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# Intergenerational field transitions in economics☆

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## HIGHLIGHTS

- We documents trends of mobility across fields in economics.
- We find intergenerational field similarity is more prevalent in larger fields.
- Choosing different fields from advisors more likely to highly demanded fields.
- Positive relation between field productivity and the median level of co-authorship

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## ABSTRACT

This note documents trends of socialization and intergenerational mobility across research networks (fields) in economics. Using data on advisor–advisee pairs, we find that intergenerational field similarity is more prevalent in larger and successful fields. We then show that researchers who do choose different fields than those of their advisors are more likely to switch to highly demanded fields in the job market. These results are consistent with the equilibrium of a model in which advisors' have concerns for their advisees' socialization and production outcomes. We also document a positive relation between field productivity and the median level of co-authorship at the field level, which is consistent with complementaries between socialization and productive efforts.



## 1. Introduction

In this note, we document trends in intergenerational field mobility in economics using the RePEc Genealogy project, which connects individual researchers with their Ph.D. advisors. Advisees choose their advisors matching their own interests and abilities (as well as other characteristics such as their academic standing and reputation for helpfulness, see e.g. Colander, 2005 and Barnes et al., 2010). Given that advisors should have a comparative advantage in transmitting knowledge in their own fields, we would generally expect a high degree of affinity between the academic subfields of advisors and advisees. We find that this is only partially true. We document that it is common for advisees to work in different fields from those of their advisors. This intergenerational divergence in research interests has some interesting features and varies across fields in meaningful ways. First, similarity in fields is common when the advisors work more on average in relatively large fields. Perhaps more importantly, the degree of field overlap between advisor and advisee is also strongly influenced by the productivity of the fields in which the advisor is working. Finally, advisees who

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do not share their main field with their advisors are more likely to work in fields with a higher demand for new assistant professors. Taken together, these facts are consistent with the hypothesis that advisors care about supporting the career of their advisees even if that means a smaller influence of their own fields. An additional important finding is that larger fields (more productive and exhibiting more intergenerational field similarity) exhibit more cooperation among researchers, which is consistent with complementarities between socialization and productive efforts as in Cabrales et al. (2011) and Albornoz et al. (2016).

## 2. Data

We extracted data from three main sources. First, we used the RePEc Genealogy project to construct a dataset of advisors and advisees for all cohorts from 1980 to 2014. Second, we web scraped information on every research paper by the authors listed in the RePEc Genealogy project from the IDEAS-RePEc website. We then used the Journal of Economic Literature (JEL) classification codes on each research paper to associate an author with a field vector,[1] where we define a field as a one digit JEL classifier, and allow authors to work in multiple fields. Finally, we construct measures of coauthorship using data we web scraped from CollEc.[2] Our final dataset consists of 7950 researchers, 5990 advisor–advisee pairs and include information on all their papers, advisors, students and coauthors.

## 3. Patterns of intergenerational transmission of research topics

To explore the patterns of "intergenerational" field mobility, we first define a measure of research overlap between advisors and advisees, which resembles closely the index presented by Fafchamps et al. (2010). We use the one digit JEL field vector described above to construct a cosine similarity measure of field overlap between an advisor $i$ and an advisee $j$,

$$\omega^{ij} = \frac{\sum_f x_f^i x_f^j}{\sqrt{\sum_f (x_f^i)^2 \sum_f (x_f^j)^2}}$$

where $x_f^i$ is the proportion of 1 digit JEL field mentions for author $i$ that correspond to the JEL field $f$. Note that this is a continuous measure that ranges from 0 (if $i$ and $j$ do not work on any paper in the same field) to 1 (if $i$ and $j$ wrote in exactly the same fields and in exactly the same proportion). In Table 1 we can see that the average field overlap between advisors and advisees is positive and significantly greater than zero at a 1% level (one-tailed $t$-test). We then compare this to the average field overlap between two authors, calculated by taking a random sample of one million author pairs and calculating the average measure of cosine similarity for this random selection.[3] As can be seen in Table 1, advisor–advisee pairs are clearly more similar in terms of field choices than the average population. This is probably capturing the fact that students often select advisors working in the fields that they are interested in, and therefore are relatively biased towards choosing the same fields.[4] However, the main point of interest in this paper is the fact that we do observe that the similarities between advisors and advisees are low and, as we show below, they vary in a meaningful way across fields.

**Table 1**
Average field similarity.

| Variable | Mean | Std. Dev. | $N$ |
|---|---|---|---|
| Advisor–advisee $\omega^{ij}$ | 0.443*** | 0.187 | 5990 |
| Random sample $\omega^{ij}$ | 0.295 | 0.251 | 1 million |

Summary statistics for advisor–advisee $\omega^{ij}$ and population $\omega^{ij}$ (estimated with a random sample of 1 million author pairs). A one-tailed $t$-test was performed on both means.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

**Table 2**
Field similarity, field size and demand.

| | Field overlap ($\omega^{ij}$) | |
|---|---|---|
| | (1) | (2) |
| Weighted size ($s_i$) | 0.073 | |
| | (0.005)*** | |
| Weighted demand ($d_i$) | | 0.655 |
| | | (0.095)*** |
| Constant | 0.186 | 0.386 |
| | (0.016)*** | (0.008)*** |
| $R^2$ | 0.05 | 0.01 |
| $N$ | 5990 | 5990 |

* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

We then calculate for each advisor a measure of "weighted average field size" as

$$s_i = \sum_f x_f^i S_f$$

where $S_f$ is measured as the number of authors with at least one article in field $f$:

$$S_f = \sum_i I_{x_f^i > 0}.$$

With these two measures, we can estimate the relationship between the advisor–advisee cosine similarity measure of field overlap and the weighted average field size of the advisor. Column 1 in Table 2 shows that there is a positive and significant relation between the advisor's weighted average field size[5] and the level of field similarity between advisors and advisees. This observation leads to:

**Empirical Observation 1.** *Intergenerational field mobility is less likely to occur when advisors work relatively more in larger fields.*

A natural concern with Empirical Observation 1 is whether it is driven by self-selection into fields by ability. In unreported analysis (available upon request), we observe that there is no correlation

[1] More specifically, we conducted the analysis as follows: we added up for each author all the JEL identifiers at the uppermost level (a single letter without numbers) for every paper she had registered in IDEAS. Then, for every individual author, we constructed a vector with the sum of all of the JEL information contained in her papers, divided by field. For example, if the author has three papers registered in IDEAS classified as A1, B2 and B31 according to the JEL, a second paper classified as B4 and B21, and the third getting C1 and A as classification, then we obtained the following vector of JEL fields: (2, 2, 1, 0, …, 0), because she has 2 papers corresponding to A category, two papers in field B and another paper classified as C.

[2] A RePEc service of rankings by co-authorship centrality for authors registered in the RePEc Author Service.

[3] We also tried selecting a sample of 100,000 and two million pairs and the results were identical up to the first 6 digits.

[4] In an alternative analysis, we assign a main field to each author (the one digit JEL code with the largest value in the field vector) and show that advisees tend to be biased towards working in the same main field as their advisor, relative to our general sample of authors. These results are available upon request.

[5] This measure of weighted size was then divided by 1000 when we ran the regressions, so as to produce a more legible coefficient.