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Intergenerational Income Mobility in Sweden: A look at the spatial disparities across cities[§]

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Abstract

This paper provides a comprehensive overview of intergenerational income mobility in Sweden. Intergenerational income mobility is considered in both relative and absolute terms, and the analysis is carried out at the individual and municipality-level. We use multilevel models to explore the correlation between upward mobility and social, economic and demographic characteristics of cities. The analyses is carried out on three subpopulations: offspring who live in a different municipality than their parents (mobile population); offspring who live in the municipality where they grew up (immobile population); offspring belonging to visible minority groups.

Our results confirm those of previous studies showing a relatively high intergenerational mobility in Sweden compared to other European and North American countries. Substantial differences are observed across municipalities meaning that the particular combination of municipality attributes contributes to shaping the chance of status attainment among young generations. Highly mobile municipalities have more significant human capital, more residential segregation by income, more income inequality, and greater accessibility to jobs.

Key Words: Intergenerational social mobility; multilevel models; cities.

JEL Codes: J62; R11; R12.

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1. Introduction

Intergenerational social mobility is a widely accepted measure of the relationship between the socioeconomic status of parents and that of their children. It has been examined in great detail for different countries and by cross-country comparisons. Majority of these studies compute the stickiness of intergenerational links in terms of income, occupation or education by either parametric or non-parametric approaches. Previous literature offers an extensive empirical investigation of social mobility, and starting from early contributions, the degree of social mobility is considered as a measure of countries' openness (Blau and Duncan, 1967; Erikson and Goldthorpe, 1992). In socially mobile or open societies, status attainment is independent of the social origin, and advantages or disadvantages are not passed on to the next generation (Hout, 1988).

Family background affects the opportunities of offspring through well-known channels such as financial constraints, investments in education and skills (Becker and Tomes, 1979; Becker and Tomes, 1996). At the country scale, social mobility is often attributed to a set of factors including economic development, industrialisation, institutions, and in particular the accessibility of education and related policies (Schuetz et al, 2008). Most of the previous studies offer social mobility measures either from a comparative perspective across countries or temporal changes in the same country, for instance, to tract evaluation of distributive policies. Recently, few works investigate the heterogeneity in social mobility within countries, across administrative units. The most notable works in this respect include Chetty's contributions on the United States, where social mobility is shown to differ significantly within in the country and among the geographical areas defined as commuting zones or counties (Chetty et al., 2014; 2016; 2018a; 2018b). Chetty et al. (2014) point out two advantages of focusing on within county comparisons as opposed to cross-country comparisons. Cross-country comparisons often suffer from differences in methods and measurements, which might be overcome by a unified method within a country. The second advantage is that within-country comparisons allow studying both relative and absolute measures of social mobility, such investigation would necessarily be confined to a single focus on relative mobility in cross-country comparisons due to the lack of a common absolute scale (Ray 2010; Chetty et al. 2014). Following the recent literature, the present paper offers an empirical investigation of intergenerational social mobility within Sweden, with particular attention on the spatial factors correlated with the observed heterogeneity in social mobility among Swedish municipalities.

Sweden is among the countries for which several studies examined social mobility dynamics and patterns for different periods. The common result is that intergenerational social mobility is relatively high in Sweden in comparison with other European countries and the United States (Björklund and Jäntti, 1997; Corak, 2006; D'Addio, 2007). Recently, Heidrich (2017) looked at the intergenerational income mobility within the country considering the variation in the local labour market as the unit of the analysis, where the local labour market is an aggregation of municipalities defined by commuting patterns. Heidrich (2017) identified large regional differences, particularly in absolute outcomes.

In this paper, we assess intergenerational income mobility in Sweden using multilevel models. We differ from previous studies in three respects: first, we carry out our analysis at a more detailed geographical level, i.e. municipalities, viewed as a combination of social, economic and demographic factors which are expected to contribute to the social mobility of its inhabitants. Second, we estimate the correlations between upward mobility and municipality characteristics that are assumed to account for geographical variation. We include a wider set of municipality characteristics than previous works carried out to analyse social mobility in the US or other European countries. This allows us to disentangle the effect of specific factors, such as the spatial distribution of income inequality within city, that in general have not been considered. Finally, we conduct the analysis for three subpopulations. We track offspring from their parental residences to current residences and define two populations. Individuals who live in the same municipality as their parents are defined as immobile and those who live in a different municipality represent the mobile population. The third population consists of visible minorities.

Our results show that mobile population shows significantly higher social mobility than the immobile population and the intergenerational social links are weaker among visible minorities than the whole population. Residential location is one of the channels determining intergenerational income mobility. We observe substantial differences across municipalities with higher mobility in big metropolitan areas like Malmö, Stockholm and Göteborg, and in areas close to major urban centres, especially Northern parts of the country. Most of the socio-economic factors defined at the municipality level account for this heterogeneity, and our results about them provide new insights for policy makers. For example, previous studies about intergenerational social mobility show a negative relationship between inequality and social mobility, implying that higher inequality is associated with lower intergenerational social mobility. The main suggestion for policy makers has been to favour a more even availability of economic resources in order to equalise opportunities and enhancing by this way social mobility. In this paper, we find that controlling for poverty, a degree of inequality within a city may provide a powerful incentive to upward mobility.

We show that our findings are robust to different specifications of the econometric models used in the study.

The remainder of the paper is as follows. Sections 2 presents the measures used to assess intergenerational income mobility. Section 3 describes the data. Section 4 presents the empirical strategy. Section 5 discusses our findings on income mobility in Sweden at the municipality level. Section 6 concludes.

2. Measures of Intergenerational Income Mobility

In this section, we present measures of intergenerational income mobility used in the literature. Intergenerational income mobility can be measured both in relative and absolute terms. Relative mobility depends on one's place in the income distribution. If a person's income puts him at the 70^{th} percentile of the distribution and his parents were at the 40^{th} at a comparable point in their lives, the relative mobility index indicates upward intergenerational mobility.

Absolute mobility refers to the degree to which individuals move up or down compared to their parents in absolute terms. If a person's inflation-adjusted income is higher than the income of her parents at a comparable point in life, the absolute mobility index indicates upward intergenerational mobility.

2.1 Relative Measures of Intergenerational Income Mobility.

Two measures of relative mobility are widely used in previous studies on intergenerational income mobility. The first measure is the elasticity of income between offspring and parents, known as intergenerational elasticity (IGE). It is estimated by regressing the log of the child's income on the log of parents' income. The slope parameter of the model quantifies the dependency of offspring' log outcomes on those of their parents. In formal terms:

$$y_c = \alpha + \beta y_p + \varepsilon \qquad (1)$$

where y_c is the offspring's log income; y_p is the parental log income observed at similar ages of offspring; ε is the error term. The parameter β measures the IGE representing the fraction of income that is on average transmitted across generations (Moonen and van den Brakel, 2011). The higher the elasticity, the lower the income mobility.

The second measure of relative intergenerational income mobility is the rank-rank correlation measure, which makes use of relative positions of both offspring and parents in overall income distribution (Dahl and Deleire, 2008). First, both offspring and parents' incomes are ranked according to their relative position in the national income distribution and ranks are scaled between 0 and 100. The conditional expectation of offspring's income rank, given the rank position of parents, is estimated as follows:

$$R_c = \alpha + \alpha_1 R_p + u \quad (2)$$

where R_c and R_p are income ranks of offspring and parents, respectively; α is the intercept term; and u is the error. The parameter α_1 is the rank-rank slope and measures the correlation between offspring and parents' positions in the income distribution. As pointed out by Mazumder (2015), rank based measures, as the rank-rank slope, allow geographic comparisons, since ranks by geographical areas are all fixed to the national income distribution.

2.2 Absolute Measures of Intergenerational Income Mobility.

Measures of absolute mobility offer a different understanding of how much equal opportunities are provided to offspring with low-income family backgrounds. The first measure is called *absolute upward mobility* (Chetty et al. 2014), and it is defined as the expected income rank of a child with parents located at a given percentile in the parental income distribution. Typically, it is of interest to measure the average absolute mobility for children with parents whose income fall below the median of the national income distribution, and also the mean income rank of offspring whose parents are at percentile 25.

The second measure corresponds to the child's probability of rising from the bottom quantile to the top quintile of the income distribution (Corak and Heisz, 1999; Hertz, 2006; Chetty et al., 2014). It can be interpreted as the percentage of children reaching the highest quantile while their parents were in the first quantile. Chetty et al. (2014) state that it is "a measure of the fraction of children who achieve the "American Dream" (Chetty et al., 2014 p. 7).

3. Data and Variables

We employ the PLACE longitudinal database. It provides detailed information about the demographic and socio-economic characteristics of all residents in Sweden. We consider the 2014 wave, which is the latest available.

In contrast to studies where only the age of the offspring is known, we do in this case have the age of both parents. This is a benefit for the analysis, also implying a rise in the number of alternative model specifications. When analysing the link between two generations, we first consider the parent with the highest income. Then we repeat the analysis with the household income corrected for differences in household size and composition (Siermann et al., 2004). A concern arises since parental income, especially that of the mother, could be endogenous to offspring's income. However, as pointed out by Heidrich (2017), since '60 women were strongly encouraged to participate in the labour market owing to the expansion of both the public sector and public child care.

We calculate the multi-year average of both offspring and parental income in order to reduce the potential bias induced by transitory income fluctuations. According to Corak and Heisz (1999), the average should be calculated at least over three years, and five years is a time horizon long enough to reduce the bias. Some years later, Mazumder (2005) argued that averaging over five years still results in downward bias. To overcome these limitations, we consider offspring aged from 30 to 39 years in 2014 and average their income over ten years. We consider parental income when parents were 30 - 39 years old. Overall, our sample is composed of more than 500,000 young individuals living in 290 Swedish municipalities. To compute the rank-rank correlation coefficient, we rank the offspring as well as the parent's income and normalise on a scale from 0 to 100, where the scale 100 represents the wealthiest segments of the society.

We consider the first group of variables characterising individuals, such as gender, visible minority background, the completed field of study at the university, and the highest-earning parent's income rank. In some detail:

- Parental income, using income data from the only or both parents (criteria for inclusion of parents is described above) in years 1990 and 1991, the ranked and normalized maximum income values (spanning between 0 and 100) are used to indicate the parent's wealth.
- Gender is measured as a binary variable indicating whether the individual is *female* or not.
- *Visible Minority* is a binary variable indicating if the individual was born in Africa, Asia (excluding Russia) or Latin America.
- *Migration Distance* is the log cartesian distance between the home of 1991 (observed residence of parents) and the coordinates of residence in 2014.
- Education is partitioned into 10 different sub-groups based on professional specialization. The following categories are considered: *Miscellaneous* (mostly general education on intermediate level), *Pedagogy* (teacher training and other teaching related educations), *Arts and Humanities*, *Social sciences* (wide range of professions with social scientific educations), *Natural sciences* (Biology, Chemistry, physics, etc.), *Tech and manufacturing* (wide range of jobs including engineering and IT), Agrarian sectors (occupations oriented towards fisheries and farming), *Health educations* (wide range of occupations including health-care, and pharmacy), *Services* (occupations oriented towards tourism, hotel, restaurants, etc.), and finally *Unknown* (often due to complex international migration events).

We also consider different aspects of cities that are expected to have a given relationship with the degree to which economic status is transmitted across generations. With the exception for the accessibility variable, all city-level variables have been normalized (z-score) on a municipality level (i.e. average score for each variable is zero in a *n*=290 municipality dataset). Descriptive values in Table 1 representing the variables are the population weighted statistics, since the population count varies significantly between municipalities. The City variables are the following:

- *Income equality* is the inverse Gini coefficient in each municipality. Gini is calculated using individual level registers of disposable income cumulated at the municipality level. High values of Income Equality indicate that wealth is evenly distributed, while low values indicate the opposite.
- *GSS14_100*, is an individualized, and localized index of income segregation. Using a k-nearest neighbour approach, the distribution of disposable income among the 100 nearest neighbours (from a full population using all resident individuals in Sweden 2014) are computed.
- *Economic diversification* is measured as the municipality's deviation from the national industrial mix in terms of the number of employees in the manufacturing, service, and public sector.
- *Regional affordability* is proxied by dividing the median disposable income at the municipality level by the average housing price for single-family homes, also at the municipality level. Resulting values are higher in municipalities with greater affordability.
- *Business Environment* is a measure for the business climate in Swedish municipalities annually delivered by the Confederation of Swedish Enterprise (Svenskt Näringsliv). The latter ranks Swedish municipalities according to their business climate on the basis of a broad range of sub-variables comprising factors such as local taxes, communications and skill-matching (Företagsklimat, 2013).
- *Escape poverty* is the percentage of population at the municipality level having a greater annual income than what is defined as the poverty line.
- *Voter participation* indicates the share of voting eligible that were participating in the national elections in 2014.
- *Log job accessibility* is based on potential accessibility to all jobs from the average residential coordinate in each municipality in Sweden. Accessibility is measured using an unconstrained Hansen (1959) approach.

- *Educational attainment* is the percentage of aged 25 + with a bachelor's degree.

The variables used in the paper are listed in Table 1.

Table 1: Variables and descriptives at different levels of analysis of Swedish data.

Level of analysis	Variable	Description	Mean or %	Std Dev.	Min	Max
1. Individual	Child ID	Over-time identifier	NA	NA	NA	NA
	Gender (female = 1)	Sex at birth	48.59%		0	1
	Visible minority background	Identify individuals as born in Africa, Asia or Latin America	4.77%		0	1
	Migration Distance	log-cartesian distance (m) between residential coordinates as child and as adult	9.038	3.187	0	15.863
	Education:	Completed field of study at the university	100%		0	9
	Miscellaneous	Any other education	17.83%		0	0
	Pedagogy	Teacher training	7.36%		1	1
	Arts and - humanities	Free arts and media-oriented education	7.22%		2	2
	Social sciences	University oriented, Social sciences	16.02%		3	3
	Natural sciences	University oriented, Natural sciences	3.26%		4	4
	Tech and - manufacturing	Manufacture oriented education	20.63%		5	5
	Agrarian sectors	Farm or animal care-oriented educations	2.04%		6	6
	Health	Health-care educations	14.84%		7	7
	Services	Retail, tourism, etc., educations	7.32%		8	8
	Unknown	Unknown or no post-mandatory education	3.49%		9	9
	Parental income	The highest earning parent's income rank	50	28.871	0	100
2. City	Municipality ID	Count 290 cities	NA	NA	114	2584
	Income equality	Spatial segregation by income	0.709	1.295	-2.271	4.57
	GSS14_100	Individualized neighbourhood	0.324	0.134	0.096	0.773

	indicator of income inequality (GINI)				
Economic diversification	Economic/sectoral diversification	-0.905	1.346	-3.918	2.191
Regional affordability	Share of income used on housing cost	-0.682	0.626	-1.339	4.31
Escape poverty	Share of population who escaped from the poverty status	0.516	0.938	-1.888	4.377
Voter participation	Voter participation in national elections	0.13	0.893	-5.066	2.71
Log job accessibility	Gravity measure of job accessibility as socio-economic conditions in the municipality of residence	10.639	1.530	5.740	13.196

Note: Source: PLACE data set.

4. Empirical Strategy

Our empirical strategy first considers relative measures of social mobility as defined by Models (1) and (2). We estimate the models by multilevel modelling approach. In the second step, we refine our empirical analysis to identify the resources and opportunities that are provided by cities and positively correlate with intergenerational income mobility. We expect statistically significant city fixed-effects as shown by the previous studies (Chetty et al., 2014; Michelangeli and Türk, 2019). We adopt a multilevel framework and introduce the set of variables described in Section 3 as the covariates in models (1) and (2). The advantage of the multilevel model is that it controls for the unobserved heterogeneity at the city-level by a random intercept term. Such a model represents a parsimonious alternative to the OLS regression with city dummy variables and avoids the inevitable multicollinearity between city dummy variables and city attributes.

In the multilevel model, individuals are considered as nested in cities, and the analysis is carried out at the individual level and city level, simultaneously. A common problem with observations nested within a higher level is that there may be a problem of spatial dependencies because individual outcomes (incomes) are likely to be similar in ways not fully accounted by the parental income in a single-level model. Multilevel models allow accommodating the spatial dependency of the residuals by differentiating between-individual errors from between-city errors, when the standard error estimates are biased (Snijders and Bosker, 1999). If the dependency is not taken into account, the results are deemed to be biased from a spatial autocorrelation perspective. A multilevel model of intergenerational income mobility can be defined as follows:

$$y_{cj} = \beta_0 + \beta_{pj} y_{pj} + u_j + \varepsilon_{cj} \tag{4}$$

Where y_{cj} is the log income (or income ranking) of offspring, who lives in city j; β_0 is the intercept and y_{pj} is the log income (or income ranking) of parents; u_j is city specific errors; and ε_{cj} represents individual level residuals. As explained above, β_{pj} measures intergenerational social mobility. Therefore, equation 4 accounts both for intergenerational income elasticity (or rank-rank correlation coefficient) between parent and child, and heterogeneity among cities, simultaneously. We can re-write the equation (4) to estimate the effect of a set of city level fixed variables in relation to relative intergenerational social mobility as follows:

$$y_{cj} = \beta_0 + \beta_{cj} x_{cj} + \beta_j x_j + u_j + \varepsilon_{cj} \tag{5}$$

Where y_{cj}, β_0, u_j and ε_{cj} are defined the same as in equation (4); x_{cj} includes individual level covariates such as gender and log of parental income (or income ranking) at location j, and finally x_j is the set of city level variables. The models are fit by maximum likelihood estimation and the best linear unbiased predictors (BLUPs) are computed to predict city level effects. BLUPs represent the deviations between the intercept for each random subject and the overall intercept.

We also measure absolute intergenerational social mobility by the following two methods:

As explained in section 2, we first measure the mean income rank of offspring whose parents are at percentile 25. After obtaining parameter estimates for each municipality we measure the following formula, again, for each municipality separately.

$$\overline{r25c} = \widehat{\beta_{i0}} + \widehat{\beta_i}25$$

where $\overline{r25c}$ is the mean income rank of offspring whose parents were at percentile 25; $\widehat{\beta_{i0}}$ represents intercept; and $\widehat{\beta_i}25$ is rank-rank correlation coefficient evaluated at percentile 25. Both intercept and rank-rank correlation coefficient are municipality specific and estimated by rank-rank correlation measure in (5) by the multilevel model.

Finally, it is possible to compute the probability of upward mobility by a non-parametric measure. We determine the quintiles of the income distributions of both offspring and parents and calculate the share of offspring whose income is at the highest quintile and whose parents are at the lowest quintile for each municipality separately. Note that the quantiles are defined based on the national income distributions.

5. Results

In this section, we discuss our findings by focusing our attention on the spatial influences in the process of intergenerational income mobility. The analyses start with a national account of intergenerational income mobility for different pairs of parents and their children. Table 2 summaries the outputs from six different multilevel models, wherein children's income is analysed against the highest-earning parent in the household, father or mother, respectively, and also by IGE or the rank-rank slope. In general, we find high intergenerational social mobility in Sweden. Nonetheless, the results point out a stronger dependence between mothers and their children, and the weakest relationship is observed for father-offspring pairs. The IGE coefficient is estimated as 0.14 and represent the extent to which opportunities passed on to the new generation from the highest earning parent. This measure is similar to Österberg (2000)'s estimate of 0.13 between sons and fathers. Björklund et al. (2006) instead estimate an IGE of 0.235 for the year 1999, which represents lower social mobility between fathers and children in Sweden. The reason might be the fact that our sample is relatively more recent compared to Björklund et al. (2006), and most importantly our multilevel modelling strategy explicitly caters for city differences and therefore, locational influences. This means that a part of the variation in the distribution of income is explained by random part of the model, which results with lower test statistics compared to what would have yielded by typically used OLS models. The estimated rank-rank correlation coefficients show that 0.0764, 0.0715 and 0.0936 percentile points increase in children's income ranks as a response to one percentile point increase in the highest-earning parents', fathers' and mother's income ranking, respectively. This finding again points out to high social mobility in Sweden.

In what follows, we present the best linear unbiased predictors (BLUPs) for each multilevel model to identify the cities that offer better chances of upward mobility, when the higher-level effects are treated as random. Fig. 1 displays the maps including random effects for relative measures of social mobility, wherein the first row shows the city effects in intergenerational social mobility between offspring and mother (first map) and offspring and father (second map). The second row includes two maps for the same pairs but with random effects derived from rank-rank correlations. In all maps, we observe similar rankings of cities in terms of their ability to promote better economic attainment. Big metropolitan areas like Malmö, Stockholm and Göteborg, and areas in proximity to major urban centres generate the greater push for upward mobility and that there is a positive correlation between city attributes and earnings of residents. Northern parts of the country also exhibit high values, as these are locations where the mining sector is developed, and earnings are generally high compared to other regions. As a result, overall maps illustrate a degree of heterogeneity in social mobility in different parts of the country. The present paper aims to examine these differences by the set of municipality specific variables as described in the data section. Nevertheless first, we test whether the city-level random effects and the rankings among them are robust if we change the model specification. In particular, we repeat our analyses of intergenerational income mobility by a non-parametric approach similar to Chetty et al., 2014 and for each municipality. The alternative analyses are conducted by first computing the mean income rank of offspring whose mother or father had an income level which was below the median of the income distribution. Then we also compute the probability of offspring to reach the top quintile of the national income distribution, while whose parents were in the bottom quintile. This is done by identifying the quintile position of children and their families in the national income distribution of their respective generations and creating a quintile transition matrix for offspring-father and offspring-mother pairs. The practice allows us to identify the share of offspring who reached the top quintile, departing from families at the bottom quintile. Both of the measures are carried out for each municipality separately. Figure 2 summaries the results, where the first row shows that the mean income rank of offspring with a parent below-median income varies between 31 to 65 percentile points. The second row indicates that the share of (or probability to reach the top quintile) offspring who experienced a jump from the bottom quintile families to the top differ significantly among municipalities and varies between 0 and 42%. These findings, too, point out a degree of heterogeneity among Swedish municipalities in intergenerational income mobility. Moreover, comparing the maps displayed in Figures 1 and 2, we observe the same ranking among municipalities.

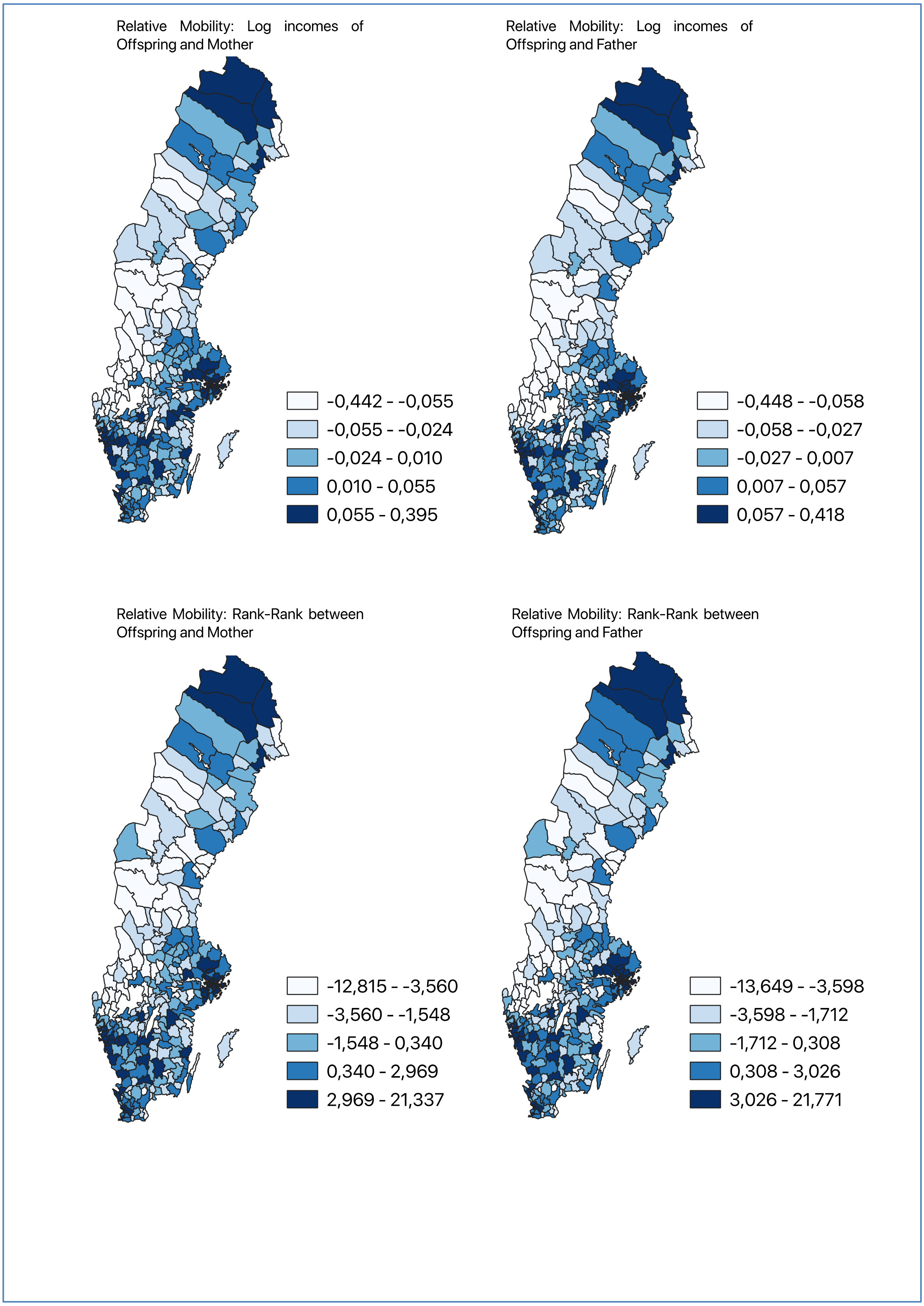

Figure 1 Relative measures of intergenerational social mobility, heterogeneity among municipalities.

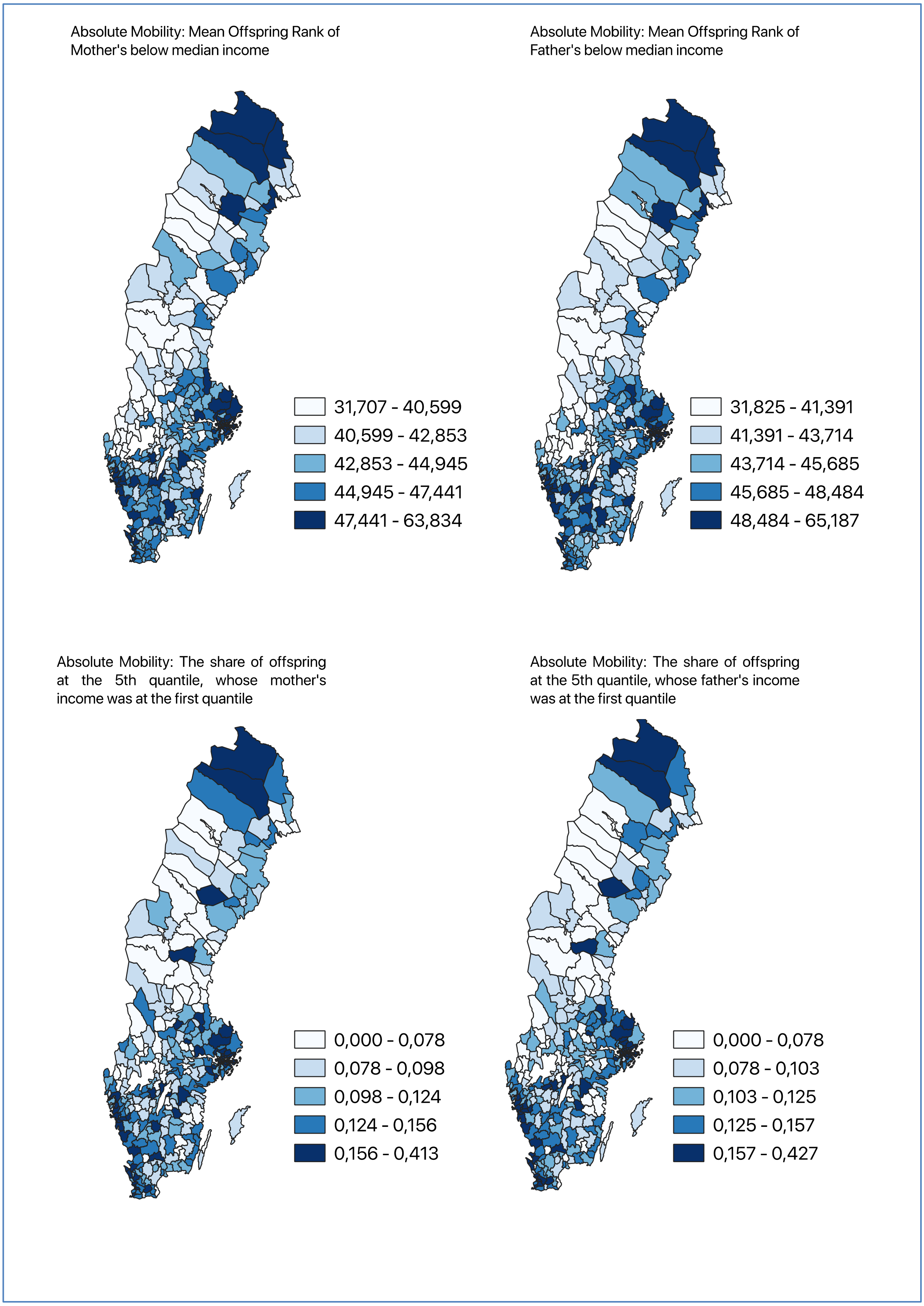

Figure 2 Absolute measures of intergenerational social mobility, heterogeneity among municipalities.

This means that the BLUPs from multilevel models are robust predictors of municipality effects and that we can conduct the following analyses to examine the dynamics behind the observed spatial heterogeneity by the multilevel model described in equation (5). Appendix Table A1 also points out a strong correlation between BLUPs and non-parametric measures of municipality effects. In addition to offspring-mother or father pairs, Table A1 includes offspring and the highest-earning parent as the background variable. All specifications result to be highly correlated with each other.

Table 2: Social mobility measures for different pairs of parents and offspring, and income definition.

Child's outcome	***Coefficient (Std. Err)***
Log parents' income	0.1400*** (0.0027)
Log father's income	0.0971*** (0.0016)
Log mother's income	0.1596*** (0.0021)
Parents' income rank	0.0764*** (0.0017)
Father's income rank	0.0715*** (0.0013)
Mother's income rank	0.0936*** (0.0013)
Number of observations	551,814
Number of cities	290

Note: Each cell in this table reports the estimated coefficient with standard errors in parentheses from different multilevel models. The dependent variable is the child outcome; the explanatory variable is the parental income measure.

In the following analyses, we specify a multilevel model with offspring's income rank as the dependent variable, and both additional first-level covariates and a set of second-level variables. We use rank-rank correlation analysis as the benchmark model since percentile ranks are more robust predictors of economic status across years and among locations, which allows us to conduct comparative investigations. The similarity between the outputs from different models in estimating municipality level effects also gives us a degree of freedom to choose the final model specification. The final model is conducted for three populations: the immobile population includes individuals who have lived in the same municipality for more than 15 years, and the mobile population is defined otherwise; the third population consists of visible minorities.

The final model includes gender, visible minority background (for mobile and immobile populations), the completed field of study at the university, and the highest-earning parent's income rank as individual-level variables. To account for the mobility both for mobile and immobile populations, we define the distance from the parental house to the current location as an independent variable. At the second level, we introduce spatial segregation by income, economic/sectoral diversification, regional affordability, business environment, the share of highly educated individuals, the share of the population who escaped from the poverty status, voter participation at local elections, and a gravity measure of job accessibility as socio-economic conditions in the municipality of residence. Table 3 shows the outputs from the multilevel models. The results point to lower social mobility for the immobile population. The coefficient of the parental income rank is 0.079, which is higher than the results shown in the fifth row of Table 2. The highest intergenerational social mobility is computed for individuals who belong to VMs. This means that the association between the earnings of generations is lower among VMs than the entire population in Sweden. Previous studies have documented different trends in various countries (see Platt, 2005, for Britain). For instance, Aydemir et al. (2009) show that in Canada, intergenerational social mobility is similar between the whole population and immigrants, but greater than it is in the US. Even though VMs experience higher mobility, they are generally disadvantaged as indicated by the coefficients of the variable VM Model 1 and 2, where belonging to the VM population is associated with around nine percentage points decrease in adult income ranks. The results also show that gender is a significant determinant of earnings and that the effect varies between the three populations. Females have almost 16 percentage points fewer income rankings than men in the immobile population and around 12 percentage points in the mobile population and VMs. That the mobile women have higher chances of social mobility compared to immobile population can be explained by moving-to-opportunity behaviour. The variable distance to the parental house especially supports this. The coefficients suggest that the residential separation between adult children and their parents is associated with higher earnings. Even in the same municipality, living farther from parents shows the same relationship with income. One explanation of the finding is that children move to locations with better labour markets and opportunities. On the other hand, the stickiness between generations might lessen due to new networks built while living farther from parents.

As for educational attainment, any degree is associated with higher earnings except Art and Humanities for the mobile and immobile populations. Meanwhile, all degrees show positive effects for VMs, as shown in Model 3. Arts and Humanities make an unusual case because individuals who complete these degrees are worse off than not completing any degree both for mobile and immobile population, but the opposite is observed for VMs.

Table 3: Multilevel models of rank-rank correlation coefficient analysis. Model (1) represents immobile population, Model (2) mobile and Model (3) visible minorities.

	Model (1)	*Model (2)*	*Model (3)*
	Coeff. (std. Err.)	Coeff. (std. Err.)	Coeff. (std. Err.)
Parental income ranking	0.079*** (0.002)	0.063*** (0.002)	0.048*** (0.007)
Visible minorities	-9.248*** (0.320)	-9.424*** (0.303)	
Female	-15.757*** (0.121)	-12.104*** (0.115)	-11.501*** (0.427)

Field of study (reference: not completed)			
Pedagogy	2.246*** (0.239)	1.878*** (0.233)	7.030*** (1.006)
Arts and Humanities	-0.282 (0.240)	-2.330*** (0.228)	2.182** (0.081)
Social Sciences	8.703*** (0.187)	10.625*** (0.082)	11.525*** (0.593)
Natural Sciences	6.468*** (0.354)	7.779*** (0.294)	10.899*** (1.131)
Tech and Manufacturing	9.619*** (0.168)	12.416*** (0.182)	13.369*** (0.822)
Agrarian Sectors	5.130*** (0.373)	5.797*** (0.400)	11.641*** (6.028)
Health	1.787*** (0.188)	2.928*** (0.198)	9.221*** (0.641)
Services	5.191*** (0.223)	6.781*** (0.238)	7.969*** (1.017)
Unknown	1.350*** (0.275)	1.992*** (.356)	0.549 (1.088)
Log distance to parental house	0.924*** (0.055)	0.388*** (0.038)	0.703*** (0.022)
Municipality Specific Effects			
Income segregation	10.944*** (2.840)	7.349*** (3.064)	-1.992 (7.082)
Income Equality	-0.537** (0.233)	-0.629** (0.259)	-1.098 (0.675)
Economic Diversification	0.042 (0.197)	-0.573 (0.212)	-0.826 (0.508)
Regional Affordability	0.859*** (0.237)	-0.265 (0.296)	0.327 (1.222)
Business Environment	0.049 (0.178)	-0.144 (0.194)	-0.748 (0.536)
Educational Attainment	0.065 (0.255)	1.094*** (0.281)	1.406** (0.626)
Out of Poverty	3.277*** (0.339)	3.214*** (0.367)	4.201*** (0.820)
Voter Participation	-0.515** (0.209)	-1.018*** (0.243)	-1.425 (0.756)

Job Accessibility	0.437** (0.220)	1.416*** (0.243)	1.349** (0.243)
Var (Municipality Level)	0.000478 (0.00009)	0.000461 (0.00006)	0.00046 (0.00008)
Var (Residual)	0.250789 (0.00071)	0.24263 (0.00045)	0.235386 (0.00068)
Observations	238,199	251,041	19,896
Log likelihood	-1110906.7	-1176747.9	-94213.565
Number of groups	239	290	256

Turning to municipality-specific variables, the overall level of human capital in the municipality, measured by the percentage of highly educated adults, positively correlates with social mobility. Among economic variables, three of them provide information on income resources. Higher shares of the population who escaped from the poverty status are positively associated with social mobility, and the relationship is stronger for VMs. On the other hand, income equality negatively correlates with social mobility for mobile and immobile populations, while the correlation is not statistically significant for VMs. A possible interpretation is that natives consider that economic incentives to climb the social ladder are too weak since income gains are on average smaller than in more unequal societies. The third variable accounts for the spatial distribution of inequality within the municipality. The positive and significant estimated coefficients for mobile and immobile people indicate that anything else being equal, social mobility is higher in cities where the most significant disparities are between neighbourhoods. In contrast, the distribution of income within each neighbourhood is quite low. Higher similarity among neighbours (income-wise) works in favour of better income attainment. This could be due to sorting behaviour. Individuals sort into neighbourhoods that reflect their income status. However, if we look to Model (3) for VMs, the association between social mobility and income segregation is not statistically significant. This is because VMs sort more on the basis of nationality rather than income.[1]

Regional affordability positively correlates with social mobility only for the immobile population. Perhaps this result reflects the general economic sustainability of housing costs at the municipality level that play a decisive role in enhancing social mobility in more stable societies.

Other economic indicators, such as business environment and economic diversity, do not exhibit a statistically significant association with social mobility. Job accessibility is associated with social mobility. The political participation of younger generations negatively correlates with social mobility for mobile and immobile populations while it does not matter for VMs. This result is consistent with relatively recent studies on Sweden and other European countries according to which younger generations are less interested in politics due to a feeling of political apathy and alienation. The former implies that citizens are generally less interested in politics. The latter admits the possibility that they can be interested, but they are de facto estranged from the formal political system for some reason. (see Górecki, 2013; Valgarðsson, 2019 and references therein).

[1] Several studies provide evidence that immigrants tend to live in neighbourhoods where other from the same origin live (see, for example, Saiz and Wachter, 2011).

6. Conclusion

The present paper has aimed to investigate intergenerational income mobility in Sweden using recent data from PLACE, providing detailed information about the demographic and socio-economic characteristics of all residents in Sweden. In addition to individual and household variables, we have modelled a variety of city resources and characteristics that have been assumed to account for differences in social mobility observed across Swedish municipalities. We have also considered different groups of population on the basis of mobility and minority status. The results have shown that social mobility differs across municipalities and groups. In particular, we find significantly higher social mobility for individuals who live in municipalities other than their parents.

Similarly, the increased social mobility is associated with the distance from the parental house even in the same municipality. Additionally, we find that visible minorities experience higher intergenerational social mobility than the whole population. As for the geographical variation, Northern parts of the country, big metropolitan areas like Malmö, Stockholm and Göteborg, and areas in proximity to major urban centres exhibit high values of social mobility. The common traits of these areas are a greater human capital, more residential segregation by income, more income inequality, and greater accessibility to jobs.

Our results lead us to argue, as Chetty (2014) did for US, that intergenerational mobility is a local issue that public governments can address with tailor-made policies. Usually, policies promoting intergenerational social mobility tend to favour a more even availability of economic resources in order to equalise opportunities and life-chances in the spirit of Massey and Denton (1996). Our findings show that controlling for poverty, a degree of inequality within a city may provide a powerful incentive to upward mobility.

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Appendix

Table A1: Correlation analysis between different BLUPs and non-parametric measures of municipality effects in intergenerational income mobility.

	Random Effects Offspring-Father log income	Random Effects Offspring-Father Rank-Rank	Random Effects Offspring-Mother log income	Random Effects Offspring-Mother Rank-Rank	First Absolute Offspring-Both Parents	First Absolute Offspring-Both or Either	First Absolute Offspring-Father	First Absolute Offspring-Mother	Second Absolute Offspring-Both Parents	Second Absolute Offspring-Father	Second Absolute Offspring-Mother
Random Effects Offspring-Father log income	1.000										
Random Effects Offspring-Father Rank-Rank	0.979	1.000									
Random Effects Offspring-Mother log income	0.996	0.974	1.000								
Random Effects Offspring-Mother Rank-Rank	0.974	0.996	0.976	1.000							
First Absolute Offspring-Both Parents	0.925	0.943	0.926	0.945	1.000						
First Absolute Offspring-Both or Either	0.954	0.975	0.951	0.973	0.970	1.000					
First Absolute Offspring-Father	0.954	0.976	0.950	0.973	0.969	0.994	1.000				
First Absolute Offspring-Mother	0.948	0.972	0.949	0.974	0.963	0.989	0.983	1.000			
Second Absolute Offspring-Both Parents	0.696	0.738	0.704	0.752	0.753	0.751	0.752	0.769	1.000		
Second Absolute Offspring-Father	0.809	0.856	0.811	0.863	0.835	0.858	0.863	0.863	0.904	1.000	
Second Absolute Offspring-Mother	0.794	0.845	0.797	0.854	0.817	0.841	0.841	0.856	0.899	0.962	1.000