



Predicting mobility and research performance of the faculty members in the economics departments at Turkish public universities

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ABSTRACT

Academic mobility is an important factor that shapes academic institutions. Research performance is correlated with many factors, including the past research performance and gender of the academic. Understanding the factors behind academic mobility and research performance may provide a guide for a better higher education policy. In this paper, we analyze the mobility, publication, and research grant performance of all faculty members who taught in economics departments at Turkish public universities in 2010. Women, older faculty, and those who work in more established universities or in three major cities are less likely to move. The faculty members who have better past research performance, and who hold foreign PhDs, publish more. However, contrary to most of the literature, we do not find any gender productivity differentials. Last, we find that past publication performance is positively correlated with the number of current research grants, although past research grant performance does not have a significant correlation with the number of current publications.

1. INTRODUCTION

Academic mobility shapes academic institutions. The best universities in the world are able to create research environments that attract productive researchers. Therefore, academic mobility may indicate competition among universities. Faculty members with the same academic title receive the same salary in all Turkish public universities. However, the universities can lure better researchers by offering a lower teaching load or a more pleasant research environment. The universities can potentially benefit from trading their faculty members, as one university may need an econometrician and another may need a labor economist. Abramo, D'Angelo, and Rosati (2016) find little mobility for Italian researchers and they see their result as a serious concern for Italian higher education policy.

In this paper, we investigate academic mobility in Turkey by considering those who work in departments that taught economics in 2010. Along with mobility, we study factors that are correlated with research productivity. In previous studies, along with academic factors such as past publication performance, personal factors such as gender and age of the faculty are considered to be correlated with research productivity. We investigate whether these personal factors are important in the Turkish case as well.

The Turkish government provides funds for Turkish students who want to get a PhD in a foreign country. In return, the students have a mandatory obligation to work in a prespecified

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public university for twice as many years as the duration of their scholarship. This is a costly higher education policy. However, no statistics are released to measure the effectiveness of the policy. Therefore, the analysis of foreign PhD in this paper partly fills this gap. In particular, we see whether faculty members who hold a foreign PhD are more productive than faculty members who hold a domestic PhD.

The government has founded new universities mostly in small cities under the policy “one university for every city” since 2006. We investigate the mobility from these universities compared to mobility from more established universities. In addition to this, we analyze the research performance of faculty members in newly established universities. This analysis may give an idea about the research productivity benefits/costs of the policy that founded new universities.

In the literature, there is a discussion on whether productivity declines with age. The analysis in this paper contributes to this discussion. Along with age, we will also consider the academic title of the faculty members. There is job security and all professors receive the same wage regardless of their productivity. Therefore, a lack of incentives may affect the research performance of professors.

Research grants are costly incentives for research performance. Therefore, it is important to see whether the incentives work in practice. We investigate whether economists who get the research grants publish more articles. Moreover, we also analyze whether the funds are equally distributed between men and women and among institutions.

2. RELATED LITERATURE

This paper covers material from three major fields. Related literature on academic mobility, publication performance, and research grants is described in the following three subsections.

2.1. Mobility

Abramo et al. (2016) have studied academic mobility for Italian scientists from 2008 to 2012. They find that mobility among Italian universities is low in general. The highest turnover rate attained for the Economics and Statistics field is 6.5% for a 3-year period¹. However, the study only includes researchers who continue to work as academics during this period. In other words, the study excludes those faculty members who left academia or retired altogether. Therefore, the calculated turnover rate is smaller than we would expect if all observations were included.

Yuret (2018) finds the turnover rate for academics at top U.S. institutions by collecting data from undergraduate catalogs. The study finds that the annual turnover rate is around 7% for economists. A similar annual turnover rate is found for the most productive economists around the world by Coupe, Smeets, and Warzysnki (2006). The annual turnover rate is found to be 8% for economists in all U.S. universities (Ehrenberg, Kasper, & Rees, 1991).

Jons (2011) surveys academic visitors in Germany and finds that women are less mobile internationally when short-term visits are considered. Azoulay, Ganguli, and Zivin (2017) investigate U.S. life sciences researchers, and they find that women are less mobile than men. However, when they control for past researcher performance, then the gender differences become insignificant. Researchers who hold an NIH grant are less likely to move to

¹ The turnover rate is one of the important measures of labor mobility. It is calculated as follows. If there are X workers who work for a company, and Y workers left the company, then Y/X is the turnover rate.

another institution. Women are less likely to be mobile because women are less likely to be promoted in academia (Durodoye, Gumpertz et al., 2020).

Horta, Jung, and Santos (2020) analyze the effect of mobility on academic performance for researchers from Hong Kong and Macau. They find that the productivity gain for mobility for men is rather limited whereas women gain more significantly from mobility. Gureyev, Mazov et al. (2020) provide a literature survey on the effects of academic mobility. The vast majority of the papers that are surveyed show that mobile researchers are more productive. However, in a few cases, a negative effect has been found. For example, researchers who are mobile lose weak links that have a considerable effect on the productivity of the researchers.

The relation between mobility and publication performance may also depend on the academic field. For example, Ejermo, Fassio, and Källström (2020) investigated a large sample of Swedish academics and they found that mobility improves research performance for engineering and life sciences researchers but has no effect on the research performance of social sciences and humanities researchers. Two studies found contradictory results for China. Liu and Hu (2022) find that academic mobility is associated with higher researcher productivity for Chinese computer scientists. In contrast, Peng, Li, and Wu (2022) claim that mobility is negatively correlated with research productivity because better researchers stay in their home institutions.

2.2. Publication Performance

Researchers who had good publication performance in the past are generally found to have good current publication performance. Researchers who have published while they are in their PhD studies publish more in their later careers (Horta & Santos, 2016; Lindahl, Colliander, & Dannell, 2020). The early career publication performance is also a good predictor for the later career (Kelchtermans & Veugelers, 2013). Past publication performance is found to be a stronger predictor of the publication performance of a research project than project review assessment (Gyorff, Herman, & Szabó, 2020).

Bornmann, Leydesdorff, and Van den Besselaar (2010) find that the researchers who get Dutch Economics and Social Research Council (MaGW) and European Molecular Biology Organization (EMBO) research grants publish more than those who applied for these research grants but were rejected. However, when the accepted proposals are compared with marginally rejected proposals, the result is reversed for some fields. Van den Besselaar and Sandström (2015) analyze Netherlands research grants and report that those who get grants publish 26.4 SCI/SSCI papers whereas those who are rejected publish 11.9 SCI/SSCI papers for an 8-year period after the grant is obtained. However, the productivity difference is found to be much less pronounced between researchers who get grants and those who are marginally declined. Jacob and Lefgren (2011) find that National Institute for Health (NIH) funding increases the productivity of researchers by only one publication in 5 years. They question whether 1.7 million dollars for a single paper improvement is worth the price.

The difference between men and women in research productivity is studied extensively. In a study that analyzes Italian hard science researchers, the ratio of unproductive women is about the same as the ratio of unproductive men (Abramo, Cicero, & D'Angelo, 2015). However, productive men are found to publish more papers than productive women. Men are found to be more productive than women among health school researchers in Denmark (Frandsen, Jacobsen et al., 2015), economists in Central Europe (Bolli & Schlapfer, 2015), and researchers from Norway (Rorstad & Aksnes, 2015). Most productive male psychologists are found to publish more papers than most productive female psychologists (Cikara, Rudman, & Fiske, 2012).

Female researchers are found to be equally productive in Canada at the early career stage, but men become more productive after age 38 (Larivière, Vignola-Gagne et al., 2011). Men are found to be more productive than women in Sweden, but part of the difference can be explained by the publication performance at the PhD level (Lindahl et al., 2020). Men are also more productive than women among North American psychologists; however, women are found to be equally productive when their short stay in the academic field is controlled for (Duffy, Jadidian et al., 2011). Women are less likely to be top performers among biomedical scientists at the University of Leuven, but they are as likely to stay as top performers as men (Kelchtermans & Veugelers, 2013). There are few studies that find that women outperform men. It has been found that women outperform men in citation impact in Israel (Weinberger & Zhitomirsky-Geffet, 2021).

Some studies investigate the reasons for the gender productivity difference. A general survey of publications of gender differences also concludes that family responsibilities account for gender differences in publications, and bias against women is not as important (Ceci & Williams, 2011). In contrast, a review of surveys and data for gender differences among U.S. economists claims that aggregation and bias against women are also important factors, along with family responsibilities (Lundberg & Stearns, 2019). In a survey conducted among female researchers, household chores and child upbringing have been noted as the main reasons for the gender productivity difference in Iran (Isfandyari-Moghaddam & Hasanzadeh, 2013). Family responsibilities held women back even more during the COVID-19 pandemic (Krukowski, Jagsi, & Cardel, 2021). There is also evidence that women are less productive, especially in fields that require funding (Larivière, Ni et al., 2013).

Many researchers in developing countries head for the developed countries for PhD education. Brazilian researchers (Perlin, Santos et al., 2017), and Turkish researchers (Kutlar, Kabasakal, & Ekici, 2013; Onder & Kasapoglu-Onder, 2011) who hold foreign PhDs are found to be more productive than those who hold domestic PhDs.

Rauber and Ursprung (2008) find that the relation between productivity and age for German economists is hump-shaped. Productivity is a maximum at the midstage of their career. Bolli and Schlapfer (2015) find that productivity declines with age for Central European economists, whereas Savage and Olejniczak (2021) claim that productivity does not decline with age for U.S. researchers. A related issue is whether professors are more productive than faculty members of lower rank. Abramo, Cicero et al. (2011) claim that professors are more productive in Italy, whereas Beckmann and Schneider (2013) conclude that professors are less productive in Germany. It is not easy to measure the effect of age and academic title on productivity because of selective attrition. More productive researchers stay in academia longer. Therefore, the results in the literature should be treated with caution.

2.3. Research Grants

Liao (2021) finds that the number of publications and the number of past grants gained are positively correlated for Taiwanese researchers. In contrast, Boyack, Smith, and Klavans (2018) claim that past research performance does not significantly affect the probability of getting NIH grants.

The bias against female researchers in peer review for grants is analyzed extensively. Some studies show a clear gender bias in grant applications. For example, Witteman, Hendricks et al. (2019) analyze the Canadian Institutes of Health Research grants in a natural experiment context. They find that when peer review focuses on the content of the project, no gender bias is found. However, when the reviewers evaluate the past research performance of the principal investigators, then there is a gender bias.

Some studies do not find any gender bias in grant applications. Marsh, Jayasinghe, and Bond (2011) analyze applications to the Australian Research Council (ARC). Although women are significantly underrepresented at 15%, the study does not find any gender bias in the approval rate of the grants. Reinhart (2009) also does not find any gender bias for women for Swiss National Science Foundation (SNSF) grants. Bornmann, Mutza, and Daniel (2007) find that women are 7% less likely to get a grant in a meta-analysis.

Studies about research grants compare the subset of researchers who get research grants to those who applied but did not get the grant. In this study, we compare faculty members who have been the principal investigators of the research grants to the faculty members who did not get any grants. Our approach has one advantage. For example, a woman may not even apply for a research grant if she thinks that the probability of getting a grant for a woman is low. By including all faculty members who have the potential to apply, we also include those women who hesitate to apply.

3. DATA

The list of faculty members from all economics departments in Turkish public universities was collected in the last 2 weeks of 2010². We updated the information of these faculty members in March 2021. Faculty members who are in public universities are required to self-report their research output and this information is available to the public on a website called YÖKAKADEMİK.³ As there are inaccuracies in the self-reports, we cross-checked their publication information from the Web of Science, and their Scientific and Technological Research Council of Turkey (TÜBİTAK) grant information from TRDizin⁴. TÜBİTAK distributes many grants, including joint projects with industry, but TRDizin only indexes the more prestigious academic research projects, which have meticulous peer-review screening. In the end, the following information is collected for each faculty member who currently works at a public university:

- The public university in which they currently work
- Their current academic title
- Their gender
- Their published articles that are indexed in SCI/SSCI
- The TÜBİTAK grants that they obtained
- Their PhD information

As we will discuss in the next section, most of the analysis is restricted to faculty members who still actively work in a public university. However, we collected gender and PhD graduation date information for the faculty members who worked in a public university in 2010 but did not work in a public university in 2021. Faculty members who moved to either a private domestic university or a foreign university had their information in their CVs/resumés on their home pages. For those who do not currently work in academia or have retired altogether, the information is collected by a general internet search.

The mobility and productivity of the faculty members may depend on the location and establishment year of the universities. Information about the universities is taken from the

² The faculty list was collected to be used in Dogan and Yuret (2013). That study shows that the research performance of the faculty and the college entrance test score performance of the students in economics departments are positively correlated.

³ The search for publications is available at <https://akademik.yok.gov.tr/AkademikArama>.

⁴ The search for grants is available at <https://trdizin.gov.tr/en/home>.

Turkish Higher Education Council (YÖK) website⁵. No public universities were established between 1993 and 2006. We refer to the universities that were established after 2006 as *newly established universities*.

4. PRELIMINARY FINDINGS

This section is composed of three parts. First, we present information about mobility and explain why we restrict our attention to mobility within public universities. Next, we provide statistics about the trend in publications and the reasons for the increase in publication performance in recent years. Last, we analyze the distribution of TÜBİTAK grants.

4.1. Mobility

Table 1 shows the mobility of faculty members by gender, location of the university in which they worked in 2010, and their PhD graduation date. There were 839 faculty members who worked in all economics departments in public universities in 2010 (Row 1). Their whereabouts in 2021 are as follows.

- Twenty-eight faculty members moved to a private university (Row 2). Thirteen of them gained their PhDs before 1991, so they chose to move to the private university towards the end of their career.
- There are 20 faculty members who moved to a foreign university (Row 3). Nine of them hold a temporary/visiting position.
- There are 161 faculty members who are either retired or hold a nonacademic job (Row 4). Around half of them gained their PhDs after 1991. Although they are relatively young, some may have retired because early retirement is allowed for some cohorts by the Turkish Labor Law. At least 29 of these faculty members were expelled from the universities for political reasons.
- Of the 226 faculty members who were working at public universities in the three major cities in 2010 (Row 5), only nine have moved to a new public university (Row 6). Of 404 faculty members who were working outside the major cities, 100 of them moved. Twenty-six of them moved to a university in a major city (not shown in the table). Therefore, the majority of faculty members who were outside the major cities moved to universities that are not in the major cities.
- Of the 630 faculty members who continued to work in public universities in 2021, only 64 were working in a public university established before 1993 in 2010 (Row 5). Twenty-eight of them were mobile (Row 6), and around half of those who were mobile (13) moved to another newly established university (not shown in the table). Of 566 faculty members who were working in a public university that was established before 1993 in 2010, only 81 moved. More than half of them (44) moved to a newly established university (not shown in the table). Therefore, there was mobility within and across newly established universities.
- 75% of faculty members were retained in the public universities (Row 8).
- The turnover rate is computed as the ratio of faculty members who have moved to another public university to the total number of faculty members in the public universities (Row 9). The turnover rate for our sample is 17.3% for 10 years. The turnover rate is much lower for female academics. Only 4% of the women have changed their public university. The turnover rate for faculty members in the three major cities and those who

⁵ <https://akademik.yok.gov.tr/AkademikArama/view/universityListview.jsp>.

Table 1. Mobility of faculty members who work in economics departments in Turkish public universities

Row #	# of faculty members	All	Female	Istanbul-Ankara-Izmir	Established after 1993	PhD Before 1991
1	Total in public university in 2010	839	224	333	77	134
2	Moved to private university	28	4	18	0	13
3	Moved to foreign university	20	4	13	1	1
4	Moved to nonacademic or retired	161	34	76	12	88
5	Total in public university in 2021 (Row 1 minus Rows 2 to 4)	630	182	226	64	32
6	Moved to another public university	109	8	9	28	1
7	At the same university in 2010 and 2021 (Row 5 minus Row 6)	521	174	217	36	31
8	Retention rate (Row 5/Row 1)	75.10%	81.30%	67.90%	83.10%	23.90%
9	Turnover rate (Row 6/Row 5)	17.30%	4.40%	4.00%	43.8%	3.10%

are older is also low. The turnover rate for faculty members who work in the newly established universities is high.

We restrict the rest of our analysis to the 630 faculty members who worked in public universities in both 2010 and 2021 because there is uncertainty about the rest of the sample. First, we do not know why the faculty members left academia. They may have retired, been expelled for poor performance, or dismissed for political reasons. Next, we do not know when some of the faculty members were out of academia so we cannot be sure about the time frame when they were active. Moreover, we are not sure whether positions in the domestic private universities are research positions or just part-time teaching positions. Last, many positions held in foreign universities are visiting positions, so they may not be comparable to the research positions held at domestic public universities.

4.2. Publication Performance

The 630 faculty members who worked in a Turkish public university in both 2010 and 2021 have published 1,277 SCI/SSCI articles between 2001 and 2020. We compute the number of per-faculty publications as follows. For a specific year, say 2008, we only consider the faculty members who received their PhD before 2008 and their publications in 2008. As all the faculty members in our sample gained their PhD by 2010, the number of faculty members does not change after 2010. To find the per-faculty number of publications in 2008, we simply divide total publications in 2008 by the number of faculty members that gained their PhD before 2008.

Figure 1 shows that the per-faculty number of SCI/SSCI publications has improved considerably. The average is around 0.02 in 2001, peaks at around 0.19 in 2011 and is 0.14 in 2020. We break down the types of publications to see the reasons behind the productivity increase. If only economics journals are included, per-faculty productivity decreases to around 0.05 in 2020. Another reason for the increase in the number of publications is newly indexed journals in SCI/SSCI. If the journals that were always indexed in SCI/SSCI between 2001 and 2020 are

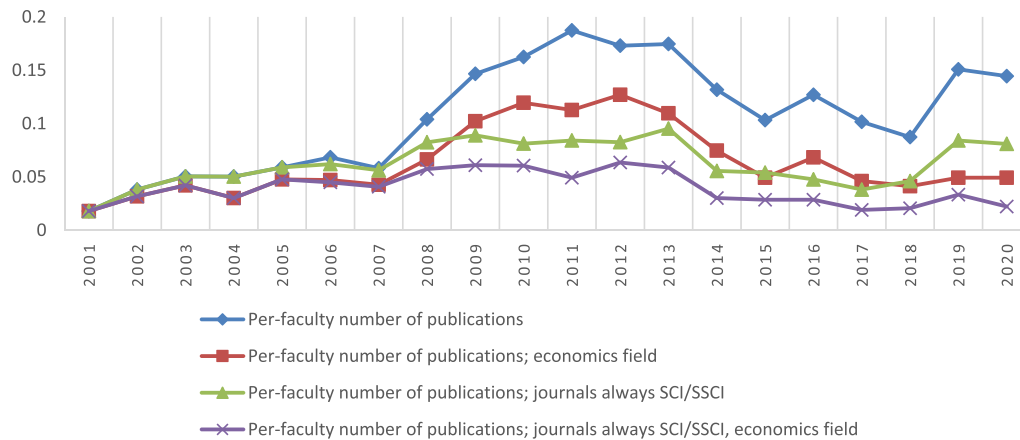


Figure 1. Per-faculty number of publications for all faculty members.

included, the per-faculty number of publications decreases to around 0.08 in 2020. If we consider the publications in the economics journals that were always indexed in SCI/SSCI between 2001 and 2020, then the per-faculty number of publications decreases to 0.02 in 2020. In other words, productivity is the same in both 2001 and in 2020 if only economics journals that were continuously indexed in SCI/SSCI are considered.

TÜBİTAK gives publication subsidies to authors. The authors received payment per article that they published in SCI journals since 1997, and SSCI journals were added in 2006⁶. The subsidy is based on the citation performance of the journal, and the subsidy is divided equally among the authors. Although the subsidy per article is small, Yuret (2017) shows that the publication subsidies are effective to some degree. Therefore, the increase after 2006 that we see in Figure 1 can be partially explained by the publication subsidies given to SSCI journals.

TÜBİTAK tries to achieve interfield equality by giving equal subsidies to journals ranked similarly within each research field. For example, a publication from a top economics journal receives the same subsidy as a publication from a top chemistry journal. However, there are large differences in the number of publications that researchers from various fields publish (Yuret, 2015). As TÜBİTAK publication subsidies do not account for interfield productivity differences, there is an unequal distribution of subsidies among fields. For example, an average chemist earns four times more than an average economist (Yuret, 2016). Therefore, the interfield inequality of publication subsidies may partially explain the fact that economists start to publish in different fields, as shown in Figure 1.

The increase in productivity due to the enlargement of the SCI/SSCI journal base is not unique to Turkey. There is clear evidence that publication incentives have increased the number of publications in the newly indexed economics and business journals in Central and Eastern Europe (Grancay, Vveinhardt, & Sumilo, 2017). Newly indexed journals are found to be advantageous to the countries that have traditionally low publication productivity (Shelton, Foland, & Gorelsky, 2009).

Along with the TÜBİTAK publication subsidies, YÖK started to give subsidies for research performance in 2016. Turkish academics are evaluated based on their publication performance, as well as the number of grants that they receive and other criteria, such as the number

⁶ Details about the subsidies are available at <https://cabim.ulakbim.gov.tr/ubyt/>.

of refereeing duties. Each research output is assigned a specific point, and the amount of research performance subsidy depends on the total points. Publications from nonindexed journals get relatively high points. There is clear evidence that Turkish researchers sometimes behave opportunistically when they choose their research outlet (Onder & Erdil, 2017). For example, it is claimed that YÖK research performance subsidies increased the number of nonselective publications (Demir, 2018a) but decreased the number of SCI/SSCI indexed journals publications (Demir, 2018b). In Figure 1, we observe a decline in SCI/SSCI publications until 2018 but the number of SCI/SSCI indexed publications increased afterwards. This is surprising, as the relatively high points assigned to publications in the nonindexed publications are still in place.

Figure 1 adds new faculty members each year so that the trend of publications in newly indexed journals or journals in fields other than economics may be due to early-career economists. To control for this, we only include the 279 faculty members who gained their PhDs before 2001 in Figure 2. This way, we are able to check their publication records for 20 years for the same faculty members. However, the trends in this line are very similar to that of Figure 1. Therefore, we can conclude that early-career, as well as experienced, economists have changed their publication outlets.

Faculty members have published 748 articles in journals that have Economics as one of their fields according to Journal Citation Reports. Table 2 gives the fields of the journals of the remaining 529 articles. The table includes fields that have more than 20 publications. We see that economists are interested in publishing about environmental sciences and energy.

The productivity of academic economists is low, as we have seen from Figures 1 and 2. The publication of an article that is indexed in SCI/SSCI is an achievement for a Turkish academic economist. Moreover, their productivity does not focus on a single field, as we see from Table 2. We know that citation performance is unequal among academic fields. We did not include a citation performance analysis because of the low number of publications that are spread over many academic fields.

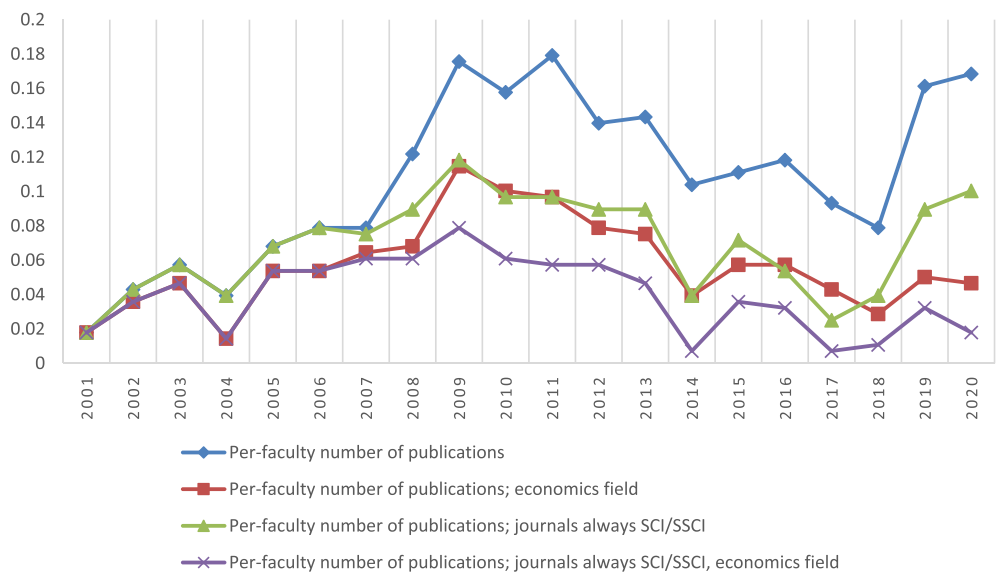


Figure 2. Per-faculty number of publications for faculty members who gained their PhD before 2001.

Table 2. Number of publications in fields other than economics

Field	# of publications	Field	# of publications
Environmental Studies	77	Urban Studies	34
Energy & Fuels	73	Geography	32
Environmental Sciences	62	Green & Sustainable Science	31
Social Sciences, Interdisciplinary	44	Public Administration	22
Regional & Urban Planning	36	Management	21
Area Studies	34	Statistics & Probability	21

In our sample, the productivity difference between men and women is tiny. The average number of publications per year for women is 0.119 whereas the average number of publications per year for men is 0.120. In other words, the difference is 0.001 (1 in a thousand) papers per year. As expected, the difference is not statistically significant. The average number of publications per year for faculty members who hold a domestic PhD is 0.077, whereas the average number of publications for faculty members who hold a foreign PhD is 0.350. In other words, there is more than a fourfold difference in productivity. This difference is statistically significant.

4.3. Research Grants

Of the 630 faculty members, 570 were not principal investigators in TÜBİTAK projects at all. Despite the fact that many academics were unable to become principal investigators, 22 academics have become principal investigators more than once. There is even one academic who has become a principal investigator six times.

There is an uneven distribution at the institutional level as well. Table 3 shows the university in which the faculty members were employed in 2010 and the number of projects in which they were principal investigators. There are only seven universities that have more than five projects. Among them, only Akdeniz Üniversitesi is not in one of the three major cities in Turkey. The per-faculty number of projects is more than a quarter in these universities. On average, there is one project for every 20 faculty members in the remaining universities.

Faculty members who obtained grants are more productive than those who did not. The average per-year publications for faculty members who gained a TÜBİTAK grant is 0.425

Table 3. TÜBİTAK grants by institution in 2010

University	# of faculty members	# of projects	# per-faculty projects
Orta Doğu Teknik Üniversitesi	18	15	0.833
Boğaziçi Üniversitesi	15	11	0.733
Dokuz Eylül Üniversitesi	26	11	0.423
Hacettepe Üniversitesi	15	10	0.667
Akdeniz Üniversitesi	11	9	0.818
Ege Üniversitesi	12	7	0.583
Ankara Üniversitesi	17	5	0.294
Other universities	516	27	0.052

and the average per-year publications for faculty members who did not get a TÜBİTAK grant is 0.088. The difference is about fivefold and is statistically significant. This difference is much more pronounced than the difference that is found in previous studies that compare the applicants who succeeded and who did not (Bornmann et al., 2010; Györfi et al., 2020; Van den Besselaar & Sandström, 2015).

Of the 95 projects, 29 (30.5%) were headed by female faculty members. As 182 faculty members out of 630 (28.9%) are women, they were slightly better represented than men in TÜBİTAK grants. Another observation about TÜBİTAK grants is the advantage of faculty members who hold foreign PhDs. 15.7% of the faculty members received 58.0% of the grants.

5. REGRESSION ANALYSIS (LINEAR REGRESSION)

In this section, we predict the mobility, publication performance, and grant performance for the years between 2011 and 2020 by using three separate linear regressions. Table 4 gives the summary statistics of all the variables that we use in the regressions. The first three variables are used as dependent variables, and the remaining variables are used as independent variables.

- The first dependent variable is a dummy variable that takes a value of 1 if the faculty member worked in a different public university in 2021 than the public university that they worked in 2010. If the faculty member worked in the same public university in 2010 and 2021, the variable takes a zero value. As we have already seen in Table 1, 17.3% of the faculty members who worked in public universities in 2010 have moved to a different public university.
- The second dependent variable is the per-year number of publications for years between 2011 and 2020. This variable is found simply by dividing all the faculty members publications indexed in Web of Science by 10. The mean publication rate of 0.138 is quite low, even though it has improved from previous years, as we have seen from Figure 1.

Table 4. Summary statistics

Row #	Variable	Mean	Standard deviation
1	Mobile	0.173	0.379
2	Per-year number of publications: 2011–2020	0.138	0.373
3	Per-year number of grants: 2011–2020	0.008	0.035
4	Per-year number of publications: 2001–2010	0.081	0.225
5	Per-year number of grants: 2001–2010	0.008	0.035
6	Women	0.289	0.454
7	Professor in 2010	0.151	0.358
8	Years after PhD in 2010	9.402	5.942
9	Foreign PhD	0.157	0.364
10	University (2010) in İstanbul, Ankara or İzmir	0.359	0.480
11	University (2010) established before 1993	0.898	0.302
# of observations: 630			

- The third dependent variable is the number of per-year TÜBİTAK grants between 2011 and 2020 that the faculty members completed as principal investigators. The total number of TÜBİTAK grants is divided by 10 to get this variable.
- Variable 4 is the per-year number of publications between 2001 and 2010. The total number of publications in this period is divided by the number of years after PhD as of 2010 (Variable 8).
- Variable 5 is the per-year number of TÜBİTAK grants in which the faculty members were principal investigators. The faculty members can only be principal investigators after they get their PhD. This variable is found by dividing the number of TÜBİTAK grants for the years between 2001 and 2010 by the number of years after PhD as of 2010 (Variable 8).
- Variable 6 is a dummy variable that takes a value of 1 if a faculty member is a woman. We see that women are underrepresented at 28.9%. Women are underrepresented in every education level in Turkey (Dogan & Yuret, 2011); therefore, representativeness at the faculty level is very important.
- Variable 7 is a dummy variable that takes a value of 1 if the faculty member was a professor in 2010.
- Variable 8 is the number of years after PhD as of 2010. The variable is constructed by subtracting 2011 from the year that the faculty member earned her or his degree.
- Variable 9 is a dummy variable that takes a value of 1 if a faculty member holds a foreign PhD. As we discussed in the previous section, the ratio of faculty members who hold a foreign PhD is 15.7%.
- Variables 10 and 11 give the properties of the universities in which the faculty members worked in 2010. Variable 10 is a dummy variable that takes a value of 1 if the university in which the faculty member worked in 2010 is located in one of the three major cities. Variable 11 is a dummy variable that takes a value of 1 if the university in which the faculty member worked in 2020 was established before 1993.

We run three general linear regressions to determine the factors that affect mobility, publication performance, and receiving research grants. Table 5 gives the results of all three regressions. The interpretation of the findings is given in the following three subsections.

5.1. Mobility

The first regression predicts the mobility of faculty members. The results of this regression can be interpreted as follows.

- Neither the effect of past publication performance (Row 1) nor the effect of past TÜBİTAK grants on mobility is significant (Row 2). In other words, productivity, in general, is not significantly correlated with the chance that an academic moves.
- To find the variable in Row 3, the per-year number of publications from 2001–2010 is subtracted from the per-year number of publications from 2011–2020 for each faculty member. We see from the regression results that the publication performance improvement is not a significant predictor of mobility.
- To find the variable in Row 4, the per-year number of grants from 2001–2010 is subtracted from the per-year number of grants from 2011–2020 for each faculty member. The grant performance improvement is significantly but negatively correlated with mobility. That is, those who gain more grants are less likely to move. The magnitude is below -1 ; that is, the marginal effect is more than the range that the dependent variable can take. We will see a more moderate change when we run the probit regression in the next section.

Table 5. Regression results: mobility, publication performance, and TÜBİTAK grants

Row #	Variable	Dependent Variables		
		Mobility	Per-year number of publications: 2011–2020	Per-year number of grants: 2011–2020
		Coefficient	Coefficient	Coefficient
1	Per-year number of publications: 2001–2010	0.063 (0.073)	0.631 (0.066)*	0.0199 (0.0063)*
2	Per-year number of grants: 2001–2010	0.046 (0.532)	–0.054 (0.400)	0.3102 (0.0379)*
3	Difference in per-year number of publications (from 2011–2020 to 2001–2010)	0.030 (0.043)		
4	Difference in per-year number of grants (from 2011–2020 to 2001–2010)	–1.003 (0.457)**		
5	Women	–0.129 (0.032)*	–0.023 (0.030)	–0.0022 (0.0028)
6	Professor in 2010	0.092 (0.052)	0.108 (0.048)**	0.0001 (0.0046)
7	Years after PhD in 2010	–0.006 (0.003)**	–0.007 (0.003)**	–0.0004 (0.0003)
8	Foreign PhD	0.035 (0.043)	0.122 (0.039)*	0.0177 (0.0037)*
9	University (2010) in İstanbul, Ankara, or İzmir	–0.156 (0.033)*	0.059 (0.030)	0.0051 (0.0029)
10	University (2010) established before 1993	–0.215 (0.049)*	–0.017 (0.046)	0.0027 (0.0043)
11	Constant	0.494 (0.049)*	0.121 (0.046)*	0.0015 (0.0043)
	R_square	0.145	0.229	0.232
	# of observations: 630			

Note: (*): Significant at 1%, (**): Significant at 5%. Standard deviations are in parantheses.

- We have already seen that women are less mobile from Table 1. The regression shows that women are significantly less mobile even after controlling for other factors (Row 5).
- There is no significant effect of being a professor in 2010 and academic mobility (Row 6). This is interesting because we would expect a negative correlation if one of the main motivations of mobility is to climb up the academic ladder. Older faculty members are significantly less likely to be mobile (Row 7).
- Holding a foreign PhD does not have a significant effect on academic mobility (Row 8). Most faculty members who have foreign PhDs are subject to mandatory working conditions in a prespecified public university for a period of usually less than 10 years. Therefore, it is surprising that we have found less mobility for them for a 10-year period.
- We have already seen from Table 1 that faculty members are significantly less mobile if they were working in a university in İstanbul, Ankara, or İzmir in 2010. We see that they are less mobile even after controlling for other variables (Row 9).
- Faculty members who worked in the established universities in 2010 are less mobile (Row 10). In other words, faculty members who are employed in newly established universities are more likely to move.

The mobility variable takes only two values (0 or 1); therefore, linear regression may not give sound results. Hence, we repeat the mobility regression by using a probit regression model, which is a more appropriate model for a dependent variable that takes a binary value. Table 6 lays out the results. The significance levels of all variables are the same as for the linear

Table 6. Probit regression results (dependent variable: mobility)

Row #	Variable	Coefficient (Standard deviation)	Marginal effect (Standard deviation)
1	Per-year number of publications: 2001–2010	0.265 (0.340)	0.056 (0.071)
2	Per-year number of grants: 2001–2010	−1.923 (3.342)	−0.403 (0.700)
3	Difference in per-year number of publications (from 2011–2020 to 2001–2010)	0.192 (0.216)	0.040 (0.045)
4	Difference in per-year number of grants (from 2011–2020 to 2001–2010)	−7.625 (3.846)**	−1.599 (0.801)**
5	Women	−0.836 (0.196)*	−0.175 (0.040)*
6	Professor in 2010	0.486 (0.242)**	0.102 (0.050)**
7	Years after PhD in 2010	−0.033 (0.015)**	−0.007 (0.003)**
8	Foreign PhD	0.206 (0.204)	0.043 (0.043)
9	University (2010) in İstanbul, Ankara, or İzmir	−0.994 (0.197)*	−0.209 (0.040)*
10	University (2010) established before 1993	−0.630 (0.185)*	−0.132 (0.038)*
11	Constant	0.141 (0.193)	
	Pseudo R_square	0.184	
	# of observations: 630		

Note: (*): Significant at 1%, (**): Significant at 5%.

regression (Table 5) except for the variable that indicates that the faculty member is a professor in 2010. The significance level for this variable is 5%, whereas the variable would be significant in the linear regression model if we allowed a significance level of 10%. We would expect professors to be less likely to move if the motive for mobility is to climb up the academic ladder. However, they may be more mobile for other reasons, such as getting a prestigious administrative job such as becoming a dean.

The coefficients of the linear regression give marginal effects, so we also report the marginal effect from the probit regression for comparison. The magnitudes are similar compared to the linear regression for some variables. For example, the significance level for the variable that indicates that the faculty member is a professor in 2010 changed but the magnitude only changed from 0.092 to 0.102. However, there are more pronounced changes, such as for the gender variable. The coefficient is −0.129 in the linear regression whereas it decreased to −0.175 in the marginal effects of the probit regression.

5.2. Publication Performance

The second regression predicts publication performance between 2011 and 2020 by considering past research performance and other factors. The interpretation of the results given in Table 5 can be interpreted as follows:

- Past publication performance significantly affects the current publication performance (Row 1). A one-paper increase in past publication performance corresponds to a 0.63

increase in current publications. Therefore, there is a large marginal effect of past publications on current publications.

- In the previous section, we noted that faculty members who hold grants are more productive. However, regression result shows that past TÜBİTAK grant success does not explain the current research performance when other factors are controlled for (Row 2). As discussed in Section 2, the effect of research grants on publication productivity is an unsettled issue. Funding does not automatically increase publication performance.
- In the previous section, we noted that the productivities of men and women were very similar. In the regression, we also see that there is no significant productivity difference between men and women (Row 5). Therefore, women are underrepresented in Turkish academia even though they are not underperforming.
- Faculty members who were already professors in 2010 are significantly more productive (Row 6). Productivity declines significantly with age (Row 7).
- We mentioned in the previous section that faculty members who hold a foreign PhD are at least four times more productive than those with a domestic PhD. We see that the productivity differences remain significant even after controlling for other factors, such as the location of their university (Row 8). The marginal effect is 0.122 and this is comparably high relative to the average value of the dependent variable 0.138, which is stated in the summary table (Table 4, Row 2). High productivity is expected for two reasons. First, many of the faculty members were selected to get government scholarships. Second, better education abroad may have helped them to be more productive.
- Neither working in a major city (Row 9) nor working at an established university (Row 10) significantly correlated with the research performance.

5.3. Research Grants

The third regression predicts the per-year number of TÜBİTAK grants that faculty members received and completed in the years between 2011 and 2020. The results can be interpreted as follows:

- Both past publication performance and past grant performance are significantly correlated with receiving a new grant (Rows 1 and 2). However, the magnitude of the effects differs. A one-paper increase in the past per-year publication performance has a marginal effect of 0.02 grants, whereas a one grant increase in the past per-year grant performance is associated with a 0.31 increase in current grants.
- Gender has no significant effects (Row 5). The panelists seem not to be affected by the gender of the applicant.
- Neither being a professor nor the years passed after PhD significantly correlate with grant decisions (Rows 6 and 7).
- As discussed in the previous section, a disproportionate number of grants are distributed to faculty members who hold a foreign PhD. In the regression, faculty members who hold a foreign PhD significantly get more grants (Row 8). This can be interpreted in two ways. First, past research performance measures may not be enough to capture real research performance, and having a foreign PhD complements that. Second, the panelists may have a bias towards faculty members who hold foreign PhDs.
- Neither faculty members who were in three major cities in 2010 (Row 9) nor those working in an established university get significantly more grants (Row 10).

6. CONCLUSION

We analyze the mobility and research performance of Turkish economists for a 10-year period. The analysis is presented in three main parts. First, we see whether biographical and biological factors, such as getting a foreign PhD or better past publication performance, are correlated with the chances that a researcher is more mobile. Second, we analyze the factors that correlate with the researchers' publication performance. Last, we investigate the factors that improve the chances of getting a research grant.

Mobility is seen as an important indicator that universities compete for better faculty members (Abramo et al., 2016). We find little mobility among public universities, which may be an indicator of a lack of competition for better researchers. The mobility is computed as 17.3% for a 10-year period. Unfortunately, we could not calculate the yearly mobility rate because we could not get the exact year of mobility for many of the academics. Nevertheless, the mobility rate seems low compared to previous studies, which calculate a yearly rate of 7–8% for all economists in the United States (Ehrenberg et al., 1991), top economists in the world (Coupe et al., 2006), and economists in top U.S. institutions (Yuret, 2018).

The especially striking result is the immobility of women. Only 4.4% of women have moved in a 10-year period. Women are found to be less mobile even after controlling for factors such as past publication performance. It has been shown that women are less mobile than men in previous studies (Azoulay et al., 2017; Jons, 2011); however, the magnitude of the difference is found to be much higher in this study.

Researchers who are already in one of the three major cities in Turkey are found to be less mobile. It has been documented that more productive researchers move toward major cities throughout the world (Verginer & Riccaboni, 2021). However, the result is still interesting because there are many universities within the major cities and it would be possible to move to one of these universities without changing residency. Researchers also do not want to stay in the newly founded universities, even when the location of these universities is controlled for.

The per-year number of publications for economists is merely 0.14 for years between 2011–2020. Publication performance is low for economists in general. For example, economists published 0.33 papers compared to 3.19 papers by chemists in the United States in 2012 (Yuret, 2014). This is an improvement from the previous decade, but the extra publications are either in newly indexed journals or journals in fields other than economics. This publication trend has been observed in other developing countries as well (Grancay et al., 2017; Shelton et al., 2009).

Current research performance is found to be significantly correlated with past research performance, even after controlling for factors such as getting a foreign PhD or being employed in an established university. A one-paper increase in past publication performance corresponds to a 0.63 paper increase in current publication performance. Past research productivity is correlated with current productivity in previous studies as well (Gyorff et al., 2020; Horta & Santos, 2016; Lindahl et al., 2020).

We did not find any gender difference in publication performance either in the uncontrolled comparison or in the regression analysis. This is in contrast with many studies that found men more productive than women (Abramo et al., 2015; Bolli & Schlapfer, 2015; Cikara et al., 2012; Frandsen et al., 2015; Rorstad & Aksnes, 2015). Women are found to be equally productive only after some conditions are controlled for (Duffy et al., 2011; Kelchtermans & Veugelers, 2013; Larivière et al., 2011; Lindahl et al., 2020). Therefore, our findings contrast with most of the previous studies in finding no gender effect, even without initial controls.

Many previous studies have investigated the reasons behind the fact that women are less productive, and family responsibilities are found to be the main factor (Isfandyari-Moghaddam & Hasanzadeh, 2013; Krukowski et al., 2021; Lundberg & Stearns, 2019). However, Turkish female researchers are as productive as their male counterparts, even though they also handle most of the household chores and duties.

We find that Turkish academics who hold foreign PhDs have superior research performance. Academics who hold foreign PhDs publish four times more than those who hold domestic PhDs. The difference remains significant in the regression analysis as well. The significant result is consistent with the previous studies done in Brazil and Turkey (Kutlar et al., 2013; Onder & Kasapoglu-Onder, 2011; Perlin et al., 2017). Academics who hold foreign PhDs are also found to be more likely to get a research grant. A majority of the foreign PhDs are obtained via government scholarships. This costs a great deal to governments, but our results show that academics with foreign PhDs have significantly more publications and get more research grants.

A one-grant increase in the past corresponds to a 0.31 grant increase in the later years, so once a faculty member gets a grant, it significantly improves their chances to get another grant. Moreover, we find that faculty members who have good past publication performance get more TÜBİTAK grants, but faculty members who got more TÜBİTAK grants in the past are not more likely to publish. Many papers find a positive effect of grants on publication performance after receiving the grant (Bornmann et al., 2010; Gyorfı et al., 2020; Van den Besselaar & Sandström, 2015). However, these studies compare the performance of academics who apply for a grant. Our data is more limited, as we do not see who applies for the grant and who does not.

There is a vast literature that investigates the factors behind academic mobility and research performance. We show that the Turkish case is largely consistent with this literature. For example, we find that past research performance is correlated with current research performance, which is a result that is well established in the literature. However, there are a few points where this study diverges. For example, women are found to be less productive in the literature, but our study contradicts this general result. Women are less mobile and undertake most of the family responsibilities in Turkey, as in other countries. Yet, these disadvantages did not transform into a productivity decline. Therefore, the underrepresentation of women in academia in Turkey must have other reasons.

Turkey founded new universities in small towns under the “one university in every city policy” after 2006. The faculty members who work there do not get fewer grants or publish fewer articles; however, they have moved more frequently. It could be either the research environment of established universities or the attractiveness of major cities that keep the faculty less mobile. It may also be the case that there is a limited capacity of the established universities and the universities in the three major cities that restricts employment from other universities. The reasons for the immobility of researchers may shed light on higher education policy.

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The author has no competing interests.

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