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Faculty Time Allocation for Teaching and Research in Korea and the United States: A Comparative Perspective †

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Abstract

This research, drawing on the 18-nation Changing Academic Profession Survey, aims to investigate the recent trends in academic work hours with respect to the teaching and research balance, as well as influential factors concerning the time allocation of academics between teaching and research. This study connects the results to national policies. A significant and contrasting difference was found in the teaching and research models between the two countries. The sign reversals of demographic, value, and institutional variables suggest that teaching and research are different constructs regardless of whether research affects teaching or vice versa. While American and Korean academics generally agree with the Humboldtian vision of a research and teaching nexus, the trend direction reversal in the work of academics is notable. In general, American academics appear to spend less time on research and more time on teaching, while Koreans spend more time on research

Key words: *faculty time allocation, teaching vs. research, national policies, cross-national comparison*

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I. Introduction

Teaching and research constitute the core work of academics, and most academics value and devote some of their time to both of these activities (Hattie & Marsh, 1996; Arimoto, 2005). However, in recent years there has been considerable debate concerning the appropriate balance between these activities. One strand of this debate asserts that teaching is the primary role of academic institutions, and that research is at best a secondary activity which may distract academics from their teaching duties. In contrast is the argument that inquiry and problem-solving are central to the mission of academic institutions and should characterize all academic work, including teaching. Intermediate to these arguments is the classical Humboldtian vision of the teaching-research nexus whereby research is seen as strengthening teaching, and reciprocally teaching may help to generate new directions of research (Clark, 1997). Distinct from these arguments about the appropriate balance between teaching and research is the suggestion that inexorable global drivers may be leading to a global convergence in values and practice with regard to teaching and research. A review of these arguments reveals that some drivers favor more emphasis on research; others favor more emphasis on teaching. Boyer's (1990) proposal of the four modes of scholarship (discovery, teaching, application, and integration) builds on this argument.

While the convergence arguments imply the inevitable change in one direction or the other, a contrary position is that national policies and programs can and sometimes do influence the

balance. Specifically, a nation such as the Republic of Korea (Korea), determined to catch up in the global brain race (Wildavsky, 2010), by introducing an ambitious national research program such as Brain Korea 21 (BK21) might conceivably have shifted the Korean balance toward research since 1999 (Cummings, 2011). Alternatively, a nation such as the United States (U.S.), which takes great pride in its liberal arts tradition and its prowess in higher education, might create a national academic climate that favors teaching. However, the public and private sectors' investment in higher learning has been extensive in scale and efforts since the establishment of land grant universities and the Sputnik shock, and all 50 states have supported numerous public doctoral-granting or research universities, which in turn support state economies. In other words, the U.S. has developed various types of educational institutions that emphasize undergraduate teaching (e.g., liberal arts colleges) and graduate research training and discovery of new knowledge (e.g., research universities) in pursuit of a research and teaching balance in the system.

In addition, the U.S. federal government has supported cutting-edge science research through research and development (R&D) activities. The Korean government, on the other hand, especially the Ministry of Education, Science, and Technology (MEST) (formerly called the Ministry of Education and Human Resources Development), exerted a great effort to transform some of the historically teaching-oriented institutions and build globally competitive research universities through research funds and programs such as BK21 (Shin, 2009). The Brain Korea 21 refers to "an intensive human resources development program" in an effort "to upgrade the research infrastructure and graduate-level training

of universities" (Ministry of Education and Human Resources Development, 2005, p. 4).

This research, drawing on the 18-nation Changing Academic Profession Survey in 2007, seeks to provide a new international perspective on this debate with a specific focus on recent trends in academic values and time allocation at work in Korea and the United States. The following questions will be addressed:

1. What are the recent trends in academic work hours with respect to the teaching and research balance in Korea and the U.S.?
2. Within the Korean and U.S. systems, what factors influence the time allocation between teaching and research? How do the influential factors differ between these countries?
3. Taking into account the various factors, can it be shown that national policies have an impact on the academics' time allocation?

The findings from the first simple trend question motivated the researchers to pursue the additional questions. Through the second question (which is the central question of this study), we sought to understand important predictors and models for the academics' time allocation between teaching and research. The last question connects the results from the first and second questions to national policies and global perspectives, and will be addressed through the discussion of hierarchical regression model analysis.

II. Literature Review

1. Teaching and Research Balance

There is much public debate on the teaching/research balance (Leslie, 2002; Bok, 2003), but the empirical literature is limited and most of it is specific to particular national contexts. Several studies focus on the U.S., several on Australia, and a smaller number on such nations as the UK and Korea, but in most instances they consider only a small number of academic settings within the national contexts.

A seeming bias in the literature is the assumption that teaching is essential but that research may not be essential, and a typical question is whether research strengthens teaching. Hattie and Marsh (1996 in a meta-analysis found no relation between hours devoted to research and quality of teaching, but most of the reviewed studies employed simple bivariate correlations. They followed up with a field study (Marsh & Hattie, 2002) in one Australian university with a similar finding. In the U.S. context, Kim, Rhoades, and Woodard (2003) investigated the relationship between faculty's sponsored research activities and undergraduate education outcomes, particularly with the effect of institutional sponsored research dollars on the probability of student graduation in 22 public research universities. They observed a positive relationship between sponsored research dollars and education outcomes, controlling for selectivity and demographic characteristics.

An important issue is the amount of time devoted to the respective activities. Milem, Berger, and Dey (2000) relied on three large-scale U.S. data sets for 1972 and 1989–1992 to consider trends

in average time devoted to teaching and research. They found that academics on average devoted more time to teaching than to research (about three times as much), but that the trend was toward a greater emphasis on research in 1989–1992 relative to 1972. The authors stressed the considerable variation in time allocation by institutional type, with faculty in research universities devoting at least twice as much time to research as those in liberal arts colleges. Also, whereas the average time for teaching declined in research universities over this 20-year period, it increased at liberal arts colleges as well as at comprehensive universities. Their study highlights the importance of considering institutional type.

Xie and Shauman (1998), drawing on large U.S. data sets, explored gender differences in time allocation and in outcomes such as publication rates. They found sizeable differences in the '70s, but these declined over time. A multivariate analysis led to the conclusion that these gender differences could be largely, albeit not totally, explained by other personal and work environment factors. This study points to the importance of considering institutional resource allocation and position in the organization in addition to time budgets.

Mamieseishvilli and Rosser (2010) compared foreign-born academics in the U.S. with native-born academics in terms of time allocation and productivity. Concerning time allocation for teaching, they found little difference between U.S. and foreign-born academics, possibly reflecting the fact that teaching duties are organizationally determined. In contrast, concerning hours devoted to research as well as research productivity, foreign-born academics had an edge. The multivariate analysis leading to this conclusion controlled for such factors as age, position, discipline, and gender.

Colbeck (1998) challenged the conventional time budget studies

that assumed working hours could be neatly assigned to teaching, research, service, and administration. She sought through an observation study to determine the extent to which research and teaching activities actually overlapped. She found modest overlap, with somewhat greater incidence in the sciences relative to the humanities. Her study points to the importance of considering disciplinary differences. Porter and Umbach (2001), using hierarchical modeling of 1,104 academics from the 1993 national faculty survey, found strong discipline/department effects. Leslie (2002) also found significant differences in faculty's promotion criteria and their emphasis on teaching vs. research among disciplines, especially in research universities.

Overall it can be said that the literature focuses on what academics actually do, and it does not touch on what academics value, what they prefer, or the impact of their preferences. Institutional type is important, as are discipline and some personal characteristics in accounting for academic values and practice with respect to the teaching/research balance. There is a presumption in the literature that the research focus has increased, but only one study (Milem, Berger, & Dey, 2000) documented the trend in faculty time allocation, and it was for the U.S. only through 1992.

2. Policies Regarding Research

The U.S. is the recognized leader in academic research. It spends more than other countries and accomplishes more. The U.S. government and business sectors have used research universities and their scholars for the advancement of new knowledge and skills that the country needs for the nation's economic and scientific

development. However, in recent years this domain of policy has been somewhat neglected. R&D as a percentage of GNP has been relatively stable and toward the low end among OECD (Organization for Economic Cooperation and Development) countries. Various national studies indicate a decline in R&D infrastructure, including the equipment and facilities at higher educational institutions.

In contrast, Korea since the early nineties has been prioritizing R&D in both industrial and academic venues. R&D as a percentage of GNP has steadily risen and now exceeds the U.S. level (National Science Board, 2010)—though, of course, the total amount of funds for academic R&D is still a fraction of that in the U.S. With the increase in R&D, the infrastructure for research, especially at the leading institutions, has significantly improved. Korea's ambitious research fellowship program, BK21, was initiated and has been supported by the Ministry of Education and Human Resource Development (the former name for MEST) through two phases (phase 1: 1999–2005 and phase 2: 2006–2012). Shin (2009) mentioned that the BK21 project was designed to build world-class research universities in Korea. Assessment of the first phase of BK21 is still incomplete, and its effects were not well documented to assist the second phase (Paik & Park, 2007; Seong et al., 2008).

Taking things together, a notable recent trend in research funding in Korea has been an increase in the proportion of research funding that is competitively awarded as contrasted with block grants. In the U.S. case, the proportion that is competitively awarded is relatively high but appears to have decreased in recent years as politicians increasingly insert "earmarks" with respect to R&D allocations.

National policy in the case of Korea has also extended to the revision of criteria for the selection of new members of the Korean

professoriate as well as for their promotion and tenure. For example, the criteria for this review places a heavy emphasis on research productivity. At most Korean institutions, tenure is not readily offered; instead, professors are subject to periodic review.

The U.S. has a more decentralized and professionally controlled academic system than Korea, so it is hard to find specific links between national policies and faculty personnel criteria. The faculty selection and promotion patterns are as various as the types and missions of institutions are numerous, but teaching is the fundamental business in any type of higher education institution. The stress on research in both systems, however, has resulted in virtually all new recruits having a doctorate. In the U.S., this practice has been longstanding.

3. National Policies Regarding Teaching

Consistent with the emphasis on research, the leaders at Korea's top national universities have introduced measures to decrease student-teacher ratios and thereby to decrease the teaching and administrative load of academic staff, particularly those in the junior ranks. Of course, national universities and a few elite private universities provide only a fraction of all academic jobs in Korea, and in Korea's large private sector teaching loads might remain relatively heavy. In the U.S. many states have articulated policies and pressure to increase faculty's teaching load (especially for undergraduate teaching), and the ongoing debate on accountability also calls for faculty's teaching load to increase in large doctoral-granting or research universities (Kim, Rhoades, & Woodard, 2003).

In the U.S. there is no national or governmental policy

regarding teaching quality in higher education, but there is much discussion of the imperative to provide high-quality teaching in order to be competitive in attracting and retaining students. Among related measures is the provision of opportunities for prospective academics to teach while in graduate school, once employed to provide them with clinics on teaching, and to stress evidence of good teaching as a criteria in hiring and promotion. Additionally, especially in the U.S., there is an increased emphasis on the use of technology in teaching—advocated both to provide students with more flexible learning opportunities and to cut costs (Cummings & Bain, 2009). For professors the stress on technology probably results in more prep time before classes and hence in more average hours teaching per week.

In sum, there is a clear divergence in national policy in these two countries. These differences lead to the speculation that recent national policies in Korea have strengthened research, whereas in the U.S. recent decisions have led to weakening research and increasing teaching obligations.

III. Data and Methods

1. Data Source and Participants

This study uses a partial data set from the comprehensive international professoriate survey called "The Changing Academic Profession (CAP): Questionnaire". The main source of data for this study is the recent 2007 CAP survey of the academic profession in 18 countries, which is a partial follow-up of a similar 1992 survey in

14 countries (the U.S. and Korea were in both surveys). The 2007 CAP survey aimed to examine the nature and extent of changes experienced by the academic profession in recent years (Shin & Cummings, 2009; Cummings & Finkelstein, forthcoming). It also sought to understand the reasons for and the consequences of the changes. For the international comparisons, all participating countries included the same core groups of academics providing academic teaching and/or research at universities and other higher education institutions.

The survey instrument in both periods focused on somewhat similar issues: personal characteristics, academic training, professional values, academic work, governance and management (including performance assessment), and internationalization. Altogether there were some 400 indicators in the 2007 survey, and more than half were replications of 1992 indicators. Concerning the CAP university variable, each national team was invited to define what was meant in its national system by universities as contrasted with other degree-granting higher educational institutions.

Although the first survey was taken in 1992, this study used the second-survey data collected in 2007, including data from 2,046 members of the professoriate in Korea and the U.S. The usable faculty respondents were 900 from 147 four-year higher education institutions in Korea, and 1,146 from 80 institutions in the U.S. The sampling strategies and strata (e.g., large/graduate, small/undergraduate, public, and private) are similar between the two countries.

In Korea, doctoral-granting or research universities consist of 44 of 147. A total of 10 academic fields were identified in the survey, and all respondents were working in the higher education sector when the surveys were taken. For the U.S. cases, the sample

representation of the 2007 CAP survey is comparable to that of the 2004 National Study of Postsecondary Faculty (NSOPF) data in the following key areas: gender, institutional type (research and doctoral-granting universities), academic field, appointment type, and faculty rank (senior professor vs. junior professor status) (Cummings & Finkelstein, forthcoming). One of the authors led this international professoriate survey. The means and percentages of demographic characteristics such as age, senior professor status, and gender proportion are presented in Table 1.

2. Variables and Coding

Dependent variables. We selected two dependent variables: percentage of time spent for teaching and percentage of time spent for research, which were extensively investigated through *t*-tests and multiple regression analysis models. Teaching and research are considered core responsibilities of faculty. Instead of self-reported hours spent for research and teaching, this research utilizes two derived variables, percentage of time spent for each activity based on our assumption that each country has its own culture of faculty work and people's habits concerning total work hours per week. The percentage of time for teaching and the percentage of time for research were calculated from the derived variable summing self-reported hours spent for each activity per week. The five areas of faculty activities were teaching, research, service, administration, and other academic-related activities.

The average work hours for each category are listed in Table 1. The survey question provides the operational definition of teaching and research. Teaching is operationally defined as "preparation of

instructional materials and lesson plans, classroom instruction, advising students, reading and evaluating student work"; research is defined as "reading literature, writing, conducting experiments, fieldwork." It is assumed that the respondents read these operational definitions when taking the survey.

Independent variables. Gender, age, rank, and foreign born were cited as important variables that can affect research and teaching productivity. Thus it is important to observe and control for these characteristics to examine the differential country effect.

Types of institutions and academic disciplines are important organizational factors that may affect teaching and research (Colbeck, 1998; Porter & Umbach, 2001). They can also serve as the proxy of faculty's academic norms and sub-cultures. The doctoral-granting university (doctoral-granting university vs. master's or bachelor's) variable was created to examine and isolate the effect of the research-intensive college environment. Research quality considered for promotion and teaching quality considered for promotion were included in the respective regression models, and they are obviously capturing the effects of the institutional emphasis or reward system on faculty's time allocation. Focus of interest was included as an independent variable in two regression models. We included it because we have observed that people tend to allocate more time for what they would like to do. Focus of interest is operationally defined as the following question item: "Regarding your own preference, do your interests lie primarily in teaching or in research?" Respondents choose from among the following: (1) primarily in teaching, (2) in both, but leaning toward teaching, (3) in both, but leaning toward research, and (4) primarily in research.

Total hours was included to examine whether faculty who work harder and longer are likely to spend their time on research or teaching. While hours allocated to other activities were not the focus of this study, we examine them in *t*-tests to better understand the work patterns of faculty in Korea and the U.S. "Research activities reinforce teaching" was included in *t*-test and multiple regression analyses to test Clark's assertion on the research and teaching nexus. It was coded to make the higher categories on the five-point scale reflect a stronger belief in the influence of scholarly research on teaching (5 = strongly agree, 1 = strongly disagree). Both "research quality [considered] for promotion" and "teaching quality [considered] for promotion" are indicators for institutional emphasis on research and teaching respectively, and they were dummy-coded (0 and 1) along with female, foreign-born, senior professor, Korea vs. U.S., doctoral-granting university status, and academic disciplines. Age, percentage of time spent on teaching or research, and hours of work per week are naturally on a continuous coding scale.

IV. Results and Interpretations

1. Mean Comparisons and t-test Analysis

Table 1 demonstrates that Korean and U.S. scholars have different personal and organizational characteristics, and it is intended to address part of the second research question. Above all, we will examine the statistical mean or percentage difference of dependent variables. Faculty in both countries spent most of their

time in teaching.

In 2007, American scholars reported that they devoted on average only 12 hours a week for research, compared with 18 hours in the case of Korean scholars. American and Korean scholars devoted equal time for teaching (21 hours). In 1992, Korean scholars spent more hours in teaching than their American counterparts (Korea: 23 hours vs. U.S.: 19 hours), while their research hours were equal (18 hours). We can observe the *convergence* in time for teaching and also observe the *divergence* in time for research between these countries. There was a 2-hour decrease (from 23 to 21) in teaching efforts among Korean scholars and a 2-hour increase (from 19 to 21) in teaching among American scholars. The drop of 6 hours in research efforts among American scholars is notable. It appears that there has been an important shift in faculty work in the two nations.

Because the norms and expectations of work hours differ among countries and cultures, we discuss the time allocation or work efforts by academics in the two countries in terms of the proportional distribution of the total working hours. To begin with, the total work hours are very different (Korea: 49.53; U.S.: 41.04). Korean scholars on average work longer hours per week (about one more working day). While the actual hours spent on teaching did not differ, American scholars tend to spend a slightly larger proportion of their time on teaching (average hours for teaching: Korea: 16.31 or 16, U.S.: 17.57 or 18 hours per week). No difference was observed in time spent on service. Korean academics now not only work longer hours in research, but also allocate a larger percentage of their time to research (Korea: 54.35, U.S.: 49.83; the percentages calculated by time on research/total work hours).

Korean scholars reported their stronger inclination toward

research according to the means (Korea: 2.72, U.S.: 2.32) on a four-point scale (1 = strongly inclined to teaching, 4 = strongly inclined to research). While faculty in Korea work longer hours than those in the U.S., most of the additional hours seem to be used for research and other non-teaching activities.

Table 1. Mean Comparison and T-test Analysis

Variables	*Mean*	*SD*	Korea		US		*t*-test	*p*
			Mean	*SD*	*Mean*	*SD*		
Percentage of teaching in session	42.69	18.59	16.31	12.68	17.57	16.92	-5.42	***
Percentage of research in session	28.79	18.00	54.35	18.99	49.83	25.74	11.45	***
Female	.31	0.46	.18	.39	.41	.49	-11.81	***
Foreign-born	.10	0.30	.01	.10	.18	.38	-14.36	***
Age	49.11	9.76	46.09	7.13	50.70	11.00	-13.87	***
Senior professor	.63	0.48	.64	.48	.64	.48	.01	
Korea vs. USA	.45	0.50	-	-	-	-	-	
Focus of interest	2.48	0.83	2.72	.65	2.32	.92	11.57	***
Total Work Hours	50.88	16.63	49.53	18.77	41.04	17.98	5.88	***
Doctoral-granting university	.49	0.50	.18	.39	.74	.44	-30.62	***
Medicine	.11	0.31	.09	.29	.13	.33	-2.73	***
Life science-agriculture	.08	0.28	.11	.31	.07	.25	3.27	***
Humanities	.20	0.40	.16	.37	.24	.43	4.41	***
Business-law	.09	0.28	.10	.29	.08	.27	1.49	
Research quality for promotion	.72	0.45	.65	.48	.77	.42	-5.57	***
Teaching quality for promotion	.72	0.45	.62	.49	.81	.39	-12.83	***
Research reinforce teaching	4.05	0.94	4.14	.75	3.98	1.07	3.90	***
Teaching hours per week	21.16	10.87	21.08	10.09	21.23	11.45	-.31	
Research hours per week	14.91	10.95	18.11	10.88	12.36	10.32	12.01	***
Service hours per week	4.65	4.85	4.68	3.92	4.63	5.48	.22	
Administration hours per week	6.92	6.93	6.00	5.48	7.66	7.82	-5.58	***
Other academic activities per week	3.04	3.69	3.34	3.28	2.81	3.97	3.32	***

*** p < .01, ** p < .05, * p < .10

Regarding faculty background characteristics, there is a much higher percentage of female scholars in the U.S. than in Korea (Korea: 18 vs. U.S.: 41), and there is a remarkable difference in the percentage of foreign-born scholars (Korea: 1 vs. U.S.: 18). Dummy-coded variables in Table 1 can be interpreted as percentages (e.g., 0.41 indicates 41%). Obviously, these sharp differences led to a statistical significance in t-tests. The percentage of participants at senior rank was the same, 64% in both countries. The means of participants' age differ by about 5 years (Korea: 46.09, U.S.: 50.70). This age difference can reflect two different situations in these countries. First, Korea's expansion of its higher education system (in number of students and faculty) was rather dramatic over the last 15 years. The new hires tend to be young assistant professor or instructor level. Second, Korea has mandatory retirement-age policies for faculty and researchers, while American higher education no longer imposes these policies.

The percentage of doctoral-granting universities is much higher in the U.S., and the data seem to reflect this reality (U.S.: 74%, Korea: 18%). These percentages reflect participants' affiliated institutional characteristics. A higher proportion of American faculty reported that their institution emphasizes both research quality for promotion (Korea: 65%, U.S.:77%) and teaching quality for promotion (or, faculty personnel decision) (Korea: 62%, U.S.: 81%). Both must be considered in higher education institutions, but it is a matter of emphasis.

The *t*-test analysis of (Your) research (activities) reinforce teaching suggests that there is a statistically significant difference in the responses between Korea and the U.S., although the practical significance is questionable because only .16 point of difference on a five-point scale was observed. Combining the results

from percentage of time for research and percentage of time for teaching, one can observe a disparity between the system behaviors and their faculty's focus of interest. For the last two decades, Korean higher education and national policies have increasingly emphasized research, and some institutions provide special monetary incentives for those who achieve excellence in research.

While Tables 2–4 present only four of the disciplines included in the regression models, we analyzed the distribution patterns of all major disciplines. Business and law were combined because of their professionally oriented characteristics; life sciences and agriculture were combined due to their similar research and department characteristics. Similar means or proportions were identified with business-law (Korea: .10, U.S.: .8). A much higher proportion of Korean scholars were identified with life science–agriculture (Korea, .11, U.S.: .07) and with engineering (Korea: .16, U.S.: .7, not shown in the table), but a much higher percentage of U.S. scholars were from medicine (Korea: .9, U.S.: .13), humanities (Korea: .16, U.S.: .24), and social science (Korea: .12, U.S.: .16, not shown in the table). While we consider our data to be relatively representative, we cannot ensure faculty's response rate by each academic discipline. Thus, the mean and proportion of each discipline show a simple sample presentation, and *t*-test analysis should be interpreted with caution.

2. Trends in Time Allocation

As noted in the literature review, there is much conjecture about trends but little actual evidence. We have cited Milem, Berger, and Dey (2000), who provided a trend analysis for the U.S. from 1972 to

1989–92 regarding time allocation: overall, both teaching hours and research hours were slightly up. For Korea there was no comparable study for that time period.

The Carnegie International Survey of the Academic Profession conducted from 1991 to 1992 in 14 countries provided evidence in support of the argument of distinctive national models for academic work. Bain and Cummings (2000) suggest that academics working in systems modeled after the German system were more inclined toward research and spent relatively more of their time on research, while those working in systems modeled after the British universities were more inclined toward teaching and spent relatively more of their time on teaching. U.S. and Korean professors were aligned toward the middle of the international distribution in terms of their inclination for teaching versus research. Concerning actual hours devoted to these two roles, U.S. professors were intermediate in the international distributions for both teaching and research, while Korean professors devoted a relatively large number of hours to teaching in 1992.

But what has transpired since then? Fifteen years later, in 2007, the CAP project conducted a follow-up in nine of the countries covered by the original Carnegie Survey. Academics in the U.S. and Korea were surveyed in both periods. From the data sets, what are the recent trends of time allocation for teaching and research among professors in the U.S. and Korea? How do they differ over time? Table 2 presents the data from the 1992 and 2007 surveys. In 1992, U.S. academics devoted fewer hours per week to teaching than did their Korean counterparts, but in 2007 the pattern changed. The average hours per week that U.S. academics devoted to teaching increased from 19 hours to 21 hours, while for Korea teaching decreased from 23 hours to 21 hours.

In 1992, academics in the two countries spent about the same number of hours for research. However, 15 years later Korean academics on average spent about the same number of hours for research (18 hours in both surveys), while American academics spent much less (from 18 to 12 hours). The role of higher education for generating new knowledge and scientific discovery might have declined in the U.S.

Table 2. Teaching-Research Effort between the U.S. and Korea

	Hours Research (1992)	Hours Research (2007)	Hours Teaching (1992)	Hours Teaching (2007)
U.S.	18	12	19	21
Korea	18	18	23	21

3. Correlation Analysis

Before conducting the multiple regression analysis, we conducted bivariate correlation analysis. The coefficient sizes and their sign direction were intuitive and consistent with mean comparison analysis. A Pearson correlation coefficient table, including all variables in Table 1 and multiple regression models, is presented in the Appendix. In the sections that follow we examine the influential factors affecting current academic work patterns and whether there is evidence that national policies play a role in shaping these patterns.

4. Multiple Regression Analysis

Two multiple regression analyses addressing predictive models of percentage of time for research and percentage of time for teaching

were performed (See Tables 3 and 4). The dependent variable for the time for the research model is the percentage of working hours allocated to research, and that for the time for the teaching model is the percentage of working hours allocated to teaching.

Tables 3 and 4 present three regressions for each outcome model. The first model, the "base model," consists of only personal faculty background characteristics and Korea (vs. U.S.). Controlling for the background characteristics, the regression examined the effect of the country (being a scholar in Korea vs. the U.S.). The null hypothesis of "no effect of working in higher education institutions in Korea vs. the U.S. on time allocation in research" was initially tested in this base model. The second, or "value model," included participants' focus of interest (or, research vs. teaching inclination), total work hours, and belief in the research and teaching nexus (personal interest and action) in addition to the variables in the base model regression. The third model (the "full model") consists of all other independent variables related to organizational characteristics, including doctoral-granting university status, academic disciplines, and research (or teaching) considered for promotion. The structures of the models and the types of variables included are parallel. Any academic discipline variables that were significant—in either the research or teaching model—were included to make the multiple regressions comparable and to find out how these discipline variables are differently related to each outcome.

5. Time for Research

The full regression explained about 31% of total variance of the percentage of research in total work hours (time allocation in

research). The variance explained by each regression is presented in Table 3. The null hypothesis (there is no differential effect of being a professor in Korea vs. the U.S.) was rejected. It means that there is a significant difference in time allocation in research between Korean and American academics, holding other independent variables in the model constant. Its effect and direction remained stable throughout the value and full models. The variable Korea can be a proxy of the Korean context (inversely, American context).

Table 3. Predicting Time for Research

	Base Model			Value Model			Full Model		
Variables	*b*	*Beta*		*b*	*Beta*		*b*	*Beta*	
Female	-4.342	-.112	***	-2.937	-.076	***	-3.177	-.082	***
Age	-.160	-.087	***	-.027	-.014		-.042	-.023	
Senior professor	3.104	.083	***	1.662	.044	**	1.714	.046	**
Foreign-born	7.396	.123	***	3.119	.052	**	3.110	.052	**
Korea	7.984	.221	***	3.894	.108	***	6.123	.169	***
Focus of interests				9.765	.450	***	9.135	.421	***
Total Hours				.044	.041	**	.043	.039	**
Research reinforces teaching				1.107	.058	***	1.210	.063	***
Doctoral university							3.773	.105	***
Business-law							-.780	-.012	
Life science							2.861	.044	**
Medicine							2.627	.045	**
Humanities							-2.017	-.045	**
Research considered - promotion							1.756	.044	**
Adj. R^2		9%			29%			31%	

*** p < .01, ** p < .05, * p < .10

Being female is a negative predictor for the percentage of work allocation in research, while being foreign-born is a positive

predictor. The pattern of these two variables is consistent with the previous studies. Interestingly, there is a positive relationship between being a senior professor (associate or full professor) and time for research. However, age was a significant negative predictor for time for research; its unstandardized coefficient (*b*) dropped sharply (from −.160 to −.027), and it was no longer significant in the value model.

Focus of interest is faculty's inclination toward research, and it is the strongest predictor for the percentage of time allocation on research over other tasks. Academics with a strong belief that research activities reinforce teaching are likely to spend or report that they allocate more time to research. It was a significant and positive predictor at the .05 alpha level (b = 1.107). Total hours spent for work was also considered in the model because people who work more hours may allocate their additional time to the task that interests them or that gives them internal satisfaction or external rewards. Both focus of interest and total hours were positively associated with each other and with the dependent variable in the model. The three additional value and behavior variables added about 20% to the adjusted R^2.

Doctoral-granting university was significant and positive in predicting time spent in research, which is consistent with the category's institutional emphasis. While Korea does not have a clear research university distinction as in America, universities granting doctoral degrees are highly likely to emphasize and promote their faculty's research productivity.

Disciplines were included in the model on the basis of the literature that suggests some disciplines are more likely to emphasize research and grants than others (Colbeck, 1998; Poter & Umbach, 2001). All academic disciplines were included at the

criteria of t = 1.5. We chose the criteria to make the regression models more parsimonious, and to have the variable inclusion criteria somewhat liberal or slightly lower than t = 1.65 or p = 0.10 (Education, engineering, physical science, and social science were not included because of their weak effects in pre-regression models in both teaching and research models). Controlling for personal background, focus of interest, and doctoral-granting universities, medicine and life science majors are significant positive predictors, and humanities is a negative predictor (at the .05 p level). Business -law was included despite its insignificant contribution to the time allocation for the research model, to show a parallel comparison with the time allocation for the teaching model.

This research included two types of institutional reward or promotion characteristics (whether teaching or research quality was considered for promotion). Consistent with our intuition, faculty tends to devote a higher percentage of work hours to research when research activities and outcomes are rewarded. Research considered for promotion is an institutional variable. The norm in U.S. higher education is that research is an important factor for the faculty's promotion and reward. Traditionally, the majority of Korean higher education institutions have not rewarded research productivity extensively, but research productivity increasingly is becoming one of the important criteria for rewards and promotion, especially in doctoral-granting or leading universities.

The greatest contributing variable in the model was focus of interest (or inclination toward research), which we intuitively expected. Interestingly, the country distinction variable, Korea vs. the U.S., was the second highest in the standardized coefficient (*Beta*) in the value and full models, controlling for other predictor variables.

In short, this suggests there are important differences in the two countries. Korean professors and scholars tend to allocate more of their time to research than teaching or other activities, compared with American professors and scholars. They tend to work more hours and show a greater academic interest in research. Moreover, we consider that the respective policy environments and their decisions concerning the differential emphasis on research are key components of these national differences. These differential policy decisions have changed the incentives in the two systems to some extent, and could have eventually changed the attitudes and behavior of academics.

6. Time for Teaching

The teaching model consists of the same set of independent variables as the research model, except for one variable. Instead of "research considered for promotion," we included "teaching considered for promotion" for our parallel modeling and analysis, regardless of its strength of association. The full model explained 24% of the total variance of percentage of teaching in total work hours. The null hypothesis (there is no differential effect of being a professor in Korea vs. the U.S. on time allocation in teaching) was rejected in the base model. It means that there is a significant difference in time allocation in teaching between Korean and American academics, holding other independent variables in the model constant.

Being a female, foreign-born, and senior professor exhibit the opposite signs between teaching allocation and research allocation. Being a senior professor was negative in teaching time allocation.

Perhaps associate or full professors do not need to prepare for teaching as much as junior assistant professors, partly because of their accumulated knowledge base and partly because of more involvement in research or service/administrative tasks. Foreign-born professor status was a significant negative predictor for the base model including only background characteristics and Korea; note that it was a positive predictor for research time allocation. Its effect, however, became insignificant when focus of interest was introduced in the value model. Perhaps the reason for the significant effect of being a foreign-born professor is their research orientation. As shown in Table 1, about 18% of U.S. participants in the survey were foreign-born, compared with only 1% of Korean participants. The finding about foreign-born scholars is somewhat similar to that of Mamiseishvilli and Rosser (2010) in that international faculty were significantly more productive in research but less productive in teaching. In the U.S., foreign-born researchers are often hired because of their strength in research rather than teaching. This study, however, shows a partial reason for lower productivity in their teaching.

Being female was a significant predictor. Female academics might be allocating more time (both proportional and actual work hours) to teaching than to research. A high proportion of female faculty in the U.S. tends to be hired on a non-tenure-track basis to teach courses than to do both teaching and research. Often, women are concentrated at the lower level of the professoriate rank in both countries (Schuster & Finkelstein, 2006). The gender effect lasted throughout the models, controlling for focus of interest, professor rank, type of institution, and discipline variables.

While faculty's age was a negative predictor for the research model, it was an insignificant predictor for the teaching model. Age

does not affect the allocation of time for teaching, although professor rank was negatively associated with faculty's time allocation toward teaching.

Table 4. Predicting Time for Teaching

	Base Model			Value Model			Full Model		
Variables	*b*	*Beta*		*b*	*Beta*		*b*	*Beta*	
Female	2.781	.069	***	1.726	.043	**	2.653	.066	***
Age	.064	.034		-.045	-.024		-.022	-.011	
Senior professor	-6.260	-.162	***	-5.165	-.134	***	-4.912	-.127	***
Foreign-born	-4.874	-.078	***	-1.729	-.028		-1.839	-.030	
Korea	-3.980	-.107	***	-.642	-.017		-4.836	-.130	***
Focus of interests				-7.184	-.320	***	-6.174	-.275	***
Total Hours				-.130	-.116	***	-.128	-.114	***
Research reinforces teaching				-.803	-.041	*	-1.131	-.057	***
Doctoral university							-7.218	-.194	***
Business-law							5.518	.083	***
Life science							.719	.011	
Medicine							-9.248	-.155	***
Humanities							3.985	.087	***
Teaching considered - promotion							-.189	-.005	
Adj. R^2		5%			16%			24%	

*** p < .01, ** p < .05, * p < .10

Working as a scholar in Korea was a strong negative predictor for time allocation in teaching. Considering research and teaching models together, Korean academics are less likely to allocate their time to teaching than to research or other tasks. Conversely, American academics are positively associated with time spent teaching. This regression analysis is consistent with the mean analysis (see comparative mean analysis). Focus of interest was the strongest predictor for time allocation in teaching (Beta = –.320 in

Value model). The variance was increased by 10% with this variable alone (not shown in the table). Reviewing research and teaching models together, we find that the pattern of this variable suggests that a substantially larger proportion of Korean academics lean toward research than teaching. Moreover, the coefficient of Korea (vs. the U.S.) dropped sharply (b from –3.980 to –.642) in the value model that included variables such as "focus of interest" and "research reinforces teaching". Perhaps, faculty's research focus or orientation is a reason for Korea's negative effect in time allocated to teaching. When time is limited, a greater focus on research suggests a lesser focus on teaching. Interestingly, the teaching model indicates that those who believe "research activities reinforce teaching" are likely to spend proportionally less time in actual teaching (significant at $p < .10$). Note the opposite coefficient signs between research and teaching models. Total work hours was a significant negative predictor for time spent teaching. Those who work more hours are more likely to spend that extra time in research rather than teaching. What troubles us is that those who work hard are likely to spend a smaller percentage of time teaching.

Not surprisingly, professors at doctoral-granting universities are allocating a smaller percentage of time to teaching. It was the second strongest predictor of the model (Beta = –.194), next to the focus-of-interest variable. About 74% of surveyed American faculty and 18% of Korean faculty worked at doctoral-granting universities. Three discipline variables were significant predictors, and the signs were opposite to those of the research model (e.g., medicine, humanities) or insignificant (life science). Business-law was a positive predictor for time in teaching. Together, the doctoral-granting university status and disciplines increase about 8% of the

total variance. Interestingly, the coefficient of Korea increased in the model, and Korea became a significant negative predictor again (from $b = -.642$ to $b = -4.836$). The major change occurred when doctoral university status entered the model.

The effect of "Teaching quality considered for promotion" in the full model was weak; its coefficients were minimal ($b = -.189$, Beta = .005). In other words, no significant effect was observed even if the institutions considered teaching quality for faculty promotion. This means that academics do not allocate much more time for teaching because of the institutional emphasis or reward for teaching quality. The classroom teaching load is mostly predetermined, and faculty in general may not spend much more or less time for their teaching because of external incentives. In short, Korean academics in general tend to be more research oriented than American academics. The direction and its statistical significance were maintained throughout the models, controlling for institution type and academic disciplines considered in the model.

V. Discussion and Implications

Has there been a convergence in academic work patterns? The answer is partially yes for teaching and partially no for research. The *t*-test table presents statistical differences in percentage of teaching, but about 1 percent difference would not be of any practical significance, especially considering that both countries report the same number (21) of teaching hours in 2007. The trend data between 1992 and 2007 presents two hours up for the U.S. and two hours down for Korea. In short, Korean academics do not spend

more time teaching than their American counterparts. However, research hours in the U.S. dropped by six hours (to 12), while research hours in Korea remained the same (18). Table 1 shows that the gap in percentage of research is about 4%. The proportional allocation in research and reported research hours shows that they are not only statistically different between the two countries, but they could also present meaningful practical differences. To academics, six hours—or 4% of working time per week—can have an accumulative long-term effect in anyone's research productivity.

Can any differences be linked to policy differences? National policy initiatives can and sometimes do have an important impact on the values and practice of academics in different academic settings. The trend toward fewer teaching hours in Korea can be attributed to the recent expansion of faculty hiring in Korea and the recent governmental supports and pressure to adjust student-faculty ratio. On the other hand, the trend toward more teaching hours in the U.S. could be related to the recent trend of faculty hires in contract and adjunct professor appointments rather than tenure-track hiring, which is often an institutional response to budget deficits and shrinking state funding for the public higher education system. For the last two decades, the support of American state governments for higher education has dwindled and the public has demanded greater transparency and accountability. Faculty's research or sponsored research activities were considered by the public to be self-serving intellectual play among academics and a potential barrier for student learning. The states' weak revenue situation and their pressure on state university faculty to teach more courses and get more involved in undergraduate teaching might have resulted in the increased teaching or teaching

preparation hours in 2007, compared with those in 1992. Finally, if the dramatic drop in research hours in the U.S. is related to the trade-off with the increase (of two hours) in teaching, a cost-benefit analysis or trade-off assessment should be conducted for short- and long-term productivity on a national scale.

Let's turn to the factors influencing faculty's time for teaching and for research. There are approximately four types of variables in the three regression models: a) personal characteristics, b) being and working in higher education in Korea vs. the U.S., c) preference between research and teaching and working behaviors, and d) institutional type and emphasis as well as academic disciplines. Independent variables included in the regression models are significant predictors for either time for teaching or time for research. The four personal characteristics (being female, age, foreign-born, and senior professor) are major control variables for the purpose of isolating the net effect of being in Korea vs. the U.S. Most of these variables were identified as important in previous related studies, and indeed they were all significant predictors for the teaching and the research models.

Interestingly, we noticed that the signs of many predictor variables were often reversed between the teaching and research models. For example, being a senior professor and foreign-born were positive predictors for the research model, but they were negative predictors for the teaching model. Being female was a negative predictor for the research model, but its sign reversed for the teaching model. Age negatively affects time allocation for research, but it does not matter for time for teaching. Taking things together, these demographic or personal characteristics explain faculty's research or teaching time allocation, although the variance explained was relatively low. Furthermore, it stimulates our desire

to understand the reasons for their sub-group differences and time allocation patterns beyond the simple effects revealed by the results. For example, why do female professors spend more time in teaching than male professors? Why do foreign-born professors spend more time in research than the native-born?

In the value model, the sign and size of the coefficient for focus of interest are intuitive, but faculty's total work hours or belief in "research reinforces teaching" is not. Academics who spend more hours at work overall tend to spend more in research and less in teaching. Total work hours are not necessarily related to individual work habits and workloads, but they can be related to cultural and institutional environments. This variable was not explored in any previous studies. Another important variable included was "research reinforces teaching," which was based on Clark's claim about the research and teaching nexus. Scholars who believe in this relationship might not spend much time teaching because they might buy out research or grant activities at the expense of their reduced teaching loads, or they might prepare for teaching through their research activities.

The quality of teaching and research is often subjective and relative. Moreover, the nature and constructs of teaching are different from those of research. We might reasonably expect the opposite signs of predictors between teaching and research models. Hattie and Marsh's (1996) meta-analysis finding showing no relation between hours devoted to research and the quality of teaching might be indirectly and partially supported from the results of this study.

Several disciplines and the doctoral-granting university status were significant predictors. Working in a doctoral-granting university involves teaching and advising doctoral students and dissertation

research. Obviously the expectation of faculty research in a doctoral-granting university is much stronger than at non-doctoral-granting universities in the U.S. and Korea. As Colbeck (1998) indicated, some disciplines are oriented toward teaching and others are oriented toward research activities. The disciplines with the greatest contrast between teaching and research models are medicine and the humanities; their coefficients were in opposite directions. Medicine and life science are positive predictors in the research model, and they are heavily research-oriented fields in the U.S. and Korea. In short, faculty's teaching and research hours or percentage breakdown are heavily dependent on their disciplines. The patterns and signs of each discipline in the full model seem to reflect the reality and research emphasis of the discipline in these two countries.

Teaching and research are the major roles of academics in colleges and universities. Institutions not only assess the performance of these activities, but they also reward them with career promotions or pay raises. Increasingly U.S. higher education institutions use the reward tool for faculty's promotion with the criteria of teaching and research quality. Research quality considered for promotion was a positive predictor for time spent on research, while teaching quality considered for promotion has a very weak correlation with the time spent for teaching. Perhaps academics are more responsive to research quality or research in general than to teaching or teaching quality, even if these are considered for promotion. Positively, we can assume that faculty may spend necessary time for teaching regardless of their institutional promotion consideration. In addition, the mean comparison and *t*-test in Table 1 reveal that American higher education has many more incentives and rewards in promotion for research quality and teaching quality than Korea (with gaps of 12% in research and 19% in teaching).

Limitations. This study was based on a self-reported international faculty survey; thus interpretations of results and comparisons should be grounded within the nature of self-reported data and limited sampling. Nevertheless, the variable patterns are consistent with the previous studies, and the new findings are consistent with our knowledge and experiences. In addition, the 1992 and 2007 data are not longitudinal data sets; thus we reviewed and presented the change patterns of only two outcome variables (i.e., hours spent at teaching, hours spent at research). A careful interpretation is necessary. While we recognize the significant variation in time allocation among faculty from different types of institutions, as suggested in Milem, Berger, and Dey (2000), we could not introduce all the different types of institutions in the model. While the doctoral-granting university variable was the only available variable, it was an important independent variable in both teaching and research models.

VI. Conclusion

Many assertions have been made about global convergence in academic roles. At a glance, the same number of hours devoted to teaching in 2007 suggests that these countries are converging in their professional work patterns. However, this study revealed that the U.S. was once high on research hours but is now low, while Korea was once high on teaching hours and now is down. While there are many interesting contrasts across academic systems, possibly the most interesting is the trend reversal in the time

allocation for the work of academics in Korea and the United States.

Through this empirical study, we aimed to expand our understanding of the factors influencing time for teaching and time for research. The demographic variables such as gender (female), faculty rank (senior professor status), age, and foreign-born status were all significant in the teaching and the research model, which is consistent with the previous studies. However, the sign reversals or changes in teaching vs. research models are notable. This suggests that teaching and research are different constructs regardless of whether research affects teaching or vice versa. Their effects going in the opposite directions also have an important implication for the appreciation of different faculty groups' behaviors or time allocation patterns.

This research also introduced important value and behavior variables to model academics' time for teaching and time for research. Focus of interest (inclination for research or teaching), total work hours per week, and the belief that "research reinforces teaching" are newly introduced variables that the previous empirical studies did not consider in their time allocation models. We found that these variables are not only strong predictors for both the teaching and research models, but there is also a strong and intuitive connection between the value and action variables. For example, professors who are inclined toward research spend a higher proportion of their time in research, and those who believe "research reinforces teaching" also tend to spend more time in research. The large overall mean (about 4 on the five-point scale) of research reinforces teaching also suggests that American and Korean academics in general agree with Clark's concept of a research and teaching nexus or the transfer of research-based knowledge to teaching.

The sign patterns of doctoral-granting university or disciplines in the full model seem to reflect the global trends in life science and medical research emphasis. The doctoral-granting university in the models resembles the characteristics of research universities in the U.S. Obviously, faculty who work in doctoral-granting universities tend to spend more time in research than those at non-doctoral-granting institutions. However, it is negatively related to time spent teaching. When the Korean government and leading institutions of higher education attempt to shift the academic culture toward research and to create more research universities through incentives and investment, such as BK21, policymakers and academics should be fully aware of the trade-offs of faculty time between research and teaching; they need to look beyond the emphasis of graduate education over undergraduate student development. In order to find a balance between research and teaching and between graduate and undergraduate education while serving students' various needs, the Korean higher education system, or MEST, should diversify funding initiatives and foster various types of institutions with varying academic missions (e.g., liberal arts colleges, research universities, community colleges) as in the U.S.

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References

Akira, A. (2005). Globalization, academic productivity, and higher education reforms, In RIHE *Globlization and Higher Education*. International Publication Series (No. 9), 1-22.

Bok, D. (2003). *University in the marketplace*. New Jersey: Princeton University Press.

Bain, O. & Cummings, W. K. (2000). Academe's glass ceiling: Societal, professional and institutional barriers to the advancement of academic women. *Comparative Education Review*, 44(4), 493-514.

Boyer, E. (1990). *Scholarship reconsidered*. Princeton, New Jersey: Princeton University Press.

Clark, B. (1997). The modern integration of research activities with teaching and learning. *The Journal of Higher Education.* 68(3), 241-255.

Colbeck, C. L. (1998). Merging in a seamless blend: How faculty integrates teaching and research. *The Journal of Higher Education*, 69(6), 647-671.

Cumming, W. K. & Bain, O. (2009). The Internationalization of the U.S. Academy in comparative perspective: A descriptive study. *Asia Pacific Education Review*, 10(1), 107-116.

Cummings, W. K. (2011). Is the academic center shifting to Asia? *CERC Studies in Comparative Education*, 27(1), 47-76.

Cummings, W. K. & Finkelstein, M. (forthcoming). *Scholars in the changing American Academy: New context, new rules and new roles*, New York, NY: Springer..

Hattie, J. & Marsh, H.W. (1996). The relationship between teaching and research: A meta-analysis. *Review of Educational Research*, 66(4), 507-542.

Kim, M. M., Rhoades, G., & Woodard, D. (2003). Sponsored research versus graduating students?: Intervening variables and unanticipated findings in public research universities. *Research in Higher Education,* 44 (1), 51-81.

Leslie, D. W. (2002). Resolving the dispute: teaching is academe's

core value. *The Journal of Higher Education*, 73(1), 49-73.

Mamiseishvili, K. & Rosser, V. J. (2010). International and citizen faculty in the United States: An examination of their productivity at research universities. *Research in Higher Education*, 51(8), 88-107.

Marsh, H. W. & Hattie, J. (2002). The relation between research productivity and teaching effectiveness: Complementary, antagonistic, or independent constructs? *Journal of Higher Education*, 73(5), 603-641.

Milem, J. F., Berger, J. B., & Dey, E. L. (2000). Faculty time allocation. *Journal of Higher Education*. 71(4), 454-475.

Ministry of Education and Human Resources Development (2005). *Brain Korea 21.* Seoul, Korea.

National Science Board. (2010). *Science and engineering indicators*. Washington, D.C.: National Science Foundation.

Paik, I & Park, K. (2007). A study on the effect of the first-step BK21 project on research achievements of universities. *The Journal of Educational Administration*, 25(4), 435-453.

Porter, S. R. & Umbach, P. D. (2001). Analyzing faculty workload data using multilevel modeling. *Research in Higher Education*. 42(2), 171-196.

Schuster, J. H. & Finkelstein, M. J. (2006). *The American faculty.* Baltimore, Maryland: The Johns Hopkins University Press.

Shin, J. C. (2009). Building world class research university: the Brain Korea 21 Project. *Higher Education.* 58(5), 669-688.

Shin, J. C. & Cummings, W. K. (2009). Multilevel analysis of academic publishing across disciplines: research preference, collaboration, and time on research. *Scientometrics,* 85(2), 581-594.

Seong, S., Popper, S. W., Goldman, C. A., Evans, D. K., &

Grammich, C. A. (2008). *Brain Korea 21 Phase II: A New Evaluation Model.* Santa Monica, California: RAND.

Wildavsky, B. (2010). *The Great Brain race: How global universities are reshaping the world*. NJ: Princeton University Press.

Xie, Y. & Shauman, K. A. (1998). Sex differences in research productivity: New evidence about an old puzzle. *American Sociological Review*, 63(6), 847-870.

Appendix. Correlation Analysis

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Korea vs.USA (1)																
% of teachings (2)	-.117															
% of research (3)	.246	-.589														
Female (4)	-.246	.109	-.175													
Foreign-born (5)	-.275	-.038	.051	-.042												
Senior professor (6)	.000	-.148	.048	-.075	-.019											
Age (7)	-.282	-.010	-.110	-.009	.011	.474										
Focus of interest (8)	.239	-.357	.516	-.138	.089	.009	-.174									
Total Hours (9)	.133	-.164	.120	-.034	-.039	-.015	-.087	.111								
Doctoral granting university (10)	-.555	-.156	.035	.133	.181	.032	.186	.058	-.037							
Business-law (11)	.033	.091	-.019	-.062	-.002	-.028	.003	-.030	-.005	-.031						
Life science (12)	.074	-.042	.114	-.046	-.007	.022	-.010	.122	.038	-.026	-.093					
Medicine (13)	-.059	-.166	.024	.124	-.035	-.001	.015	-.015	-.032	.108	-.108	-.107				
Humanities (13)	-.095	.121	-.090	.050	-.005	-.006	-.004	-.025	-.003	-.015	-.155	-.155	-.180			
Research reinforce teaching (14)	.083	-.155	.203	-.082	.009	.056	.003	.255	.146	.001	.015	.036	-.060	.067		
Research quality-promote (15)	-.140	-.045	.039	.051	.039	-.089	-.003	-.001	-.030	.216	-.045	.020	.067	-.007	-.001	
Teaching quality-promote (16)	-.213	.042	-.054	.063	.070	-.053	.052	-.073	-.030	.085	-.018	.005	.031	.046	.013	.557