi:10.1177/0002764206295011.

Frémeaux, N., and A. Lefranc. 2015. 'Assortative Mating and Earnings Inequality in France'. presented at the ECINEQ conference paper: http://www.ecineq.org/ecineq_lux15/FILESx2015/CR2/p224.pdf.

Gerfin, Michael. 1993. 'A Simultaneous Discrete Choice Model of Labor Supply and Wages for Married Women in Switzerland'. *Empirical Economics* 18 (2): 337–56. doi:10.1007/BF01205407.

Gerfin, Michael, and Robert E. Leu. 2007. 'Evaluating the Cost-Effectiveness of In-Work Benefits: A Simulation Study for Switzerland'. *German Economic Review* 8 (4): 447–67. doi:10.1111/j.1468-0475.2007.00414.x.

Goode, William Josiah. 1963. *World Revolution and Family Patterns*. New York: Free Press.

Greenwood, Jeremy, Nezih Guner, Georgi Kocharkov, and Cezar Santos. 2014. 'Marry Your Like: Assortative Mating and Income Inequality'. Working Paper 19829. National Bureau of Economic Research. http://www.nber.org/papers/w19829.

Harkness, Susan. 2013. 'Women's Employment and Household Income Inequality'. In *Income Inequality: Economic Disparities and the Middle Class in Affluent Countries*, edited by Janet Gornick, 207–33. Stanford, CA.: Stanford University Press.

Hryshko, Dmytro, Chinhui Juhn, and Kristin McCue. 2015. 'Trends in Earnings Inequality and Earnings Instability among U.S. Couples: How Important Is Assortative Matching?' Working Papers 2015–1. University of Alberta, Department of Economics. http://EconPapers.repec.org/RePEc:ris:albaec:2015_001.

Kalmijn, Matthijs. 1998. 'Intermarriage and Homogamy: Causes, Patterns, Trends'. *Annual Review of Sociology* 24 (1): 395–421. doi:10.1146/annurev.soc.24.1.395.

Kremer, Michael. 1997. ‘How Much Does Sorting Increase Inequality?’ *The Quarterly Journal of Economics* 112 (1): 115–39. doi:10.1162/003355397555145.

Kuhn, Ursina, and Laura Ravazzini. 2017. ‘Female Labour Force Participation and Income Inequality: A Study on the Effect of Part-Time Work in Switzerland’. *Swiss Journal of Sociology* 43 (1): 115–135.

Lam, David. 1997. ‘Chapter 18 Demographic Variables and Income Inequality’. In *Handbook of Population and Family Economics*, edited by Mark R. Rosenzweig and Oded Stark, Volume 1, Part B:1015–59. Elsevier.

Larrimore, Jeff. 2014. ‘Accounting for United States Household Income Inequality Trends: The Changing Importance of Household Structure and Male and Female Labor Earnings Inequality’. *Review of Income and Wealth* 60 (4): 683–701. doi:10.1111/roiw.12043.

Lemieux, Thomas. 2006. ‘Increasing Residual Wage Inequality: Composition Effects, Noisy Data, or Rising Demand for Skill?’ *The American Economic Review* 96 (3): 461–98.

Pestel, Nico. 2017. ‘Marital Sorting, Inequality and the Role of Female Labour Supply: Evidence from East and West Germany’. *Economica* 84 (333): 104–27. doi:10.1111/ecca.12189.

Ravazzini, Laura, and Ursina Kuhn. 2017. ‘Do Opposites Attract? Educational Assortative Mating and Dynamics of Wage Homogamy in Switzerland, 1992-2014’. *Swiss Journal of Sociology* 43(3), in press.

Reed, Deborah, and Maria Cancian. 2001. ‘Sources of Inequality: Measuring the Contributions of Income Sources to Rising Family Income Inequality’. *Review of Income and Wealth* 47 (3): 321–33. doi:10.1111/1475-4991.00020.

Schmid, Flurina. 2016. ‘The Gender Wage Gap in Switzerland over Time’. *Swiss Journal of Sociology* 42 (3). doi:10.1515/sjs-2016-0020.

Schwartz, Christine R. 2010. ‘Earnings Inequality and the Changing Association between Spouses’ Earnings’. *AJS; American Journal of Sociology* 115 (5): 1524–57. doi:10.1086/651373.

———. 2013. ‘Trends and Variation in Assortative Mating: Causes and Consequences’. *Annual Review of Sociology* 39 (1): 451–70. doi:10.1146/annurev-soc-071312-145544.

Suter, Christian, Ursina Kuhn, Pascale Gazareth, Eric Crettaz, and Laura Ravazzini. 2016. ‘Considering the Various Data Sources, Survey Types and Indicators: To What Extent Do Conclusions Regarding the Evolution of Income Inequality in Switzerland since the Early 1990s Converge?’ In *Essays on Inequality and*

Integration, edited by Axel Franzen, Ben Jann, Christian Joppke, and Eric Widmer, 154–83. Zurich: Seismo.

Sweeney, Megan M., and Maria Cancian. 2004. 'The Changing Importance of White Women's Economic Prospects for Assortative Mating'. *Journal of Marriage and Family* 66 (4): 1015–28.