Influence in Economics and Aging

Pavel Jelnov and Yoram Weiss *

September 27, 2019

Abstract

We study the relationship between age and influence in a closed group of 1,000 leading economists. We consider, as a measurement of influence, monthly ranking that takes into account several indexes: publications, citations, network, etc. We find that the rank is not affected by age but is affected by experience. The optimal level of experience is 30 years since PhD graduation. We also find no robust difference in the effect of age and experience between Nobel laureates and leading non-Nobelists. Finally, we find that labor economists experience the strongest positive effect of the first decades of their careers on their rank but reach the peak earlier than others.

JEL code: J24

Keywords: aging; Nobel; citations; research productivity

*Pavel Jelnov: Institute for Labor Economics, Leibniz University Hannover, and IZA, e-mail: jelnov@aoek.uni-hannover.de. Yoram Weiss: Foerder Institute for Economic Research, Eitan Berglas School of Economics, Tel Aviv University, and IZA, e-mail: weiss@post.tau.ac.il.

1 Introduction

Measurement of scientists' productivity as a function of age dates back at least to Wayne (1956). On the one hand, scientists accumulate experience, reputation, and network. On the other hand, their productivity may deteriorate because of aging-related factors (Desjardins and Warnke, 2012, Barrett and Riddell, 2016, Green and Riddell, 2013, Skirbekk, 2004). However, influence differs from productivity. Do scientists follow the Matthew effect, when "the rich get richer and the poor get poorer" (Allison et al., 1982) or does their influence follow a non-monotonic trend? For instance, Gingras et al. (2008) show that while scientists become less innovate after age of 40, the average number of papers in highly cited journals and among highly cited papers rises continuously until retirement.[1] Meanwhile, as scientists age, they compete over influence, at least implicitly, with younger colleagues. The young colleagues may be healthier, strongly motivated, and be more likely to generate novel conceptual ideas (Weinberg and Galenson, 2005). Intuitively, the effects of experience and network on influence are positive, whereas the effects of aging and competition with younger colleagues are negative.

Fortunato et al. (2018) describe science as "a complex, self-organizing, and evolving network of scholars, projects, papers, and ideas."[2] Hence, science is an industry where participants experience a life cycle of research while both complementing each other and competing with each other. The effect of complementarity is identified in Azoulay et al. (2010), who find that unexpected death of academic superstars deteriorates the productivity of their coau-

[1] By contrast, Sinatra et al. (2016) model the impact of a scientific article as a product of constant ability and age-independent luck and find that this model fits data.

[2] The complex nature of institutional science motivates some authors to use models from physics, biology, and other disciplines to address the spread of citations across papers. See, for example, Clough et al. (2015), Goldberg et al. (2015), and Zeng et al. (2017).

thors, and the decrease is sharper the more influential the deceased star was. Meanwhile, the effect of competition is identified in Reschke et al. (2018), who find that articles that are topic neighbors to articles that become prize-awarded suffer from a drop in citations.

The contribution of this paper lies in studying dynamics within a closed group. Using RePEc[3] monthly rankings of top economists, we estimate the effect of age and experience on their influence. The rankings arise from data on citations, publications, journal pages, abstract views, downloads, scientific network, and number of students. RePEc is open for new members and over years it has become a popular platform that currently includes more than 55,000 research economists. The agents that we analyze are economists that are continuously ranked among the top 5% of RePEc members. Thus, we analyze a strictly balanced panel of leading economists. We rank them with respect to each other in order to remove the effect of new RePEc members. The longitudinal data allows for control over compositional biases by including individual fixed effects and for controlling for author-specific autoregressive disturbance.

We find almost no effect of age and a strong and robust effect of experience on the scientist's rank. The latter effect is an inverted U-shape, and the optimal level of experience is 30 years since PhD graduation. Furthermore, we find that Nobelists are not different from other top economists in terms of the effect of age and experience on their rank. We also address possible heterogeneity between economists. To this end, we construct "families" of

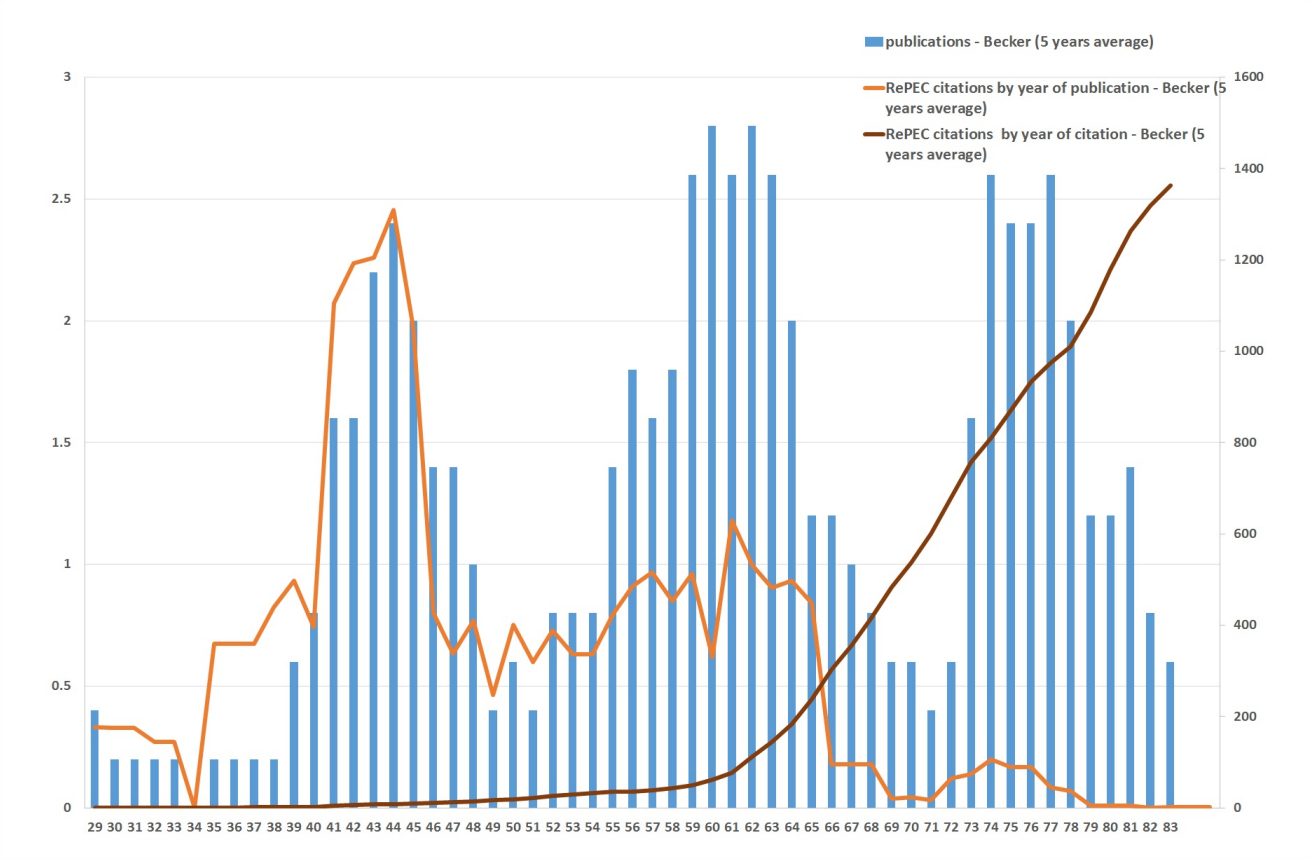
[3]RePEc (Research Papers in Economics) describes itself as "a collaborative effort of hundreds of volunteers in 99 countries to enhance the dissemination of research in Economics and related sciences. The heart of the project is a decentralized bibliographic database of working papers, journal articles, books, books chapters and software components, all maintained by volunteers. The collected data are then used in various services that serve the collected metadata to users or enhance it. So far, over 2,000 archives from 99 countries have contributed about 2.6 million research pieces from 3,000 journals and 4,600 working paper series. Over 50,000 authors have registered and 75,000 email subscriptions are served every week."

top RePEc members. A family is defined by a common "ancestor" in terms of PhD supervison. We analyze the largest families, and find that members of the family of labor economists have a stronger than for other families (in particular, macroeconomists) positive effect of the first 25 years of their career after PhD graduation. However, they reach the peak of their ranking earlier in their careers than others.

The complex relationship between age and influence can be illustrated with the example of Garry Becker, the 1992 Nobel laureate (Figure 1). The figure shows Becker's publications and citations by year of the cited publication and by year of citation (all data is from RePEc). Becker's most frequently cited papers were published in his 40s. However, the take-off in the number of citations took place only in his 60s.

This complexity can be also illustrated by heterogeneity across disciplines. In Figure 2, we compare Nobel laureates in economics to Nobel laureates in two other disciplines: physics and literature. The horizontal axis is the age, while the vertical axis is the level of experience at the time of receiving the Nobel (the figure considers prizes awarded between 1990 and 2018). The level of experience for laureates in economics and physics is the number of years since PhD and for laureates in literature it is the number of years since the publications of the first book. The figure shows that the distribution of ages at the time of being awarded with Nobel varies across the disciplines. All Nobelists in economics are at least 50 years old. Nobelists in literature have a similar to economists range of ages when they receive the prize but a wider range of levels of experience. By contrast, some Nobelists in physics are younger than 50 and have less than 20 years of experience. Meanwhile, some Nobelists in physics are very old, including the oldest person to receive ever the Nobel Prize. In this sense, economists

Figure 1: Publications and citations of Garry Becker

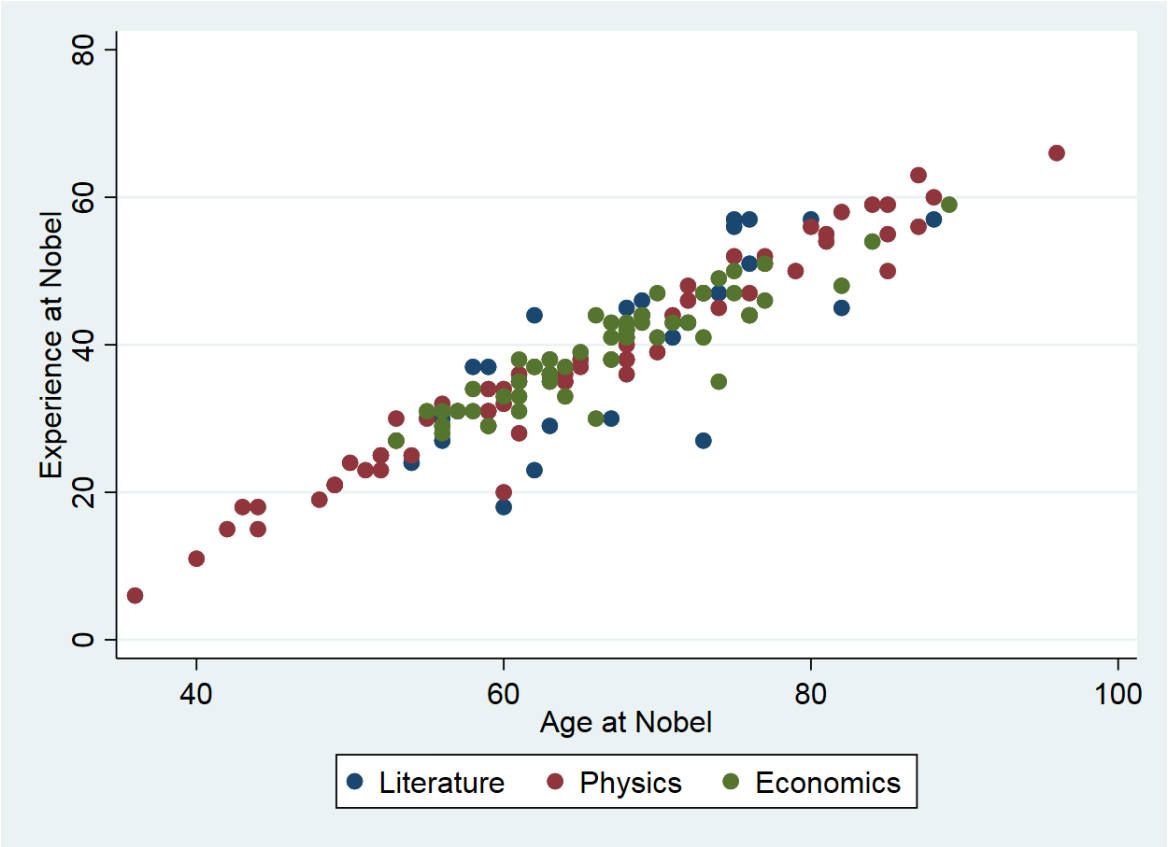


are more similar to writers than to physicists.[4]

In the empirical model, we distinguish between Nobelists and other leading economists. Nobel Prize is an external recognition of the scientist's exceptional influence, independent of the specific ranking methodology. In words of Hirsch (2005): "For the few scientists who earn a Nobel prize, the impact and relevance of their research is unquestionable." It is not easy

[4]This observation makes an interesting link to the Friedman (1953) discussion about the art of economics and its similarity (and dissimilarity) to physics. The reference to the Friedman's essay appears as even more interesting when one takes into account that it was published before the establishment of Nobel Prize in economics and many decades before the Prizes observed in Figure 2 were awarded.

Figure 2: Age and experience: Nobel laureates in economics, literature, and physics



Note: The Figures includes Nobel Prizes awarded from 1990 to 2018. The level of experience for Nobel laureates in economics and physics is the number of years since PhD graduation. The level of experience for Nobel laureates in literature is the number of years since publication of the first book or equivalent.

to find a proper comparison group for the Nobel laureates. A natural comparison group are nominees who did not win the Prize (Baffes and Vamvakidis, 2011), but this data is released with a 50-year lag. In this paper, we use a recent data from RePEc project, where Nobel laureates in economics are consistently compared with top non-Nobelists.[5]

The remaining of the paper is organized as follows. In Section 2, we present the descriptive relationship between age and rank and between level of experience and rank. In Section 3, we introduce the data. In Section 4, we describe the estimation procedure. In Section 5, we show the results. In Section 6, we discuss heterogeneity across "families" of top economists. Section 7 concludes.

2 Descriptive Graphs

Let us start with some descriptive graphs that show the average rank of top 5% of RePEc members by age and experience, separately for Nobelists and non-Nobelists. In Figure 3, we plot the average rank by age. As seen in the figure, the rank improves (goes toward 1, the best rank) until age of about 60 and then it declines (goes away from 1). The Nobelists are different from other top economists in having a better rank on average, and in a relative

[5] The use of the Nobel Prize in empirical research is divided into two concepts. The first concept relates to Nobel as a deterministic achievement and tries to figure out what is special about the laureates' background and life cycle and how the winner can be predicted (Gingras and Wallace, 2009, Wagner et al., 2015, Baffes and Vamvakidis, 2011, Van Dalen, 1999, Stephan and Levin, 1993, Shavinina, 2004, Rothenberg, 2005, Weinberg and Galenson, 2005, Ham and Weinberg, 2008). In addition, the Prize is sometimes used as a benchmark to investigate the efficiency of a certain ranking methodology (Krapf and Schläpfer, 2012), trends in the profession (Boettke et al., 2012), creativity (Weinberg and Galenson, 2005), and knowledge diffusion (Bjork et al., 2014). The second concept considers the Nobel Prize as a semi-experimental setup, where the winner and the timing of the award are, to some extent, exogenous. This literature uses the prize to estimate the effect of a positive status shock on outcomes such as collaboration, productivity, and health (Rablen and Osward, 2008, Chan et al., 2015, Chan et al., 2014, Chan et al., 2015, Frandsen and Nicolaisen, 2013, Zuckerman, 1967).

stability of the rank until the late 70s.

In Figure 4, we show the average aggregate rank as a function of number of years since PhD graduation. The rank improves for all levels of academic experience until the very high level of 50 years since graduation. Again, Nobelists have a better rank by average, but the dynamics of their rank as a function of academic experience is not different from non-Nobelists.

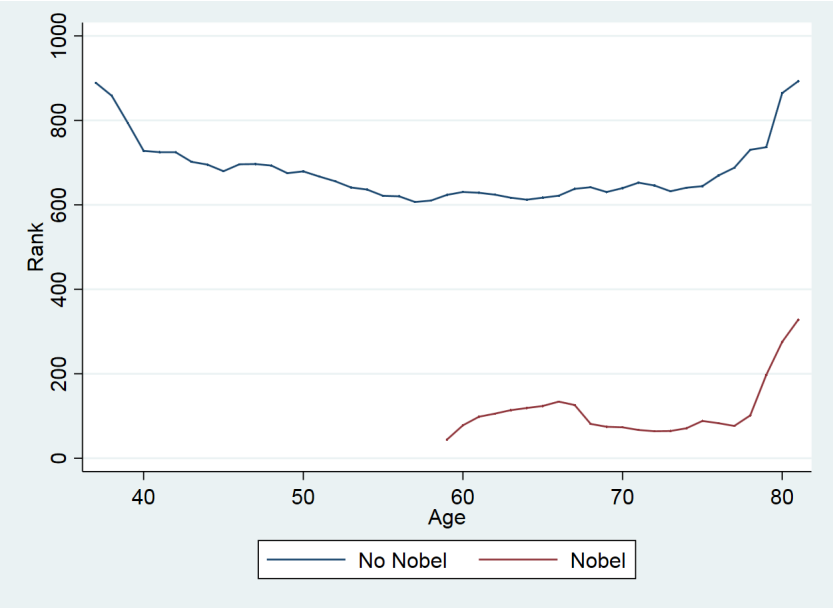
One can plot also the average rank separately for the components of the aggregate ranking. There are 37 measures that RePEc uses to rank each scientist. The aggregate ranking is a harmonic mean of the economist's ranks according to these 37 indexes. The indexes measure publications, citations, journal pages, abstract views and downloads from RePEc database, quality of network, and, recently, also number of students.[6] All data on publications and citations, collected by RePEc, refers to scientific economic journals and books.

For some indexes, such as number of works and number of journal pages, there is no difference between Nobelists and others. Figure 5 shows the rank in terms of the number of citations and the number of distinct works indexed in RePEc by age and years since PhD. We see only a moderate difference between Nobelists and the other top economists in the number of works as a function of age and no difference at all in the number of works as a function of academic experience.

However, there is a significant difference in the ranking of Nobelists and other top economists in terms of number of citations. There is a big advantage for Nobelists at all ages and at all levels of academic experience.

[6]The correlation between different indexes that measure the same type of outcome, for example, citations, is high. The high correlation between different indexes of the number of citations refers to the finding of Besancenot and Maddi (2019) that a simple citation count is a sufficient measure of citations.

Figure 3: Aggregate rank of top economists by age



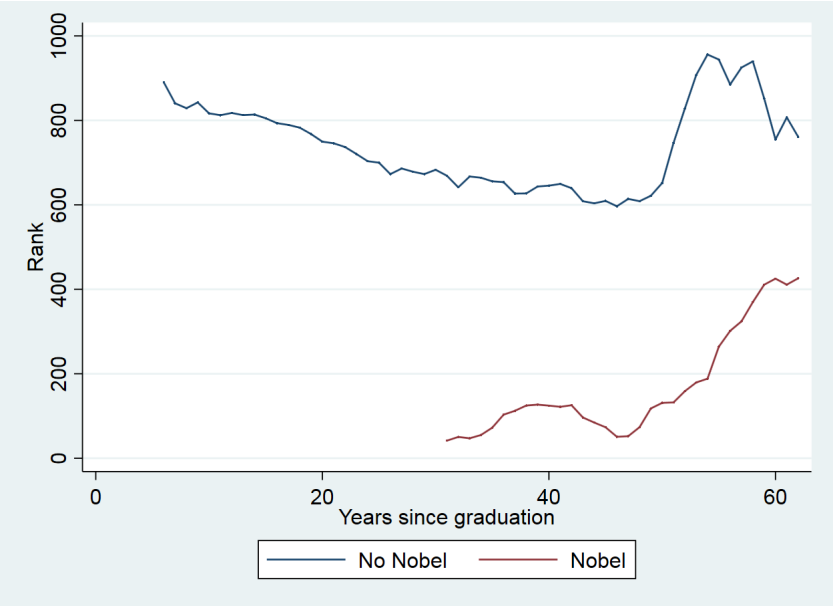
All figures show stylized facts which are, obviously, very much dependent on compositional aspects of the top RePEc economists and on autoregression of the ranking within author. In the econometric analysis, summarized below, we control for invariate unobserved heterogeneity and for autoregression of the disturbance, and illuminate the age-specific and level-of-experience-specific dynamics of their ranks.

3 Data

3.1 The largest balanced panel (a big panel)

The full data is the collection of rankings of top 5% of RePEc members, published every month since August 2000. The number of RePEc members in its early years was relatively

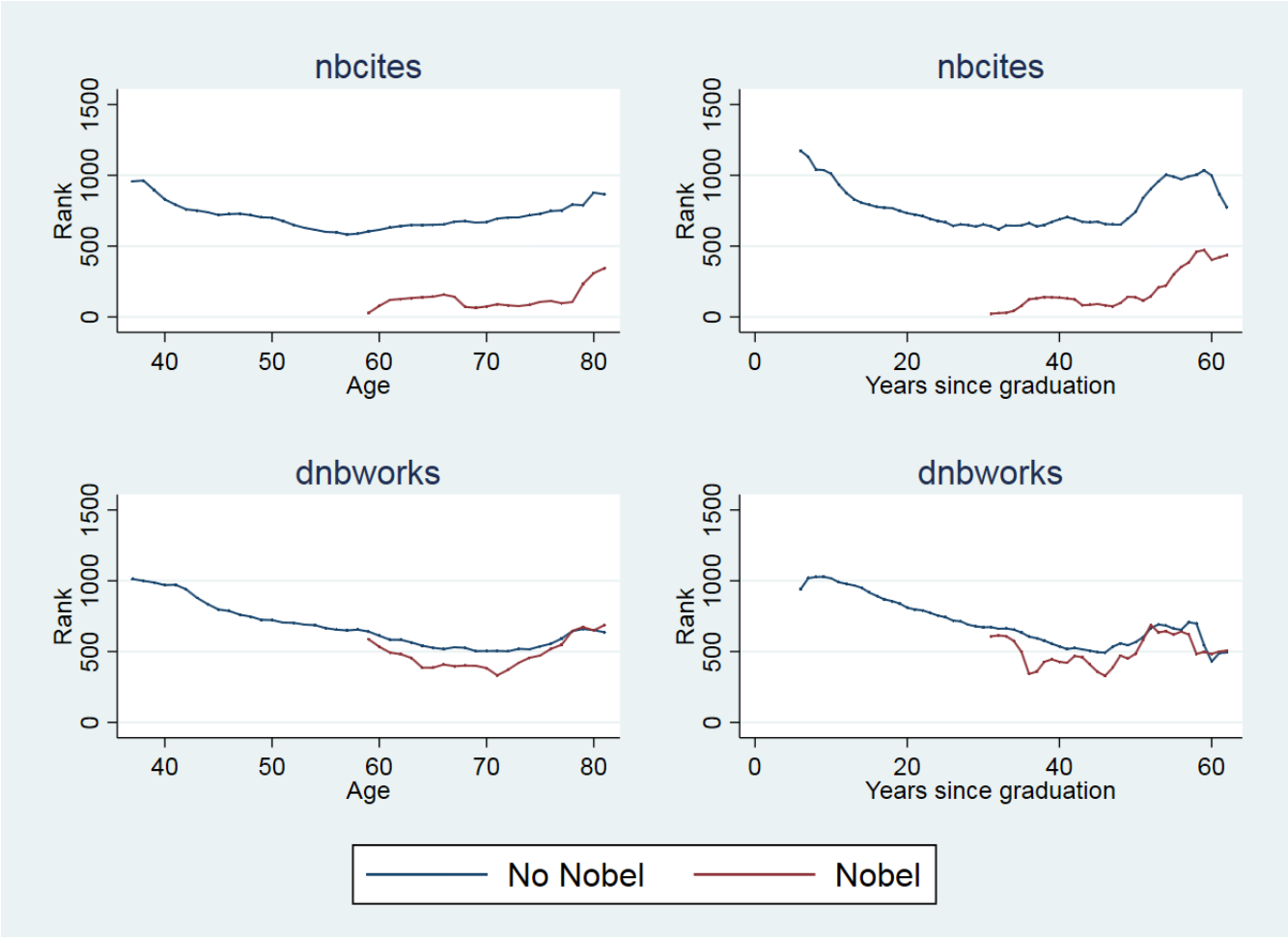
Figure 4: Aggregate rank of top economists by number of years since PhD



small, but exploded since the rankings started to be published. Accordingly, the number of top 5% members grew from 18 in the first ranking published in August 2000 to over 3,000 in 2019. In order the ranks of economists that we analyze not to be biased by newcomers to RePEc, we chose the range of months that maximizes the number of observations in a strongly balanced panel (economists $\times$ months). This means that we consider RePEc members that are continuously ranked among the top 5%, and the group is such that the resulting data set is as large as possible. Thus, we study dynamics of influence in a closed group, where individuals are ranked every month with respect to each other. We also restrict the sample to economists who are alive at the time of ranking.[7] The range of months that is analyzed is from March 2012 to July 2019. This is the maximal possible balanced panel with $N = 1,380$, $T = 89$, and $N \times T = 122,820$. Out of the total of 1,380 economists, 29 are Nobel laureates.

[7] RePEc continues to rank its members after they die.

Figure 5: Ranking of top economists in terms the number of distinct works and number of citations, by age and years since PhD



Thus, the sample that we analyze consists of 1,380 economists ranked during 89 months. For simplicity of notation, we refer to this sample as to "big panel." We normalize the ranking within this group, such that the top economist in our data has a rank of $\frac{1}{1{,}380}$, while the ranks of other economists are ranged between $\frac{2}{1{,}380}$ and 1.

Our analysis addresses the variables of age and experience. Thus, in order to use the RePEc ranking data, we need to know the year of birth and the year of graduation for the 1,380 economists in the sample. We use different sources to find these data: Curriculum Vitae, personal and institutional websites, RePEc genealogy project, Wikipedia, and Prabook project. We manage to find both year of birth and year of PhD in economics (or equivalent) graduation for 1,001 out of the 1,380 economists (72.5%). The economists in the sample have a wide range of ages from 32 to 94 for non-Nobelists and from 56 to 91 for Nobelists. Hence, the efficient sample that includes age and experience consists of $1,001 \times 88 = 88,088$ observations.[8] Figure 6 illustrates the full data, the sample, and the efficient sample. It shows the number of top-5% RePEc economists on the vertical axis and the month of ranking on the horizontal axis. The large rectangle shows the sample and the smaller rectangle inside it shows the efficient sample used for estimation. Table 2 shows the descriptive statistics of age and number years since PhD graduation in the sample.

RePEc publishes the aggregate ranking and the rankings in each of the indexes that are used to calculate the aggregate rank.[9] The aggregate ranking is a harmonic mean of the rankings according to these indexes. In our analysis, we consider the aggregate ranking as a proxy for influence. In addition, we analyze each of the underlying indexes separately.

[8] The sample with experience only is larger, as it is easier to find the year of graduation than year of birth. It consists of $1,325 \times 88 = 116,600$ observations.

[9] Some of the indexes were not calculated in the early years of RePEc.

The list of indexes has also grown significantly over years and includes 37 indexes in the most recent rankings (see Table 1 for the list of indexes). The indexes consider the number of works, the number of citations (including h-index), the number of published pages, the number of abstract views and downloads from RePEc, and, recently, also the number of graduate students and indexes for networking.

3.2 An alternative sample (a long panel)

A natural robustness check of the results is reestimation of the model with a different sample. In the big panel $T = 89$ and $N = 1,380$. For the robustness check we increase T by 50% at the expense of a lower N. Thus, we reestimate the model with $T = 133$ (July 2008 to July 2019). The largest N for a balanced panel in this period of time is 737 scientists, of whom for 598 scientists we know the years of birth and graduation. Of these 598, there are 26 Nobelists. Thus, the efficient sample for the robustness check is $T = 133$, $N = 598$. For simplicity of notation, we refer to this sample as to "long panel."

4 Estimation

4.1 Econometric model

We estimate a model where we consider, as the outcomes of interest, the aggregate rank (which we relate to as a proxy for influence) and the rank in each of the indexes that combine into the aggregate rank. The main explanatory variables are age and the number of years since PhD graduation, which we concisely refer to as experience. We include, additionally, an interaction term between being the economist a Nobelist (current or future) and the

Table 1: RePEc indexes used for ranking authors

Index	Description
	Number of works
dnbworks	Number of Distinct Works
scworks	Number of Distinct Works, Weighted by Simple Impact Factor
wscworks	Number of Distinct Works, Weighted by Recursive Impact Factor
anbworks	Number of Distinct Works, Weighted by Number of Authors
ascworks	Number of Distinct Works, Weighted by Number of Authors and Simple Impact Factors
awscworks	Number of Distinct Works, Weighted by Number of Authors and Recursive Impact Factors
	Number of Journal Pages
nbpages	Number of Journal Pages
scpages	Number of Journal Pages, Weighted by Simple Impact Factor
wscpages	Number of Journal Pages, Weighted by Recursive Impact Factor
anbpages	Number of Journal Pages, Weighted by Number of Authors
ascpages	Number of Journal Pages, Weighted by Number of Authors and Simple Impact Factors
awscpages	Number of Journal Pages, Weighted by Number of Authors and Recursive Impact Factors
	Number of citations
nbcites	Number of Citations
dcites	Number of Citations, Discounted by Citation Age
sccites	Number of Citations, Weighted by Simple Impact Factor
dsccites	Number of Citations, Weighted by Simple Impact Factor, Discounted by Citation Age
wsccites	Number of Citations, Weighted by Recursive Impact Factor
wdsccites	Number of Citations, Weighted by Recursive Impact Factor, Discounted by Citation Age
anbcites	Number of Citations, Weighted by Number of Authors
adcites	Number of Citations, Weighted by Number of Authors, Discounted by Citation Age
asccites	Number of Citations, Weighted by Number of Authors and Simple Impact Factors
adsccites	Number of Citations, Weighted by Number of Authors and Simple Impact Factors, Discounted by Citation Age
awsccites	Number of Citations, Weighted by Number of Authors and Recursive Impact Factors
awdsccites	Number of Citations, Weighted by Number of Authors and Recursive Impact Factors, Discounted by Citation Age
hindex	h-index
ncauthors	Number of Registered Citing Authors
rcauthors	Number of Registered Citing Authors, Weighted by Rank (Max. 1 per Author)
euclid	Euclidean citation score
nepcites	Breadth of citations across fields
	Abstract views and downloads
absviews	Number of Abstract Views in RePEc Services over the past 12 months
downloads	Number of Downloads through RePEc Services over the past 12 months
aabsviews	Number of Abstract Views in RePEc Services over the past 12 months, Weighted by Number of Authors
adownloads	Number of Downloads through RePEc Services over the past 12 months, Weighted by Number of Authors
	Network and students
close	Closeness measure in co-authorship network
betweenn	Betweenness measure in co-authorship network
students	Record of graduates

Figure 6: Full data, the sample, and the efficient sample

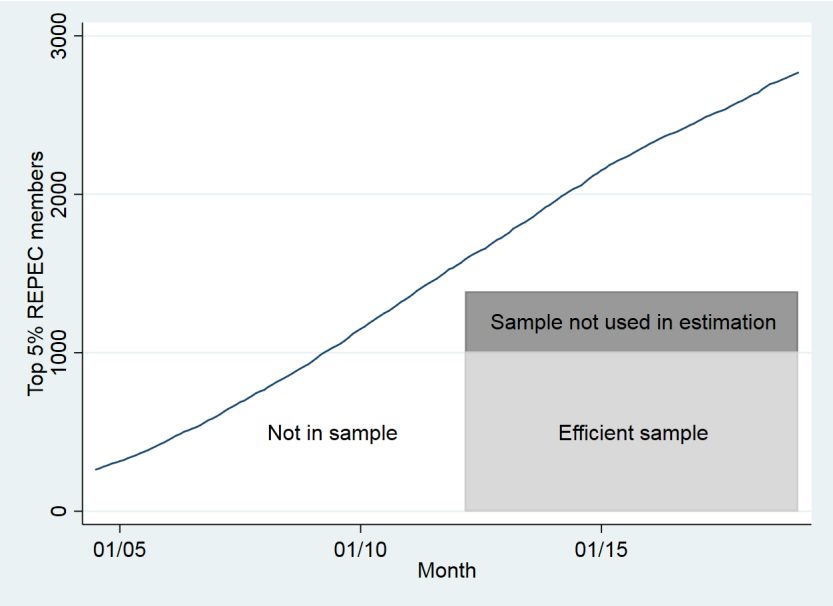


Table 2: Summary statistics

Variable	Others **(alive in July 2019)**					**Nobel laureates (alive in July 2019)**				
	Mean	**Std. Dev.**	Min.	Max.	**N**	**Mean**	**Std. Dev.**	Min.	Max.	**N**
	Big panel (March 2012 to July 2019, 1380 economists)									
Age	59.7	9.5	32	95	89,267	72.8	7.47	56	92	2,581
Years since PhD	29.7	9.8	2	69	115,344	46.5	7.443	28	64	2,581
	Long panel (July 2008 to July 2019, 598 economists)									
Age	59.2	9.0	30	95	77,406	70.5	7.8	53	92	3,591
Years since PhD	29.9	9.3	0	69	92,568	44.4	8.0	25	64	3,591

explanatory variables. Thus, we estimate the age-specific and experience-specific trend in the rank, with respect to Nobelists and non-Nobelists. The identification arises from the fact that the longitudinal data that we have allows for controlling for individual fixed effects and autoregression of the disturbance. These effects capture unobserved heterogeneity *within* the group of leading economists, even though our sample remains non-representative with respect to general population.

Formally, the model is

$$R_{it} = \beta_1 Exp_{it} + \beta_2 Exp_{it}^2 + Age_{it} \cdot \gamma + Nobel_i \times (\beta_3 Exp_{it} + Age_{it} \cdot \delta) + \mu_i + \varepsilon_{it} \qquad (1)$$

where R_{it} is the rank of economist i in month t. On the right hand side, Exp is experience, which is defined as the number of years since award of PhD in economics or an equivalent degree. Age is a vector of dummy variables for age groups (younger than 50, 50 to 59, 60 to 69, and 70 or more years old). Age is grouped because age and experience are colinear in presence of individual fixed effects. $Nobel$ is a dummy variable for being the economist a Nobel laureat or a future Nobel laureat (the latest considered Nobel Prize is the one of 2018). The grouping of age into dummy variables is different for Nobelists and non-Nobelists, because, differently from non-Nobelists, some of whom are younger than 40, all Nobelists (before or after the Prize) in our data are at least 49 years old. Individual fixed effects are captured by μ_i. The fixed effects allow to deal with composition of the data. The disturbance is allowed to be first-order autoregressive within each author.[10]

[10] We use the STATA function *xtregar* for estimation.

4.2 Interpretation of the coefficients

The considered outcomes are the rankings within a closed group of 1,380 economists (737 for the long panel) who are continuously in the top-5% of RePEc members. Thus, all coefficients are interpreted as the effect of the explanatory variable on the normalized rank, where the normalized rank is ranged between $\frac{1}{1{,}380}$ and 1, the lower the better. Thus, a negative coefficient means a better rank as a function of the explanatory variable. Because of the normalization of rankings, we interpret the coefficients as percentage points in the uniform distribution of the authors according to the ranking.

5 Results

Tables 3 and 4 present the results of estimation for the aggregate ranking (that we interpret as influence) and for the main indexes. Table 3 shows the results for the big panel (89 months and 1,001 economists) and Table 4 shows the results for the long panel (133 months and 598 economists). Column 1 shows the results for the aggregate ranking. The results show that influence is not affected by age (the only effects that are statistically significant in the big panel are not observed in the long panel), whereas its relationship with experience is a robust inverse U-shape. The optimal level of experience is about 30 years after PhD graduation. The aggregate rank of economists with 30 years of experience is 5 percentage points lower than the rank of those with 10 years of experience, conditional on age. Nobelists are not different from non-Nobelists in terms of the effect of aging on aggregate rank. Thus, the difference between Nobelists and non-Nobelists, observed in Figures 3-4, is explained by individual fixed effects and autoregression of the disturbance, and not by different effects of

age and experience on the rank.

Columns 2-9 show the effects for main indexes: number of citations, number of distinct works, abstract views and downloads of papers from RePEc, quality of network and the number of students. The inverse U-shaped relationship between rank and experience is observed for all indexes but abstract views and downloads. The only index that shows a strong relationship with age is the number of students, but this relationhsip is not observed in the long panel. However, a weak but robust effect of age is observed for closeness measure in co-authorship network. The difference between Nobelists and non-Nobelists is observed for two indexes: the number of citations and betweenness measure in co-authorship network. However, both effects are not observed in the long panel.

In Tables 8-12 in the Appendix, we report full results for all indexes listed in Table 1 for the big panel, and in Tables 13-17 we report the results for the long panel.

6 Heterogeneity

Finally, we investigate the heterogeneity of the effects. We use RePEc Genealogy project that links many of RePEc members to their PhD advisors and students. We construct "families" of economists, where ancestry is defined by PhD supervison. The families that we manage to construct have up to four generations. A family is defined by a common ancestor. Some economists belong to more than one family, because they have multiple PhD advisors who themselves belong to different families. Figure 7 shows, as an example, the family headed by Simon Kuznetz (even though Kuznetz himself did not have an opportunity to be a RePEc member). The natural interpretation of families is their relationship to specific fields of

Table 3: Main results, big panel

VARIABLES	(1) rank	(2) nbcites	(3) dnbworks	(4) nbpages	(5) absviews	(6) downloads	(7) close	(8) betweenn	(9) students
Exp	-0.006***	-0.004***	-0.006***	-0.004***	-0.000	0.000	-0.013***	-0.011***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000***	0.000***	0.000***	0.000***	0.000	-0.000	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.003**	-0.002**	-0.001	-0.000	-0.001	-0.000	0.001	-0.003**	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
$Age \leq 49$					*omitted*				
$50 \leq Age \leq 59$	0.001	-0.000	0.001	0.002	0.000	-0.000	-0.009***	0.004	0.012***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.003)	(0.003)	(0.004)
$60 \leq Age \leq 69$	0.002	0.001	0.002	0.003*	-0.000	0.000	-0.008*	0.005	0.015***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.004)	(0.004)	(0.005)
$70 \leq Age$	0.003	0.002	0.002	0.003	-0.001	-0.000	-0.000	0.016***	0.013**
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.006)
$(Age \leq 64) \times Nobel$					*omitted*				
$(65 \leq Age \leq 79) \times Nobel$	0.004	0.003	0.002	0.003	0.000	0.007	-0.005	0.008	0.017
	(0.008)	(0.007)	(0.006)	(0.007)	(0.006)	(0.007)	(0.016)	(0.013)	(0.017)
$(80 \leq Age) \times Nobel$	0.005	0.004	-0.002	0.003	0.001	0.005	-0.011	0.009	0.014
	(0.012)	(0.010)	(0.009)	(0.009)	(0.008)	(0.011)	(0.024)	(0.020)	(0.029)
Observations	88,088	88,088	88,088	88,088	88,087	88,087	88,088	88,088	73,073
Num. of authors	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001
Delta (30-10)	-0.0470	-0.0290	-0.0440	-0.0320	0	0	-0.0950	-0.0790	-0.0390
(st. dev.)	0.0255	0.0205	0.0172	1.467	95.44	0.0236	0.807	0.0275	0.0372
Optimal exp.	31.75	31.86	31.23	31.79	26.09	21.63	31.31	31.91	41.61
(st. dev.)	1.243	1.623	0.848	1.464	103.7	31.38	0.819	0.823	5.423

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 4: Main results, long panel

VARIABLES	(1) rank	(2) nbcites	(3) dnbworks	(4) nbpages	(5) absviews	(6) downloads	(7) close	(8) betweenn	(9) students
Exp	-0.003***	-0.001	-0.005***	-0.003***	-0.001*	-0.000	-0.011***	-0.009***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Exp^2	0.000***	0.000	0.000***	0.000***	0.000*	0.000	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.001	-0.000	-0.000	-0.000	0.001	0.000	-0.000	-0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
$Age \leq 49$					*omitted*				
$50 \leq Age \leq 59$	0.001	0.001	0.001	0.000	0.004***	0.002	-0.011**	-0.003	-0.005
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.005)	(0.004)	(0.005)
$60 \leq Age \leq 69$	0.002	0.001	0.003	0.000	0.005***	0.003*	-0.012**	-0.002	-0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)	(0.006)	(0.005)	(0.006)
$70 \leq Age$	0.002	0.003	0.003	0.000	0.003*	0.001	-0.007	0.007	-0.006
	(0.003)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.007)	(0.006)	(0.008)
$(Age \leq 64) \times Nobel$					*omitted*				
$(65 \leq Age \leq 79) \times Nobel$	0.001	0.001	0.001	0.001	-0.001	0.003	-0.009	0.002	0.006
	(0.006)	(0.005)	(0.006)	(0.006)	(0.004)	(0.005)	(0.015)	(0.013)	(0.015)
$(80 \leq Age) \times Nobel$	0.003	-0.000	-0.000	0.002	-0.001	0.000	-0.013	0.000	0.002
	(0.010)	(0.008)	(0.009)	(0.009)	(0.007)	(0.008)	(0.024)	(0.020)	(0.025)
Observations	78,936	78,936	78,936	78,936	78,936	78,936	52,624	52,624	43,654
Num. of authors	598	598	598	598	598	598	598	598	598
Delta (30-10)	-0.0250	-0.00600	-0.0360	-0.0200	-0.00900	-0.00300	-0.0800	-0.0750	-0.0360
(st. dev.)	2.342	9.574	0.0230	0.0259	5.802	16.49	1.266	1.234	0.0481
Optimal exp.	31.68	34.84	32.70	32.15	33.57	32.71	32.05	33.44	35.95
(st. dev.)	0.0279	0.0217	1.495	2.821	0.0206	0.0238	0.0475	0.0389	3.721

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

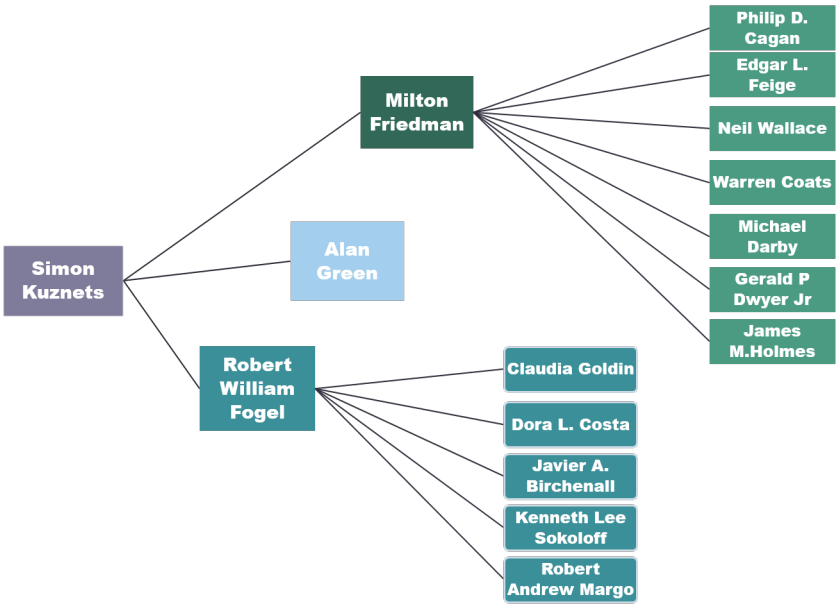
Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

economic research. We focus on five largest families that we found in RePEc data, listed by their heads: Kenneth Arrow, Lawrence Katz, Wassily Leontief, Rüdiger Dornbusch, and Tjalling Koopmans.

We estimate the empirical model for each of the big five families (we do not pool families, because some economists belong to two families). Because there are only few or none Nobelists in each family, we exclude the interaction with Nobel status from the model. Tables 5-7 show the main results of the estimation for the big panel, while the results for the long panel appear in Tables 18-20 in the Appendix.

We indeed observe heterogeneity. Prominently, Katz family (which is, roughly speaking, a family of labor economists) is different from Leontief family (which is, roughly speaking, a family of macroeconomists) by having a stronger positive effect of the first three decades of experience on the main indexes and the aggregate rank. An economist who belongs to the Katz family advances 18 percentage points in the ranking between 10th and 30th year since PhD graduation. However, she reaches the peak of her influence as early as 26 years after PhD graduation (25 years in the long panel), while a corresponding figure for Leontief family's members is 34 years (36 years in the long panel). Thus, labor economists reach the peak of their influence 10 years earlier (in terms of years since graduation) than macroeconomists. The inverse U-shape effect of experience on the main indexes for other three families is much weaker. An exception is the number of students, where four families (Arrow, Katz, Leontief, and Koopmans) show a significant effect of experience. The effect is, however, heterogeneous. Arrow and Koopman families have a U-shaped (and not an inversed U-shaped) relationship. It means that in this families the rank with respect to the number of studnets improves for high levels of experience. Katz family has an inverse U-shaped relationship. Finally, Leontief

Figure 7: An example of a "family" of economists



family shows a linear relationship - the ranking with respect to the number of students improves monotonically with experience. The effects of age on any indexes are sporadic and not robust to the choice of the panel (big or long).

7 Conclusions

We use rich and growing RePEc database to capture several years of implicit competition between leading economists of different ages over a higher rank. We find that age is not related to the rank, while experience is. Economists reach the peak of their rank after 30 years of post-graduate career. This figure varies across fields. In particular, labor economists reach the peak earlier than others, but the return to experience that they enjoy before reaching the peak is higher than for others. Scientiests whose exceptional influence is recognized

Table 5: Aggregate rank and number of citations (big families), big panel

	(1)	(2)	(3)	(4)	(5)	(2)	(4)	(6)	(8)	(10)
	Aggregate rank					Nbcites				
VARIABLES	Arrow	Katz	Leontief	Dornbusch	Koopmans	Arrow	Katz	Leontief	Dornbusch	Koopmans
Exp	0.006	-0.038***	-0.008***	-0.007*	0.003	0.004	-0.039***	-0.004*	-0.007**	0.003
	(0.004)	(0.008)	(0.002)	(0.004)	(0.004)	(0.004)	(0.008)	(0.002)	(0.004)	(0.002)
Exp^2	-0.000	0.001***	0.000***	0.000*	-0.000	-0.000*	0.001***	0.000**	0.000**	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Age \leq 49$					*omitted*					
$50 \leq Age$	-0.003	0.007	0.004	-0.002	0.004	0.001	0.007	0.003	-0.003	0.001
≤ 59	(0.007)	(0.012)	(0.006)	(0.006)	(0.008)	(0.006)	(0.012)	(0.005)	(0.006)	(0.004)
$60 \leq Age$	-0.000	0.006	0.009	0.014*	0.005	0.005	-0.004	0.005	0.021***	0.000
≤ 69	(0.010)	(0.027)	(0.008)	(0.007)	(0.010)	(0.009)	(0.026)	(0.007)	(0.007)	(0.006)
$70 \leq Age$	0.002		0.005	0.018	0.001	0.008		0.008	0.031**	0.002
	(0.024)		(0.010)	(0.015)	(0.013)	(0.021)		(0.009)	(0.014)	(0.008)
Observations	2,640	1,760	7,304	2,024	2,464	2,640	1,760	7,304	2,024	2,464
N. of authors	30	20	83	23	28	30	20	83	23	28
Delta (30-10)	0.023	-0.180	-0.064	-0.050	0.017	-0.00600	-0.149	-0.0180	-0.0420	0.0150
(st. dev.)	6.668	2.155	3.618	4.412	12.05	0.121	1.804	5.907	0.122	8.174
Optimal exp.	25.19	26.14	33.93	30.46	27.03	18.53	24.72	26.68	27.92	27.25
(st. dev.)	0.138	0.305	0.0700	0.130	0.116	8.661	0.312	0.0640	3.478	0.0710

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance.

Delta (30-10) is the difference between 30 and 10 years since PhD graduation.

Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 6: Number of works and number of students (big families), big panel

	(1)	(2)	(3)	(4)	(5)	(2)	(4)	(6)	(8)	(10)
			Dnbworks					Students		
VARIABLES	Arrow	Katz	Leontief	Dornbusch	Koopmans	Arrow	Katz	Leontief	Dornbusch	Koopmans
Exp	-0.002	-0.019***	-0.008***	-0.006	0.004	0.016**	-0.054***	-0.020***	-0.012	0.030***
	(0.003)	(0.004)	(0.001)	(0.004)	(0.003)	(0.008)	(0.012)	(0.003)	(0.012)	(0.007)
Exp^2	0.000	0.000***	0.000***	0.000	-0.000	-0.000***	0.001***	0.000***	0.000	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Age \leq 49$					*omitted*					
$50 \leq Age$	-0.002	0.010*	0.002	-0.001	-0.009*	0.028	-0.029	0.052***	-0.001	0.002
≤ 59	(0.005)	(0.006)	(0.004)	(0.006)	(0.006)	(0.018)	(0.022)	(0.012)	(0.031)	(0.025)
$60 \leq Age$	0.000	0.005	0.003	-0.001	-0.009	-0.001	-0.008	0.082***	-0.008	-0.017
≤ 69	(0.007)	(0.013)	(0.005)	(0.007)	(0.007)	(0.030)	(0.052)	(0.018)	(0.038)	(0.032)
$70 \leq Age$	0.011		0.001	-0.017	-0.018*	0.092		0.075***	-0.193***	0.012
	(0.016)		(0.007)	(0.015)	(0.010)	(0.064)		(0.023)	(0.061)	(0.039)
Observations	2,640	1,760	7,304	2,024	2,464	2,190	1,460	6,059	1,679	2,044
N. of authors	30	20	83	23	28	30	20	83	23	28
Delta (30-10)	-0.0410	-0.148	-0.0770	-0.0380	0.0510	-0.0170	-0.150	-0.287	-0.191	0.163
(st. dev.)	1229	4.226	2.635	0.126	0.0780	0.252	1.560	16.75	362.5	0.208
Optimal exp.	197.6	32.98	37.73	29.06	53.89	18.98	23.25	74.66	116.0	27.43
(st. dev.)	0.0840	0.137	0.0430	4.650	21.36	4.342	0.455	0.105	0.399	2.311

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance.

Delta (30-10) is the difference between 30 and 10 years since PhD graduation.

Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

	(1)	(2)	(3)	(4)	(5)	(2)	(4)	(6)	(8)	(10)
			Close					Betweenn		
VARIABLES	Arrow	Katz	Leontief	Dornbusch	Koopmans	Arrow	Katz	Leontief	Dornbusch	Koopmans
Exp	-0.016***	-0.009	-0.008**	-0.036***	0.004	-0.016***	-0.010	-0.008***	-0.011	-0.006
	(0.004)	(0.008)	(0.003)	(0.011)	(0.004)	(0.004)	(0.006)	(0.002)	(0.007)	(0.004)
Exp^2	0.000***	0.000	0.000***	0.000**	0.000*	0.000***	0.000	0.000***	0.000	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Age \leq 49$					*omitted*					
$50 \leq Age$	0.018*	0.009	-0.026**	-0.008	-0.051***	0.015	-0.005	0.002	-0.004	-0.006
≤ 59	(0.010)	(0.014)	(0.011)	(0.024)	(0.015)	(0.010)	(0.012)	(0.008)	(0.018)	(0.014)
$60 \leq Age$	0.028*	0.060*	-0.030**	0.002	-0.037*	0.024	0.018	0.001	0.016	0.001
≤ 69	(0.016)	(0.031)	(0.015)	(0.030)	(0.022)	(0.016)	(0.028)	(0.012)	(0.023)	(0.020)
$70 \leq Age$	-0.029		-0.041**	0.025	-0.026	0.010		0.003	0.018	-0.004
	(0.032)		(0.019)	(0.057)	(0.026)	(0.031)		(0.015)	(0.043)	(0.024)
Observations	2,640	1,760	7,304	2,024	2,464	2,640	1,760	7,304	2,024	2,464
N. of authors	30	20	83	23	28	30	20	83	23	28
Delta (30-10)	-0.0660	-0.0970	-0.0370	-0.362	0.149	-0.135	-0.0990	-0.0800	-0.198	0.0340
(st. dev.)	2.123	49.51	4.458	6.449	0.125	2.854	0.235	0.0750	385.6	5.760
Optimal exp.	25.26	45.07	26.26	40.46	-19.48	34.20	40.95	41.02	144.2	15.66
(st. dev.)	0.120	0.298	0.102	0.374	32.93	0.118	27.56	6.034	0.252	0.114

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance.

Delta (30-10) is the difference between 30 and 10 years since PhD graduation.

Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 7: Network (big families), big panel

externally by Nobel Comittee are not different from others in the effect of age and experience on their rank. To conclude, even though the relationship between age and scientific influence in economics is observed as a stilysed fact, the biological factor of aging does not explain this relationship.

References

Aizenman, J. and Kletzer, K., 2011. The life cycle of scholars and papers in economics–the 'citation death tax'. *Applied Economics*, 43(27), pp.4135-4148.

Allison, P.D., Long, J.S. and Krauze, T.K., 1982. Cumulative advantage and inequality in science. *American Sociological Review*, pp.615-625.

Azoulay, P., Graff Zivin, J.S. and Wang, J., 2010. Superstar extinction. *The Quarterly Journal of Economics*, 125(2), pp.549-589.

Baffes, J. and Vamvakidis, A., 2011. Are you too young for the Nobel Prize?. Research Policy, 40(10), pp.1345-1353.

Barrett, Garry F., and W. Craig Riddell. "Aging and literacy skills: Evidence from IALS, ALL and PIAAC." (2016).

Baldi, S., 1998. Normative versus social constructivist processes in the allocation of citations: A network-analytic model. *American Sociological Review*, pp.829-846.

Bergsma, S., Mandryk, R.L. and McCalla, G., 2014, May. Learning to measure influence in a scientific social network. In Canadian Conference on Artificial Intelligence (pp. 35-46). Springer, Cham.

Besancenot, Damien, and Abdelghani Maddi, 2019, Should citations be weighted to assess the influence of an academic article?, *Economics Bulletin*, 39(1), pp. 435-445.

Bjork, S., Offer, A. and Söderberg, G., 2014. Time series citation data: The Nobel Prize in economics. Scientometrics, 98(1), pp.185-196.

Boettke, P.J., Fink, A. and Smith, D.J., 2012. The Impact of Nobel Prize Winners in Economics: Mainline vs. Mainstream. *American Journal of Economics and Sociology*, 71(5), pp.1219-1249.

Bornmann, L. and Daniel, H.D., 2008. What do citation counts measure? A review of studies on citing behavior. *Journal of Documentation*, 64(1), pp.45-80.

Chan, H.F., Gleeson, L. and Torgler, B., 2014. Awards before and after the Nobel Prize: A Matthew effect and/or a ticket to one's own funeral?. Research Evaluation, 23(3), pp.210-220.

Chan, H.F., Önder, A.S. and Torgler, B., 2015. Do Nobel laureates change their patterns of collaboration following prize reception?. *Scientometrics*, 105(3), pp.2215-2235.

Chiappori, P.A. and Levitt, S.D., 2003. An examination of the influence of theory and individual theorists on empirical research in microeconomics. *American Economic Review*, 93(2), pp.151-155.

Clough, J.R., Gollings, J., Loach, T.V. and Evans, T.S., 2015. Transitive reduction of citation networks. *Journal of Complex Networks*, 3(2), pp.189-203.

Dennis, W., 1956. Age and productivity among scientists. *Science*, 123(3200), pp.724-725.

Desjardins, Richard, and Arne Jonas Warnke. aging and skills: a review and analysis of skill gain and skill loss over the lifespan and over time. No. 72. OECD Education Working Papers, 2012.

Ellison, G., 2013. How does the market use citation data? The Hirsch index in economics. *American Economic Journal: Applied Economics*, 5(3), pp.63-90.

Fortunato, S., Bergstrom, C.T., Börner, K., Evans, J.A., Helbing, D., Milojević, S., Petersen,

A.M., Radicchi, F., Sinatra, R., Uzzi, B. and Vespignani, A., 2018. Science of science. *Science*, 359(6379), p.eaao0185.

Frandsen, T.F. and Nicolaisen, J., 2013. The ripple effect: Citation chain reactions of a nobel prize. *Journal of the American Society for Information Science and Technology*, 64(3), pp.437-447.

Friedman, M., 1953. *The methodology of positive economics.*

Gingras, Y., Lariviere, V., Macaluso, B. and Robitaille, J.P., 2008. The effects of aging on researchers' publication and citation patterns. *PloS one*, 3(12), p.e4048.

Gingras, Y. and Wallace, M., 2009. Why it has become more difficult to predict Nobel Prize winners: a bibliometric analysis of nominees and winners of the chemistry and physics prizes (1901–2007). *Scientometrics*, 82(2), pp.401-412.

Goldberg, S.R., Anthony, H. and Evans, T.S., 2015. Modelling citation networks. *Scientometrics*, 105(3), pp.1577-1604.

Green, David A., and W. Craig Riddell. Aging and literacy skills: Evidence from Canada, Norway and the United States. *Labour Economics* 22 (2013): 16-29.

Ham, J.C. and Weinberg, B.A., 2008. Geography and innovation: Evidence from Nobel laureates. Working Paper, Ohio State University.

Hamermesh, D.S., 2013. Six decades of top economics publishing: Who and how?. *Journal of Economic Literature*, 51(1), pp.162-72.

Hamermesh, D.S., 2018. Citations in economics: Measurement, uses, and impacts. *Journal of Economic Literature*, 56(1), pp.115-56.

Hardy, G.H., 1992. *A mathematician's apology.* Cambridge University Press.

Hilmer, M.J., Ransom, M.R. and Hilmer, C.E., 2015. Fame and the fortune of academic economists: How the market rewards influential research in economics. *Southern Economic Journal*, 82(2), pp.430-452.

Hirsch, J.E., 2005. An index to quantify an individual's scientific research output. *Proceedings of the National academy of Sciences*, 102(46), pp.16569-16572.

Krapf, Matthias and , Jörg. (2012) How Nobel Laureates Would Perform in the Handelsblatt Ranking. *Regional and Sectoral Economic Studies*, 12 (3). pp. 46-56.

Levin, S.G. and Stephan, P.E., 1991. Research productivity over the life cycle: Evidence for academic scientists.*American Economic Review*, pp.114-132.

Niyazov, Y., Vogel, C., Price, R., Lund, B., Judd, D., Akil, A., Mortonson, M., Schwartzman, J. and Shron, M., 2016. Open access meets discoverability: Citations to articles posted to Academia. edu. *PloS one*, 11(2), p.e0148257.

Oster, S.M. and Hamermesh, D.S., 1998. Aging and productivity among economists. *Review of Economics and Statistics*, 80(1), pp.154-156.

Palacios-Huerta, I. and Volij, O., 2004. The measurement of intellectual influence. *Econometrica*, 72(3), pp.963-977.

Perry, M. and Reny, P.J., 2016. How to count citations if you must. *American Economic Review*, 106(9), pp.2722-41.

Rablen, M.D. and Oswald, A.J., 2008. Mortality and immortality: The Nobel Prize as an experiment into the effect of status upon longevity. *Journal of Health Economics*, 27(6), pp.1462-1471.

Rauber, M. and Ursprung, H.W., 2008. Life cycle and cohort productivity in economic research: The case of Germany. *German Economic Review*, 9(4), pp.431-456.

Reschke, B.P., Azoulay, P. and Stuart, T.E., 2018. Status spillovers: The effect of status-conferring Prizes on the allocation of attention. *Administrative Science Quarterly*, 63(4), pp.819-847.

Rothenberg, A., 2005. Family background and genius II: Nobel laureates in science. *The Canadian Journal of Psychiatry*, 50(14), pp.918-925.

Sinatra, R., Wang, D., Deville, P., Song, C. and Barabási, A.L., 2016. Quantifying the evolution of individual scientific impact. *Science*, 354(6312), p.aaf5239.

Shavinina, L.V., 2004. Explaining high abilities of Nobel laureates. *High Ability Studies*, 15(2), pp.243-254.

Skirbekk, V., 2004. Age and individual productivity: A literature survey.

Stephan, P. and Levin, S., 1993. Age and the Nobel Prize revisited. *Scientometrics*, 28(3), pp.387-399.

Zeng, A., Shen, Z., Zhou, J., Wu, J., Fan, Y., Wang, Y. and Stanley, H.E., 2017. The science of science: From the perspective of complex systems. *Physics Reports*, 714, pp.1-73.

Zuckerman, H., 1967. Nobel laureates in science: Patterns of productivity, collaboration, and authorship. *American Sociological Review*, pp.391-403.

Van Dalen, H.P., 1999. The golden age of Nobel economists. *The American Economist*, 43(2), pp.19-35.

Wagner, C.S., Horlings, E., Whetsell, T.A., Mattsson, P. and Nordqvist, K., 2015. Do Nobel

Laureates create prize-winning networks? An analysis of collaborative research in physiology or medicine. *PloS one*, 10(7), p.e0134164.

Weinberg, B.A. and Galenson, D.W., 2005. Creative careers: The life cycles of Nobel laureates in economics (No. w11799). National Bureau of Economic Research.

Appenidx: omitted tables

Table 8: Regression results: Number of works, big panel

VARIABLES	(1) dnbworks	(2) scworks	(3) wscworks	(4) anbworks	(5) ascworks	(6) awscworks
Exp	-0.006***	-0.005***	-0.011***	-0.004***	-0.005***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.001	-0.003**	-0.004***	-0.003**	-0.004***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Age \leq 49$			*omitted*			
$50 \leq Age \leq 59$	0.001	0.000	0.002	0.001	0.001	0.002
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
$60 \leq Age \leq 69$	0.002	0.000	0.008***	0.002	0.001	0.012***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
$70 \leq Age$	0.001	-0.000	0.008**	0.002	0.000	0.012***
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.004)
$(Age \leq 64) \times Nobel$			*omitted*			
$(65 \leq Age \leq 79) \times Nobel$	0.004	0.003	0.015	0.003	0.004	0.020*
	(0.006)	(0.007)	(0.011)	(0.007)	(0.007)	(0.011)
$(80 \leq Age) \times Nobel \times Nobel$	0.000	0.003	0.005	0.001	0.004	0.013
	(0.009)	(0.010)	(0.016)	(0.010)	(0.011)	(0.016)
Observations	88,088	88,088	88,088	88,088	88,088	88,088
Num. of authors	1,001	1,001	1,001	1,001	1,001	1,001
Delta (30-10)	-0.0440	-0.0370	-0.0830	-0.0270	-0.0340	-0.0760
(st. dev.)	0.837	0.0214	0.652	1.664	1.360	0.762
Optimal exp.	31.03	30.68	32.07	31.16	30.60	32.47
(st. dev.)	0.0172	1.187	0.0226	0.0205	0.0222	0.0232

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 9: Regression results: Number of pages, big panel

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	nbpages	scpages	wscpages	anbpages	ascpages	awscpages
Exp	-0.004***	-0.006***	-0.013***	-0.004***	-0.006***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.000	-0.002	-0.003	-0.001	-0.003**	-0.006***
	(0.001)	(0.002)	(0.002)	(0.001)	(0.002)	(0.002)
$Age \leq 49$			*omitted*			
$50 \leq Age \leq 59$	0.002	0.002	0.003	0.002	0.002	0.003
	(0.001)	(0.002)	(0.003)	(0.001)	(0.002)	(0.002)
$60 \leq Age \leq 69$	0.003*	0.003	0.009***	0.003*	0.004*	0.011***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
$70 \leq Age$	0.003	0.002	0.010**	0.003	0.004	0.012***
	(0.002)	(0.003)	(0.004)	(0.002)	(0.003)	(0.004)
$(Age \leq 64) \times Nobel$			*omitted*			
$(65 \leq Age \leq 79) \times Nobel$	0.003	0.003	0.016	0.001	0.003	0.021*
	(0.007)	(0.009)	(0.012)	(0.007)	(0.009)	(0.012)
$(80 \leq Age) \times Nobel$	0.003	0.006	0.010	0.002	0.007	0.026
	(0.009)	(0.013)	(0.019)	(0.011)	(0.013)	(0.018)
Observations	88,088	88,088	88,088	88,088	88,088	88,088
Num. of authors	1,001	1,001	1,001	1,001	1,001	1,001
Delta (30-10)	-0.0320	-0.0480	-0.0970	-0.0290	-0.0490	-0.0930
(st. dev.)	1.458	0.0265	0.674	1.930	0.0268	0.728
Optimal exp.	31.75	31.63	31.66	32.48	32.34	32.36
(st. dev.)	0.0204	1.255	0.0286	0.0230	1.319	0.0279

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 10: Regression results: Number of citations (part I), big panel

VARIABLES	(1) nbcites	(2) dcites	(3) sccites	(4) dsccites	(5) wsccites	(6) wdsccites	(7) anbcites	(8) adcites
Exp	-0.004***	-0.010***	-0.005***	-0.011***	-0.019***	-0.018***	-0.004***	-0.012***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.002**	-0.003**	-0.003***	-0.003**	-0.009***	-0.006***	-0.003*	-0.005***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$Age \leq 49$				*omitted*				
$50 \leq Age \leq 59$	-0.000	0.000	0.000	0.001	0.007***	0.005**	0.000	0.001
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.002)	(0.001)	(0.002)
$60 \leq Age \leq 69$	0.001	0.003	0.001	0.003	0.015***	0.011***	0.002	0.004
	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
$70 \leq Age$	0.002	0.002	0.001	0.003	0.016***	0.012***	0.002	0.004
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.004)	(0.002)	(0.004)
$(Age \leq 64) \times Nobel$				*omitted*				
$(65 \leq Age \leq 79) \times Nobel$	0.003	0.007	0.004	0.003	0.017**	0.013	0.002	0.006
	(0.007)	(0.010)	(0.006)	(0.009)	(0.008)	(0.010)	(0.008)	(0.011)
$(80 \leq Age) \times Nobel$	0.004	0.006	0.005	0.000	0.012	0.007	0.002	0.002
	(0.010)	(0.015)	(0.009)	(0.014)	(0.013)	(0.016)	(0.011)	(0.016)
Observations	88,088	88,088	88,088	88,088	88,088	88,088	88,088	88,088
Num. of authors	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001
Delta (30-10)	-0.0290	-0.0760	-0.0390	-0.0810	-0.141	-0.139	-0.0310	-0.0850
(st. dev.)	1.625	0.839	0.0189	0.747	0.315	0.404	1.634	0.784
Optimal exp.	31.84	31.80	32.16	32.14	32.11	32.15	31.30	31.43
(st. dev.)	0.0205	0.0278	1.138	0.0257	0.0184	0.0234	0.0234	0.0301

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 11: Regression results: Number of citations (part II), big panel

VARIABLES	(1) asccites	(2) adsccites	(3) awsccites	(4) awdsccites	(5) hindex	(6) ncauthors	(7) rcauthors	(8) nepcites
Exp	-0.005***	-0.011***	-0.016***	-0.018***	-0.012***	-0.004***	-0.006***	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.003**	-0.004***	-0.009***	-0.008***	-0.003*	-0.002*	-0.003***	-0.004**
	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
$Age \leq 49$				*omitted*				
$50 \leq Age \leq 59$	0.001	0.001	0.006***	0.005**	-0.003	0.000	0.000	-0.002
	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
$60 \leq Age \leq 69$	0.002	0.004	0.014***	0.013***	-0.000	0.001	0.002	-0.000
	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.001)	(0.002)	(0.003)
$70 \leq Age$	0.003	0.004	0.015***	0.014***	-0.003	0.001	0.002	-0.001
	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)	(0.002)	(0.002)	(0.003)
$(Age \leq 64) \times Nobel$				*omitted*				
$(65 \leq Age \leq 79) \times Nobel$	0.003	0.005	0.017*	0.016	0.009	0.003	0.005	0.012
	(0.007)	(0.010)	(0.009)	(0.011)	(0.012)	(0.006)	(0.006)	(0.010)
$(80 \leq Age) \times Nobel$	0.005	0.006	0.016	0.014	0.014	0.002	0.005	0.012
	(0.010)	(0.015)	(0.014)	(0.017)	(0.018)	(0.008)	(0.009)	(0.015)
Observations	88,088	88,088	88,088	88,088	88,088	88,088	88,088	73,073
Num. of authors	1,001	1,001	1,001	1,001	1,001	1,001	1,001	1,001
Delta (30-10)	-0.0350	-0.0810	-0.124	-0.134	-0.0830	-0.0280	-0.0440	-0.0430
(st. dev.)	0.0210	0.0278	0.419	0.459	0.819	1.445	0.0184	1.560
Optimal exp.	31.78	31.79	32.11	32.08	30.85	31.89	31.82	31.58
(st. dev.)	1.363	0.784	0.0218	0.0259	0.0322	0.0174	0.951	0.0306

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 12: Regression results: Abstract views, downloads, network, and students, big panel

VARIABLES	(1) absviews	(2) downloads	(3) aabsviews	(4) adownloads	(5) close	(6) betweenn	(7) students
Exp	-0.000	0.000	-0.004***	-0.003***	-0.013***	-0.011***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000	-0.000	0.000***	0.000***	0.000***	0.000***	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.001	-0.000	-0.001	-0.001	0.000	-0.003**	-0.002
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
$Age \leq 49$				*omitted*			
$50 \leq Age \leq 59$	0.000	-0.000	-0.000	-0.002	-0.009***	0.004	0.016***
	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)
$60 \leq Age \leq 69$	-0.000	-0.000	0.001	-0.001	-0.008*	0.006*	0.022***
	(0.001)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)	(0.005)
$70 \leq Age$	-0.001	-0.000	0.003	0.001	0.000	0.016***	0.025***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.005)	(0.005)	(0.006)
$(Age \leq 64) \times Nobel$				*omitted*			
$(65 \leq Age \leq 79) \times Nobel$	0.000	0.006	0.007	0.011	-0.007	0.007	0.018
	(0.006)	(0.007)	(0.008)	(0.009)	(0.016)	(0.013)	(0.017)
$(80 \leq Age) \times Nobel$	0.001	0.005	0.007	0.009	-0.013	0.010	0.039
	(0.008)	(0.011)	(0.012)	(0.013)	(0.024)	(0.020)	(0.029)
Observations	88,087	88,087	88,088	88,088	88,088	88,088	73,073
Num. of authors	1,001	1,001	1,001	1,001	1,001	1,001	1,001
Delta (30-10)	0	0	-0.0330	-0.0250	-0.0970	-0.0790	-0.0390
(st. dev.)	0.0182	39.44	1.857	0.0291	0.809	0.0275	0.0373
Optimal exp.	25.74	19.83	32.16	33.23	31.31	31.92	51.20
(st. dev.)	131.4	0.0236	0.0260	3.003	0.0350	0.825	12.37

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 13: Regression results: Number of works, long panel

VARIABLES	(1) dnbworks	(2) scworks	(3) wscworks	(4) anbworks	(5) ascworks	(6) awscworks
Exp	-0.005***	-0.003***	-0.005***	-0.003***	-0.003***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.001	-0.002	-0.002	-0.001	-0.003**	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Age \leq 49$			*omitted*			
$50 \leq Age \leq 59$	0.001	0.002	-0.001	0.000	0.001	0.000
	(0.001)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
$60 \leq Age \leq 69$	0.003	0.000	0.002	0.002	-0.000	0.005
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.004)
$70 \leq Age$	0.003	-0.000	0.003	0.001	-0.001	0.006
	(0.002)	(0.002)	(0.005)	(0.002)	(0.003)	(0.005)
$(Age \leq 64) \times Nobel$			*omitted*			
$(65 \leq Age \leq 79) \times Nobel$	0.002	0.001	0.009	0.002	0.002	0.008
	(0.006)	(0.006)	(0.011)	(0.006)	(0.006)	(0.011)
$(80 \leq Age) \times Nobel$	0.002	-0.002	0.003	0.001	-0.000	0.003
	(0.009)	(0.009)	(0.018)	(0.009)	(0.010)	(0.018)
Observations	78,936	78,936	78,936	78,936	78,936	78,936
Num. of authors	598	598	598	598	598	598
Delta (30-10)	-0.0350	-0.0240	-0.0440	-0.0240	-0.0240	-0.0350
(st. dev.)	1.514	0.0248	2.095	0.0249	0.0265	3.415
Optimal exp.	32.67	31.35	34.31	32.34	30.80	36.83
(st. dev.)	0.0230	2.128	0.0334	2.350	2.144	0.0336

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 14: Regression results: Number of pages, long panel

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	nbpages	scpages	wscpages	anbpages	ascpages	awscpages
Exp	-0.003***	-0.004***	-0.010***	-0.003***	-0.004***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000***	0.000***	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.000	-0.001	-0.001	-0.000	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$Age \leq 49$			*omitted*			
$50 \leq Age \leq 59$	0.000	0.002	0.006*	0.000	0.002	0.005*
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)	(0.003)
$60 \leq Age \leq 69$	0.001	0.002	0.009**	0.001	0.003	0.009**
	(0.002)	(0.002)	(0.004)	(0.002)	(0.002)	(0.004)
$70 \leq Age$	0.000	0.002	0.008*	-0.000	0.003	0.010*
	(0.002)	(0.003)	(0.005)	(0.003)	(0.003)	(0.005)
$(Age \leq 64) \times Nobel$			*omitted*			
$(65 \leq Age \leq 79) \times Nobel$	0.001	0.003	0.012	0.000	0.002	0.014
	(0.006)	(0.007)	(0.011)	(0.006)	(0.007)	(0.011)
$(80 \leq Age) \times Nobel$	0.002	0.005	0.018	0.002	0.003	0.018
	(0.009)	(0.011)	(0.018)	(0.010)	(0.012)	(0.018)
Observations	78,936	78,936	78,936	78,936	78,936	78,936
Num. of authors	598	598	598	598	598	598
Delta (30-10)	-0.0200	-0.0330	-0.0790	-0.0190	-0.0300	-0.0620
(st. dev.)	0.0259	0.0297	0.976	0.0276	2.260	0.0322
Optimal exp.	32.06	32.09	32.70	31.73	32.22	33.45
(st. dev.)	2.794	2.002	0.0324	3.123	0.0310	1.314

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 15: Regression results: Number of citations (part I), long panel

VARIABLES	(1) nbcites	(2) dcites	(3) sccites	(4) dsccites	(5) wsccites	(6) wdsccites	(7) anbcites	(8) adcites
Exp	-0.001	-0.004***	-0.001	-0.006***	-0.010***	-0.009***	-0.002**	-0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000	0.000***	0.000	0.000***	0.000***	0.000***	0.000**	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.000	0.001	-0.001	-0.001	-0.005***	-0.002*	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
$Age \leq 49$				*omitted*				
$50 \leq Age \leq 59$	0.001	0.001	0.001	0.002	0.003	0.003	0.002	0.002
	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)	(0.003)	(0.001)	(0.003)
$60 \leq Age \leq 69$	0.001	0.002	0.000	0.003	0.005*	0.004	0.002	0.002
	(0.002)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)
$70 \leq Age$	0.002	0.002	0.002	0.004	0.006*	0.005	0.002	0.001
	(0.002)	(0.004)	(0.002)	(0.004)	(0.004)	(0.004)	(0.002)	(0.004)
$(Age \leq 64) \times Nobel$				*omitted*				
$(65 \leq Age \leq 79) \times Nobel$	0.001	0.002	0.002	-0.000	0.006	0.003	0.000	-0.000
	(0.005)	(0.009)	(0.005)	(0.008)	(0.008)	(0.009)	(0.006)	(0.009)
$(80 \leq Age) \times Nobel$	-0.000	-0.003	-0.000	-0.007	0.003	-0.005	-0.001	-0.007
	(0.008)	(0.014)	(0.007)	(0.014)	(0.013)	(0.015)	(0.009)	(0.015)
Observations	78,936	78,936	78,936	78,936	78,936	78,936	78,936	78,936
Num. of authors	598	598	598	598	598	598	598	598
Delta (30-10)	-0.00600	-0.0330	-0.00800	-0.0450	-0.0700	-0.0690	-0.0130	-0.0410
(st. dev.)	0.0217	0.0323	7.241	1.614	0.728	0.0280	4.195	0.0349
Optimal exp.	34.75	32.80	34.40	32.97	31.65	32.59	31.44	31.58
(st. dev.)	10.10	2.266	0.0205	0.0304	0.0239	0.946	0.0254	1.791

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 16: Regression results: Number of citations (part II), long panel

VARIABLES	(1) asccites	(2) adsccites	(3) awsccites	(4) awdsccites	(5) hindex	(6) ncauthors	(7) rcauthors	(8) nepcites
Exp	-0.002**	-0.006***	-0.008***	-0.009***	-0.004***	-0.001	-0.002***	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Exp^2	0.000**	0.000***	0.000***	0.000***	0.000***	0.000	0.000***	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	-0.001	-0.001	-0.005***	-0.003**	0.003*	-0.000	-0.000	-0.004**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.002)
$Age \leq 49$				*omitted*				
$50 \leq Age \leq 59$	0.001	0.002	0.002	0.003	0.002	0.001	0.001	0.001
	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)	(0.003)
$60 \leq Age \leq 69$	0.001	0.002	0.004	0.005	0.005	0.002	0.002	0.003
	(0.002)	(0.003)	(0.003)	(0.004)	(0.003)	(0.001)	(0.001)	(0.004)
$70 \leq Age$	0.003	0.003	0.005	0.006	0.005	0.002	0.002	0.002
	(0.002)	(0.004)	(0.004)	(0.005)	(0.004)	(0.002)	(0.002)	(0.005)
$(Age \leq 64) \times Nobel$				*omitted*				
$(65 \leq Age \leq 79) \times Nobel$	0.002	0.001	0.007	0.005	0.006	0.000	0.002	0.011
	(0.005)	(0.009)	(0.009)	(0.010)	(0.010)	(0.004)	(0.004)	(0.010)
$(80 \leq Age) \times Nobel$	-0.002	-0.008	0.004	-0.001	0.013	-0.003	-0.002	0.013
	(0.009)	(0.015)	(0.014)	(0.016)	(0.016)	(0.006)	(0.007)	(0.015)
Observations	78,936	78,936	78,936	78,936	78,936	78,936	78,936	43,654
Num. of authors	598	598	598	598	598	598	598	598
Delta (30-10)	-0.0130	-0.0460	-0.0600	-0.0670	-0.0390	-0.00600	-0.0130	-0.0170
(st. dev.)	0.0242	1.589	0.950	0.0310	3.172	6.967	3.486	0.0444
Optimal exp.	31.67	31.98	31.39	32.24	36.32	34.05	33.01	32.13
(st. dev.)	3.930	0.0334	0.0270	1.044	0.0377	0.0169	0.0189	5.465

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 17: Regression results: Abstract views, downloads, network, and students, long panel

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	absviews	downloads	aabsviews	adownloads	close	betweenn	students
Exp	-0.001*	-0.000	-0.004***	-0.004***	-0.011***	-0.009***	-0.003**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)
Exp^2	0.000*	0.000	0.000***	0.000***	0.000***	0.000***	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Exp \times Nobel$	0.001	0.000	-0.000	0.000	0.000	-0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
$Age \leq 49$				*omitted*			
$50 \leq Age \leq 59$	0.004***	0.002	-0.000	-0.001	-0.011**	-0.003	-0.006
	(0.001)	(0.001)	(0.002)	(0.002)	(0.005)	(0.004)	(0.005)
$60 \leq Age \leq 69$	0.005***	0.003*	-0.000	-0.000	-0.011*	-0.002	-0.005
	(0.001)	(0.002)	(0.002)	(0.002)	(0.006)	(0.005)	(0.006)
$70 \leq Age$	0.003*	0.001	0.002	0.001	-0.007	0.007	-0.004
	(0.002)	(0.002)	(0.003)	(0.003)	(0.007)	(0.006)	(0.007)
$(Age \leq 64) \times Nobel$				*omitted*			
$(65 \leq Age \leq 79) \times Nobel$	-0.001	0.003	0.004	0.007	-0.010	0.005	0.006
	(0.004)	(0.005)	(0.006)	(0.006)	(0.015)	(0.013)	(0.015)
$(80 \leq Age) \times Nobel$	-0.001	0.000	-0.003	-0.002	-0.013	0.005	0.019
	(0.007)	(0.008)	(0.010)	(0.010)	(0.024)	(0.020)	(0.025)
Observations	78,936	78,936	78,936	78,936	52,624	52,624	43,654
Num. of authors	598	598	598	598	598	598	598
Delta (30-10)	-0.00900	-0.00300	-0.0280	-0.0260	-0.0800	-0.0760	-0.0300
(st. dev.)	0.0206	16.09	2.024	2.378	0.0476	0.0388	4.636
Optimal exp.	33.65	32.62	30.56	31.37	32.17	33.47	36.50
(st. dev.)	5.864	0.0238	0.0293	0.0303	1.280	1.225	0.0469

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance. Delta (30-10) is the difference between 30 and 10 years since PhD graduation. Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 18: Aggregate rank and number of citations (big families), long panel

	(1)	(2)	(3)	(4)	(5)	(2)	(4)	(6)	(8)	(10)
	Aggregate rank					Nbcites				
VARIABLES	Arrow	Katz	Leontief	Dornbusch	Koopmans	Arrow	Katz	Leontief	Dornbusch	Koopmans
Exp	-0.005	-0.024***	-0.007***	-0.005	0.004	-0.008	-0.023***	-0.001	-0.000	-0.000
	(0.007)	(0.006)	(0.002)	(0.005)	(0.004)	(0.006)	(0.006)	(0.002)	(0.004)	(0.003)
Exp^2	0.000	0.000***	0.000***	0.000	-0.000	0.000	0.001***	0.000	0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Age \leq 49$					*omitted*					
$50 \leq Age$	0.008	0.004	0.001	-0.003	0.007	0.011	0.006	0.001	-0.009*	0.009**
≤ 59	(0.011)	(0.008)	(0.005)	(0.005)	(0.008)	(0.010)	(0.009)	(0.004)	(0.005)	(0.004)
$60 \leq Age$	0.009	-0.005	0.002	0.014*	0.009	0.013	-0.009	0.003	0.015**	0.008
≤ 69	(0.014)	(0.027)	(0.007)	(0.007)	(0.010)	(0.013)	(0.028)	(0.005)	(0.007)	(0.006)
$70 \leq Age$	0.016		-0.002	0.019	0.009	0.013		0.005	0.029*	0.010
	(0.022)		(0.008)	(0.017)	(0.013)	(0.021)		(0.006)	(0.016)	(0.007)
Observations	1,848	1,452	8,316	2,640	2,244	1,848	1,452	8,316	2,640	2,244
N. of authors	14	11	63	20	17	14	11	63	20	17
Delta (30-10)	-0.0400	-0.100	-0.0600	-0.0350	0.0330	-0.0780	-0.0320	-0.00100	0.00500	-0.00300
(st. dev.)	13.06	0.246	0.0630	5.545	0.124	13.15	1.583	20.94	0.142	0.0780
Optimal exp.	33.33	25.25	35.73	29.29	32.56	40.31	21.49	21.32	11.40	-3.745
(st. dev.)	0.219	2.520	3.997	0.153	9.542	0.199	0.233	0.0530	89.61	403.4

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance.

Delta (30-10) is the difference between 30 and 10 years since PhD graduation.

Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 19: Number of works and number of students (big families), long panel

	(1)	(2)	(3)	(4)	(5)	(2)	(4)	(6)	(8)	(10)
			Dnbworks					Students		
VARIABLES	Arrow	Katz	Leontief	Dornbusch	Koopmans	Arrow	Katz	Leontief	Dornbusch	Koopmans
Exp	-0.010*	-0.009**	-0.004**	-0.006	0.003	0.041**	-0.071***	-0.012***	-0.019	0.037***
	(0.006)	(0.004)	(0.002)	(0.005)	(0.003)	(0.019)	(0.019)	(0.004)	(0.017)	(0.010)
Exp^2	0.000*	0.000	0.000	0.000	-0.000	-0.001***	0.001***	0.000	0.000	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Age \leq 49$						*omitted*				
$50 \leq Age$	0.006	0.007	0.002	0.001	-0.006	-0.008	-0.012	0.036***	-0.030	-0.015
≤ 59	(0.011)	(0.005)	(0.004)	(0.005)	(0.005)	(0.037)	(0.023)	(0.014)	(0.033)	(0.056)
$60 \leq Age$	0.006	0.010	0.001	0.001	-0.004	-0.012	-0.042	0.030	-0.038	-0.044
≤ 69	(0.014)	(0.016)	(0.005)	(0.007)	(0.007)	(0.049)	(0.081)	(0.019)	(0.041)	(0.061)
$70 \leq Age$	0.016		-0.002	-0.019	-0.001	0.029		0.007	-0.274***	-0.003
	(0.023)		(0.006)	(0.016)	(0.009)	(0.081)		(0.024)	(0.062)	(0.070)
Observations	1,848	1,452	8,316	2,640	2,244	1,022	803	4,599	1,460	1,241
N. of authors	14	11	63	20	17	14	11	63	20	17
Delta (30-10)	-0.0750	-0.102	-0.0420	-0.0390	0.0350	0.213	-0.341	-0.179	-0.204	0.242
(st. dev.)	0.196	0.150	12.88	5.185	0.0780	3.771	2.137	0.115	18.84	0.315
Optimal exp.	31.82	46.93	48.70	29.53	56.69	26.97	26.36	79.70	43.62	29.88
(st. dev.)	5.219	27.27	0.0480	0.152	35.58	0.605	0.700	32.43	0.567	2.886

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance.

Delta (30-10) is the difference between 30 and 10 years since PhD graduation.

Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

	(1)	(2)	(3)	(4)	(5)	(2)	(4)	(6)	(8)	(10)
			Close					Betweenn		
VARIABLES	Arrow	Katz	Leontief	Dornbusch	Koopmans	Arrow	Katz	Leontief	Dornbusch	Koopmans
Exp	0.001	0.005	-0.014***	-0.030**	0.010*	-0.008	0.017**	-0.010***	-0.010	0.008
	(0.007)	(0.013)	(0.004)	(0.015)	(0.005)	(0.006)	(0.007)	(0.003)	(0.010)	(0.005)
Exp^2	0.000	-0.000	0.000***	0.000	-0.000	0.000	-0.001***	0.000***	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
$Age \leq 49$					*omitted*					
$50 \leq Age$	0.020	0.008	-0.032**	-0.000	-0.008	0.016	-0.013	-0.007	-0.000	-0.014
≤ 59	(0.018)	(0.015)	(0.013)	(0.025)	(0.039)	(0.016)	(0.011)	(0.011)	(0.020)	(0.039)
$60 \leq Age$	0.027	0.043	-0.037**	0.008	-0.007	0.022	0.025	-0.007	0.018	-0.003
≤ 69	(0.025)	(0.043)	(0.018)	(0.031)	(0.043)	(0.022)	(0.042)	(0.015)	(0.024)	(0.043)
$70 \leq Age$	-0.020		-0.051**	0.039	0.002	0.012		-0.007	0.026	0.002
	(0.037)		(0.021)	(0.055)	(0.048)	(0.033)		(0.018)	(0.042)	(0.048)
Observations	1,232	968	5,544	1,760	1,496	1,232	968	5,544	1,760	1,496
N. of authors	14	11	63	20	17	14	11	63	20	17
Delta (30-10)	0.0300	-0.0810	-0.108	-0.353	0.171	-0.0870	-0.115	-0.115	-0.205	0.166
(st. dev.)	2417	0.489	0.119	16.74	0.162	0.199	0.269	6.035	0.340	21599
Optimal exp.	-106.0	10.80	33.06	49.24	170.4	44.99	15.04	44.56	-354.3	1156
(st. dev.)	0.219	15.85	3.210	0.494	336.4	16.20	2.345	0.0920	4774	0.161

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Notes: The estimation procedure controls for individual fixed effects and allows for ar(1) disturbance.

Delta (30-10) is the difference between 30 and 10 years since PhD graduation.

Optimal experience is the number of years since PhD graduation that maximizes the rank according to the estimated marginal effect.

Table 20: Network (big families), long panel