DISCUSSION PAPER SERIES

IZA DP No. 8010

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February 2014

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

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Discussion Paper No. 8010
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IZA Discussion Paper No. 8010
February 2014

ABSTRACT

How Much Does Social Status Matter to Health? Evidence from China's Academician Election

The impact of socio-economic status on health has been widely recognized, but the independent impact of social status alone on health remains inconclusive. We approach this challenge by exploiting a natural experiment in which subjects undergo a shift in their social status without considerable economic impact. We gather data on 4190 scientists who were either nominated for or successfully elected to the Chinese Academy of Science or of Engineering. Being elected as an academician in China is a boost in social status (vice-ministerial level) with negligible economic impact (US$30 monthly before 2009). After correcting for two sources of bias: 1) Some potential academicians decease too young to be elected, leading to immortal-time bias in favor of academicians and 2) the endogenous relationship between health and social status, we find that the enhanced social status of becoming an academician leads to approximately 1.2-years longer life.

JEL Classification: I12

Keywords: social status, health, academician, China

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I. Introduction

The correlation between socio-economic status (SES) and health has been widely recognized, but separating the contribution of social status from its association with economic factors is troublesome. We identify a means of identifying the impact of social status alone on health as measured by longevity. Our contribution is accomplished through studying data from elections to the China Academy of Science or Engineering. Scientists who are successfully elected to an Academy undergo a shift in their social status (from none to vice-ministerial level) with minimal increase in monthly payment (US$30 before 2009).

After correcting for immortal-time (longevity) bias and other confounders, we find that scientists who win election to their Academies live approximately 1.2 longer than their counterparts who are not elected. This result is robust to various manipulations of the sample- and variable definitions, and the impact is long-lasting (increasing with the age of the Academician).

The following sections are organized as follows. The next section contains a brief review of literature on the relationship between SES and health outcomes; the third section describes background information on the Chinese Academician Election; the fourth section presents our methodology; the fifth section presents our main results and the final section concludes.

II. Literature Review.

A widely cited work is the so-called Whitehall Study of British civil servants by Reid et al.(1974), which finds that among 18,403 subjects between 40 and 64 years old the proportion having diabetes, pneumonia and lung cancer is far lower than average males of the same age. After a 7.5 years of follow-up survey on 17,530 subjects, Marmot et al.(1978) report that administrative hierarchy has a significant negative correlation with the rate of coronary heart disease. Subsequently, Marmot, et al. (1984) shows that after controlling for other possible causes of death civil servants of the lowest hierarchy are still 3 times more likely to die of coronary heart disease than those ranked highest. In contrast, some evidence from U. S. presidential medical records since the 1920s suggests that being in the White House leads to a doubling of the speed of aging, although recent work by Olshansky(2011) rebuts this conclusion. Olshansky finds that the estimated age of mortality for presidents under the assumption that being elected doubles their aging rate is 68.1 years, whereas the observed age of mortality averages 73.0 years.

The channels through which poor health might lead to loss of income and thereby lower SES (confounding attempts to identify the impact of social status on health) are intuitively clear. They are also well established. For example, Luft(1975) suggests that healthier workers receive higher salaries because of their greater productivity and, presumably, can afford better health care. Smith (1998, 1999, 2005) reports evidence that direction of causality changes over the lifecycle. He notes that the impact of the early-life SES on health is strong and that for people over age 50, the reverse impact is even stronger. Using data from the Health and Retirement Study, Smith (2005) finds that health plays a significant role in determining household income, wealth and labor supply, especially for the middle-aged, for example, through the severity of accidents.

In analyzing the mechanisms through which SES influences health, Marmot (2002) argues that socio-economic status influences health through psychological effects in addition to income and education channels. The psychological channel operates through a low degree of job control (Marmot, et al., 1991) leading to stress and depressive symptoms as argued by Steptoe et al., (2003a). Stansfeld et al.(1999); and by Karasek and Theorell (1990). Perceived feeling of humiliation, disrespect and social anxiety at work can also lead to high levels of stress hormones (Wilkinson 2000), which brings about deleterious effects on immunological systems (Steptoe and Marmot, 2005).

Related to the direction of causality, omitted-variables can bias estimation of the impact of SES on health. An important problem in many samples would be early-life conditions that affect health (e.g. as in the studies by Smith cited above) and thus influence health conditions in later life. Evidence suggests that early-life health is a major factor determining health of adults. (Roseboom et al., 2011, Case et al., 2002). Moreover, healthy children (benefitting from family economic status and/or genetic endowment) tend to achieve more schooling, achieve more from acquired education and are likely to reach higher SES later in life. Our sample consists of adults who have all received the highest level of scientific education available to them; thus the influence of early-life health on the schooling component of SES is minimized if not eliminated entirely.

An important dimension of the causality issue (and the principal focus of this study) is to identify whether the social component of SES alone improves health. Research in this regard has taken advantage of natural experiments in which samples have undergone shift in their social status without considerable economic. Matthew et al.(2008) compares scientists who were either nominated for or won the Nobel Prize in Chemistry and Physics from 1901 to 1950. They find that winning the Nobel Prize brings about additional longevity of 2.08, 1.30 and 0.69 years for American, German and European scientists respectively. The average impact of social status on health is 1.6 years.

In closely related literature, Redelmeier and Singh(2001a) find that oscar-winning actors and actresses out-live the nominees by 3.9 years . However, the same authors find in another article (2001b) find that screenwriters who win an academy award live 3.6 years shorter lives than nominees.

III. Chinese Academy Elections.

The Chinese Academy of Science (CAS) was first established in 1955 as the highest scientific advisory institution in China. CAS members, who were directly appointed until 1999, received the title of CAS Academician[1], which was regarded as

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[1] At the outset, members of CAS and CAE were referred to as Academy Commissioner, which was changed to Academician in 1993.

the highest academic title in the field of science in China. In 1993, several academicians initiated establishment of the Chinese Academy of Engineering (CAE), which also directly appointed their first few waves of academicians. Since 1999, both academies have used a biennial election mechanism for their new academicians.

Any prominent researchers, professors or scholars who have made systematic and creative contributions to the fields of science and engineering can be elected as academicians by either CAS or CAE[2]. New academicians are elected from nominees by present academicians, and the title becomes a life-long honor for the scientists. Academicians are vice-ministerial level(*Fu Bu Ji*) according to the Chinese administrative hierarchy, but they receive a minimal amount of economic benefit from this promotion. There is no lump-sum prize at election, and until 2009, each academician received a monthly subsidy of 200 RMB (around US$30) and now receives 1000 RMB (around US$150) monthly. Since it is a boost in the social status of the scientists without considerable economic impact, election of Chinese academicians qualifies as an ideal natural experiment for us to observe whether social status per se has a direct impact on health.

The nomination and election process for academicians is the same for both CAS and CAE. There are two channels of nomination: (1) Present academicians can directly nominate scientists. Each academician can nominate as many as three scientists, and a scientist has to receive at least three distinct nominations from present academicians in one division to be a candidate for election. (2) Scientific research institutes, academic organizations, universities and enterprises, and other institutions can recommend scientists to take part in local elections of nominees. Winners of local elections then become candidates for election to an Academy. In our research, we do not differentiate between these two channels of nomination. Neither CAS nor CAE accepts self-nomination.

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[2] Both academies are further divided into divisions. Specifically, CAS is divided into 6 divisions, while CAE has 9 divisions (See Table 2 for the list of divisions).

Both CAS and CAE limit to 60 the number who can be elected to membership each year. In every election, academicians in each division vote yes or no on each nominee. Nominees who receive votes from more than two thirds of voting academicians are considered and the nominees who received the most votes become academicians up to the quota for their respective divisions. The regular committee of the academicians' congress distributes academician quotas to each division based on the distribution and development of each division. But every year the total number of quotas does not exceed 60. Except for this restriction, both nomination and election processes are independent across divisions.

IV. Data and Methodology

The authors collected the data for this study. Academicians' information can be found at the official website of CAE and CAS. On the website, deceased academicians and living academicians' information have been recorded separately.[3] As mentioned above, the first group of academicians in CAS were directly appointed as early as 1955, and the CAS added their members irregularly until 1998. CAE appointed their academicians from 1994 to 1998 and both CAS and CAE replaced the appointment mechanism with an election mechanism in 1999. From the official website of CAS and CAE, we were able to identify 1121 CAS academicians and 786 CAE academicians, of whom respectively 270 and 367 academicians were elected rather thanappointed.

Data for nominees who did not attain academician status is relatively difficult to collect, since there is no single website that has documented all biographical information for each nominee. Our first step was to identify the list of nominees based

[3] A full list of and biographical information about living academicians in CAS could be found at http://sourcedb.cas.cn/sourcedb_ad_cas/zw2/ysxx/qtysmd/;
Deceased CAS academicians at
http://sourcedb.cas.cn/sourcedb_ad_cas/zw2/ysxx/ygysmd/;
Living CAE academicians at http://www.cae.cn/cn/ysxx/qtysmd/;
Deceased CAE academicians at http://www.cae.cn/cn/ysxx/ygys/

on “Preliminary List of Candidates for Academician Election”[4],issued by CAE and CAS biennially since 1999. We then selected only those nominees who did not become academicians from our nominee samples. Based on this residual list of nominees, we used the Internet search engines Google and Baidu Encyclopedia to gather biographical information about the nominees including gender, age, dead or alive, year of death, etc. We were able to gather data on 482 and 1796 nominees in CAS and CAE respectively.

Observations with incomplete information have to be dropped from our quantitative analysis, and this could lead to bias issues, since the number of nominees with incomplete information is much larger than the numbers of academician with incomplete data. If there is systematic difference between the nominees in the sample and nominees who are dropped, then the estimation of social status effect will be biased. We argue that this bias is against rejecting the null of no social-status effect on health when the null is false, because dropped nominees are likely to be less famous than nominees remaining in the sample. Thus we believe that we estimate the lower bound of the social status effect on health.

The biographical information that we could gather for our observations include:

- *name,*
- *gender,*
- *academician or not,*
- *year of first nomination (for nominees),*
- *year of election (for academicians),*
- *year of birth,*
- *deceased or alive as of Sept. 1st 2011 and year of death,*
- *division and academy(CAS or CAE).*

[4] This list is sometimes referred to as the list of eligible nominees in the second round.

When we obtained contradictory information on an observation, we confirmed our data from *China National Knowledge Infrastructure* (CNKI). The data collection process relied on the software Epidata, and all the observations have been cross-checked by an independent person using a function built into this software. After dropping observations with missing variables, we retained a sample of 3654 observations.[5]

Econometric Issues

Identifying the causal effect of social status on health can be confounded by several econometric issues. (1) Scientific productivity and health are likely endogenous (Stephen Hawking notwithstanding). Poor health is likely to reduce research productivity. (2) Omitted variables, in particular parental wealth, may affect both health and research productivity. We refer to these two biases as *endogeneity bias.* We adopt an instrument variable approach to deal with this bias.

The third econometric issue is "immortal-time bias" (Matthew et al.,2008, Redelmeier and Singh 2001a). Academicians consist of the subset of eminent scholars who have lived long enough to be both nominated and elected. Some equally outstanding scholars may have died before election or even before nomination. Weinberg and Galenson (2005) suggest that direct comparison of average age between academicians and nominees is especially troublesome in the case of scientists who have to gain experience through experiments, as the probability of being elected is an increasing function of years lived. Bias is similar if it takes a fairly long time for the accomplishments of a scientist to be acknowledged.[6]

Formally, immortal-time bias can be defined as:

$$\mathrm{E}(A_i|A_i > A_i^w) - \mathrm{E}(A_j|A_j < A_j^w) > 0$$

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[5] The original number of observations before dropping incomplete observations was 4190.

[6] In our data the average age of election (61.7) is older than the average age of first nomination for the nominees group (60.0), suggesting that there are two different age thresholds to become academicians and nominees.

where *i* and *j* are notations respectively for academicians and nominees; A denotes the observed age in the data; A_i^w denotes the election age of the academicians; A_j^w denotes the "unobserved" election age for the nominees who have (or had) the potential to be elected but have not or did not survive long enough to win election. Intuitively, some nominees would have become academicians had they lived longer. Thusthe average age of the nominees is underestimated and the age advantage from being elected is overestimated from the raw data due to immortal-time bias.

The fourth challenge, which interacts with immortal time bias, is that our samples are relatively young. Although, a small fraction of CAS academicians were directly appointed as early as 1955, CAE enrolled their first academicians only in 1994 and the systematic election mechanism has been used for both Academies only since 1999. Thus observed Chinese nominees and academicians are relatively young compared with the sample of Nobel-Prize contenders analyzed by Rablen and Oswald (2008). They analyzed the impact of winning the Prize on longevity of scientists who either were nominated for or won the Nobel Prize during the period 1901 to 1950, whereas the average year of birth for academicians and nominees in our sample is 1935 and 1943 respectively.

The relatively young age of our sample leads to two problems. First, only a proportion of our sample had died by the year 2011, and we therefore cannot view the entire lifespans of the survivors. Therefore, our *age*, which is the indicator for health, is defined as the age of death if the scientist is dead, while it is defined as the current age if the scientist is still alive on Sept. 1st 2011. The second problem, closely related to the first one, is that observed average age of academicians is much older than that of the nominees, because of academicians being from relatively older cohorts than nominees.[7]

7 Academicians tend to be from older cohorts than nominees for two reasons: first, academicians were directly appointed before the formal election mechanism was

Although the problem of the age gap between academicians and nominees would be mitigated if we confined our sample to academicians who were elected since 1999, this sample restriction would severely reduce the number of observations that have deceased; only 15 academicians in this subgroup have passed deceased. Thus, limiting the sample to include only academicians elected in 1999 or later makes it very difficult to obtain statistically significant estimates. We have therefore included both appointed and elected academicians in our samples; we believe that both mechanisms have a similar positive impact on scientists' social status without considerable economic impact.

Endogeneity

Both immortal-time bias and the fact that healthier scientists are likely to be more productive create significant econometric challenges to identifying the effect of social status on health and longevity. [8] To overcome the endogenous relationship between health and scientific productivity, we adopt a two-stage approach in which a scientist's status as an academician is instrumented with the division that the scientist belongs to. (See table 2 for a list of the academic subdivisions of the Academies.) We show that a scientist's academic division predicts whether a nominee is elected as an academician but is not directly related to their health outcome, thus this instrumental variable (IV) satisfies the exclusion restriction.

Validity of the Instrument

We believe that the disciplinary division for each scientist is a good instrument variable for following two reasons. (i) The probability of being elected is not uniform across divisions, so the division of each scientist is a good predictor of being elected as an academician or not, as shown in our estimation results. In figure 2, we restrict

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formed and second, older scientists have a higher likelihood of being elected in a given year of election.

[8] A later test of endogeneity has rejected the null hypothesis that SES and health are exogenous. Durbin (score) Chi-squared is 42.41 (p=0.0000), Wu-Hausman F is 42.84 (p=0.0000)

our samples to scientists who have become either nominees or academicians after the formal election mechanism was established and calculate the probability of being elected across divisions. The probability of being elected is especially high in three divisions (2, 3, and 6), reaching over 40%. In contrast, we see comparatively low and evenly distributed probabilities of being elected for nominees in CAE Divisions 7 through 15. The uneven distribution of election probability is due to independent nomination and election processes in each division. Also as we look at the distribution of election probability across divisions by years[9], we do not find a clear correlation of probability distribution across the years, suggesting that the outcome of the uneven distribution of election probability is driven by random factors, or at least not by factors relevant to the health of scientists in each division.[10]

A priori, there is no reason to believe that a scientists' health directly affects his or her scientific division. It seems unlikely that specialization of research and health are related, say, healthier people prefer Physics to Chemistry. Moreover, since neither CAE nor CAS accepts self-nomination of the scientists, the possibility that healthier scientists may select into certain divisions to enhance the probability of their election is not relevant.

The results of over-identification tests for our exogenous variables lead us not to reject the null hypothesis that all the instrumental variables are exogenous. The Sargan (score) Chi-squared is 14.00 (p= 0.37), and the Basmann Chi-squared is 13.99 (p= 0.37)

Immortal-Time Bias

To deal with immortal-time bias, we limit our nominees subsample to individuals who lived long enough to reach an "age of election" derived from the most

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[9] We do not present this chart in this paper. However this is available from the authors on request.

[10] Our F-statistic in the main regression is slightly over 20, which corroborates this point.

comparable academicians. The idea behind this is that immortal-time bias is generated in part because some nominees died too young to be elected. We mitigate this source of bias by excluding from our sample nominees who died before reaching an estimated “age of election”.

By artificially dropping nominees who died younger than his unobserved “age of election”, i.e $A_i < \widehat{A_i^w}$. , regardless of whether the scientist had the potential to become an academician, we mitigate the bias arising from mortality. To obtain $\widehat{A_i^w}$ we assume that nominees and academicians who were born in the same year have the same expected age of election, and we drop all the nominees who died younger than the mean election age of academicians of the same cohort[11]. There are four nominees who do not share year of birth with any academicians, and they are also dropped.

The fact that academicians on average were born before the average nomineecreates an omitted variable probem—life expectancy at birth. To deal with this potential source of bias, we introduce a quadratic cohort variable, equal to 1 if a scientist was born in 1919[12] 2 in 1920 and so forth.[13] Since most of our sample is still alive, we derive coefficient estimates for the linear term of cohort of around 1.

Regression

Our main regression estimation is based on the following equation:

$$Age_i = \beta_0 + \beta_1 SS_i + \beta_2 Male_i + \beta_3 Cohort_i + \beta_4 {Cohort_i}^2$$

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[11] In our main regression result, each nominee is matched to academicians based on their cohort to derive their “election age”. However, our result is robust to other matching approaches, such as by division and by cohorts born in the same decade.

[12] 1919 the earliest year of birth for nominees. Academicians who were born before 1919 are coded as 1),

[13] Our results are robust to another coding approach, in which the oldest academicians were coded as 1 and so forth.

Where the dependent variable *Age* is defined as the age of death if the scientist has deceased by Sept. 2011 and as the current age if the scientist has survived. We also let Age take on alternative definitions:

(i) Observed years lived after either being elected or nominated.

(ii) Observed years lived after being elected (nominees' election age is estimated from the academicians of the same cohort).

(iii) Observed additional years lived after the age of N, given that the scientist has reached N (N = 50, 60, 70, 80).

Using alternative definitions of the dependent variable provides an opportunity not only to check the robustness of our result but also to observe how social-status effect varies across different age groups.

The variable *SS*, indicating Academician status, is instrumented as described above; the subscript i is the indicator for each scientist; *Cohort* is a discrete variable with integer values equal to 1 in 1919, 2 in 1920 and so forth.

V. Summary Statistics and Estimation Results

Table 1 presents the summary statistics of our sample. Of our total sample of 3654 observations, 2193 scientists are nominees while 1461 are academicians. 57 and 95 of the each group respectively deceased by Sept.2011. The observed average age for nominees and academicians is 67.9 and 75.5 years, respectively. Males are 94% of the sample of both the nominees and the academicians group. Nominees, on average, were nominated for the first time at age of 60.0 and academicians were elected at the average age of 61.7, suggesting that the raw data have an immortal-time bias of about 1.7 years in favor of academicians. Though not shown in table 1, we note that only 23.13% of our observations were appointed rather than elected.

Academicians tend to be more concentrated in CAS, rather than CAE. The distribution of academicians across divisions as shown in figure 1 is uneven. There are two reasons why distributions of academicians are not even across divisions: (i) a larger number of academicians were directly appointed in CAS than in CAE, because

CAS was founded much earlier than CAE and yet elections began in 1999 for both Academies; (ii) even if we focus on academicians and nominees who were either elected or nominated after 1999, we find that the probability of being elected varies considerably across divisions as illustrated in figure 2.

Figure 3 shows the Kaplan-Meier survival analysis curve for academicians and nominees. Even though survival analysis does not account for the endogeneity problems discussed above, we view this chart as a useful summary of the data. As can be seen, the K-M curves do not fall to the survival rate of zero, because most observations are censored (alive). Also, we see that the curves nearly overlap each other until the age of 80 and they display a rather large divergence after around the age of 85. Our overall impression is that academicians have a higher survival rate than nominees at any given age. However, the null hypothesis that these curves are indistinguishable cannot be rejected using a log-rank test (*p*-value, 0.31). This result does not correct for age-related bias that life expectancy has been growing rapidly in China in the beginning of the20th century. Since academicians in our samples tend to be from older cohorts than the nominees, direct comparison of these two groups on the K-M curve is corrupted by the differences in their life expectancies at birth.

Our principal estimation results are reported in Table 3. As described above, we use an IV regression where scientists' academic status is instrumented with their divisions, and we exclude nominees who died younger than their "election age" estimated from the election age of academicians of the same cohort. We also provide estimation results that control for gender, a quadratic form of cohort and the age of nomination or election (in column 2 and column 3).

The dependent variable in the first column is *age*, defined as current age if alive, age of death if deceased. The dependent variable in the second column is years lived after nomination or election respectively for nominees and academicians. The dependent variable in the third column is years lived after election, based on the imposed value of election age for nominees. The following columns use the years lived after the age of N as the dependent variables, under the restrictions that scientists have reached the age of N and that they were born in years earlier than 2011-N.

The estimated coefficient of the principal variable of interest, “Academician” is positive and significant with *p-value* = 0.01or less in every specification. In column 1, it is estimated that becoming an academician brings about an exogenous impact on longevity of about 1.2 years. The second and the third columns suggest that the result is robust when we are comparing health outcome after the impact of election. The reason why the estimated effect of becoming an academician is smaller in column 2 than in column 3 is that nominees’ average nomination age tends to be younger than academicians’ average election age.

The last four columns suggest that the exogenous impact of a boost in social status becomes even stronger in the later years of an academician’ life, increasing from 1.2 when the dependent variable is years lived after 50 to 2.2 when observing years lived after 80. However, this conclusion should be taken cautiously since the F-statistic is barely 7.97 (p<0.001) in the last column.

Admittedly, we are limited to variables that we can find from the Internet and cannot control for some conventional control variables in health regressions such as working environment and wealth. But we suppose that our samples are very homogenous in these regards and that our coefficient estimates are less prone to bias from omission of relevant variables. For instance, any scientists who had the honor of being nominated for academician election should have received the highest level of education in his time. They should also be able to afford nutritious food and receive good healthcare benefits from their institutions. Therefore we argue that our coefficient estimates should be robust even though we failed to control for some health-related variables.

VI. Conclusion

We provide evidence of a causal relation between social status and health. Our sample consists of nominees and those elected to Academies of Science and

Academies of Engineering in China. This natural experiment is based on the boost in social status for the scientists (academicians are vice-ministerial level), who receive minimal direct economic impact (monthly subsidy of 30USD before 2009 and 150USD after) from their election.

In order to overcome the endogeneity problem and the immortal-time bias, we adopt IV regression where the social status is instrumented with the academic divisions, and we drop nominees who died younger than their “election age”, which is the average election age of the academicians of the same cohort. Since both academicians and nominees have lived beyond than their election age in the residual sample, they have the same baseline for comparison, i.e. free of immortal-time bias.

The regression results shows that becoming an academician brings about a causal longevity advantage of about 1.2 years, they are robust to various definitions of age, ways of coding cohorts and ways of imposing “election age” on nominees. Another implication is that the impact of successful election on health increases as academicians become older. This suggests that the effect of becoming an academician is long-lasting, and academicians receive ongoing status-related benefit as they get older. The cumulative effect is shown as the increasing longevity advantage for older academicians.

Table 1

Summary Statistics

Status	Nominees	Academicians
Average Age	67.85	75.46
Male	0.94	0.94
Age of First Nomination	60.04	N/A
Age of Election	N/A	61.65
Average Year of Birth	1943	1935
Average Year of Death	2006	2005
CAS	0.22	0.46
CAE	0.78	0.54
Observations	2193	1461
Deceased Observation	57	95

Table 2

Division Label	Division
China Academy of Sciences	
1	Division of Mathematics and Physics
2	Division of Chemistry
3	Division of Life Sciences and Medical Sciences
4	Division of Earth Sciences
5	Division of Information Technological Sciences
6	Division of Technological Sciences
China Academy of Engineering	
7	Division of Mechanical and Vehicle Engineering
8	Division of Information and Electronic Engineering
9	Division of Chemical, Metallurgic and Material Engineering
10	Division of Energy and Mining Engineering
11	Division of Civil, Hydraulic Engineering and Architecture and Water Conservancy
12	Division of Light Industries, Textile and Environmental Engineering
13	Division of Agriculture

14	Division of Medicine and Health Engineering
15	Division of Management of Engineering

Table 3

IV Regression	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	Age	Years lived after Nomination or Election	Years lived after Election	Years lived after 50	Years lived after 60	Years lived after 70	Years lived after 80
Academician	1.168***	1.268***	1.840***	1.207***	1.300***	1.392***	2.292***
	(0.202)	(0.295)	(0.613)	(0.208)	(0.232)	(0.239)	(0.464)
Male	-0.115	-0.125	-0.170	-0.121	-0.132	-0.213	-0.148
	(0.107)	(0.108)	(0.224)	(0.111)	(0.125)	(0.134)	(0.337)
Cohort	-0.923***	-0.913***	-0.658***	-0.919***	-0.934***	-0.967***	-1.009***
	(0.0119)	(0.0177)	(0.0367)	(0.0135)	(0.0185)	(0.0243)	(0.0879)
$Cohort^2$	-0.000930***	-0.000832***	-0.00142***	-0.00102***	-0.000428	0.00122	0.00619
	(0.000197)	(0.000188)	(0.000390)	(0.000247)	(0.000469)	(0.000856)	(0.00580)
Age of Nom or Elect		-0.979***	-0.566***				
		(0.0126)	(0.0261)				
Constant	91.36***	89.78***	60.96***	41.31***	31.32***	21.50***	11.07***
	(0.242)	(1.165)	(2.418)	(0.255)	(0.289)	(0.294)	(0.651)
F-statistic	20.19	20.19	20.19	19.79	17.83	15.14	7.84
Observations	3649	3649	3649	3450	3012	2361	686
R-squared	0.981	0.940	0.712	0.974	0.946	0.926	0.795

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4A

Tests of Endogeneity		
Durbin (score) chi2(1)	42.4119	(p = 0.0000)
Wu-Hausman F(1,3643)	42.8401	(p = 0.0000)

For the regression in the Table 3 Column 1.

Table 4B

Tests of Overidentifying Restrictions:		
Sargan (score) chi2(13)	14.0049	(p = 0.3735)
Basmann chi2(13)	13.9895	(p = 0.3746)

For the regression in the Table 3 Column 1.

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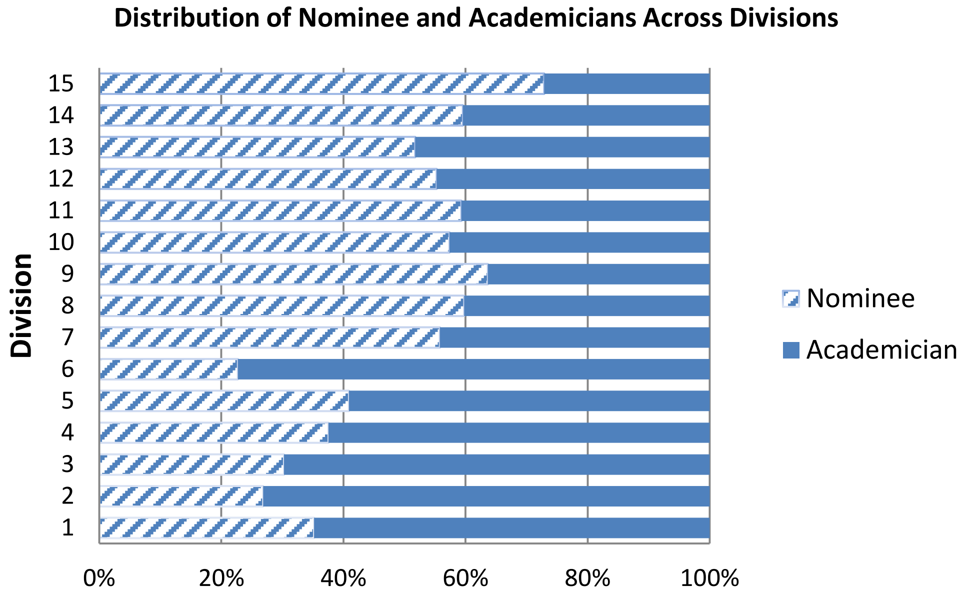
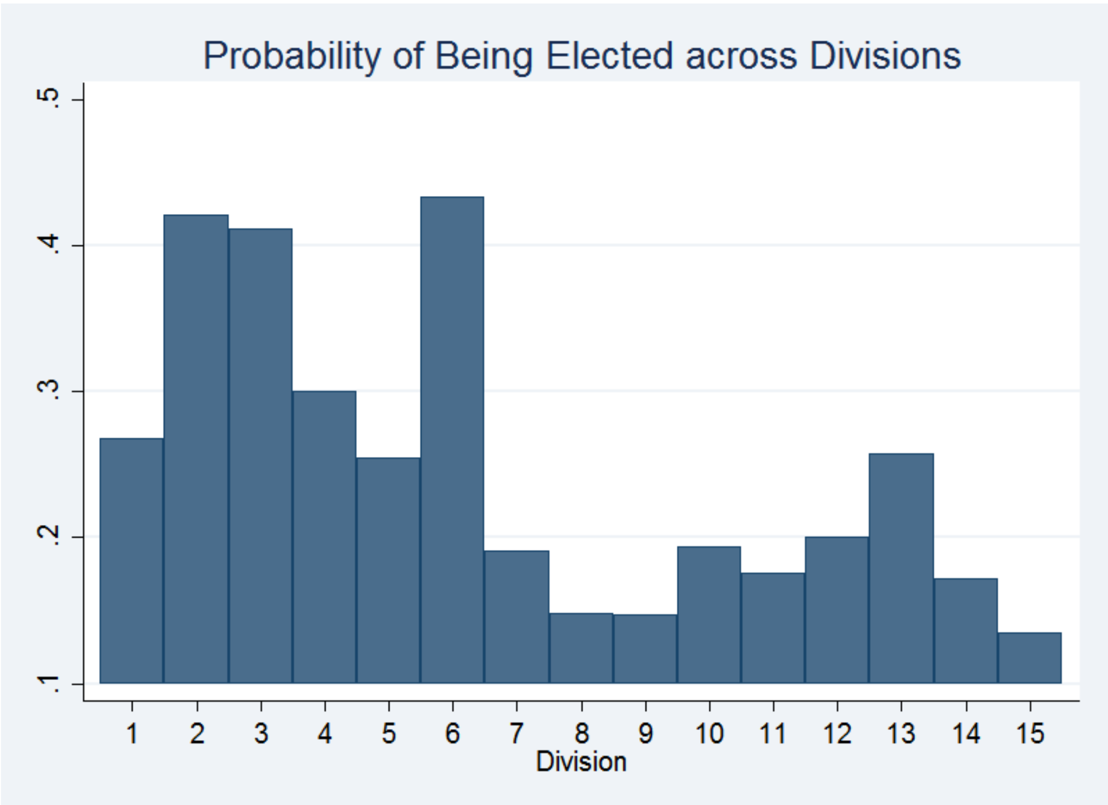
Figure 1



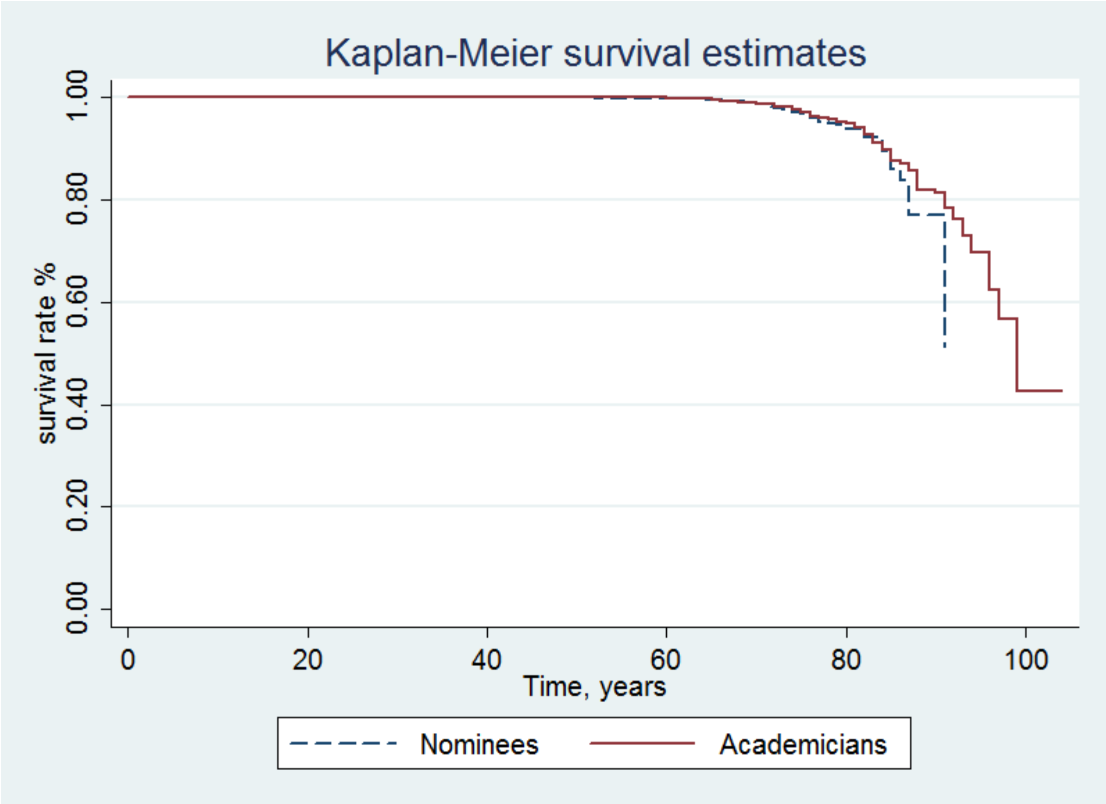
See Table 2 for the label of each Division.

Figure 2



See Table 2 for the label of each Division.

Figure 3



The null hypothesis that two curves are not distinguishable cannot be rejected at a conventional level. Yet we do not attach much importance to this figure since most of our samples are censored and reverse causality problem is not solved.

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