Exploration of Leisure Time Valuation to Explain Sex-Based Wage Gaps among Salaried Primary Care Physicians in the US

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Abstract: In the US, female physicians have lower hourly incomes than their male counterparts, across specialties and after adjusting for physician and practice characteristics; however, female physicians work fewer hours than their male counterparts. We wanted to determine whether a simple method of valuing leisure time – overtime pay – might help explain sex-based wage gaps among US primary care physicians. Therefore, we used Community Tracking Study Physician Survey data from 1996-2005 to model the impact of overtime pay on sex-based wage gaps. As overtime premiums increased in our models, sex-based wage disparities decreased: they become statistically insignificant when overtime wages reached 0%, 32%, and 61% premiums using the ordinary least squared model and with 0%, 62%, and 55% premiums using the propensity score weighted model, for internal medicine, family practice, and pediatric physicians, respectively. We conclude that modest overtime premiums reduced sex-based hourly wage gaps for the salaried primary care physicians we examined. Future analyses of sex-based wage gaps should account for leisure time and its trade for work hours when it becomes scarce.

Keywords: Sex-based wage gaps, primary care physicians, workforce, gender, physician income.

INTRODUCTION

Studies of US physicians have repeatedly shown that female physicians earn between 10-20% less than their male counterparts, regardless of specialty and after adjusting for physician and practice characteristics.(Baker, 1996; Kehrer, 1976; Ohsfeldt & Culler, 1986; Weeks *et al*., 2009) Such studies have used two methods to correct for the invariable finding that female physicians work fewer hours than their male counterparts. The first assumes a linear relationship between income and work hours and uses the average hourly wage as the dependent variable or the number of hours worked as an independent variable in linear regression models, regardless of the number of hours worked.(Baker, 1996; Lo Sasso *et al*., 2010; Ohsfeldt & Culler, 1986; Weeks *et al*., 2009) The second uses the log of the number of hours worked within a linear regression,(Kehrer, 1976) thereby causing higher number of work hours have marginally less impact.

But a linear or marginally decreasing relationship between work hours and income across a broad range of work hours seems unrealistic and is not reflective of the non-linear, backward bending supply curve of labor that suggests that workers demand a greater hourly wage as leisure time becomes increasingly scarce. (Hanoch, 1965) While physicians are not currently paid for overtime work, they receive supplemental income for work that consumes more of their time through 'productivity bonuses' that are awarded only after a threshold level of productivity is achieved(Glass *et al*., 1999) or additional pay for on-call coverage and medical directorship duties.(MGMA, 2011) This suggests that physicians might reasonably expect supplemental income in exchange for their increasingly scarce leisure time.

In the US, overtime is regulated. Employees covered by the Fair Labor Standards Act must receive overtime pay of at least one and one-half times their regular rates of pay if they work more than 40 hours in a workweek. (US Department of Labor) Minimum applicable salary levels for the law were recently increased to $50,440,(Scheiber) suggesting that the US is embracing use of overtime pay to compensate for leisure time across a broad swath of income levels.

In this context, we wondered whether a theoretical overtime premium might help explain sex-based wage gaps among US physicians. To explore that possibility, we obtained several years' data on three types of salaried primary care physicians' work hours and incomes from the Center for Studying Health Systems Change's Community Tracking Study Physician Surveys. Using those data, we explored the impact of modeling varying overtime pay premiums to account for lost leisure time on sex-based wage gaps using three

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methods: ordinary least squared (OLS) regression, propensity score weighting, and Oaxaca decomposition.

MATERIALS AND METHODS

Data

Evaluation of sex-based wage differences among physicians requires having accurate data on number of annual work hours and annual income from the practice of medicine, the number of years practiced, and other variables that influence physician income, such as board certification status, ownership status, practice characteristics, and setting in which the physician practices.(Baker, 1996; Ohsfeldt & Culler, 1986; Weeks *et al*., 2009)

Such data were collected in Community Tracking Study (CTS) Physician Surveys for 1996-97 (ICPSR 2524), 1998-99 (ICPSR 3267), 2000-01 (ICPSR 3764), and 2004-05 (ICPSR 4584). While publically available data do not have specific values for age, years in practice, hours worked, or income, we obtained restricted files that do have those data elements. We limited our analysis to physicians who indicated that they were salaried primary care practitioners, had no ownership interest in the organization for which they worked, and who were in one of three specialties: general internal medicine (Primary Specialty Code (PSC) 42), family practice (PSC 19), or pediatrics (PSC 88). We eliminated practitioners who indicated that they were in a subspecialty practice. We examined only those physician, practice, work effort, and income characteristics that were collected in all survey years. We limited our analysis to respondents who provided income and hours worked data, as well as information on whether their income was impacted by patient satisfaction, quality measures, profiling, or productivity. From the dataset, we retained cases for which calculated hourly income was the middle 90% of those for each specialty, thereby removing income coding errors – such as annual incomes being listed as $125 and extremely high reported annual work hours – and also excluded incomes in the very highest category (the surveys had an annual income cap of $400,000 per year).

Statistical Analyses

Basic Comparisons and Ordinary Least Square Linear Regression

For each specialty, we used Student's Independent T-Test analyses and chi-square tests to retrospectively compare physician characteristics, practice characteristics, work effort, and income information for male and female physicians. We used OLS linear regression to determine whether, after adjusting for twenty-two potentially important physician, practice, and work-effort characteristics, as well as physician specialty and year of the survey, sex was associated with annual income per hour worked. To determine sex-based wage gap percentages, we ran regression models using the natural log of the hourly wage, exponentiated the coefficient for sex, and then subtracted that amount from 1 (when the coefficient was negative). We used SPSS version 23.0 (released 2015, IBM Corporation, Armonk, NY) for all analyses.

Propensity Scoring

We calculated the propensity of each respondent to be male with a tolerance of 0.05 after considering age, years practicing medicine, and those physician characteristics that statistically significantly differed by sex for each specialty, except for those associated with number of hours worked. We then used OLS regression techniques to model the association between sex and income per hour, adjusting only for the year of the survey (to account for experienced inflation) and weighting each case by the inverse propensity to be male. (Armstrong, 2012; Austin, 2011; Austin *et al*., 2007) We were not able to generate propensity scores for every case; therefore, our propensity score analysis was limited to: 1,935 male and 1,012 female internal medicine primary care physicians; 2,433 male and 1,071 female family practice primary care physicians; and 960 male and 1,250 female pediatric primary care physicians.

Oaxaca Decomposition

Oaxaca decomposition methods have been widely used to examine sex-based discrimination in a number of populations, (Oaxaca, 1973; Oaxaca & Ransom, 1999) including physicians.(Dumontet *et al*., 2012; Gravelle *et al*., 2011) Briefly, the Oaxaca decomposition methodology uses linear regression to calculate coefficients for important independent variables (physician and practice characteristics) that are predictive of the dependent variable of interest (hourly income, here) for the group that is thought not to experience discrimination (males, in this case). (Oaxaca, 1973) Then values for the group that is thought to experience discrimination (females, here) are applied to the regression coefficients to generate an estimate of the dependent variable of interest. Conceptually, the method examines what might have

had the independent variables describing the class that is thought to be experiencing discrimination been valued in the same way that they were for the class that is not thought to be experiencing discrimination.

To explore the impact of modeled overtime pay on discriminatory wage gaps, we applied the Oaxaca methodology in a serial manner, as follows. First, using reported data from survey respondents, we calculated the average hourly wage from the reported annual income (Y) and the total number of hours worked (H):

$$W = \frac{Y}{H}$$

Then we subtracted the female mean hourly wage from the male mean hourly wage to generate the mean sex-based hourly wage difference, $\bar{\Delta}_{\text{male-female}}$.

$$\bar{\Delta}_{\text{male-female}} = \frac{\mathrm{Y_m}}{\mathrm{H_m}} - \frac{\mathrm{Y_f}}{\mathrm{H_f}}$$

Next, for each of the primary care specialties that we examined, we limited our sample to male physicians and conducted an ordinary least squared regression analysis that used the same variables explored in our basic OLS analysis to predict the actual income per hour, where m indicates male, V represents independent variables 1 through x, and β represents the variable specific regression coefficient.

$$\frac{\mathrm{Y_m}}{\mathrm{H_m}} = \beta_0 + \beta_1 \mathrm{V_1} + \beta_2 \mathrm{V_2} + \cdots + \beta_x \mathrm{V_x}$$

For each variable V, we then subtracted the mean for female physicians from those for male physicians and applied the difference to the regression equation and summed those differences to generate a predicted difference in mean hourly wage for females that was attributable to differences in the characteristics of male and female physicians that was explained by the model.

$$\hat{\Delta}_{\text{male-female}} = \hat{\beta}_1(\bar{\mathrm{V}}_{1\mathrm{m}} - \bar{\mathrm{V}}_{1\mathrm{f}}) + \hat{\beta}_2(\bar{\mathrm{V}}_{2\mathrm{m}} - \bar{\mathrm{V}}_{2\mathrm{f}}) + \cdots + \hat{\beta}_x(\bar{\mathrm{V}}_{x\mathrm{m}} - \bar{\mathrm{V}}_{x\mathrm{f}})$$

Finally, we calculated the proportion of the sex-based hourly income difference that was explained by the sex-based differences in characteristics and subtracted that from one to generate the proportion of the hourly income difference that was not explained using the Oaxaca method.

$$\%\ \text{not explained by model} = 1 - \frac{\hat{\Delta}_{\text{male-female}}}{\bar{\Delta}_{\text{male-female}}}$$

Modeling Overtime Pay

We generated counterfactual estimates of the impact of overtime pay across a range of overtime premiums on physician wages as follows. While we were able to calculate the average hourly wage from the reported annual income (Y) and the total number of hours worked (H), we wanted to estimate hourly wages for normal (non-overtime) work and for overtime work. Therefore, we crafted an equation that split average hourly income into two components: that earned from work during normal hours (denoted with N) and during overtime hours (denoted with O).

$$\frac{\mathrm{Y}}{\mathrm{H}} = \frac{\mathrm{Y_N}}{\mathrm{H_N}}\left(\frac{\mathrm{H_N}}{\mathrm{H_N} + \mathrm{H_O}}\right) + \frac{\mathrm{Y_O}}{\mathrm{H_O}}\left(\frac{\mathrm{H_O}}{\mathrm{H_N} + \mathrm{H_O}}\right)$$

Assuming that overtime hours are paid a premium of μ% more than that paid for normal hours, the equation expands to:

$$\frac{\mathrm{Y}}{\mathrm{H}} = \frac{\mathrm{Y_N}}{\mathrm{H_N}}\left(\frac{\mathrm{H_N}}{\mathrm{H_N} + \mathrm{H_O}}\right) + (1+\mu)\frac{\mathrm{Y_N}}{\mathrm{H_N}}\left(\frac{\mathrm{H_O}}{\mathrm{H_N} + \mathrm{H_O}}\right)$$

Then:

$$\mathrm{w} = \breve{\mathrm{w}} * [(1-\mathrm{b}) + (1+\mu)\mathrm{b}]$$

Where $\mathrm{W} = \frac{\mathrm{Y}}{\mathrm{H}}$ (which denotes effective hourly wage), $\breve{\mathrm{W}} = \frac{\mathrm{Y_N}}{\mathrm{H_N}}$ (which denotes basic hourly wage), and *b* denotes the percentage of overtime work.

We assumed that definition of the "normal time" (H_N) is neither individually set nor different for males and females. Therefore, the equation can be written at the individual level as:

$$\mathrm{w_i} = \breve{\mathrm{w}}_\mathrm{i}.[(1-\mathrm{b_i}) + (1+\mu)\mathrm{b_i}]$$

or

$$\mathrm{w_i} = \breve{\mathrm{w}}_\mathrm{i} + (\breve{\mathrm{w}}_\mathrm{i}.\mu)\mathrm{b_i}$$

From the data, we were able to calculated w_i, the hourly earnings. For the purposes of this analysis, we set overtime hours as any work beyond 2000 hours per year. We chose 2000 hours as the benchmark for overtime as that number roundly approximates the annual number of hours at which the Fair Labor Standards Act would require application of overtime premiums. (US Department of Labor) We were then able to calculate H_O, the number of overtime hours and

Table 1: Examples of Normal and Overtime Hourly Wages Across a Range of Overtime Premiums

		Overtime premium (Value of μ)	Actual annual income	Normal hours worked H_N	Overtime hours worked H_O	Hourly wage		Calculated annual income based on normal and overtime pay
						Normal $\bar{w}$	Overtime $\bar{w} * (1+\mu)$	
No overtime scheme		0%	$200,000	2,650	NA	$75.47	$75.47	$200,000
Overtime scheme	Time & 1/4	25%	$200,000	2,000	650	$71.11	$88.89	$200,000
	Time & 1/2	50%	$200,000	2,000	650	$67.23	$100.84	$200,000
	Time & 3/4	75%	$200,000	2,000	650	$63.75	$111.55	$200,000

b_i, the percentage of overtime hours, for each individual. When individuals worked less than 2000 hours in a year, there was no overtime. We then calculated the basic income per hour, $\bar{w}_i$ across a range of values of μ, for male and female primary care physicians.

For example, assume that a physician survey respondent worked 2,650 hours and generated an annual income of $200,000; average income per hour would be $75.47 (Table **1**). Application of a scheme in which overtime work was paid at one and one-half times the normal rate (μ=0.5) results in a normal hourly wage of $67.23 and an overtime wage of $100.84. Regardless of the μ chosen, the annual pay remains the same; however, as overtime premiums increase, the normal hourly wage drops.

Exploration of the Impact of Overtime Pay on Sex-Based Income Gaps

After counterfactually introducing a series of overtime premiums to account for varying levels of reimbursement for lost leisure time, we used each of the three methods described above to examine sex-based wage disparities, to calculate the adjusted sex-based normal hourly wage differential (which we present as a proportion of the adjusted male mean normal hourly wage), and to calculate the proportion of the sex-based normal hourly income difference that was not explained by the Oaxaca decomposition.

Human Subjects Approval

Dartmouth College's Internal Review Board and Committee for the Protection of Human Subjects approved the study (CPHS #24514).

RESULTS

Comparison of Physician Characteristics

Regardless of specialty, when compared to their male counterparts, female physicians were younger, had practiced fewer years, were more likely to be board certified, and were somewhat less satisfied with their careers (though statistically significantly so only in pediatrics (Table **2**)). Females were more likely to practice in a metropolitan area and a greater proportion of female physicians' practices were composed of Medicaid patients. As expected, female primary care physicians worked fewer annual hours, weeks per year, and total hours in the prior week, both overall in in direct patient care; however, compared to their male counterparts, female internists and pediatricians spent a greater proportion of their time in direct patient care.

Females tended to provide more charity care, though the differences were statistically significant only for family practitioners. Female physicians' salaries were less likely to be influenced by patient satisfaction, quality, profiling, and productivity measures. Without adjustment for differences in characteristics, female physicians had inflation adjusted annual incomes that were about 20% lower for all specialties, and inflation adjusted annual incomes per hour that were 2.4%, 6.6%, and 7.5% lower that that of their salaried internal medicine, family practice, and pediatric male counterpart primary care physicians, respectively.

Ordinary Least Square Regression and Propensity Score Results without Modeling

After adjustment for male-female differences in physician characteristics, practice patterns, work effort, and income information, female gender was associated with a $0.35 (0.8%), $2.26 (3.9%), and $3.25 (6.1%) lower income per hour for internal medicine, family practice, and pediatrics, respectively (Table **3**). Propensity score weighted results were similar for pediatricians, but showed somewhat higher wage gaps for internists and family practitioners.

Modeled Overtime Results

The modeled overtime analysis that used the OLS method is shown in Figure **1**. As overtime premiums

Table 2: Comparison of Characteristics of Salaried Male and Female Physicians for Three Primary Care Specialties

		Internal Medicine PCP			Family Practice PCP			Pediatric PCP		
		Male	**Female**	**p**	**Male**	**Female**	**p**	**Male**	**Female**	**p**
Physician characteristics	Number	1,987	1,036		2,460	1,087		965	1,254	
	Mean age	44.5	40.3	<0.001	45.3	41.7	<0.001	46.9	41.3	<0.001
	Mean years practicing	12.2	8.0	<0.001	13.9	9.1	<0.001	15.4	9.4	<0.001
	Board certified (%)	86.3	90.5	<0.001	92.0	95.1	<0.001	91.3	93.2	0.095
	Doctors of Osteopathy (%)	3.5	3.0	0.48	16.7	14.4	0.08	3.0	2.3	0.32
	Foreign medical school graduate (%)	28.1	23.3	0.004	10.6	14.4	0.003	18.7	23.8	0.003
	Very satisfied with career (%)	34.6	33.2	0.44	41.3	40.3	0.57	50.8	43.1	<0.001
Practice characteristics	Is in a large metropolitan area (%)	89.8	95.3	<0.001	81.2	85.9	<0.001	93.7	95.1	0.14
	Payment source (%)									
	Medicare	38.1	32.5	<0.001	28.0	25.0	<0.001	10.9	11.4	0.53
	Medicaid	14.9	16.4	0.027	15.6	19.6	<0.001	28.2	32.2	0.001
	Does NOT accept (%)									
	new Medicare patients	4.8	4.3	0.59	6.6	7.8	0.21	35.0	36.8	0.38
	new Medicaid patients	18.6	16.9	0.25	19.2	17.2	0.15	10.6	11.1	0.70
	new privately insured patients	4.1	5.3	0.15	4.1	4.7	0.46	2.5	3.4	0.19
Work effort	Estimated annual hours worked	2,585	2,148	<0.001	2,476	2,101	<0.001	2,305	1,971	<0.001
	Weeks worked in prior year	46.9	45.7	<0.001	47.4	46.1	<0.001	47.0	46.4	0.005
	Hours worked in past week									
	Total	55.1	46.9	<0.001	52.2	45.5	<0.001	49.1	42.5	<0.001
	Direct patient care	45.1	38.9	<0.001	42.8	37.2	<0.001	40.5	36.6	<0.001
	Proportion of time in direct patient care	82.4	83.8	0.026	85.6	82.8	0.64	83.5	86.9	<0.001
	Hours of charity care in last month	6.5	6.4	0.81	6.3	8.5	0.003	4.6	4.8	0.73
Income information	Percent with income impacted by									
	Patient satisfaction	44.0	38.4	0.003	40.1	34.9	0.003	39.4	33.9	0.008
	Quality	34.9	31.2	0.045	30.8	25.1	<0.001	30.1	26.9	0.095
	Profiling	23.8	19.8	0.015	21.3	19.6	0.26	22.0	21.4	0.70
	Productivity	76.3	71.8	0.008	76.2	67.9	<0.001	70.4	61.9	<0.001
	Annual income from medical practice (2004 $)	142,237	113,856	<0.001	143,231	112,523	<0.001	133,206	104,482	<0.001
	Net income per hour worked (2004 $/hr)	56.78	55.39	0.022	59.38	55.48	<0.001	59.44	55.00	<0.001

increased, sex-based wage gaps decreased, although at slightly different rates for the different specialties. Without overtime, the sex-based wage gap for internists was not statistically significant, and it was absolutely eliminated at an 8% overtime premium. For family practitioners, the sex-based wage gap lost statistical significance when the overtime premium reached 32% and was eliminated at an overtime premium of 61%. For pediatricians, the sex-based wage gap became statistically insignificant with a 61% overtime premium and was eliminated at a 123% overtime premium.

After inversely weighting cased by the inverse of each respondent's propensity to be male, based on those physician and practice characteristics that were found to be statistically significant at $p<0.05$ in the OLS regression, we found that increasing modeled overtime

Table 3: Results of OLS regression analysis and OLS regression analysis where cases were weighted by the inverse of the survey respondent's propensity to be female after accounting for age, years practicing, and the statistically significant variables in the regression analysis. Results for models predicting income per hour and natural log of the income per hour are presented. Numbers in parentheses indicate negative values. Regression coefficients are >0.05 for general internal medicine but are statistically significant at p<0.001 for pediatrics and family practice.

	Internal medicine PCP	Family practice PCP	Pediatric PCP
OLS method	**β**	**β**	**β**
Female sex income per hour	($0.35)	($2.26)	($3.25)
Female sex LN income per hour	(0.008)	(0.040)	(0.063)
% by which female hourly wage is lower than male hourly wage	0.8%	3.9%	6.1%
Adjusted R square	0.090	0.093	0.122
Propensity score weighting method			
Female sex income per hour	($0.89)	($3.47)	($3.25)
Female sex LN income per hour	(0.017)	(0.062)	(0.062)
% by which female hourly wage is lower than male hourly wage	1.6%	6.0%	6.0%
Adjusted R square	0.012	0.022	0.022

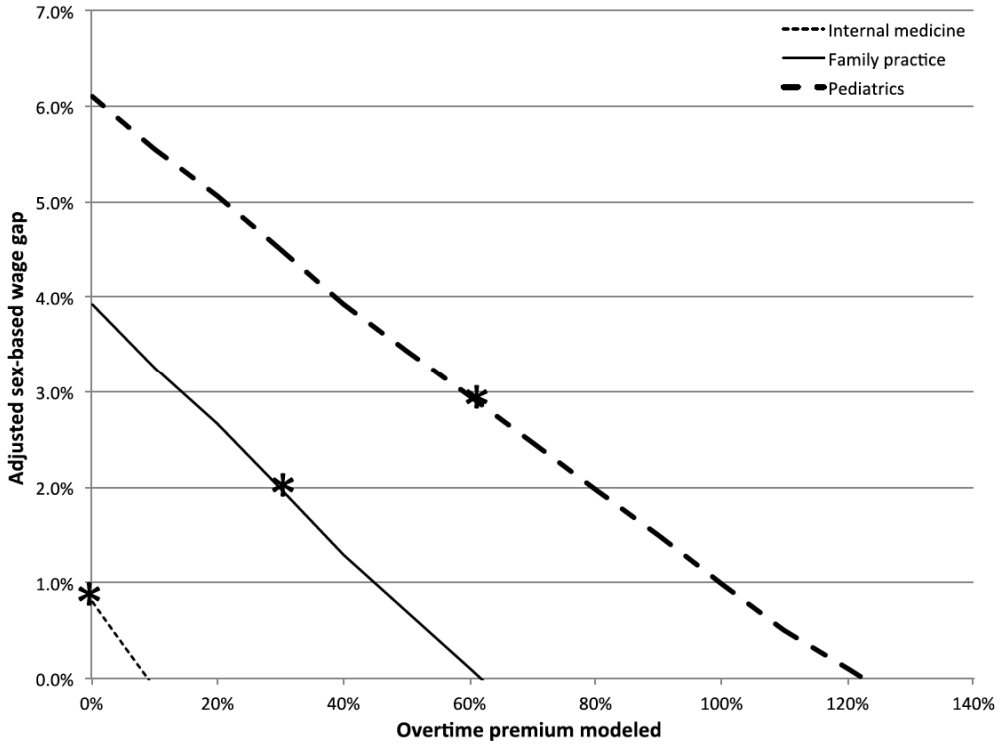

Figure 1: Sex-based wage gaps using the OLS method, across a range of overtime premiums. For each specialty, the asterisk shows where the gap becomes statistically insignficiant (at p >0.05). Absolute sex-based wage gaps are eliminated when the line crosses 0.0%.

premiums were associated with decreasing sex-based wage gaps for all three specialties (Figure **2**). Without overtime, the sex-based wage gap for internists was not statistically significant and it was absolutely eliminated at an 18% overtime premium. For family practitioners, the sex-based wage gap lost statistical significance when the overtime premium reached 62% and was eliminated at an overtime premium of 100%. For pediatricians, the sex-based wage gap became statistically insignificant with a 55% overtime premium and was eliminated at a 109% overtime premium.

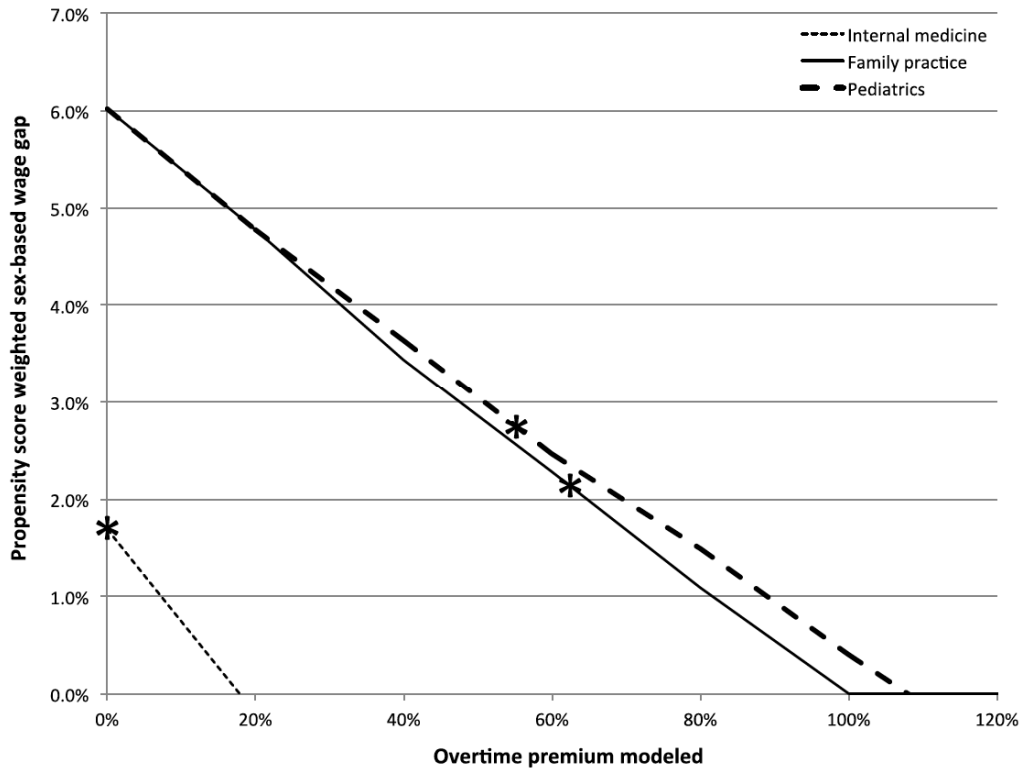

Figure 2: Propensity score weighted sex-based wage gaps across a range of overtime premiums. For each specialty, the asterisk shows where the gap becomes statistically insignficiant (at p >0.05). Absolute sex-based wage gaps are eliminated when the line crosses 0.0%.

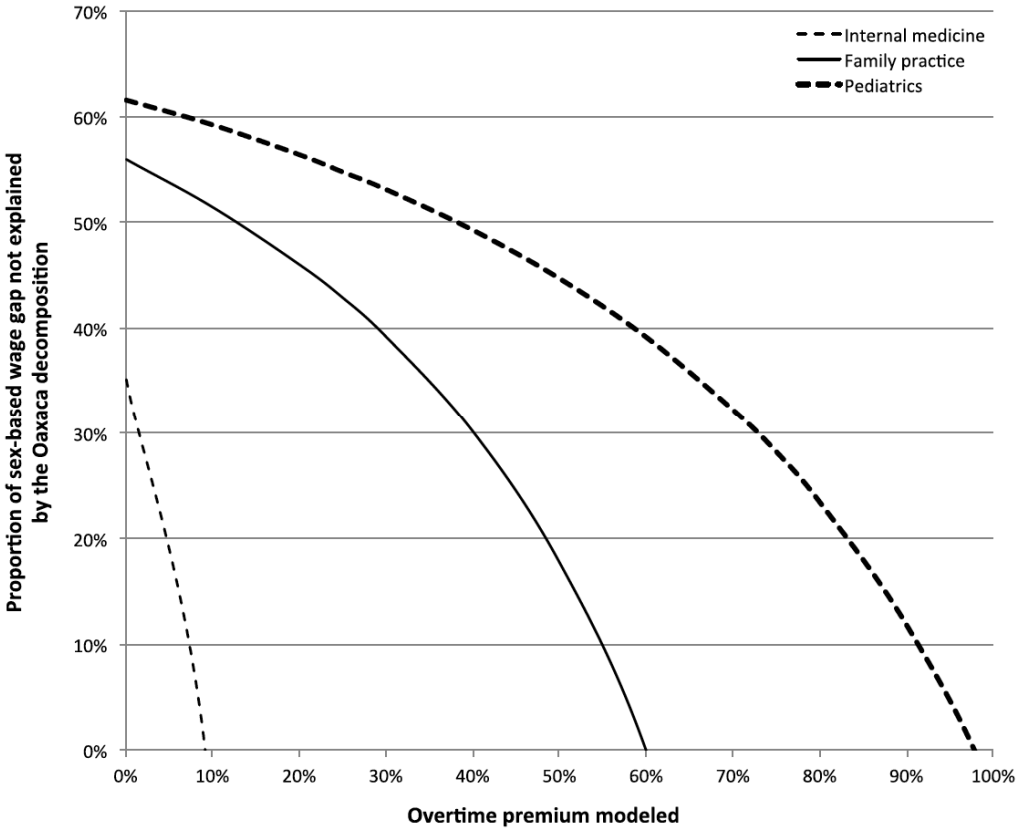

Figure 3: The proportion of the sex-based wage gap not explained by the Oaxaca decomposition, across a range of overtime premiums. Absolute sex-based wage gaps were eliminated when the line crosses 0.0%.

Results of the serial Oaxaca decomposition are shown in Figure **3**, where the curvilinear relationship between overtime premium and the proportion of sex-based wage gap that is not explained by the Oaxaca decomposition is evident. For internists, an overtime premium of 8% fully the explained sex-based wage gap; for family practitioners, an overtime premium of 62% fully explained it; and for pediatricians, an overtime premium of 96% fully explained it.

DISCUSSION

To explore the possibility that leisure time valuation might explain sex-based wage gaps among salaried US physicians, we applied several methodologies to survey data on annual income, work effort, and practice characteristics obtained for three primary care specialties across nine years. We found that sex-based wage gaps persist, but also that female physicians worked fewer annual hours than their male counterparts. Hypothetical overtime premiums that inherently value leisure time statistically eliminated sex-based hourly wage gaps at relatively low overtime premiums – similar to those required by the Fair Labor Standards Act – although a somewhat higher overtime premiums were required to absolutely eradicate sex-based hourly wage gaps for all groups.

While most US physicians are still self-employed,(Kocher & Sahni, 2011) the healthcare marketplace is changing: physicians are increasingly employed(O'Malley *et al*., 2011) and new practice opportunities with more defined work hours that could be augmented with productivity bonuses(Chavey *et al*., 2014) are increasing, with estimates of incentive-based compensation ranging between 10-40%.(Floyd, 2014) Concurrently, US physicians appear to be spending less time in medical practice,(Staiger *et al*., 2010) perhaps reflecting a higher valuation of leisure time. Therefore, an expectation of higher marginal reimbursement for additional hours worked beyond some standard amount may be an attractive and reasonable approach to compensate physicians in the future.

As US physicians increasingly join large practices as employees, and as different practice patterns emerge, hourly wages may become a more common way for physicians to be paid; indeed, others have suggested that hourly wage comparisons might help inform debate over physician pay.(Leigh *et al*., 2010) That females and males differ in their willingness to reallocate their time between leisure and work hours in response to price variations,(Bourguignon & Chiappori, 1992; Rizzo & Blumenthal, 1996; Weeks *et al*., 2013) suggests that male and female physicians value their time differently and may help explain our findings.

Our study has several limitations. First, it is limited to data on salaried US physicians in three primary care specialties in the decade ending about 10 years ago. However, these are the most recent data available that includes specific income and hours worked information: while CTS's 2008 Health Tracking Physician Survey asked physicians to identify one of six broad annual income categories, more specific data were required for the analysis we completed. Nonetheless, data from other specialties or other countries might produce different results. Second, we retroactively calculated hourly wages. Prospective setting of normal hourly wages and overtime premiums might change behaviors and result in different annual incomes. Third, we chose 2,000 hours as the benchmark for overtime because this is what the Fair Labor Standards Act would use, assuming a 40 hour work week, 50 weeks of work, and 2 weeks of vacation time. Other benchmarks would likely require somewhat different premiums to eliminate sex-based wage disparities. Fourth, we combined cross-sectional data from several years to conduct our analysis. Although we captured the effect of different years of analysis on the income levels by incorporating survey year into our regression analyses, were it available, a longitudinal dataset would provide more robust findings. Finally, our analysis assumed free choice in the tradeoff of leisure for work time. It may be that female physicians choose not to work as many hours as their male counterparts; indeed, a 1984 paper found that women chose to work fewer hours, not because of child care responsibilities but because their overall family incomes were high.(Mitchell, 1984) Alternatively, women may be treated differently than their male counterparts when it comes to number of work hours available.

Nonetheless, our study suggests that leisure time, and its trade for work hours when it becomes scarce, should be considered when evaluating sex-based income differences among physicians. If theoretical overtime premiums explain such differences, perhaps future work should focus on whether female physicians have the same freedom as male physicians to determine the characteristics of the practices in which they work, choose the specialties in which they practice, and control the number of hours that they work.

INSTITUTIONAL REVIEW BOARD APPROVAL

Dartmouth College's Internal Review Board and Committee for the Protection of Human Subjects approved the study (CPHS #24514).

REFERENCES

Armstrong, K. (2012). Methods in comparative effectiveness research. *J Clin Oncol,* 30, 4208-4214. https://doi.org/10.1200/JCO.2012.42.2659

Austin, P.C. (2011). An Introduction to Propensity Score Methods for Reducing the Effects of Confounding in Observational Studies. *Multivariate Behav Res,* 46, 399-424. https://doi.org/10.1080/00273171.2011.568786

Austin, P.C., Grootendorst, P., & Anderson, G.M. (2007). A comparison of the ability of different propensity score models to balance measured variables between treated and untreated subjects: a Monte Carlo study. *Stat Med,* 26, 734-753. https://doi.org/10.1002/sim.2580

Baker, L.C. (1996). Differences in earnings between male and female physicians. *NEJM,* 334, 960-964. https://doi.org/10.1056/NEJM199604113341506

Bourguignon, F., & Chiappori, P.A. (1992). Collective models of household behavior: an introduction. *European Economic Review,* 36, 355-364. https://doi.org/10.1016/0014-2921(92)90091-A

Chavey, W.E., Medvedev, S., Hohmann, S., & Ewigman, B. (2014). The status of adult inpatient care by family physicians at US academic medical centers and affiliated teaching hospitals 2003 to 2012: the impact of the hospitalist movement. *Family Medicine,* 46, 94-99.

Dumontet, M., Le Valliant, M., & Franc, C. (2012). What determines the income gap between French male and female GPs - the role of medical practices. *BMC Family Practice,* 13, 94. https://doi.org/10.1186/1471-2296-13-94

Floyd, P. (2014). Roadmap for physician compensation in a value-based world. *Physician Leadership Journal,* 1, 14-21.

Glass, K.P., Pieper, L.E., & Berlin, M.F. (1999). Incentive-based physician compensation models. *Journal of Ambulatory Care Management,* 22, 36-46. https://doi.org/10.1097/00004479-199907000-00008

Gravelle, H., Hole, A.R., & Santos, R. (2011). Measuring and testing for gender discrimination in physician pay: English family doctors. *Journal of Health Economics,* 30, 660-674. https://doi.org/10.1016/j.jhealeco.2011.05.005

Hanoch, G. (1965). The 'backward-bending' supply of labor. *Journal of Political Economy,* 73, 636-642. https://doi.org/10.1086/259089

Kehrer, B.H. (1976). Factors affecting the incomes of men and women physicians: an exploratory analysis. *Journal of Human Resources,* 11, 526-545. https://doi.org/10.2307/145430

Kocher, R., & Sahni, N.R. (2011). Hospitals' race to employ physicians - the logic behind a money-losing proposition. *NEJM,* 364, 1790-1793. https://doi.org/10.1056/NEJMp1101959

Leigh, J.P., Tancredit, D., Jerant, A., & Kravitz, R.L. (2010). Physician wages across specialties: informing the physician reimbursement debate. *Archives of Internal Medicine,* 170, 1728-1734. https://doi.org/10.1001/archinternmed.2010.350

Lo Sasso, A.T., Richards, M.R., Chou, C., & Gerber, S.E. (2010). The $16,819 pay gap for newly trained physicians: the unexplained trend of men earning more than women. *Health Affairs,* 30, 193-201. https://doi.org/10.1377/hlthaff.2010.0597

MGMA (2011). *Medical Directorship and On-Call Compensation Survey: 2010 Report Based on 2009 Data*. Englewood, CO: Medical Group Management Association.

Mitchell, J.B. (1984). Why do women physicians work fewer hours than men physicians? *Inquiry,* 21, 361-368.

O'Malley, A.S., Bond, A.M., & Berenson, R.A. (2011). Rising hospital employment of physicians: better quality, higher costs? *Center for Health System Change Issue Brief,* 136, 1-4.

Oaxaca, R.L. (1973). Male-female wage differentials in urban labor markets. *International Economic Review,* 14, 693-709. https://doi.org/10.2307/2525981

Oaxaca, R.L., & Ransom, M.R. (1999). Note: Identification in detailed wage decompostions. *The Review of Economics and Statistics,* 81, 154-157. https://doi.org/10.1162/003465399767923908

Ohsfeldt, R.L., & Culler, S.D. (1986). Differences in income between male and female physicians. *Journal of Health Economics,* 5, 335-346. https://doi.org/10.1016/0167-6296(86)90008-1

Rizzo, J.A., & Blumenthal, D. (1996). Is the target income hypothesis an economic heresy? *Medical Care Research and Review,* 53, 243-265. https://doi.org/10.1177/107755879605300301

Scheiber, N. Obama sets rule change to expand overtime (page B1). The New York Times. New York, New York.

Staiger, D.O., Auerbach, D.I., & Buerhaus, P.I. (2010). Trends in the work hours of physicians in the United States. *JAMA,* 303, 747-753. https://doi.org/10.1001/jama.2010.168

US Department of Labor. Wage and Hour Division, United States Department of Labor: Overtime Pay. Washington, DC.

Weeks, W.B., Paraponaris, A., & Ventelou, B. (2013). Sex-based differences in income and response to proposed financial incentives among general practitioners in France. *Health Policy,* 113, 199-205. https://doi.org/10.1016/j.healthpol.2013.09.016

Weeks, W.B., Wallace, T.A., & Wallace, A.E. (2009). How do race and sex affect the earnings of primary care physicians? *Health Affairs,* 28, 557-566. https://doi.org/10.1377/hlthaff.28.2.557

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