



Gender differences in performance-based pay: Evidence from a Chinese University



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ABSTRACT

We examined gender differences in performance-based pay in an institute of a top Chinese university, to provide insight into the gender earnings gap. We found that male professors earned more from research and less from teaching than did comparable female professors even though male and female professors showed no statistically significant difference in the total performance-based pay. Given the piece rate nature of bonuses in the institute and one's tendency to invest more time in areas where one has comparative advantages to maximize the total income, the study results lead to the conclusion that male professors displayed comparative advantage in research while female professors exhibited comparative advantage in teaching. The conclusion is corroborated by analyses of time allocation, and number of papers published as first author and as co-author.

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1. Introduction

Though generally on the decline in the past decades, the gender pay gap still prevails. Ichino and Moretti (2009) measured a 20% gender earnings gap among white-collar workers in the United States and a 17% gap in Europe.

While traditional investigations into the gender pay gap tend to focus on gender discrimination (Oh & Lewis, 2011), the latest studies dig into various gender differences as potential causes of the gap. For example, Ichino and Moretti (2009) showed that menstrual cycle-induced absenteeism contributed to at least 14% of the gender earnings gap in Italy. Saygin (2012) revealed that Turkish female high school graduates were more conservative in program and college selection while male graduates were more willing to choose selective colleges and programs that might lead to high-pay jobs, with the risk of having to re-take the college entrance examination and apply again the next year. According to Bertrand, Kamenica, and Pan (2012), a woman is more likely to quit working or earn less than she potentially could if her potential income exceeds her husband's income; in a family where the wife does earn more than the husband, the couple tend to feel less satisfied with the marriage and are more likely to divorce. Research has also demonstrated that women tend to invest less time at work because they shoulder a larger share of housework at home than do men. This is true in both developing and developed countries (Cao & Chai, 2007; Garcia, Molina, & Montuenga, 2009; Medeiros, Osório, & Costa, 2007).

Surprisingly few studies have examined the gender pay gap among professors and none has been conducted in China. Little evidence has been found to suggest that female professors invest less time at work than their male counterparts. A majority of previous studies on the gender difference in at-work activities among professors, such as research and teaching, focus on gender

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differences in research outputs, but not in teaching. For example, Sheehan and Welch (1996) and Bentley (2012) found women less likely than men to publish books, journal articles, reports and conference papers. Ramsden (1994) examined factors correlated with publication productivity and found that women published less than men, but gender had no significant effect after academic rank was controlled for. Similarly, Teodorescu (2000) showed that gender was not significantly associated with the number of publications after controlling for individual-level characteristics.

Economic incentives could influence where professors invest their work time and as a result their output. Professors may get rewarded for publication. For instance, O'Keefe and Wang (2012) found that, among faculty members in the economics department of eight University of California campuses, those who published more earned significantly more than those who published less. The mechanism for rewarding publication might differ: pay raise could be negotiated or be based on a piece rate for each paper published. Heywood, Wei, and Ye (2011) found that an increase in the piece rate paid to faculty in a Chinese university for publishing peer-reviewed papers significantly improved research output, for both male and female professors. The finding provided evidence for the motivating power of monetary rewards to professors.

To the best of the authors' knowledge, professors' allocation of time among teaching, research, grant writing, and service has been investigated by only one study. Link, Swann, and Bozeman (2008) discovered that among science and engineering faculty members at top US research universities, women on average allocated more time to university service and less time to research than did men. They might be assigned less important work and consequently not be able to realize their full potential. However, Link et al. (2008) examined gender differences only in time allocation, but not in the output of each work activity or the total pay.

In this paper, we provide new insight into the gender pay differential by examining gender differences in performance-based pay, measured by the end-of-year bonus in an institute of one of the best universities in China. Most faculty members in Chinese universities are non-tenured. They usually receive extra pay for each credit hour taught and for publications, as a result of the university and institute or department attempt to promote teaching and research. With the basic salary generally low for non-tenure track faculty members, the year-end bonus contributes greatly to their annual income and may even exceed the basic salary for some. Most faculty members in the institute under study are non-tenured and receive year-end bonus for teaching and publications. In this sense, the institute can be viewed as a representative of many universities in China, providing support for the generalizability of the findings of this study.

We aim to achieve two goals with this study. First, we examine whether male and female professors with similar characteristics earned different performance-based pays in total, in research, and in teaching. Second, we investigate the underlying mechanism that might drive gender differences in performance-based pay by looking into professors' at-work time allocation and number of publications. We also make robust analyses, namely analysis of teaching evaluation results and analysis of younger professors only (as younger faculty members are more likely to be affected by the incentive scheme).

This study makes two major contributions. For one thing, it is the first attempt to explore gender differences in performance-based pay from different work activities and gender differences in time allocations by professors in China. In addition, the study provides new evidence for understanding the gender pay gap by identifying differences in male and female professors' comparative advantages. Unlike the fixed basic salary, the year-end bonus in this institute depends predominantly on teaching loads and publications and is essentially piece rate bonus. Consequently, it can reflect a professor's input and comparative advantage.

2. Model, data and methods

2.1. Theoretical framework

In this section, we illustrate why the time allocation between research and teaching can reflect professors' comparative advantages. Assume that all professors have the same work time endowment T for now (we test this hypothesis empirically and the results are presented in Section 3). Furthermore, male professors invest t_m in research and thus $T - t_m$ in teaching, and the time allocations by female professors are t_f and $T - t_f$, respectively. The male and female production functions for research and teaching are (f_m, g_m) and (f_f, g_f) , respectively. Functions f and g are assumed to be increasing and concave. Correspondingly, both $f'_m(t)/g'_m(T-t)$ and $f'_f(t)/g'_f(T-t)$ are decreasing functions of t .

Let p_1 and p_2 be the unit award for research and teaching outputs. Assuming that professors allocate time to maximize total income,¹ rearranging first order conditions results in:

$$f'_m/g'_m = f'_f/g'_f = p_2/p_1 \quad (1)$$

where f'_m , g'_m , f'_f , and g'_f are the first derivatives. Let the optimal time allocations to research by male and female professors be t_m^* and t_f^* , respectively.

¹ Admittedly, professors may have different preferences for research and teaching. As a result, they may maximize not the total income, but rather the utility in accordance with their taste or distaste for each work activity (Lillydahl & Singell, 1993). However, it is difficult to measure people's preferences for different activities, so we make a simplified assumption that people maximize their income by choosing time allocation between different activities. The "comparative advantage" in the present study can be understood as differences in capacity, preference or risk aversion.

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