The gender earnings gap for physicians and its increase over time*

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Male physicians outearn women by 13% at the outset of their careers and by 28% eight years later. Conflicting evidence on the existence of a wage gap in medicine stems from the earnings measure used: hourly earnings versus yearly earnings controlling for hours worked.

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1 Background

Recent articles in influential medical journals have reported conflicting evidence on the important policy issue of whether the gender wage gap has disappeared in medicine. Further, it is unknown how gender earnings trajectories change over time.

An influential paper by Baker (1996) claimed that the hourly earnings of young female physicians (with 2-5 years of experience and of at most 40 years of age) had caught up with those of their male counterparts by 1990, suggesting the end of the wage gap. He conjectured that this newfound equality in his national sample of physicians could be due to favorable changes in the environment, such as reduced discrimination towards female doctors or the increased demand for them.

But two follow-up studies reported contradictory results. McMurray et al. (2000) found that young female physicians in 1995 still earned significantly less than their male counterparts. And Ash et al. (2004), in a survey of faculty members, found that the cohort of young and mid-career doctors in 1990 showed a wage gap in 1995.

We contribute to this important debate by using a novel comprehensive multi-year survey of physicians between 1997 and 2005 to document: (i) a gender pay gap for young physicians of 13% overall and of 8-12% across most major specialties, as well as a gap of 23% among all doctors, and (ii) the more than doubling of the wage gap to 28% as young physicians age between 1997-2005. Further, we address how the conflicting evidence on equality stems from the choice of the earnings measure.

2 Material and Methods

We use data from the four rounds of the Community Tracking Study Physician Survey (1997, 1998, 2001, and 2005). This survey, sponsored by the Robert Wood Johnson Foundation, was conducted via telephone by the Center for Studying Health System Change. Physicians originated from 51 randomly selected metropolitan and nine non-metropolitan areas. Physicians could not be federal employees, fellows, or residents and must have provided patient care for more than 20 hours per week. The center conducted approximately 12,000 interviews each round, except in 2005 when it did 6,000. The response rates were 65.4% in 1997, 60.9% in 1999, 58.6% in 2001, and 52.4% in 2005.

The sample design used stratification, clustering and oversampling, requiring analysis in Sudaan 10 to address the complex design, as recommended in the survey's technical appendix.

The survey covered physicians' earnings, hours and weeks worked, demographics, practice setting, specialty, and geographic location. Practice settings were coded as solo practice, group practice partial owner, group practice employee, HMO employee, hospital employee, free standing clinic employee, medical school employee, government employee, or other. Specialties were grouped into Family Practice, Internal Medicine, Pediatrics, Psychiatry, General Surgery, Ophthalmology, Orthopedic Surgery, Cardiology, Obstetrics/Gynecology, Emergency Medicine, Dermatology and Other.

We excluded physicians who worked less than an average of 20 hours per week in the survey year, who worked fewer than 26 weeks, who earned less than $10 per hour, or who resided in but did not practice in one of the 60 sites covered in the survey.

We used OLS to estimate the effect of gender on earnings, regressing the natural logarithm of yearly earnings on a binary (1-0) gender variable, coded one for male. We further adjusted this difference by several factors, such as yearly hours worked, specialty, practice setting, etc., as described below. The coefficient on the binary gender variable is a lower bound on the estimate of the percent premium. The true effect will be larger for two reasons. First, the functional semilog form underestimates the wage premium (Halvorsen & Palmquist, 1980; Kennedy, 1981).[1] Second, earnings are top coded at $400,000 across all survey years. Though, across all specifications, at most 9% of the sample exhibits top coding, at least 90% of these observations are from men.[2,3]

3 Results and Discussion

Summary statistics for all physicians and young physicians. Table 1 documents that yearly earnings are approximately 49% higher for male physicians. Women tend to work in Pediatrics, Psychiatry, and Obstetrics/Gynecology, tend to be employees, and are less likely to be part-owners in a group practice. They are also almost five years younger and five years less experienced than men. Among young physicians, yearly earnings are approximately 39% higher for young men.

The 23% adjusted earnings gap for all physicians. Table 2 starts by documenting that, between 1997-2005, the unadjusted gap is 40% (column 1). This estimate is lower than the 49% mentioned above since our specification underestimates the wage gap, as noted in the Material and Methods section. Adjusting for yearly hours worked, shrinks the gap to 33% (column 2). Thus, the gap is partially explained by men working about 400 more hours per year than women. Adjusting for the survey year leaves the gap unchanged (column 3). Further adjusting for specialty lowers the gap to 26% (column 4). Hence, within a given year, for men and women that work the same amount and in the same specialty, men still outearn women by 26%. Adjusting for practice setting, reduces the gap to 24% (column 5). Further adjusting for

[1] Adjustments to obtain the actual estimate and its standard error would require sample bootstrapping taking into account the complex design, which exceeds Sudaan's capabilities.

[2] We could not conduct quantile regression in Sudaan to assess differences in median yearly earnings as this also exceeds Sudaan's capabilities.

[3] Non-response by high earners, who tend to be disproportionately male, might also bias the male premium downwards. The survey weights, however, adjust for the characteristics on non-responding physicians (which will be correlated with earnings) and therefore help mitigate this bias.

a broad set of variables, including the area where physicians practice, their age, experience and other characteristics, leaves our estimate unchanged at a stable 23% (columns 6-8).

The 13% adjusted earnings gap for young physicians overall and within specialty. Between 1997-2005, even young male physicians (with 2-5 years of experience and of at most 40 years of age) earned 13% more than their female counterparts (Table 2, column 9), consistent with McMurray et al. (2000) and Ash et al. (2004) but contradicting Baker's (1996) finding that young women had attained earnings equality by 1990.

The gap varies by major specialty: 10% in Family and General Practice, 12% in Internal Medicine and 8% in Pediatrics. In Obstetrics and Gynecology, however, there is no wage gap (Table 2, columns 10-13); Reyes (2007), using a specification similar to ours, also found this result. This could be due to the higher demand for female physicians relative to male physicians in this specialty.

The wage gap more than doubles initially but stabilizes thereafter. Table 3 shows that young male physicians, aged between 30-37 years in 1997, outearned their female counterparts by 13%, but this differential increased to 28% during the ensuing eight years as the cohort matured to 38-45 years (columns 1 and 2). We found, however, no such increase eight years later for older cohorts of doctors: the 23-26% gap for the cohorts aged 38-45 and 46-53 in 1997 remains unchanged over the ensuing eight years (columns 3 and 4).

The earnings measure role in the conflicting evidence for the earnings gap. The reason Baker (1996) found wage equality for young physicians, in contrast to ours and other studies, is that Baker analyzes earnings per hour instead of total earnings (yearly pay) holding constant hours worked. Earnings per hour leads to apparent gender equality in medicine because (i) pay per hour is not constant, but rather decreases with hours worked, and (ii) a larger share of women than men work fewer hours.

Consider a simple example. Suppose a sample contains men and women who choose to work either 1,500 or 3,500 hours per year (about 29 and 67 hours per week, respectively). Men always outearn women: if they work 1,500 hours they earn \$70 per hour (versus \$60 for women) and if they work 3,500 hours they earn \$50 per hour (versus \$40 for women). Suppose 25% of men work 1,500 hours and 75% of men work 3,500 hours: men's average pay per hour is \$55. In contrast, a larger share of women work fewer hours: 75% of women work 1,500 hours and 25% work 3,500 hours. Women's average pay per hour is also \$55.[4] Hence, though women always earn less per hour than men, the higher share of women than men working fewer hours inflates women's average hourly earnings, matching those of men. But, if we consider total earnings, holding constant hours worked, at either 1,500 or 3,500, the pay gap reappears, as men outearn women in both categories of hours.

Indeed, Figure 1 documents that between 1997-2005, (i) young physicians' pay declined with hours worked, and (ii) most women worked 20-60 hours per week whereas most men worked

[4] We obtain the average hourly earnings for men by calculating $.25 * 70 + .75 * 50 = 55$ and for women by calculating $.75 * 60 + .25 * 40 = 55$.

40-80 hours per week. Thus, when we estimated the gap in hourly earnings, controlling for the several factors in our analysis (except hours worked), women's hourly pay matched men's, consistent with Baker (1996). However, when we estimated the gap in total earnings (yearly pay) holding constant hours worked and other factors, women's yearly pay lagged men's. Baker (1996) thus reached the conclusion of earnings equality because he analyzed the gap in hourly earnings in a sample that had these two characteristics – declining pay per hour and a larger share of women than men working fewer hours – resulting, perhaps misleadingly, in earnings equality (see also Bashaw & Heywood (2001)).

Mechanisms. Several mechanisms might explain why women's earnings lag men's and why this differential worsens with time, even when they work the same hours, choose the same specialty, etc. For example, caring for dependents may lead women, early on and throughout their careers, to choose lower-paying activities in exchange for more flexible schedules whereas men may pursue increasingly higher-paying activities. Or, patient demand for female doctors may be relatively lower across most specialties. Or, women may suffer discrimination both at the outset of their careers and when vying for higher-paying practice management positions later on.

4 Conclusion

Future work should focus on understanding the mechanisms underpinning the lag in earnings for female physicians and its increase over time.

Importantly, researchers studying pay disparities between groups should verify whether results obtained using hourly earnings differ from those using yearly earnings as a measure of pay. If hourly pay declines with hours worked and a larger share of one group works fewer hours, using hourly earnings as the measure of pay may substantially underestimate pay disparities.

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Table 1: Summary statistics for whole sample of physicians and "young" physicians, by gender (1997-2005)

	Male Physicians	Female Physicians	Male Physicians 40 or Younger with 2-5 years of experience	Female Physicians 40 or Younger with 2-5 years of experience
Average Yearly Income	199,637	133,863	166,440	119,571
Average Weeks Worked per Year	48	47	48	46
Average Hours Worked Per Week	57	49	59	50
Total Hours Worked per Year	2,719	2,310	2,836	2,328
Specialty				
Percentage in Family or General Practice	15%	16%	13%	16%
Percentage in Internal Medicine	14%	16%	17%	22%
Percentage in Pediatrics	7%	20%	6%	20%
Percentage in Psychiatry	6%	9%	3%	4%
Percentage in OB/GYN	6%	9%	6%	10%
Percentage in General Surgery	5%	2%	4%	2%
Percentage in Ophthalmology	5%	2%	3%	2%
Percentage in Orthopedic Surgery	5%	1%	3%	0%
Percentage in Emergency Medicine	5%	4%	7%	3%
Percentage in Cardiology	4%	1%	4%	1%
Percentage in Dermatology	2%	3%	1%	3%
Percentage in Other Specialty*	26%	17%	33%	17%
Practice setting				
Solo Practice	28%	20%	11%	9%
Group Practice Part Owner	33%	20%	29%	13%
Group Practice Employee	7%	11%	17%	18%
HMO Employee	4%	7%	5%	6%
Hospital Employee	9%	12%	9%	16%
Free Standing Clinic Employee	2%	3%	2%	4%
Medical School Employee	8%	11%	12%	12%
Government Employee	2%	4%	2%	4%
Other Practice Setting	8%	12%	13%	18%
Age	49.98	45.21	35.68	35.04
Experience	17.65	12.4	3.54	3.48
Total Raw Observations	24,718	7,747	2,452	1,448
Total Weighted Observations (Representative Sample)	999,329	269,314	95,477	44,935

Notes: Other specialties, not detailed because they represent 2% or less of male and female doctors, include: Urology, Dermatology, Gastroenterology, among others. Summary statistics were created in Sudaan using the survey weights listed in the technical appendix of the survey. The standard errors (not shown) are extremely small.

Table 2: Earnings premium of male physicians versus female physicians (1997-2005).

Dependent variable:	Log (Yearly Income)									Log (Yearly Income)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
Male[1]	.40 (.01)***	.33 (.01)***	.33 (.01)***	.26 (.01)***	.24 (.01)***	.23 (.01)***	.23 (.01)***	.23 (.01)***	.13 (.02)***	.10 (.02)***	.12 (.02)***	.08 (.03)**	.02 (.05)
Log (Yearly Hours Worked)	-	.41 (.02)***	.43 (.02)***	.35 (.02)***	.34 (.02)***	.33 (.02)***	.29 (.02)***	.29 (.02)***	.28 (.04)***	0.34 (0.04)***	0.30 (0.04)***	0.21 (0.06)***	0.19 (0.08)**
Year Adjustment	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	-	-	-	-
Specialty Adjustment	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Practice Setting Adjustment	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Practice Location Adjustment	-	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age and Experience Quadratic	-	-	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Other adjustments[2]		-	-	-	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes
Sample	All Physicians								Physicians 40 Years Old and Younger with 2-5 years of experience	Family or General Practice	Internal Medicine	Pediatrics	OB/GYN
										Physicians 40 Years Old and Younger with 2-5 years of experience			
R-squared	0.10	0.15	0.17	0.31	0.35	0.37	0.39	0.40	0.48	0.49	0.39	0.38	0.65
Raw Observations	32,465	32,348	32,348	32,348	32,348	32,348	32,348	32,348	3,900	746	1,070	628	178
Total Weighted Observations (Representative Sample)	1,268,643	1,264,268	1,264,268	1,264,268	1,264,268	1,264,268	1,264,268	1,264,268	140,411	19,494	26,028	15,101	10,618

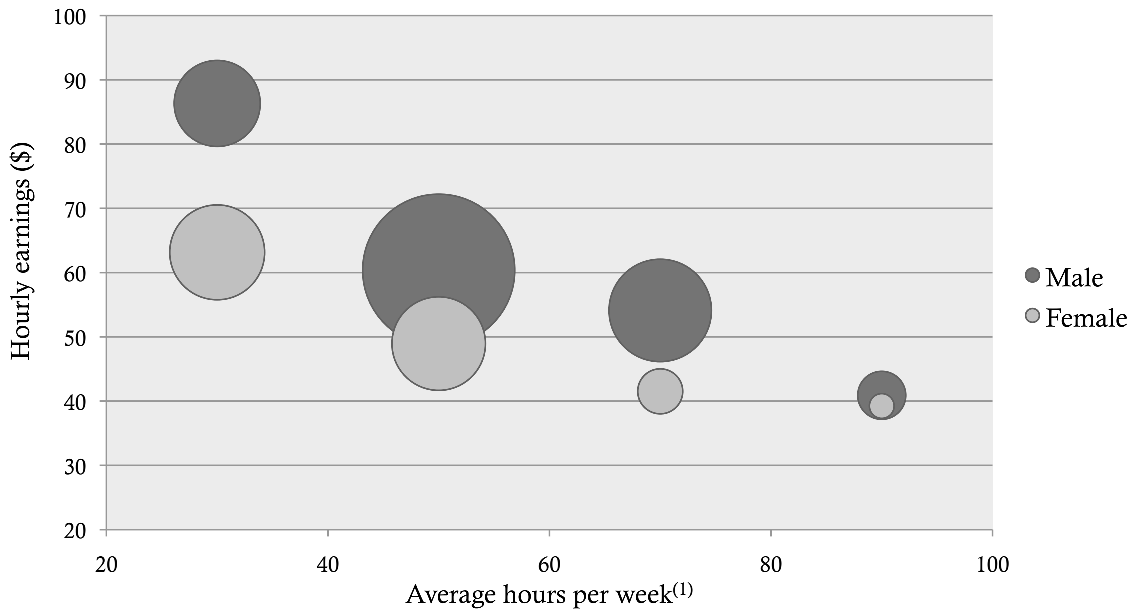
Notes: (1) Denotes the coefficient on the binary variable Male: =1 if the physician is male and =0 otherwise. (2) Includes region of physicians' medical school (US, Canada, Puerto Rico or Other) and whether physician is a primary care physician. Standard errors in parentheses. * significant at 10% level, ** significant at 5% level, *** significant at 1% level. The number of observations changes from column (1) to (2) because of a small number of missing observations for hours worked.

Table 3: Evolution of the male physician earnings premium between 1997-2005 — by age cohort of physicians.

Dependent variable:	Log(Yearly Income)					
	(1)	(2)	(1)	(2)	(1)	(2)
Male[1]	.13 (.03)***	.28 (.03)***	.23 (.02)***	.25 (.04)***	.26 (.03)***	.26 (.03)***
Year	1997	2005	1997	2005	1997	2005
Log (Yearly Hours Worked)	.29 (.04)***	.24 (.05)***	.31 (.03)***	.33 (.07)***	.27 (.03)***	.28 (.05)***
Sample	Physicians Between 30 & 37 in 1997	Physicians Between 38 & 45 in 2005	Physicians Between 38 & 45 in 1997	Physicians Between 46 & 53 in 2005	Physicians Between 46 & 53 in 1997	Physicians Between 54 & 61 in 2005
R-squared	0.51	0.57	0.46	0.46	0.39	0.49
Raw Observations	1,141	1,112	3,133	1,371	2,596	1,018
Total Weighted Observations (Representative Sample)	31,964	74,390	101,412	100,810	85,726	68,798

Notes: [1] Denotes the coefficient on the binary variable Male: =1 if the physician is male and =0 otherwise. This estimate is adjusted for the full set of controls: log of yearly hours worked, specialty, practice setting, practice location, age and experience quadratics and other adjustments such as the region of the physician's medical school and whether the physician is a primary care physician. Standard errors in parentheses. * significant at 10% level, ** significant at 5% level, *** significant at 1% level.

Figure 1: Number of young male and female physicians working 20-40, 40-60, 60-80, and more than 80 hours per week, and respective average hourly earnings at each of these hours-per-week bins



Note: [1]Average hours per week=total hours per year divided by 52 weeks. The size of bubble represents the number of "young" physicians (male in black and female in grey) working in each bin of hours worked per week: 20-40, 40-60, 60-80 and more than 80 hours per week. The average hourly earnings for each group is represented by the center of each ball. For any bin of hours-per-week men earn more per hour than women, on average. A higher proportion of women work 20-40 and 40-60 hours per week, whereas a higher proportion of men work 40-60 and 60-80 hours per week.