

An International Comparison of Social Mobility from the Perspective of Assortative Mating

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Abstract

This paper compares the social mobility of OECD countries using PISA data, which contain information on the educational attainment of parents of 15-year-old students. We derive several measures of the degree of assortative mating in terms of educational attainment at the country level from parents' educational attainment. It turns out that Eastern European countries have a high degree of assortative mating while Northern European countries have a distinctively lower degree. Furthermore, for 12 countries with measures of intergenerational income elasticity, we find a positive relationship between the degree of assortative mating and the intergenerational income elasticity. Compared with other OECD countries, Korea has a somewhat high degree of assortative mating. From the degree of assortative mating by educational attainment, we can infer that the intergenerational income elasticity of Korea might be between 0.3 and 0.4, which is higher than that found in previous studies.

Keywords: Assortative Mating, Intergenerational Income Elasticity, PISA, Social Mobility

1. Introduction

Many people, including social scientists, policy makers and the general public, care a great deal about social mobility along with income inequality. In a dynamic society in which there is high income mobility among generations, inequality itself might not be a serious social problem. However, when the intergenerational income mobility is limited, parents' incomes are easily transmitted to the younger generation and it is highly likely that children from lower-income families will end up with a low-income class. This is not just an issue of equality. In a society in which the upward movement is limited, there is less incentive for human capital accumulation, which might lead to a low level of productivity for the society as a whole. That is, social mobility is not just an equality issue but also an efficiency issue.

There are growing concerns about social mobility around the world. As shown in 4, there have been attempts to compare the degree of social mobility among different countries. In this study, we pay special attention to assortative mating as a determinant of the intergenerational income elasticity and use it as an indicator of the current state of social mobility in different countries. More specifically, this paper first examines the different degrees of assortative mating in different countries then continues by investigating the relationship between assortative mating and intergenerational income mobility (henceforth IIE).

This paper proceeds as follows. In section 2, we derive measures of the degree of assortative mating of OECD countries from the PISA data. In section 3, we investigate the empirical relationship between the degree of assortative mating and the intergenerational income elasticity. In

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section 4, we briefly summarize the results and discuss the further research possibilities.

2. Deriving Measures of Assortative Mating

In this section, we derive measures of the degree of assortative mating at the national level from the international test data. The main data set is PISA 2009. PISA is a series of international exams administered by the OECD that give the same questions to students aged 15 from different member countries. Along with the test scores, the OECD surveys students to obtain some information about their school life and family background. Among the questions asked, there are questions on the educational attainment of the students' parents. We utilize this information to obtain estimates of the degree of assortative mating.

In PISA's questionnaire, the parents' educational attainment is categorized into seven groups. We rearrange the educational attainment according to five categories: (1) graduating from elementary school or less, (2) experiencing middle school or high school education, but not graduating from high school, (3) graduating from high school, (4) some college experience or graduating from a two-year college course and (5) graduating from a four-

year university course or gaining a master or doctoral degree.

With these five categories, we can construct a "marriage by educational attainment" matrix from the information on fathers' and mothers' educational attainment provided by the students. As an example, Table 1 presents a "marriage by educational attainment" matrix for Korea. In deriving this matrix, we drop the cases of a single mother or a single father. In the case of Korea, 5,030 students answered the question on both their father's and their mother's education. In the matrix given in Table 1, the row stands for the mothers' educational attainment and the column stands for the fathers' educational attainment. We can see that for fathers there are 231 (4.6%) cases of elementary school graduates, 1,219 (24.2%) cases of middle school graduates, 1,536 (31.1%) cases of high school graduates, 274 (5.4%) cases with some college experience and 1,743 (34.7%) cases with a university degree and beyond.

On the mothers' side, there are 269 (5.3%) cases of elementary school graduates, 1,280 (25.4%) cases of middle school graduates, 2,230 (44.3%) cases of high school graduates, 211 (4.2%) cases with some college experience and 1,040 (20.7%) cases with a university degree and beyond. Note that the diagonal elements are the cases in which couples have the same educational attainment.

Table 1. Marriage-educational attainment matrix (PISA 2009, Korea)

	F-Ele	F-Mid	F-High	F-Col	F-Univ	Sum
M-Ele	112	91	42	10	14	269
M_Mid	59	673	305	63	180	1,280
M-High	57	388	1,130	113	542	2,230
M-Col	2	25	24	55	105	211
M-Univ	1	42	62	33	902	1,040
Sum	231	1,219	1,563	274	1,743	5,030

Once we have constructed the “marriage by educational attainment” matrix, we can transform it into a percentage form as shown in Table 2. From this matrix, we can derive measures of the degree of assortative mating. In the process of deriving measures, we need to pay special attention to the diagonal elements. The sum of the diagonal elements in Table 2 means the percentage of couples who have the same educational attainment. In the case of Korea, this is 56.4%, which is sixth highest among the OECD countries. The sums of the diagonal elements of the marriage matrix of OECD countries are typically within the range of 52%~56%.

The sum of the elements below the diagonal elements is the percentage of marriages in which mothers have higher educational attainment, while the sum of the elements above the diagonal elements is the percentage of couples in which fathers have higher educational attainment. These sums could be possible candidates for the degree of assortative mating measures for different countries. However, for now, let us concentrate on the measure that is the diagonal sum of the marriage matrix^a.

We can derive the same measures for different countries. Figure 1 presents the degree of assortative mating measures for 34 OECD countries. It is arranged in descending order, so the countries on the left side have a higher degree of assortative mating than those on

the right side. We can see that Denmark, Ireland, New Zealand, Australia, Iceland, Greece, Norway, Spain, Japan, the Netherlands, Chile and Austria have a relatively low degree of assortative mating. In these countries, the sum of the diagonal elements, which means the percentage of marriages in which the couples have the same educational attainment, is less than 0.5. On the other hand, Eastern European countries, like Poland, Slovenia, Hungary and the Czech Republic, have a high degree of assortative mating.

Another measure can be derived from the estimation of the following matching equation for each country:

$$H^p = a_0 + a_1 H + u.$$

Here, H^p is the educational attainment, as measured by years of schooling, of females and H is the educational attainment of males. This equation relates the educational attainment of males to that of females, and the coefficient a_1 can be considered as a measure of the degree of assortative mating for each country. A high value of a_1 means that the educational attainments of couples are closely related and therefore there is a high degree of assortative mating. We can obtain the estimates of a_1 for the OECD countries using the PISA data^b.

As we can see in Figure 2, these two measures of the degree of assortative mating are closely related. The cor-

Table 2. Marriage-educational attainment matrix in percentage form (PISA 2009, Korea)

	F-Ele	F-Mid	F-High	F-Col	F-Univ	Sum
M-Ele	2.2%	1.8%	0.8%	0.2%	0.3%	5.3%
M_Mid	1.2%	13.4%	6.1%	1.3%	3.6%	25.4%
M-High	1.1%	7.7%	22.5%	2.2%	10.8%	44.3%
M-Col	0.0%	0.5%	0.5%	1.1%	2.1%	4.2%
M-Univ	0.0%	0.8%	1.2%	0.7%	17.9%	20.7%
Sum	4.6%	24.2%	31.1%	5.4%	34.7%	100%

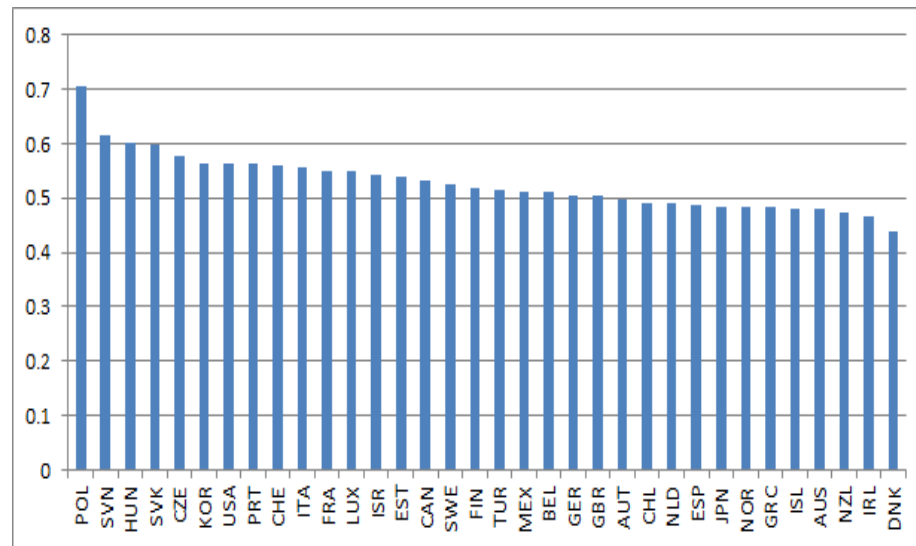


Figure 1. Percentage of couples with the same educational attainment.

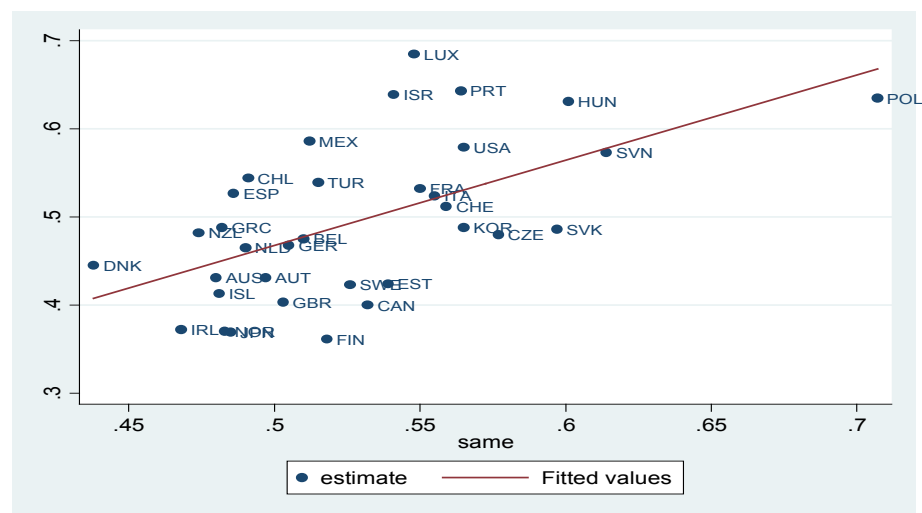


Figure 2. The relationship between two measures of the degree of assortative mating.

relation coefficient is 0.577. In the following section, we have qualitatively the same results for both measures.

3. Assortative Mating and the Intergenerational Income Mobility

One of the reasons that we pay attention to assortative mating is its possible connection to the intergenera-

tional income transfer. There is some research that relates assortative mating to the intergenerational income transmission mechanism. For example, using a unique British data set,¹ showed that the correlation between father-in-laws' and son-in-laws' income was higher for the 1970 birth cohort than for the 1958 birth cohort. The study argued that assortative mating is one of the major factors leading to this change. With a Swedish data set,² showed that the smaller degree of assortative mating was one of the factors that created the higher level of intergeneratio-

nal mobility over time in Sweden.

Reference³ argued that 40 to 50% of the correlation between the family incomes of the parents' generation and those of the children's generation can be explained by the selection of the spouse. They also argued that the main transmission mechanism of parents' income to children's income is human capital accumulation.

While these works provide theoretical and empirical frameworks that relate assortative mating and the intergenerational income transfer, their perspectives are typically confined to the individual household level within a country. We try to expand the perspective to the international level with the measures derived in the previous section.

Reference⁴ reports estimates of the Intergenerational Income Elasticity (IIE) of twelve countries. The IIE is relatively high for countries like Germany, Italy and the

For example, in a society in which assortative mating is dominant, the family background affects the next generation's income. Conversely, in a society in which social mobility is limited, there are incentives to seek a spouse with a similar family background to keep and transfer the social status to the next generation. There is also the possibility that some common factors might be behind the low degree of assortative mating and low IIE. Whatever the reason, it is worthwhile noting that there is quite a strong correlation between assortative mating and intergenerational income mobility at the national level.

4. Conclusion

In this paper, we derived some measures of the degree of assortative mating and its relationship with intergenera-

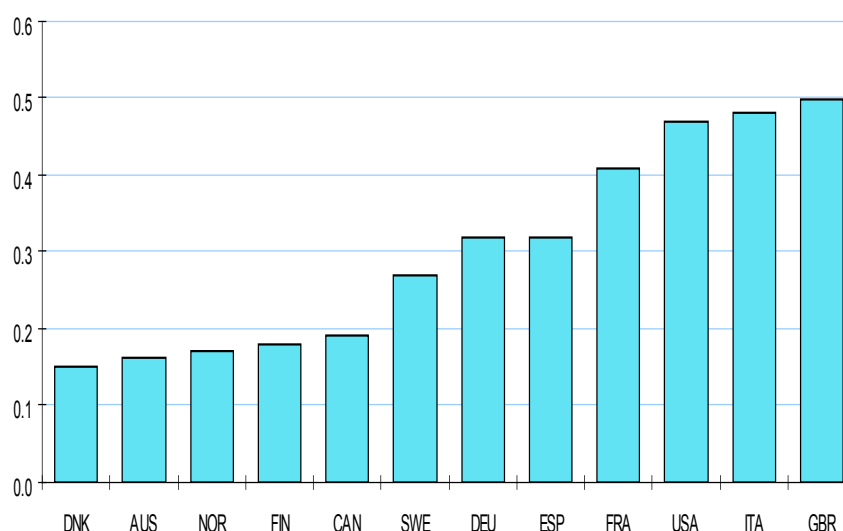


Figure 3. Estimates of intergenerational income elasticity for some OECD countries.

USA. It is relatively low for Scandinavian countries and Australia.

Now let us look at the relationship between the degree of assortative mating and the IIE. It turns out that there is a high correlation between these two measures. For example, the correlation coefficient between the percentage of marriages with the same educational attainment and the intergenerational income elasticity is 0.65.

Of course, we need to be careful about interpreting this correlation. There are many possible explanations.

tional income elasticity. We found a positive correlation between assortative mating and IIE.

We provided measures of the degree of assortative mating from the PISA 2009 data, and for a sample of countries, we investigated the relationship between the degree of assortative mating and the intergenerational income elasticity.

When we paid special attention to the case of Korea, where there are arguments that social mobility is decreasing, we could find some empirical support for these

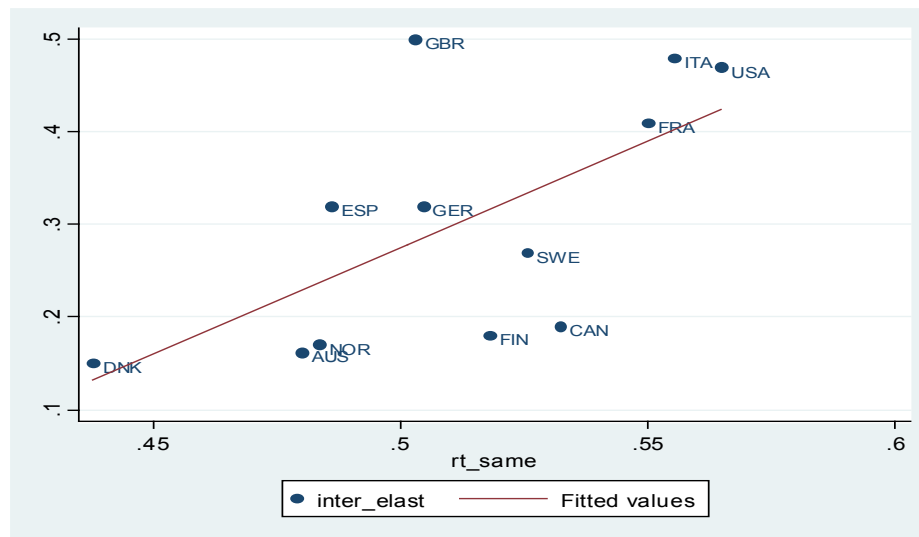


Figure 4. The relationship between assortative mating and intergenerational income elasticity.

arguments from the international comparison. Indeed, Korea has a relatively high degree of assortative mating compared with other OECD countries. If we estimate the IIE of Korea from the estimates of the degree of assortative mating, it seems to be within the 0.3~0.4 range. This is bigger than the estimates found in previous Korean literature.

With the growing literature on IIE estimates from many countries, we can check the validity of our empirical finding with a larger sample of countries. It is also worthwhile considering what determines the degree of assortative mating for different countries. The measures introduced in this paper will possibly contribute to more in-depth studies investigating the various aspects of social mobility.

5. Acknowledgement

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Appendix: Degree of assortative mating measures for 34 OECD countries

Country	Code	Same Educ.	Male Higher	Female Higher	Estimates of a_1
Korea	KOR	0.565	0.278	0.157	0.488
Australia	AUS	0.48	0.245	0.275	0.431
Austria	AUT	0.497	0.34	0.163	0.431
Belgium	BEL	0.51	0.231	0.259	0.475
Canada	CAN	0.532	0.177	0.291	0.400
Switzerland	CHE	0.559	0.285	0.156	0.512
Chile	CHL	0.491	0.283	0.225	0.544
Czech Republic	CZE	0.577	0.2	0.223	0.480
Denmark	DNK	0.438	0.24	0.322	0.445
Spain	ESP	0.486	0.245	0.269	0.527
Estonia	EST	0.539	0.159	0.302	0.424
Finland	FIN	0.518	0.174	0.308	0.361
France	FRA	0.55	0.207	0.243	0.532
Great Britain	GBR	0.503	0.223	0.274	0.403
Germany	GER	0.505	0.327	0.168	0.468
Greece	GRC	0.482	0.239	0.279	0.488
Hungary	HUN	0.601	0.154	0.244	0.631
Ireland	IRL	0.468	0.220	0.312	0.372
Iceland	ISL	0.481	0.245	0.274	0.413
Israel	ISR	0.541	0.204	0.255	0.639
Italy	ITA	0.555	0.213	0.232	0.524
Japan	JPN	0.485	0.312	0.203	0.369
Luxemburg	LUX	0.548	0.265	0.187	0.685
Mexico	MEX	0.512	0.283	0.206	0.586
Netherland	NLD	0.49	0.294	0.215	0.465
Norway	NOR	0.483	0.247	0.270	0.370
New Zealand	NZL	0.474	0.281	0.245	0.482
Poland	POL	0.707	0.072	0.220	0.635
Portugal	PRT	0.564	0.173	0.262	0.643
Slovakia	SVK	0.597	0.169	0.235	0.486
Slovenia	SVN	0.614	0.161	0.225	0.573
Sweden	SWE	0.526	0.170	0.305	0.423
Turkey	TUR	0.515	0.410	0.076	0.539
USA	USA	0.565	0.183	0.252	0.579