**The Gender Gap in Academic Biomedical Salaries**

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**Abstract**

**Purpose**

Using secondary data, the authors measured the gender gap in biomedical academic salaries and how it changed as careers developed. They investigated whether this gap was due to percentages tenure-track or to different background characteristics, work gaps or family choices within tracks.

**Method**

Using data on biomedical 1980-2011 PhDs in NSF’s Survey of Doctorate Recipients, the authors calculated gender salary gaps of full-time academics, differentiating between tenure-track academics doing some research and other academics. Also, the authors estimated within-track regressions of logged salaries on gender, time-since-PhD, demographics, education, ability proxies, hours worked, work histories, and gender-specific family status.

**Results**

26% of the gender salary gap was attributable to fewer women in tenure-track jobs. Within tenure-track academia, with controls there was an insignificant gap in starting salaries that widened to 11% at 10 years post-PhD even for people working full-time continuously. The 10-year gap was smaller for childless singles (7%) than for married people (10%-11% with or without children). Women outside the tenure-track started with a salary advantage (14%) but by year 10 had a large salary disadvantage (11-12%) that extended to those who were single and childless.

**Conclusions**

The gender salary gap among biomedical academics can be partially attributed to fewer women in tenure-track positions. Even women without children who had worked full-time continuously had substantial salary disadvantages by 10 years post-PhD. This contrasts with the zero gender salary gaps in physical sciences and suggests a concerning disparity that deserves further research.

The canonical measure of women’s economic progress is the gender gap in earnings. Recent reports in the popular press indicate that women earn 78 cents for every dollar of men’s earnings.1 The economics literature found that median annual earnings of full-time working women in the US were 77%–81% of men’s in 2010, implying a gap of 19% - 23%.2,3,4 This represents a considerable narrowing since the 1970s. However, the gap for college-educated women has not narrowed. While in 1980, the college-educated gap was smaller than for those less educated, in 2010 the gender gaps were approximately equal.4,5 The gender salary gap narrowed by about one third when the analysis controlled for occupations, leaving a gap of about 16% among the full-time college-educated workforce.2 This gap could indicate unequal opportunities for similar men and women, or alternatively different abilities or choices made by men and women.

In this study, we measured gender salary gaps in biomedical academia, using the National Science Foundation’s (NSF) Survey of Doctorate Recipients (SDR), a longitudinal survey of PhDs. Finding significant gaps, we then investigated: 1) whether these salary gaps were due to different likelihoods that men and women were working in non-tenure-track (non-TT) jobs instead of tenure-track/tenured (TT/T) jobs and/or were teaching instead of conducting research; 2) whether the gender salary gap within tracks widened as careers developed; 3) whether the gap within tracks was due to women’s family choices; and 4) whether the gap within tracks was due to different cumulative work time.

**Background**

Social scientists have examined the factors associated with the gender salary gap. In the general labor market, the gap has been shown to increase as age increases until about age 45 and then start narrowing.2,6,7 This suggests that reasons for the gap are related to family formation and the need for mothers both to work fewer hours and to have flexible schedules.2,4,8,9,10 Tradeoffs between career and family have been found specifically to be responsible for pay-gaps of MDs.11

There is also a literature on pay gaps within academia. Most studies combined all fields together despite the fact that both average salaries and gender distribution differ by field. Calculations using the American Association of University Professors’ most recent (2014/15) annual survey identified average gender salary gaps across all fields as 15% for Professors, 7.5% for Associate Professors, and 8.8% for Assistant Professors.12 Other work controlled for field in a regression and found narrowing gender salary gaps through 200413,14 and that white women without children (single or married) earned academic salaries similar to single white men.15 Our own research in 2010 concentrating on STEM fields found that faculty salaries within academic ranks by scientific fields did not differ by gender in most cases16, but that life sciences were an exception. That comparison was limited because it did not control for possibly confounding factors including demographics, hours, experience and subfields.

In academia, there is also limited evidence that the gender salary gap grows as careers develop.14 Similarly, the gap increases with higher academic ranks within the broad fields of life science, physical science and engineering.17

**Method**

We measured the gender gap in salaries of biomedical PhDs s who received PhDs 1980 through 2011 and work full-time in medical schools or four-year universities and colleges. The longitudinal data set was created using SAS version 9.2. All estimates were performed using STATA 13.

**Data**

We used the biomedical PhDs in the NSF’s Survey of Doctorate Recipients (SDR), a longitudinal panel survey. We included only salary observations from the survey waves 1995 through 2013 because work hours information became available in 1995. We used data from earlier survey waves (1981-1993) to identify scientists’ work histories. Using a range of survey years increased the sample size and allowed us to differentiate between cohort salary differences and salary differences that occur as people age and accumulate experience. We excluded joint MD/PhDs because their salaries are partially determined by the clinical nature of medical work. We dropped years when people were employed as postdocs since their remuneration included credentials and training in addition to salary.

The SDR surveys are generally administered every other year, but there was one three-year gap (between 2003 and 2006). New PhDs are added each survey year. All PhDs are re-interviewed each survey wave until they turn 75 or are dropped by NSF to balance the survey. Salaries are defined as basic annual salaries at the person’s principal job. We adjusted salaries for inflation by converting them to 2013 dollars using the Consumer Price Index. We included only those working full time, defined as at least 40 hours or more per week and 40 weeks or more per year. We excluded those earning less than the minimum wage. To ensure that salary gap estimates were not dominated by a few individuals with particularly large incomes, we top-coded salaries at the 99.5th percentile, a method standard in labor economics.[[1]](#endnote-1)

**Variables and models estimated**

We first estimated descriptive statistics on salaries and the gender gap, defined as 1 minus the ratio of female salaries to male salaries. We report these measures for median salaries, average salaries and the natural log of salaries. Median salaries better represent typical people’s salaries while average salaries are heavily influenced by observations with extremely high salaries. Logged salary also reduces the effect of extremely large salaries.

To model what affects salaries, we used regression analysis of the natural log of salary, which economists have shown to be more accurate than regressions of unlogged salary. With a log specification, coefficients on a female dummy (indicator) variable can be interpreted as the percentage difference in salary between females and males (i.e. the gender gap). Since we have several observations on each person, standard errors were computed clustering on the individual.

We ran a regression of log salary on female and a dummy variable for being in a tenure-track or tenured position engaged in research at least secondarily (TT/T), as opposed to being in a non-tenure track position (non-TT) and/or teaching . We compared the female coefficient in this specification to the coefficient from a simple regression on female to isolate the gender gap due to academic sector.

We then studied the gender gap within the TT/T and non-TT sectors by running separate series of regressions for each sector because they had different salary structures. Regression Model 1 included no control variables. Model 2 included dummy variables for biomedical sub-field, PhD year, race, whether the person was foreign born with temporary visa status at PhD, age at PhD and years since PhD receipt, the latter a proxy for the career stage of the person. Age at PhD was allowed a nonlinear relationship by including a quadratic term[[2]](#endnote-2). Years since PhD receipt was allowed a more flexible nonlinear relationship by including quadratic, cubic and quartic terms.

Model 3 added more control variables to capture ability proxies and institutional type (which themselves might be correlated with ability or preferences of the scientist). Ability proxies included whether the person received any government support (e.g. federal research grants), the National Research Council (NRC) ranking of the PhD department, [[3]](#endnote-3) the Carnegie rating of the PhD department (R1 university, R2 university, or other), and whether their graduate education was funded primarily by grants/scholarships. Unfortunately, the SDR includes only sporadic information on publications and no information on grants awarded. Institutional variables included dummies for medical schools, Research 1 universities, other PhD-granting non-medical schools, and non-PhD granting institutions. Finally, for the non-TT, we added two variables for whether the person only taught, one for those teaching in medical schools and one for those teaching in other kinds of institutions.

Models 4-8 allowed men and women to have different coefficients on years-since-PhD and its square[[4]](#endnote-4) in order to determine whether the gender gap changed as people aged. In other work,19 we showed that practically all biomedical PhDs who enter TT/T academia started in postdocs, the median duration of which was four years. Therefore, we report results on TT/T gender salary gaps at 4 years post-PhD to represent starting salaries as well as at 10 years post-PhD. Non-TT salary gaps were shown at 4 years and 10 years post-PhD but also at 1-year, since a substantial proportion of non-TT academics skipped postdocs. In these predictions, we assumed the median age at PhD of 30 years. Model 4 includes no control variables except gender-specific years-since-PhD variables. Model 5 added all control variables from previous models, also allowing age and age-squared to have a gender-specific slope.

The economics literature on high-skilled labor markets has shown that gender differences widen as women cut down hours or leave the labor force completely for periods of time. In order to determine whether cumulative time spent working was responsible for the gender differences in salary growth, in Model 6 we added controls for weekly work hours (quadratic), annual weeks worked (even though all people were full-time and full-year), and a dummy if the person was ever observed not working full-time full-year in past surveys or the subsequent survey. In Model 7, we took this one step further by excluding anyone with these work-gaps from the analysis, ensuring that only biomedical scientists who are committed to their career were included.

We can know only whether these scientists were working full-time in a “typical week.” As such, our work-gaps measure is likely to miss short gaps such as maternity leaves. Moreover, family care responsibilities may affect productivity without affecting typical work hours. Accordingly, in Model 8, we added gender-specific family variables to Model 7 (which is limited to those with no full-time gaps) and report gender salary gaps for specific gender-family comparisons.

We caution that while differences between salaries of men and women in similar family situations may capture the causal impact of family on each, they may instead capture differences in the kinds of people who tend to be in each family situation, something economists call “selection.” For instance, married men with children have been shown to have higher salaries than single childless men. Studies able to disentangle the causal effects of marriage and children on men’s productivity from selection have found evidence of both.20,21,22,23,24,25,26,27 In contrast, studies have found that children causally *lower* women’s salaries because women forgo higher salaries for greater scheduling flexibility, fewer work-hours or more absenteeism.2,8,9,27,28 These effects were found at all education levels.7,11 Thus, model 8 must be interpreted keeping in mind that effects of family may represent either causal effects or selection.

**Results**

The gender gap in 1985-2013 inflation-adjusted median salaries among academic biomedical PhDs was 11.8% -- considerably less than the 19%-23% in the general college-educated population. The gender gap based on average salaries was 15.2%. Based on logged salaries, it was 13.4%, falling between estimates of median and average salaries. We concentrate here on measures based on logged salaries.

Some of this gender difference was due to the double facts that salaries in the TT/T sector were 20% higher than in the non-TT sector controlling for years-from PhD, and that a lower percentage of biomedical academic women than men were employed in TT/T jobs (50.8% v. 64.6%). By comparing the coefficients on female in a regression of logged salary on female and in a regression of logged salary on female *and* a TT/T dummy, we calculated that 3.5 percentage points (ppt.) or 26% of the total gender salary gap can be attributed to the person’s academic sector. In this study, we do not focus on the assignment to academic sector, but rather on salary gender differences *within* academic sector, differences that we might expect to disappear when controlling for ability, education, and cumulative time spent working.

Table 1 gives separate descriptive statistics about salaries of TT/T and non-TT scientists. Salaries were significantly higher in the TT/T sector than in the non-TT sector. Both men and women working in medical schools earn more than those not in medical schools. Table 1 demonstrates that whichever measure is used (median, average or logs), substantial gender salary gaps existed within each sector. There were greater gender gaps in the TT/T sector than in the non-TT sector (12.0 in TT/T jobs v. 8.4 in non-TT using logged salaries). Within the TT/T sector, the gender gap was larger in medical schools than other institutions. In the non-TT sector, the gender salary gap was larger in medical schools for medians and logs but not for averages.

Women and men differed in characteristics even within sector, which may have been responsible for the gender gaps. The average values of the covariates for men and women in each academic sector are given in Table 2. In both sectors, women worked significantly fewer weekly hours than men even among this full-time sample; women were more likely than men to have experienced gaps in full-time work; men were more likely to be temporary residents, to be married, and to have children. Genders differed in their distributions across fields as well. For those in TT/T positions only, women were older at PhD, were more likely to be at non-PhD granting institutions, and worked fewer annual weeks. For those in non-TT positions only, women had later PhDs and were more likely to have been funded by scholarships or grants during graduate school. These gender differences in covariates may explain a substantial part of the gender gap.

**Gender salary difference in Tenure Track or Tenured positions**

Table 3 gives the coefficient on female in regressions of logged salaries on covariates. This coefficient represents the percentage difference between male and female salaries (holding covariates constant). The full results of this and all regressions are included in an on-line supplement.

We first considered tenure-track/tenured (TT/T) academia. Model 1 gives the gender gap with no controls and show the highly significant gender gap in each sector. Model 2 included controls for demographics, field and years from PhD data. Adding these covariates decreased the gender gap in TT/T by about 1 ppt. Model 3 further added controls for ability proxies and institutional characteristics and changed gender differences by only 0.8 ppt.

Models 4-8 added interactions terms between female and years-since-PhD and between gender and age, and some of these results are graphed in Figure 1. Since gender now affects salary via several coefficients, the results in Table 3 are predicted gender salary gaps at specific career points. Without any covariates (Model 4), gender differences in TT/T academia were significant and numerically similar at the two career stages (about 12%). Model 4’s almost parallel pattern of log salaries of men and women as careers progressed is shown in Figure 1A.

Model 5 added all explanatory variables from Model 3. This lowered the estimated gender gap in starting salaries (4 yr. point) to 6.3% (p=.101); the gender gap at the 10-year point remained high and significant (11.3%). Thus, the TT/T gender salary gap widened as people aged.

Model 6 further accounted for work-time and work-history. Full regression results indicate that in the TT/T sector, salary increased with weekly hours worked at faster rate suggesting that the more hours one worked, the *more* one got paid per hour. Annual weeks worked also had a strong positive effect. However, the coefficient of the full-time gaps variable was not distinguishable from zero, with a sign opposite to expectations (+.013, p=.67). Adding these variables to the log salary regression did not change the qualitative results: women’s and men’s salaries in TT/T biomedical academia started at statistically similar levels but rose to a significant 10.6% gap by 10 years post-PhD.

Re-estimating this specification excluding anyone with past career gaps from the analysis (Model 7) had no qualitative impact on the salary gap, unsurprising in light of the fact that full-time gaps were insignificant in predicting gender salary gaps. Figure 1B shows predicted log salaries from Model 7 (with covariates held constant at their means), with salary gaps widening as careers develop.

In the final model (Model 8), gender-specific family status variables were added. Model 8 results should be interpreted keeping in mind that among TT/T academics with no career gaps, 69% of men and 57% of women were married with children (Table 2). The within-gender comparisons at the bottom of Table 3 indicate that the combination of marriage and children was associated with 9.4% higher salaries for academic men – similar to studies of the general labor market. Marriage with children was also associated with 5.6% higher salaries for these academic women with no full-time gaps, although insignificantly so (p=.17), a very different result than found in the general labor market.

The gender comparisons of Model 8 indicate that even comparing men and women of specific family types – married with children, with no spouse or children (10% of men, 19% of women), or married without children[[5]](#endnote-5) (20-21% of either gender)– there were no significant gender gaps in year 4 salaries but significant gaps in year 10. Thus, similar to when all family types were combined, TT/T women were paid similarly to men when they started their jobs but their salary gap increased as their careers developed. The gender salary gaps at year 10 were largest for those married with children (11.3%, p<.001) and smallest and least significant for those with neither children nor spouse (7.4%, p=.09).

**Gender salary differences in non-tenure track academia**

In non-TT academia, there was a smaller average salary gap of approximately 8% both without controls and with basic demographic, background and ability controls (Table 3 Models 1-3). Table 3 Models 4 – 8 give gender salary gaps not only at years 4 and 10, but also at one year after the PhD since a substantial proportion of non-TT academia skip postdocs.

Allowing non-TT women’s and men’s salaries to change over time at different rates reveals a very different pattern than in TT/T academia, a pattern that is repeated in Model 4 through Model 7. The predicted salary gap in Models 4 and 7 is graphed in Figures 1C and 1D. The pattern is also similar comparing single women and men, married childless women and men, and married mothers and fathers (Model 8). In all of these models, predicted year 1 starting salaries for those who do not start in a postdoc were significantly *higher* for women than for men, indicating that women who immediately entered non-TT academia post-PhD were paid more than similar men. Women’s salary advantage dropped to insignificance by year 4. By year 10, men had the clear salary advantage of approximately 12%, similar to the year 10 male advantage in the TT/T sector.

The two sectors did not differ in the likelihood of full-time work gaps. However, in the non-TT sector, a person with work gaps work had 5.4% lower salaries *ceteris paribus*, while in the TT/T sector, work gaps had no effect. Also, surprisingly, non-tenure track women were less likely than TT/T women to have children or be married (Table 2). Marriage and children increased salaries for non-TT men, similar to TT/T academia (both near 9%). Marriage and children also increased salaries for non-TT women by a significant 8.1 ppt, much more than seen among TT/T women.

**Discussion**

This study found a gender salary gap in biomedical academia. Using estimates based on logged salaries, we found that women were paid 13% less than men. We investigated the correlates of this gap.

About 26% of this gap was attributable to whether or not women start in tenure track jobs. One limitation of this research is that we do not model assignment to tenure-track/tenured (TT/T) jobs, which could be due to bias, to personal choices, or to inherent ability.

Within TT/T jobs, the estimated gender salary gap ranged from 10 to 12% depending on whether or not the models controlled for background and ability proxies. The TT/T gender gap was found to increase as careers developed. Even limiting our analysis to TT/T academics working full-time continuously and controlling for hours and weeks worked as well as other covariates, TT/T academic women started their academic careers with no significant pay difference from men but by ten years post-PhD were earning 11% less than men.

Family choices affected the salary gap. The salary gap at 10 years post-PhD was largest between married fathers and mothers (the majority of the sample). However, even among TT/T academics married without children, the gender gap at 10 years was substantial (10%). The gender gap between single childless men and women was smaller at 10 years post-PhD (7.5% p=.09). Family is often the reason for different gender work choices, so single childless people may be the most indicative of the gender salary gap in the absence of family concerns. However, the economics literature suggests that there is positive selection into marriage, consistent with the positive effect of marriage found here. As a result, the gender salary gap between those married but childless may most accurately represent the gap in the absence of family concerns.

Note that by only looking at salaries while in T/TT jobs, we underestimate salary gaps that would occur if we studied salary paths of all those who *started* on the tenure-track, because women in life sciences are more likely to be denied tenure and move to non-TT jobs.18

As a comparison to biomedicine, we have estimated the same regressions for TT/T academics in the physical sciences. Women in the physical sciences had smaller and less significant gender salary gaps in all Models than those in biomedicine. The 10-year gender salary gaps were less than half those in biomedicine in Models 1-7. Dividing by family type, the 10-year gender salary gap among singles with no children and no work gaps (Model 8) was small and insignificant in physical science (3.2%); among those married without children, it was less than 1%. Thus, for TT/T women without children in physical science, there was no gender salary gap, very different from women in biomedicine. However, those married with children in physical science were similarly large at both the 4-year and 10-year career points, more than 11%.

We also estimated Models 1-8 for *non-TT* academics in the physical sciences. There was no trend of increasing gender salary gaps as careers develop. For those with no full-time gaps, there were no significant gender salary gaps on average or for any family types at the 1, 4 or 10 year stages, with point estimates being both negative (women earned less) and positive (women earned more). This contrasts sharply with biomedical non-TT.

The gender salary gaps in biomedicine may indicate greater gender bias – implicit or explicit. However, there are other possibilities that this research does not address. A major limitation of our study is that we do not have the data to investigate whether the salary differences were due to a lower tendency of women to apply for and receive grants as PIs, identified by some researchers.29 Similarly, we do not have data to investigate whether the gap is due to fewer publications of women, a tendency that others have found to be true in academia as a whole (see review16). Another important limitation is that we do not include MD’s because we have no way to attribute salaries to clinical work v. research/teaching.

The difference between biomedicine and physical sciences, however, suggests that a concerning gender salary disparity in biomedical academia that deserves further research.

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*Other Disclosures:* **Data Access:** The NSF Survey of Doctorate Recipients used in this study contain personal information from individuals who have submitted applications. The information is therefore protected by the Privacy Act of 1974 as amended (5 U.S.C. 552a) and the National Science Foundation Act of 1950 as amended (42 U.S.C. 1873(i). More complete information can be found in the NSF/SRS Restricted-Use Data Procedures Guide available at [www.nsf.gov/statistics/license/forms/pdf/srs\_license\_guide\_august\_2008.pdf](http://www.nsf.gov/statistics/license/forms/pdf/srs_license_guide_august_2008.pdf) and the NSF Data and Tools Web site at [www.nsf.gov/statistics/database.cfm](http://www.nsf.gov/statistics/database.cfm).

*Ethical Approval:* Not applicable. Because only de-identified secondary data was used, no IRB review was required. All data analysis was performed in a secure environment by authorized staff.

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**Table 1**

**Gender Salary Differences for Full-Time Biomedical PhDs in Academic Jobs (1995-2013) within 20 years of PhD , by TT/nonTT status and type of job. Data from the 1995-2014 waves of the NSF Survey of Doctorate Recipients.**

|  |  |  |
| --- | --- | --- |
|  | **Tenure track/tenured** | **Non-Tenure track** |
|  | **Male**  | **Female** | **Gender Gap (as % of male salary)** | **Male**  | **Female** | **Gender Gap (as % of male salary)** |
|  | **Medians** |
| All  | $97,380 | $89,740 | -7.84% | $70,000 | $66,373 | -5.18% |
| Not in medical schools | $86,560 | $80,000 | -7.58% | $67,118 | $64,920 | -3.28% |
| In medical schools | $105,232 | $96,221 | -8.56% | $73,812 | $69,551 | -5.77% |
| Teaching onlyc | na | na | na | $70,330 | $70,000 | -0.47% |
|  | **Averages** |
| All  | $110,032 | $95,488 | -13.22% | $89,528 | $78,508 | -12.31% |
| Not in medical schools | $93,746 | $84,437 | -9.93% | $87,615 | $76,610 | -12.56% |
| In medical schools | $121,085 | $104,105 | -14.02% | $91,574 | $80,858 | -11.70% |
| Teaching onlyc | na | na | na | $101,206 | $84,079 | -16.92% |
|  | **Logs (natural)** |
| All  | 11.524 | 11.404 | -11.98% | 11.254 | 11.170 | 8.37% |
| Not in medical schools | 11.385 | 11.284 | -10.10% | 11.224 | 11.145 | 7.86% |
| In medical schools | 11.619 | 11.498 | -12.03% | 11.286 | 11.201 | 8.49% |
| Teaching onlyc | na | na | na | 11.327 | 11.217 | 11.03% |
|  |  |  |  |  |  |  |

cthose teaching only categorized with non-tenure track

Abbreviations: TT indicates tenure-track

**Table 2**

**Gender Differences in Control Variables Used to Explain Salary Differences. . Data from the 1995-2014 waves of the NSF Survey of Doctorate Recipients.**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Academia TT** |  | **Academia non-TT** |  |
|  | **Male Average** | **Female Average** |  | **Male Average** | **Female Average** |  |
| **Time-varying explanatory variables** |  |  |  |  |  |  |
| Years since PhD | 11.92 | 11.73 |  | 9.78 | 9.71 |  |
| Medical school dummy | 59.57% | 56.19% |  | 48.31%\* | 44.67%\* |  |
| Research I employer | 20.52% | 19.45% |  | 14.20% | 12.11% |  |
| Other doctorate-granting employers | 7.40% | 7.54% |  | 6.20% | 7.75% |  |
| Non-PhD-granting academic instns.  | 12.51%\*\*\* | 16.83%\*\*\* |  | 15.54% | 15.11% |  |
| Receiving govt. support | 75.21% | 71.34% |  | 58.84% | 55.78% |  |
| Teach only | na | na |  | 40.85% | 42.20% |  |
| Current temporary visa | 1.10%\*\* | 0.97%\*\* |  | 4.28%\*\* | 2.62%\*\* |  |
| Weekly hours | 55.39\*\* | 54.27\*\* |  | 53.488\*\*\* | 50.618\*\*\* |  |
| Annual weeks worked | 50.07\*\* | 49.59\*\* |  | 50.982 | 50.836 |  |
| Dummy for gaps in past or in next survey | 21.95%\*\*\* | 32.86%\*\*\* |  | 25.48%\*\*\* | 31.09%\*\*\* |  |
| **Background variables - Not time varying (average over people)** |   |   |  |   |   |  |
| Asian dummy | 16.91% | 18.14% |  | 24.16% | 25.94% |  |
| % Underrepresented minority dummy  | 6.20% | 8.50% |  | 7.97% | 9.51% |  |
| Temporary visa at PhD dummy | 13.07% | 14.45% |  | 19.51% | 18.87% |  |
| Age at PhD | 30.6089\*\*\* | 31.5161\*\*\* |  | 31.72 | 32.93 |  |
| PhD year | 1992.87 | 1993.6 |  | 1996.64\*\*\* | 1998.03\*\*\* |  |
| NRC ranking of PhD institutions | 3.419 | 3.35423 |  | 3.22 | 3.21 |  |
| PhD from R1 university | 73.32% | 73.32% |  | 67.20% | 67.17% |  |
| PhD from R2 university | 10.36% | 8.51% |  | 8.27% | 9.56% |  |
| PhD primary funding scholarship/grant | 23.07% | 22.13% |  | 27.97%\*\* | 32.39%\*\* |  |
| PhD field dummies: |   |   |  |   |   |  |
| biotech | 0.48% | 0.00% |  | 0.61% | 0.26% |  |
| biostatistics | 2.20% | 1.46% |  | 1.33% | 2.15% |  |
| developmental/embiology | 0.93% | 1.35% |  | 1.10% | 1.20% |  |
| endocrinology | 0.76% | 1.02% |  | 0.32% | 0.70% |  |
| immunology | 4.13% | 5.98% |  | 5.57% | 5.79% |  |
| neurology | 9.02% | 9.39% |  | 12.47%\*\*\* | 9.02%\*\*\* |  |
| parasitology | 0.17% | 0.33% |  | 0.50% | 0.46% |  |
| toxicology | 1.23% | 1.06% |  | 1.82% | 1.74% |  |
| biochemistry and biophysics | 20.15% | 18.13% |  | 17.74% | 16.40% |  |
| biology, general  | 5.73% | 4.26% |  | 4.72% | 4.71% |  |
| cell and molecular bio | 16.29% | 18.51% |  | 17.66% | 16.40% |  |
| genetics | 4.62% | 5.73% |  | 3.64%\*\*\* | 6.28%\*\*\* |  |
| microbiology | 10.54%\*\* | 6.37%\*\* |  | 7.00%\*\* | 9.65%\*\* |  |
| nutritional sciences  | 2.38%\*\*\* | 7.27%\*\*\* |  | 1.76%\*\*\* | 4.57%\*\*\* |  |
| pharmacology | 6.06%\* | 3.75%\* |  | 6.05% | 5.00% |  |
| physiology | 7.95%\*\* | 4.71%\*\* |  | 8.03% | 8.89% |  |
| other biological sciences | 7.38%\*\* | 10.69%\*\* |  | 9.66%\* | 7.49%\* |  |
| Family variables (Time-varying) |   |   |  |   |   |  |
| Married dummy (all) | 88.69%\*\*\* | 78.24%\*\*\* |  | 83.64%\*\*\* | 73.92%\*\*\* |  |
| Children dummy (all) | 69.96%\*\*\* | 60.31%\*\*\* |  | 62.21%\*\*\* | 48.71%\*\*\* |  |
| Married dummy (subset with no past gaps) | 89.03%\*\*\* | 78.24%\*\*\* |  | 84.83%\*\*\* | 72.82%\*\*\* |  |
| Children dummy (subset with no past gaps) | 69.87%\*\*\* | 60.31%\*\*\* |  | 61.87%\*\*\* | 46.39%\*\*\* |  |
| Single no children (subset with no past gaps) | 10.08%\*\*\* | 18.58%\*\*\* |  | 13.73%\*\*\* | 24.74%\*\*\* |  |
| Single w. children (subset with no past gaps) | 0.89%\*\*\* | 3.18%\*\*\* |  | 1.43%\*\* | 2.44%\*\* |  |
| Married no children (subset with no past gaps) | 20.05% | 21.11% |  | 24.40%\*\*\* | 28.88%\*\*\* |  |
| Married w. children (subset with no past gaps) | 68.98%\*\*\* | 57.13%\*\*\* |  | 60.43%\*\*\* | 43.95%\*\*\* |  |
|  |  |  |  |  |  |

Abbreviations: TT indicates tenure-track; NRC indicates National Research Council.

Gender difference significance \*\*\*p<.01 \*\*p<.05 \*p<.10

**Table 3: Male - Female Salary Differences (Estimated by Regression of log Salary). Data from the 1995-2014 waves of the NSF Survey of Doctorate Recipients.**

|  |  |  |
| --- | --- | --- |
| Model # | **Academic TT** | **Academic nonTT** |
| 1 | No controls | -11.98%\*\*\* | -8.37%\*\*\* |
| 2 | Fields, Yrs since PhD (quartic), age at PhD (quadratic), other controls1 | -10.89%\*\*\* | -7.95%\*\*\* |
| 3 | Model 2 + NRC ranking, Carnegie ranking, funding in grad school | -10.06%\*\*\* | -7.65%\*\*\* |
| **Adding Gender-Specific Returns to Time since PhD** |
|  |  | **Academia TT** | **Academia non-TT** |
|  |  | **year 4** | **year 10** | **year 1** | **year 4** | **year 10** |
| 4 | Female, female\*Yrs since PhD(quadratic) | -12.21%\*\*\* | -12.10%\*\*\* | 13.74%\*\*\* | 2.33% | -12.45%\*\*\* |
| 5 | Model 3 + female\*Yrs since PhD (quadratic), female\*age-at-PhD | -6.28% | -11.25%\*\*\* | 14.34%\*\*\* | 2.03% | -13.76%\*\*\* |
| 6 | Model 5 + hrs/wk (quadratic),wks/yr, past gaps FT work | -4.81% | -10.62%\*\*\* | 15.59%\*\*\* | 3.85%\* | -11.49%\*\*\* |
| 7 | Model 6 variables, subset of those without past gap in FT work | -2.93% | -11.32%\*\*\* | 16.35%\*\*\* | 3.69% | -12.20%\*\*\* |
| 8 | Model 7 (no gaps) + gender-specific family variables |  |  |  |  |   |
|  | single childless female v. single childless male | 0.84% | -7.45%\* | 16.68%\*\*\* | 4.56% | -10.69%\*\* |
|  | married female w. child v. married male w. child | -2.96% | -11.25%\*\*\* | 15.75%\*\*\* | 3.63% | -11.61%\*\*\* |
|  | married childless female v. married childless male | -1.64% | -9.94%\*\*\* | 18.08%\*\*\* | 5.96%\* | -9.29%\*\* |
|  | WITHIN sex comparison: married w.child female v. single childless fem. | 5.55% | 8.11%\*\* |
|  | WITHIN sec comparison: married w. child male v. single childless male | 9.35%\*\*\* | 9.03%\*\*\* |

Abbreviations: TT indicates tenure-track; NRC, National Research Council.

1other controls are dummies for fields, race, PhD year, visa status at PhD

Gender difference significance \*\*\*p<.01 \*\*p<.05 \*p<.10

**Figure 1**

 **Predicted Salaries versus Years f rom PhD by Gender and Tenure-Track-with-Research status, calculated from Model 4 (No Controls) and Model 7 (only those with no full-time gaps, all controls except family)**

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1. Specifically, we cut out those earning less than $8,240 a year, which corresponds to people who work 40 hours per week and 40 years per year earning the 2008 minimum wage. This cuts out about .005 of the sample. We topcode (or windsorize) people earning more than $526,159 per year in 2008 dollars, which is the .995 percentile. [↑](#endnote-ref-1)
2. Higher powers for age at PhD were never significant. [↑](#endnote-ref-2)
3. Details on how we created a consistent measures on NRC franking are in the supplementary material. [↑](#endnote-ref-3)
4. Separate gender coefficients for the cubic and quartic terms of years from PhD were never significant. [↑](#endnote-ref-4)
5. We do not compare singles with children because the sample is small too small for accuracy (see Table 2). [↑](#endnote-ref-5)