

# Some determinants of publication performance: A study of Turkish economics academicians

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## ABSTRACT

This study explores the impact of some individual and environmental determinants on the publication performance of Turkish economics academicians using cross-sectional data. The present study results show that only two of the variables employed, Institutional Control and Academic Origin, were found to be significant, which implies that working at a private university and holding a PhD from abroad, more specifically from the US, have a positive impact on the publication performance of Turkish economics academicians. Results also show that male researchers' productivity follows an inverted U-shaped (life-cycle) pattern.

**Keywords:** Academic performance, economists, publication performance, Turkey

## INTRODUCTION

What are the determinants of research productivity? At first sight, this seems like a relatively simple question to answer by relating inputs to outputs. The question is rather more complicated than it seems, however, researchers from different disciplines have long been addressing the issue and there is still a long way to go and need for new studies.

The complexity derives from various sources, including definition and evaluation of outputs, data availability, input focus and methodologies. For example, some studies work at an institutional level,<sup>[1,2]</sup> and others at an individual level.<sup>[3,4]</sup> Some of the studies focus only on publishing researchers,<sup>[2]</sup> whereas others also take non-publishers into account.<sup>[3]</sup> Some studies deals with more than one

discipline,<sup>[5]</sup> while some others are limited to one.<sup>[6]</sup> Each study handles the topic from a different perspective and contributes just to that specific part.

This paper concentrates on the individual performance of Turkish economics academicians who have published at least one article in Social Sciences Citation Index (SSCI) Economics journals during the period of 2006-2011. It adds to our knowledge about the determinants of research productivity in several ways. First, previous studies<sup>[5,7,8]</sup> have showed that the impact of specific determinants varies with the discipline, implying a need for discipline specific studies. This study contributes to (the limited number of) studies that explore academic economists.<sup>[1,6,9]</sup> Second, this is, to my knowledge, the only work of this kind to focus on Turkish social scientists. Third, since it examines the impact of range of determinants that have been frequently used in previous research, the results reported here provide additional evidence of the impact on research productivity of these determinants. Fourth, the findings of this study also provide evidence that is useful in evaluating some trends and higher education policies in Turkey in recent decades.

The study is organized as follows. Section 1 reviews previous studies in this field and Section 2 describes the data and methodology used here. This is followed by a

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presentation of the ordinary least squares results of the regressions exploring the relationships between the various determinants employed and publication performance. The final section evaluates the results.

## LITERATURE REVIEW

Studies examining the publication performance of researchers employ a variety of determinants which can be classified under two headings, individual and environmental. The former refers to individual characteristics of the researcher, like age, gender, graduation and internal motivation, while the latter refers to the characteristics of the researcher's working environment, like reputation of the institution, availability of funds and quality of colleagues. No single work handles all of these variables, due to data limitations or methodological differences. The current paper is similarly limited and this literature review restricted just to work related to the determinants used in the present study.

One of the determinants used here is gender. A range of studies covering various fields and different time periods demonstrate that men perform better than women in terms of publications.<sup>[5,8,10-14]</sup> A detailed examination of this body of work stresses several considerations as bearing on the productivity difference between the two sexes. First, Long<sup>[12]</sup> asserts that the difference – men's greater productivity – originates in women's relative overrepresentation among unpublished researchers in combination with their underrepresentation among the extremely productive publishers. Second, Xie and Shauman<sup>[14]</sup> show the productivity difference between the sexes to be declining over time, with female productivity as a proportion of male increasing from 60% in the late 1960s to 75-80% in the early 1990s. Third, there is a small number of studies which conclude that actually no significant difference exists between the productivity distributions of male and female scientists.<sup>[15]</sup> Fourth, some studies suggest that the productivity difference between the sexes in social sciences, the area in which women are represented with the high proportion, is either small or absent.<sup>[8,16]</sup> Finally, there are studies that explore the motives behind the productivity difference focusing on the restrictive role of women's family obligations and discrimination against women in academia. Despite the research carried out in this area, no consensus exists among scholars regarding the reasons for women scientists' underperformance.<sup>[12,13]</sup>

The second determinant examined in this study is age. Researchers suggest that the productivity of academics

follows a cyclical pattern. At the beginning of their careers, people in academic life devote more time to their research activities and produce more to build a reputation in order to maximize their welfare in the future. As they approach their retirement – with no incentive any longer to build for their future – they change their time allocation and concentrate more on non-research activities and their productivity declines.<sup>[17,18]</sup> Empirical studies support this hypothesis and find an inverted U-shaped relationship between researcher age and productivity, in which the latter peaks at a certain age (which varies depending on the field) and then falls again.<sup>[5,18,19]</sup> There are also studies that diverge from this quadratic pattern. For example, Diamond<sup>[20]</sup> finds a linear negative relationship between age and quantity and quality of research, whereas Carayol and Matt<sup>[3]</sup> found no significant relationship between age and academic performance.

Another determinant considered influential on publication performance is academic inbreeding, the institutional practice of hiring former PhDs as faculty members following graduation. This has long been considered to have damaging effects on academic achievement. For example, Horta *et al.*<sup>[21]</sup> in their study found that academic inbreeding is associated with lower scholarly output, a higher concentration on its own institution and reduced openness to the rest of the scientific world. They also show that a predominance of inbreeding in a faculty has negative externalities on other academic staff in terms of productivity. Sivak and Yudkevich<sup>[22]</sup> made similar findings for Russian academics. In Turkey also, research into technical universities by Inanc and Tuncer<sup>[23]</sup> found the practice of inbreeding to adversely affect the overall productivity of an institution. Despite extensive evidence against inbreeding, however, a limited number of studies have reported countervailing results with no significant relationship between academic (publishing) productivity and institutional (faculty) inbreeding.<sup>[24,25]</sup>

The control structure (public or private) of an institution is regarded as another determinant of publication performance. Public universities may suffer from managerial inefficiencies like other public institutions, due to weak property rights and blurred targets, while private institutions may operate more efficiently and reach their predetermined aims more frequently than their public counterparts since they have better defined targets and more attractive incentive schemes to reach them. Several studies<sup>[2,26-28]</sup> support this hypothesis. Dundar and Levis<sup>[2]</sup> suggest various possible explanations for why private

institutions outperform their public counterparts. First, the faculty of public institutions may focus more on other outputs or politicians set them targets other than research. Second, public institution may have weaker incentives to maximize research performance and recruit research-productive faculty. Finally, private institutions may provide better organizational structures and performance incentives for their faculties to promote their research activities.

The last determinant of the publication performance employed in this study is that of the academic origin of the researcher. Many studies find a positive relationship between the quality of academic origin and research productivity (for a survey, see Long *et al.*<sup>[4]</sup>). In this study, however, the focus of interest is not on the institutional so much as the international level: Not, that is, on the quality of the institution attended, but on the country in which the PhD degree was gained. Gonzalez-Brambila and Veloso<sup>[5]</sup> showed that Mexican researchers in social sciences who hold a PhD from the US are more productive than others. Katranidis *et al.*<sup>[1]</sup> has also found that Greek economists holding a PhD from the US and the UK are more productive than others, while Çokgezen<sup>[27]</sup> found the best performing economists in Turkey to hold a doctoral degree from the US.

Two explanations for this are offered. One is that the American education system is more competitive and awards productivity better than those in Europe. American economists are more productive than their European counterparts,<sup>[29]</sup> so being trained in such a system might be one of the factors accounting for the productivity difference between US and non-US trained economists from other countries. Proficiency in English represents a second explanatory factor. In recent decades, the English language has increasingly come to dominate the academic world. Almost all the most prominent publications are in English. Even in non-English speaking countries, researchers prefer to publish in English, the lingua franca of science in particular, motivated by desires such as to better share their work with their peers and gain recognition. This second explanation is also supported by empirical studies that relate English usage to publication productivity.<sup>[30]</sup>

To sum up, this brief review of the literature indicates a dominance, albeit not consensus, of findings expressed as the following statement: Being male, holding a PhD degree from abroad, particularly from English speaking countries (and especially the US) and working at a private

university all have a positive impact on the publication performance of academicians, while being employed at the same university at which they are trained has a negative impact and productivity increases up to a certain age after which it declines. This statement of determining factors, therefore, constitutes the *a priori* expectation of this study.

## Model and Data

Within the framework indicated by the literature review, the following model is used to determine the impact of determinants on publication performance of economics academicians:

$$\ln \text{Performance}_i = \beta_0 + \beta_1 \text{Gender}_i + \beta_2 \text{Academic Origin}_i + \beta_3 \text{Academic Inbreeding}_i + \beta_4 \text{Institutional Control}_i + \beta_5 \text{Age}_i + \beta_6 \text{Age}_i^2 + u$$

Where

Gender = gender of researcher (male = 1, 0 otherwise),  
Academic Origin = country where the researcher received his/her PhD (outside Turkey = 1, 0 otherwise)

Academic Inbreeding = Is the faculty inbred? (inbred = 1, 0 otherwise)

Institutional Control = public/private ownership/control of university (private = 1, 0 otherwise)

Age = number of years since researcher received his/her doctoral degree (2011-Year of graduation).

Researchers primarily disseminate their scholarly output through publication in book, article or thesis form. Although these all contribute to a researcher's performance, performance studies usually focus solely on articles published in journals. This is due to a lack of (1) data sources that provide easy access to the other forms of publication and (2) widely accepted evaluation criteria for works other than articles. Hence, in this study, only articles published in journals are counted as indicating performance and the SSCI database is employed to reach publication records of the researchers. Information is used on articles published between January 1, 2006 and December 31, 2011, with all Turkey-addressed publications under the SSCI economics journals category during this period counted as outputs of Turkish economists.

For a fair evaluation, one should consider quality differences between the journals. A second stage of analysis is thus introduced, with the quality of publications factored in as related to (determined by) the journals in which the articles are published. There is no single measure of weighting

journals upon which economists agree; here, the weighting measures employed is that developed by Kalaitzidakis *et al.*<sup>[31]</sup> This weighing scheme is based on the number of citations of articles published between 2003 and 2008 and received in the preceding 10-year period, excluding self-citations and adjusted for impact and age and corrected for size of journal.

The performance of a researcher is considered as the sum of his/her publication weights. In co-authored articles, the weighted value of a publication is divided and distributed equally among the authors. Here, the performance scores of Turkish economists ranged from near zero to about 100, with a mean of 3.6974 and median value of 1.1700 and in which 86.5% of the economists' ( $n = 205$ ) performance scores were evaluated at an interval of between 0 and 6.7806. The skewness of the data is reduced by taking the logarithm of the performance values.

After elimination of non-academic economists and those who had left their tenure before 2011, performance scores for a total of 237 economists were derived. Of these, three economists were not counted as some information on them was missing, leaving a total of 234 for which full information was accessed. Information about independent variables was obtained from personal web pages of Turkish economists and/or other relevant Internet resources.<sup>1</sup>

Tables 1 and 2 give the mean, standard deviations of and intercorrelations among the study variables. In this sample, the proportion of males was 67.5%, about 40% of the institutions were private, about 39% of researchers found to hold a PhD from Turkey and the average number of years since PhD degree completion about 11 years<sup>2</sup>. Correlations between the dependent variable (LnPerformance) and all independent variables have the expected signs. Being male and working at a private university correlate with academic performance positively, while holding a PhD from a Turkish university and being inbred are negatively correlated with the dependent variable. The positive sign of Age and negative sign of Age<sup>2</sup> are consistent with the life cycle hypothesis. The highest correlation, except that

**Table 1: Means and standard deviations of the variables**

Variables	Mean	SD
LnPerformance	-0.39739	2.5961
Gender	0.67511	0.46933
Institutional control	0.39241	0.48932
Academic origin	0.38819	0.48837
Inbred	0.16456	0.37156
Age	11.218	7.596
Age 2	183.29	258.90

SD: Standard deviation

between the Age and Age<sup>2</sup>, occurs between Academic Origin and Inbreeding, since it is only possible for academics holding a PhD from Turkey to be inbred and more than 40% of the academics who hold a PhD from a Turkish university are inbred.

## RESULTS

Table 3 summarizes the regression results of several models. In all models, R<sup>2</sup>s are low, as expected in models with cross-section data, but the F-values, which show the overall significance of the model, are significantly high. Model 1 includes all the variables except inbreeding, since, as will be explained below, this worsens the heteroscedasticity problem in the model. In Model 1 the Breush-Pagan test indicates heteroscedastic disturbances, while the White test shows the opposite. Despite this contradictory result regarding heteroscedasticity, heteroscedasticity-robust standard errors<sup>3</sup> are employed. All variables, again, have the expected signs, but only two of them are statistically significant at the 1% level.

Regression results of the new model with an additional explanatory variable, Inbred, is shown in Model 2. With the inclusion of the new variable, both the Breush-Pagan and White tests indicate a worsened heteroscedasticity problem.<sup>4</sup> Again, White standard errors are used to test the statistical significance of the estimated coefficients. In this regression, the new variable has a negative but not significant sign. The signs of all the other variables in Model 1 remain unchanged in Model 2. The statically significant variables are also the same, although the significance level of Academic Origin is lower (at 5%).

Both models 1 and 2 show the impact on publication performance of a PhD degree received from a foreign country to be positive and statistically significant.

1. For instance, in some cases the date economist received her PhD was missing. In such cases, dissertations were accessed using standard search engines.
2. It should be noted that these statistics are about publishing academics. If all academic economists were considered we would have expected different ratios. Even though no reliable data is available, one can say that the ratio of woman, holding PhD from a university in Turkey is higher.

3. The sample size is sufficiently large ( $n = 234$ ) to use White standard errors.
4. The White test finds a significant relationship only between the squares of residuals and the variable Inbred, at one percent level.

**Table 2: Intercorrelations among study variables**

Variables	LnPerformance	Gender	Institutional control	Academic origin	Inbred	Age	Age 2
InPerormance	1.0000	0.0491	0.3127	0.2202	-0.2415	0.0094	-0.0165
Gender		1.0000	0.0593	0.1314	-0.1295	0.0081	0.0235
Institutional control			1.0000	0.1082	-0.3334	0.1633	0.1594
Academic origin				1.0000	-0.5338	0.0739	0.0594
Inbred					1.0000	-0.1082	-0.1054
Age						1.0000	0.9443
Age 2							1.0000

**Table 3: Regression estimates**

	Coefficient	Model 1	Model 2	Model 3	Model 4	Model 5
Constant	$\beta_0$	-1.88689*** (0.555361)	-1.62488*** (0.606286)	-1.62195*** (0.607688)	-1.65453** (0.790128)	-1.10797 (0.720234)
Gender	$\beta_1$	0.081348 (0.340297)	0.0627656 (0.344177)	0.0187344 (0.339486)		
Institutional control	$\beta_2$	1.56849*** (0.304069)	1.4594*** (0.299309)	1.38255*** (0.300446)	1.57748*** (0.373946)	1.0898** (0.503123)
Academic origin	$\beta_3$	1.02557*** (0.350914)	0.829121** (0.332783)			
Age	$\beta_4$	0.0565481 (0.656485)	0.0572666 (0.0664009)	0.0642421 (0.0666057)	0.105505 (0.0858996)	-0.0885453 (0.0995813)
Age 2	$\beta_5$	-0.00232412 (0.00188468)	-0.00236765 (0.00191377)	-0.00251309 (0.0019203)	-0.039963* (0.00238328)	0.00297724 (0.00302885)
Inbred	$\beta_6$		-0.52231 (0.673732)	-0.525927 (0.687275)	-1.17539 (1.00466)	0.282764 (0.912773)
UK	$\beta_7$			-0.145927 (0.516627)	-0.328479 (0.437283)	0.125756 (0.995999)
US	$\beta_8$			1.14505*** (0.347655)	0.934328** (0.437283)	1.44889*** (0.534999)
Europe	$\beta_9$			0.261771 (0.573971)	0.104908 (0.686623)	0.362456 (1.29257)
$R^2$		0.142136	0.145723	0.169154	0.208772	0.129590
Adjusted $R^2$		0.123323	0.123143	0.139613	0.171600	0.041287
SE of Reg.		2.431481	2.431731	2.408785	2.462880	2.313574
F		7.320555	6.574647	6.606804	5.921682	2.058240
Pr (F)		2.21e-06	2.03e-06	9.48e-08	4.35e-06	0.059864
Breusch-Pagan		24.1327	43.7855	48.6202	35.5078	19.9683
Pr (BP)		0.000204725	8.15242e-008	7.5173e-008	8.97605e-006	0.00563852
White		8.73579	16.7638	17.0401	13.7023	6.74485
Pr (white)		0.188992	0.0189841	0.0480921	0.0898618	0.564395

Standard errors in parenthesis. \*\*\* $P < 0.01$ , \*\* $P < 0.05$ , \* $P < 0.10$

However, this finding fails to address a key discussion in the literature: Is it the country in which the degree is received or proficiency in English that is the determining factor here? In order to answer this question, researchers are classified into three groups according to the geographical location in which they received their degrees: The UK, the US and continental Europe. Of the 145 economists, with a PhD from outside of Turkey in the sample, 105 were graduates of a university in the US,<sup>5</sup> 23 from the UK,<sup>6</sup> and 17 from continental

Europe. For each group, a dummy variable is defined and researchers holding a doctoral degree from Turkey taken as the base category. In this model, the coefficient of the Institutional Control variable is again significantly positive. And of the doctoral origin coefficients, only that of the US is significant at the 1% level, which implies that in terms of Academic Origin, only holding a PhD degree from an American university has a significantly positive impact on a researcher's performance.<sup>7</sup>

are also included in this category.

7. The higher  $R^2$  of this model also implies that it fits better to our data than the previous two models.

In Models 4 and 5, we run Regression 3 for male and female researchers, separately. These give very similar results. Academic Origin and Institutional Control again have significant coefficients with the same signs, showing that studying in the US and working for a private university have a positive impact on productivity, for both male and female researchers. In Model 4, the coefficient of Age<sup>2</sup> is significant at 10% level and has a negative sign, implying that the productivity of male researchers increases up to a certain age then falls. The female researchers' life-cycle shows a reverse trend, but statistically insignificant. The coefficient of Inbreeding has opposite signs for both sexes, but is insignificant in both models.

To sum up, in all models only two of the independent variables, Institutional Control and Academic Origin, are found to be significant, which implies that working at a private university and holding a PhD from abroad, more specifically from the US, have a positive impact on publication performance for economic academicians. Statistically, the significant sign of Age<sup>2</sup> in Model 5 shows that male researcher productivity is consistent with the life-cycle hypothesis. In all regressions except the fifth, the signs of the repressors are the same and are consistent with the literature.

## CONCLUSION

This study examined the impact of determinants specified as Gender, Academic Origin, Academic Inbreeding, Institutional Control and Age on the publication performance of Turkish economics academicians who published in SSCI economics journals between the years 2006 and 2011. The findings, which should be considered within the limitations of the study, are evaluated below. While some of these findings support the common view in the field, others gave countervailing results.

First, even though previous studies have generally provided convincing evidence for the poor performance of women academics, we found no significant relationship between gender and publication performance. In this regard, the present finding essentially contradicts the dominant view in the literature generally, but provides additional support to those studies that (i) find no significant relationship, particularly in the social sciences and (ii) claim that underperformance of women comes from their overrepresentation among non-publishers (since this study is limited to published researchers).

Holding a PhD degree from a foreign country was found to be a significant determinant of performance, as in

many other previous works. However, further analysis also showed that a degree from the US is particularly important while the impact of degrees from other countries was insignificant, including the UK. This result may be interpreted as evidence for the competition argument, that being trained in a competitive education system like the US influenced Turkish researchers' productivity in positive manner. The study gave only weak support for the impact of proficiency in English on publication performance.

Contrary to expectations, we found that working in the same institution in which the researcher received her/his PhD had no insignificant effect on productivity. Although in all models, except 5, Academic Inbreeding had a negative sign, these results were all insignificant. One should bear in mind, again, that another analysis taking non-publishers into account may give the expected results for Inbreeding variable.

Regression results showed that working at a private university is correlated with higher researcher productivity. This point is also made in earlier studies of Turkish economists.<sup>[27,28]</sup> In Turkey, researchers working at public universities are paid on a standard pay scale regardless of their performance while private universities are able to adopt more flexible systems and provide incentives for their higher performing staff. Private university staff are also paid more, which might encourage more dynamic professionals (i.e., those more liable to publish anyway, regardless of the environment) and/or encourage more dynamic behaviour (as a response to assumed or perceived expectations – which might, of course, be related to the environment generally and not just related to financial reward). The higher flexibility of private universities, which specifically aim for excellence in research, enable them to design more efficient incentive schemes and otherwise support more dynamic environments, which may also help to explain the productivity difference.

The results show a quadratic relationship between male researchers' age and their productivity. Specifically, up to a certain age, their productivity increases which is followed by a downward trend. This is consistent with many other studies. Interestingly, regression results for female researchers gave an opposite-albeit insignificant-trend, which requires further examination.

Lastly, our findings provide support for three common trends and education policies followed in Turkey. First, with the help of globalization, facilitating interaction

among countries and increasing prosperity in Turkey, the number of students going abroad for graduate education, particularly to the US, has flourished over the last two to three decades. In addition to private initiatives, Turkish governments have also promoted graduate education abroad. Starting from 1990s, the state has provided an increasing number of scholarships for graduate education abroad and after graduation these students have been hired at public universities. Second, following the 1992 legislation allowing for the establishment of private universities<sup>8</sup>, the number of private universities soared, reaching 65 by 2012. Our findings provide supporting evidence for the compatibility of these trends/policies with research performance. Third, in 2005 the government changed the law and imposed a compulsory retirement age on academics working at public universities. Although, the basic motivation behind the change was related to the social security system, when our results regarding age is considered, we can expect that this also may have contributed to the productivity of public universities.

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