The Career Cost of Family

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Abstract

This paper concerns the career costs of family and how these costs have changed in occupations at the upper end of the education and income spectrums. Career costs of family include penalties to labor supply behavior that is more compatible with having a family, such as job interruptions, short hours, and part-time work. Self-employment, when it involves owning a practice, often requires more hours of work because of classic agency problems and is less conducive to family. But when self-employment does not entail capital ownership it often enables women to set their own hours and enjoy greater workplace flexibility.

We study the pecuniary penalties for these family-related amenities, how women have responded to them, and how the penalties have changed over time. The career costs of family vary greatly across the high-end careers we study. More important, perhaps, is that the penalties to family-conducive behaviors have largely decreased over time. We conclude that many professions at the high end (e.g., pharmacy, optometry, some medical specialties, veterinary medicine) have experienced an increase in workplace flexibility driven often by exogenous changes but also endogenously because of increased numbers of women. Some sectors, notably in the corporate and financial areas, have lagged.

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A. Introduction

This paper concerns the career costs of family and how they have changed for occupations at the upper end of the education and income spectrums. We study the pecuniary penalties for various family-related amenities, how women have responded to them, and whether the penalties have changed over time. To explore these topics we use a large number of different data sets concerning various professions.

The career costs of family include penalties to labor supply behavior that is more compatible with having a family. These behaviors include job interruptions, short hours, and part-time work. Self-employment in professions with office practices (e.g., dentists) often requires more hours of work because of classic agency problems. Self-employment in these professions, therefore, is frequently less conducive to family. In other professions, however, where self-employment does not involve considerable investment in various forms of capital (e.g., consulting) it gives women the ability to employ themselves for shorter hours and with greater flexibility than permitted in the corporate sector.

The costs of family vary greatly across the high-end careers we study. More important, perhaps, is that the penalties to family-conducive behaviors have changed, largely decreasing over time. The clearest evidence that the earnings penalty for job interruptions differs greatly by highest degree comes from our Harvard and Beyond (H&B) survey data. The H&B surveyed members of Harvard College graduating classes from 1969 to 1992. A large fraction of the women (and men) in these classes – around 60 to 65 percent – pursued one of the four advanced degrees MBA, JD, MD, and PhD.

The penalty incurred from taking time off is largest proportionately for MBAs. The MDs have the lowest penalty and the PhDs and JDs are in the middle of the pack. These penalties are computed from the log earnings regressions given in Table 1. The log earnings penalty experienced for individuals from each of the four degree groups had they a job interruption of one-tenth of their post-BA period is 53 log points for the MBAs forgo, 40 log points for the PhDs, 35 log points for the JDs but just 17 log points for the MDs.

Job interruptions are entered in the regressions as "any job interruption" (a dummy variable) and as the "share of post-BA years" in which the individual was not employed (a continuous variable).[1] The penalty for "any job interruption" is substantial for the MBAs and is larger than that for any of the other three degree groups. The MDs have almost no penalty for "any job interruption" and all of their loss comes from the actual time off. The JDs and PhDs are penalized moderately for both.

Individuals make career choices at various moments in their life cycles with imperfect knowledge about the penalties and uncertainty about their family responsibilities. People sort across careers for various reasons and the career and family goal is one of them. As the penalties to family have decreased in various careers, women have flocked to them.

We first develop a framework to understand the impact of changes in the demands of individuals who want a family-friendly workplace as well as the impact of changes on the supply side of firms with different and changing costs to providing these amenities. We then present vignettes for various high-end professions and subspecialties within professions concerning earnings differences and changes for amenities, how women have responded and

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[1]Job interruptions in the H&B are defined as spells of more than six months (post BA) for which the individuals state they are not employed at all and are not in school.

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whether women's demands have shaped these changes. We then return to the implications of the framework concerning changes in the cost of the amenity, the fraction female in the profession, and the gender gap in earnings. We end with an analysis of almost 90 of the highest paying and most skilled occupations showing that some impose greater penalties on women than do others and by implication impose penalties on family conduciveness.

B. A Compensating Differentials Framework of Gender Differences in Earnings and Occupations

Certain occupations at the high end are more enabling of family than are other high-income jobs and some firms are considered family friendly. Many professions now have more workplace flexibility than they had a few decades ago. What these statements generally translate into is that occupations and professions differ in their pecuniary penalties to certain characteristics that are considered family-friendly amenities. What happens in the labor market when there is a shift in worker demand for greater flexibility? What happens when there is a technological change that reduces the costs of providing such flexibility? To explore these questions we develop a model of an occupation having an amenity that is costly to offer.

We model the provision of the amenity, such as workplace flexibility, by borrowing from Sherwin Rosen's (1986) model of "compensating differentials," which in turn is a formalization of ideas dating back to Adam Smith. Our framework is, as well, a generalization of that in Mincer and Polachek (1974), which emphasizes the impact of career interruptions for the gender wage gap and occupational choice. Whereas Mincer and Polachek treat the mix of jobs as given, we endogenize it. The model will reveal the differential impacts of an increase in the demand for the amenity (or a decreased willingness to work with the disamenity) and a decrease in the cost of providing the amenity (or reducing the disamenity).

Consider that various aspects of work are disamenities to some but are not overly bothersome to others. These disamenities can include workplace hazards but we focus on workplace flexibility in all its forms. The ability to shift hours during the day may be highly valued by some but not worth much to others. The fact that some professions heavily penalize job interruptions and disproportionately tax short hours may be more important to some workers than to others. The same is true with other aspects of workplace family friendliness including the provision of on-site daycare and paid leave policy.

The amenity we consider is job flexibility and it is modeled as a discrete variable. Jobs are either inflexible or flexible. The inflexible jobs come with a disamenity (D = 1). Alternatively, jobs can be flexible and not have the disamenity (D = 0).

Workers are assumed to be heterogeneous in their tastes for the disamenity (D). If Z = the compensating variation required for indifference between D = 1 and D = 0 and C = worker's consumption, then $U(C, D) \rightarrow U(C^*, 1) = U(C_0, 0)$ and $Z = (C^* - C_0)$. Z is continuously distributed $Z \sim G(Z)$. The compensating differential in earnings between a job with the disamenity and one without is $\Delta W = [W(D = 1) - W(D = 0)] > 0$.

If G(Z) is given by the distribution drawn in Figure 1.A and the compensating differential for the disamenity in the occupation or firm is ΔW^*, all individuals to the right of ΔW^* will opt for the job without the disamenity. The offered wage difference of ΔW^* is insufficiently high for those to the right of the dashed line to be fully compensated for the

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disamenity. Those to the left, however, express a willingness to take the job with the disamenity since the wage difference is higher than the amount that would make them indifferent between having and not having the disamenity. That is, a worker chooses the disamenity, $D = 1$, if $\Delta W > Z$.

Similarly, the firms' technologies that produce the amenity (or that ameliorate the disamenity) are assumed to be distributed continuously. On the supply side of the market, firms are assumed to be heterogeneous in the productivity benefit of the disamenity (B) and thus in the costs of getting rid of it, such that $B \sim F(B)$. If $F(B)$ is given by the distribution drawn in Figure 1.B and W^* is the given wage differential the firms are paying, firms to the left of ΔW^* would provide the amenity and the firms to the right of the dashed line would not. The firm chooses to have jobs with the disamenity, $D = 1$, if $\Delta W < B$.

The market equilibrium for the amenity occurs when its supply equals its demand. In equilibrium, the share of jobs with the amenity ($D = 0$) is: $[1 - G(\Delta W)] = F(\Delta W)$. In the case drawn in Figure 1 the supply of the amenity appears to be equal to the demand at the going wage differential. If it were greater than demand, the price of the amenity would fall and if it were less than demand, the price of the amenity would rise.

The model can be elaborated on by dividing workers into two groups, for example males and females. As depicted in Figure 1.C, the G(Z) distribution for women lies to the right of that for men. At every ΔW, and at ΔW^{**} in particular, women demand more of the amenity than men, and men, instead, walk away with the higher salary and the disamenity.

Two main changes can alter the equilibrium. The first is a labor supply shift. An influx of women into an occupation (who presumably are more willing than men to pay for the amenity) will lead to a rightward shift in the distribution G(Z). At the going wage differential, demand will exceed supply and the price of the amenity will rise, in consequence. A larger wage differential between jobs with and without the amenity will result, the fraction of jobs offering the amenity will increase, and a greater fraction of men who opt for the amenity will decrease since they are less willing to pay for it.

If, on the other hand, the cost of providing the amenity (or, alternatively, the productive benefit of the disamenity) decreases, the distribution F(B) would shift to the left. At the current wage differential more firms would want to offer the amenity ($D = 0$) and pressure will mount for ΔW to decrease to attract more workers to purchase it. More men and women will shift into flexible jobs, but it is likely that relatively more women than men will be enticed into these positions. Men, in fact, might shift into the highly compensated inflexible jobs.

In sum, the framework shows that individuals with a greater willingness to pay for the amenity earn less than others and that a decrease in the cost of supplying the amenity increases their relative earnings. An increase in the supply of individuals who value the amenity will increase the equilibrium amount paid for the amenity and widen the gap in earnings between men and women. We will present evidence for several professions that suggests that the provision of job flexibility changed exogenously but that it was also responsive to increased demands for more flexibility within occupations and sectors.

C. Occupational Vignettes

In the past four or so decades, women at the top of the educational distribution have been heading in great numbers to various professions. As can be seen in the top part of Figure 2 women have increased their presence in many of the high-end professions, such as medicine, law, and business, less so in dentistry. The fraction female among first year law students increased from around 5 percent in the late 1960s to more than 30 percent in the late 1970s, and reached approximate parity with men in about 2000. The increase among MBAs was also rapid in the 1970s although the levels were lower and continue to be below those achieved by women in law and medicine. In dentistry, which appears to have been eschewed by women, an increase is apparent in the late 1970s.

As can be seen in the bottom part of Figure 2, women have also greatly increased their numbers in some of the smaller high-end professions such as veterinary medicine, pharmacy, and optometry, less so in chiropractic medicine. In fact, some of the largest gains can be found in many of the smaller professions. Among these, veterinary medicine is the most striking. Whereas women were less than 10 percent of all graduating veterinarians in 1970, they are almost 80 percent in the most recent years. Optometry, once a male bastion, is about 60 percent female now. Pharmacy graduates are also around 60 percent female now but were 30 percent in the mid-1970s. Women were pharmacy graduates to a greater degree than these other professions in the earliest years in the figures, but they have clearly increased their numbers even as the requirements to be a practicing pharmacist have increased.[2]

But have women been heading in the direction of greater workplace flexibility and a lower price to this choice, or have they simply been going into professions that were previously male-dominated and were at the top of the salary and prestige hierarchy? To answer these questions, several professions are discussed and a collage of evidence is presented.

In general, women appear to be moving in the direction of choosing professions and specialties within professions that are consistent with their greater desire for workplace flexibility. Although some professions have changed exogenously largely due to changes in the scale of operations, other professions and worksites have changed because of the influx of women. Both changes have altered the tradeoffs between work amenities desired by women, such as workplace flexibility, and their earnings per unit time.

For each of four professions – medicine, veterinary medicine, business, and pharmacy– we discuss evidence we have currently assembled on aspects of workplace flexibility, earnings tradeoffs, and choice across specialties, practice settings, and worksites. These "vignettes" are suggestive and will form the basis of a larger study. Of the various professions that we have included here the largest in terms of degrees awarded in 2008 is business with more than 155,000 graduates. Medicine is a far second with 15,646 and pharmacy is next with 10,932. Veterinary medicine is the smallest with just 2,504 degrees awarded. We give the full list, in Table 2, of recent degrees for various professions.

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[2] The American Association of Colleges of Pharmacy, a long standing arbiter of pharmacy credentials, makes recommendations concerning the requirements for first professional degrees in pharmacy. (Higher degrees also offered at some pharmacy colleges.) In 1907 a 2-year curriculum was recommended, increased in 1925 to a 3-year curriculum and then in 1932 to a 4-year curriculum. In 1960 a 5-year curriculum as part of a BS program was recommended and most recently, in 1992, a 6-year curriculum. The American Council on Pharmaceutical Education adopted accreditation standards requiring the "Pharm.D" program in 1997 and the pharmacy graduating class of 2005 was the last to have the 5-year BS in pharmacy as the standard. See Smith, et al. (2005).

1. Medicine

Women have greatly increased their numbers in medicine. But they have increased their relative numbers in some specialties far more than in others, according to the most recent data for 2007. As can be seen in the top portion of Figure 3, younger female physicians (under 45 years old) are 42 percent of all physicians (see the "total" group). But they dominate Ob-Gyn, pediatrics, dermatology, child psychiatry, and medical genetics in which they are more than half of all specialists. They exceed their average of 42 percent but are less than 50 percent in allergy and immunology, family practice, psychiatry, pathology, public health, general preventive medicine, internal medicine, and forensic pathology.[3] The bottom portion of Figure 3, which continues the graph, reveals that the younger female physicians are rare in fields like gastroenterology, otolaryngology, plastic surgery, aerospace medicine, radiology, cardiology, and various surgical specialties (urological, transplant, neurological, thoracic, and orthopedic).

Not only are the levels different across the specialties, ranging from almost 70 percent to less than 10 percent, but the rates of increase also differ in interesting ways. The difference between the two bars (the darker versus the lighter ones) shows the growth or slowdown of certain specialties among women relative to men. All specialties have seen increases in the fraction female and that is not surprising given that women are 42 percent of the under 45 year old group, 46 percent of the under 35 year old group, but 28 percent for all included physicians.

Some specialties have had a large fraction of women for a long time (e.g., pediatrics) whereas other have low fraction of women (e.g., surgical specialties). Some have had extremely large increases in the fraction female, as is the case for Ob-Gyn, dermatology, allergy and immunology, and occupational medicine. Others that were once popular among women (e.g., diagnostic radiology, radiology, and anesthesiology) have had relatively slow growth. On the other hand, some at the low end, such as colon and rectal surgery, ophthalmology, gastroenterology, and urology, have had large increases in women. What can account for the levels differences and changes in the fraction female among the various specialties?

We have used various printed guides (e.g., Iserson 2006, Freeman 2007) intended to assist medical students in making decisions about residency and fellowship programs, to obtain information on the requirements and work life for each of the specialties. Because requirements for each specialty can change, we first examine the relationship between fairly recent data on clinical and patient hours per week and the fraction female among those less than 45 years old.

Figure 4 shows that women appear to be attracted to specialties with lower weekly hours, although the causation could be that specialties with a higher fraction female have lower average hours because women work fewer hours by choice. The positive outliers are two fields (pediatrics and Ob-Gyn) that have a client base that is disproportionately female or child. The surgical specialties tend to be in the higher end of the hours distribution and these may contain other aspects that deter women from entering. There may be other reasons why women eschew many of the surgical fields, for example their longer residency period. But even without the various surgical specialties, the relationship between hours and fraction female is still negative.

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[3] Some of the specialties, it should be noted, are far smaller than others. Among those at the high end of the fraction female distribution, public health, occupational medicine, medical genetics, immunology, general preventive medicine, and forensic pathology each contain less than 1 percent of all physicians. Ob-gyn, pediatrics, psychiatry, and family practice each have more than 5 percent of all physicians.

Weekly clinical and patient hours do not provide a complete picture of the time demands of physicians. A complementary indicator of workload, and one that is more exogenous than actual hours, is whether the specialty has on-call, emergency, or night hours on a regular basis. We created an indicator variable of this characteristic. The specialties that have relatively few younger female physicians are generally those with more excessive demands. Among the 26 specialties, with information on workload characteristics, 8 of the 13 with the lowest fraction female had high demands but just 3 of the 13 with the highest fraction female had high demand (one of which is Ob-Gyn). Women, in addition, are less apt to be in specialties with the longest residency and fellowship training periods and they are also somewhat less apt to be in specialties for which residency programs are considered the most difficult to enter. Although some of the differences in workloads and training demands are due to the fact that the surgical specialties have a lower fraction female, these relationships generally hold even in their absence.

As we pointed out, some physician specialties have undergone large changes in the fraction female during the past several decades. The reason for the change often reveals much about the demand for workplace amenities. Gastroenterology provides one of the best examples. For years this specialty had among the lowest fractions female. In 2007 just 5 percent of these specialists were women among those 55-64 years old, 11 percent were among those 45 to 54 years old, 18 percent were in the 35 to 44 year old group, and 30 percent were of those less than 35 years old. One of the reasons for the large shift of women to this specialty is the expansion of routine and scheduled colonoscopies. That growth meant a large increase in the demand for those who perform colonoscopies, such as gastroenterologists and colon and rectal surgeons.[4]

2. Veterinary Medicine

The increase of female veterinarians from the 1970s to the present day is probably the largest among all the professions with degrees listed in Table 2. What are the reasons for women's enormous inroads in this field? Female veterinarians like to emphasize their attraction to the caring nature of their profession, but that aspect of the job has not changed much. Compelling evidence suggests that the increasing ability of many veterinarians to schedule their hours and reduce or eliminate on-call, night, and weekend hours has been a contributory factor.

The organizational changes that transformed many veterinary practices involve the rise of regional veterinary hospitals and other emergency facilities. During nights and weekends these hospitals care for the clients of smaller veterinary practices, allowing these practices to be closed during all but regular daytime hours. Another factor is that female veterinarians appear to shy away from being equity stakeholders in their practices and there is a recent movement to larger, corporate ownership of veterinary practices.[5] These two factors are not the only reasons for the increase of female veterinarians. We do not yet have information on practice settings and their change over time. But

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[4] The increase in the fraction female with age for colon and rectal surgeons is similar to that for gastroenterologists. These are almost ten times as many gastroenterologists as there are colon and rectal surgeons. Although the former do many of the scheduled colonoscopies and endoscopies, colon and rectal surgeons also perform many colonoscopies. See American Medical Association (2009).

[5] We will show that female veterinarians, conditional on age, have a far lower equity stake. This fact has implications for ownership in the veterinary business as the older, mainly male, generation retires and the younger, mainly female, takes their place. Corporate ownership of veterinary businesses has been expanding. For example, National Veterinary Associates is the largest private owner of free-standing veterinary hospitals in the United States and currently owns 96 animal hospitals with 300 veterinarians in 29 states (see <http://veterinarybusiness.dvm360.com/vetec/article/articleDetail.jsp?id=472439>).

we do have thick information on veterinarians in 2007 from which we can make some inferences about the time series changes.[6]

Because the total number of active veterinarians in the nation is small (probably around 60,000), the more usual sources, such as CPS and even the decennial census, do not yield adequate information with which to explore the preferences of female veterinarians relative to male veterinarians and understand the time series changes.[7] We are fortunate to have a data set of almost 4,000 veterinarians in 2007 from a biennial survey taken by the American Veterinary Medical Association.[8]

A number of important aspects of female and male veterinarians can be seen in Figure 5. The most apparent is the sharp change in the ratio of female to male veterinarians either with age or with time since degree. The graph mimics the data on veterinary degrees given in Figure 2, rising from around 10 percent for those graduating more than three decades ago and currently 60 years old, to almost 80 percent for the most recent graduates of veterinary colleges. Another key aspect (given in Figure 5.B) is that female veterinarians decrease their hours of work a few years after joining a practice and then, if the cross section data provides any guide, continue to work considerably shorter hours than male veterinarians. Their hours of work average around 44 per week whereas male veterinarians average around 53.

Related to the data on hours of work is that, among the ever-married group, more than 20 percent of female veterinarians work part-time from their late thirties to their early fifties (once again, if the cross section is a reasonable guide). Among male veterinarians, less than 5 percent work part-time. The interesting finding for female veterinarians is that part-time work is relatively the same from around the mid-thirties to the early-fifties. We use the ever-married group because the survey does not provide information on children. It would appear that ever-married women decide to work shorter hours or to have no on-call, night, and weekend hours when young and then stay with their routine.

A far higher fraction of male than female veterinarians in private practice have an equity stake in their practice and men have considerably more invested conditional on any equity stake. These relationships exist across all ages and are not just a product of the more recent surge in female veterinary students.

In Figure 5.D the fraction of women with an equity stake is shown to be less than half that for men at all ages. Whereas about 75 percent of male veterinarians in private practice in their late forties and fifties have some equity stake in their practice, about 35 percent of female veterinarians do. In addition, conditional on having any equity stake, male veterinarians have a far higher amount invested in their practice.[9] On average men have almost $100K more than women invested in their practice, given their age.[10]

Female veterinarians earn less than male veterinarians and these differences are explored in Table 3 in a regression context to hold factors, such as hours and weeks worked and job experience differences, constant. The raw difference

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[6] Summary tables from the survey are published by the AVMA. For example, those for 2005 are in AVMA (2006); see http://www.avma.org/reference/marketstats/compensation.asp.

[7] Data at <http://bhpr.hrsa.gov/healthworkforce/reports/factbook02/FB505.htm> gives 60,100 total active veterinarians for the year 2000 or 21.8 per 100,000 population in the U.S.

[8] Prior surveys are either not available or are unusable in micro-data form.

[9] The lower equity amount for female versus male owners can be seen in the two lines in Figure 5.D, each of which are fifth degree polynomials fitted to the means in the various age bins.

[10] The $100K figure comes from a regression of the amount of equity invested in the practice, conditional on being greater than zero, on age, age squared, and a dummy for male. The coefficient on the male dummy in a regression of ln (equity) and the same covariates is about 70 log points.

between male and female earnings, without any covariates, is 40 log points (the ratio of uncorrected female to male veterinary earnings is 0.67). But male veterinarians are considerably older than female veterinarians and work longer hours and more weeks per year. Adding job experience and its square reduces the female dummy to 31 log points. The female dummy is 17.6 log points when hours and weeks (both entered in logs) are added. Including other reasonably exogenous variables such as whether the veterinarian is board certified, did a residency, has an ownership stake in the business, and lives in a small or moderately sized community slightly reduces the coefficient on female further to 16.6 log points (making the ratio of female to male earnings = 0.85).

Several factors reduce the coefficient on female further. One is ever-married status interacted with female. Because we do not have information on whether a female veterinarian has children, ever-married status is our best proxy. About 9 log points of the difference can be accounted for by differences between ever-married and never-married women or men leaving 9 log points of unexplained or residual gap.

Another important factor to emphasize is the impact of taking any time off from veterinary practice. We earlier showed, using our Harvard and Beyond (H&B) data, that the career penalty from job interruptions varied considerably by profession. MDs had the lowest penalties and MBAs the highest. In our H&B data, time off was meant to exclude additional education and training. In our veterinary data, time off includes further education and, inconsequence, we also add in Table 3 whether the individual did a residency, internship, or was board certified. The coefficient on time off is relatively small – just 9 log points for any time off given the specification in Table 3. It is closest to the estimates for the MDs in the H&B data than it is to that for any of the other professions. When the specification is virtually identical to that in Table 2, the impact of any time off is no different from zero and the entire impact of job interruptions comes from the amount of time off rather than whether any time was taken.

In sum, women have greatly increased their numbers in veterinary medicine. There is no specialty in medicine that has a greater fraction female and none in which in the fraction female has increased as much since 1970.

Female veterinarians state that they find the field attractive because of their love of animals and because they do not have to interact as much with the public as in medicine. But the extraordinary relative growth among women is probably due to changes in the organization of the industry which, in turn, may have been hastened by a critical mass of female veterinarians.

One is the ability of veterinarians to be in private practice yet not have evening, weekend, and on-call hours. About 40 percent of female veterinarians in private practice in 2007 (versus 27 percent of male veterinarians) stated that they put in no emergency hours. Rural veterinarians and those outside major urban areas do put in more emergency hours than do those in large cities and many work on-call and have night duty. But hours in general for veterinarians are lower than are those of physicians and a greater fraction work part-time.

The reason that many veterinarians can have normal hours and some can work part-time, is that regional and emergency animal hospitals have spread even in smaller cities. These hospitals take care of after-hour emergencies and they use their greater scale to purchase expensive medical equipment and hire board-certified veterinarians.

Another factor that has made the veterinary profession friendlier to women is that joining a private practice does not mean that one has to be an owner or an equity stakeholder. The data we have presented suggest that women are less inclined to be owners and stakeholders. Some portion of the growth among female veterinarians is because many

in private practice are employees rather than partners, making them more substitutable for each other. The case for this reasoning, we will see below, is greatest for pharmacists among the groups considered here.

3. MBAs: The Corporate and Financial Sectors

We noted earlier that among the most numerically important professions in our H&B sample, MBA women have the lowest labor force participation rates, the longest periods of job interruption when they have children, and forfeit the largest fraction of their income when they take time off. To understand why MBA women's career trajectories are more extreme than those of other female professionals, and to comprehend how women have fared in this highly lucrative sector, Marianne Bertrand and the two of us surveyed the 1990 to 2006 MBA graduates from the Chicago Booth School.

Our sample consists of about 2,500 MBA graduates, 25 percent of which are female. Because the survey is retrospective, the resulting data set contains more than 18,000 person-years on earnings and hours, other employment information, and detailed information on marriage and family. Our detailed findings, and more information about the sample, can be found in Bertrand, Goldin, and Katz (2010).

At start of their careers, earnings by gender are almost identical. But five years out a 30 log point difference in annual earnings develops and 10 to 16 years out the gender gap in earnings grows to 60 log points (or that uncorrected women earn 55 percent what men do). Three factors in our data set can explain 84 percent of the gap. Training prior to MBA receipt, e.g., finance courses, GPA accounts for 24 percent. Career interruptions and job experience account for 30 percent, and differences in weekly hours are the remaining 30 percent. All aspects of the gender labor supply gap expand with time since MBA including the fraction not working in a year, the part-time share, and hours worked among full-time workers.

The dynamics of gender differences in labor supply can be seen in changes in hours per week with time since MBA, share working full-time, full-year (FT-FY), which declines to about 0.60 for women, and the share not working which rises to about 0.17 for women. Thus at 10 to 16 years out 23 percent of MBA women who are in the labor force work part-time. Cumulative time not working is about one year for all women 10 to16 years after the MBA. At 10 to16 years out 60 percent work FT-FY, 51 percent do for those with children; the rest is about equally divided between part-time (PT) work and opting-out (see Figure 6). Interestingly, more than half of those working PT employ themselves.

The gender gap in earnings, as we noted, is small directly following MBA receipt and then widens substantially. But even this gap can be largely "explained" by the three main factors: training prior to the MBA and MBA coursework, career interruptions and job experience and hours worked, as can be seen in the (ln) earnings regressions in Table 4. The regressions progress across the five columns: the first has only cohort-year dummies, the second adds schooling, the next includes hours, the fourth adds post-MBA job experience and time off, and the final column includes employer type and other aspects of the job. Note the decrease in the coefficient on female as one goes across the columns and also that there is a large penalty from taking *any* time out, which is about two-thirds of the total penalty from job interruptions.

Not surprisingly children are the main contributors to labor supply differences such as career interruptions and hours worked. Women with children have labor force rates that are 20 percentage points lower than are men's or women's without children. They work 24 percent fewer hours than men or women without children. The impact of children on female labor supply differs strongly by spousal education or income. MBA moms with high earning

spouses (> $200K, in 2006$) have labor force rates that are 18.5 percentage points lower than those with lesser earnings spouses. They work 19 percent fewer hours (when working) than those with median or lower earnings spouses. Note that the MBA mom's with non-high earning spouses show no effect on participation from kids, but they do work fewer hours than women without kids. The effect of husband's income, moreover, holds up in individual fixed-effects estimation.

Another important result is that the impact of a birth on labor supply grows over time in an individual, fixed-effects estimation. The effect after one year is about 60 to 70 percent the effect measured at five-plus years. A year after a first birth, women's hours are reduced by 17 percent and their participation by 13 percent. But three to four years later, hours decline by 24 percent and participation by 18 percent. It is as if some MBA moms try to stay in the fast lane but ultimately find it is unworkable. The increased impact years after the first birth, moreover, is not due to effect of additional births.

One of the most revealing parts of the analysis, and one that hints at the mechanism, is to divide the sample by the income of the husbands. Women with richer husbands decrease their participation by 31.5 percentage points, work 20 percent fewer hours, and earn about $200K less at five years since the first birth than they otherwise would. The changes, moreover, increase significantly with time since the birth. Those with lower-income husbands do not decrease their participation and have a far lower "hit" to their income, although they do work fewer hours.

Women who marry high-earnings spouses and who do not have children work more, not less, than those who marry the lower-earnings spouses. The interaction of kids and high earning husbands is what matters.

Part-time work in the corporate sector is uncommon and part-timers are often self-employed (more than half are at 10 to16 years out). Because of the use of self-employment, the opt-out group is actually smaller than the part-timers. Disparities in career interruptions and hours worked by sex are not large but the corporate and financial sectors impose heavy penalties on deviation from the norm. Some female MBAs with children, especially those with high earning husbands, find the tradeoffs too steep and leave or engage in self-employment.

In sum, the MBA lure for women is large – incomes are substantial even though they are far lower than those of their male peers. But some women with children find the inflexibility of work insurmountable. Some leave or become self-employed. Gender differences in labor supply are largely driven by the presence of children and those with well-off spouses exit the labor force more often and work fewer hours. MBA moms with less well-off spouses employ more childcare services, whereas those with high income spouses who drop out take care of their own kids. When MBA moms leave the labor force, they give "family" as the reason, not career, and therefore it does not appear that MBA moms are forced out.

4. Pharmacy

The pharmacy industry experienced large structural changes precisely when female pharmacists substantially increased in number. Women were about 8 percent of all pharmacists in 1966 and are almost 60 percent today. Similarly, the fraction female among pharmacy school graduates increased from 14 percent in the mid-1960s to almost 70 percent today (see Figure 7).

Pharmacists are found in several sectors. Although the most important numerically is retail sales, pharmacists are also employed in hospitals, government, industry, and academia. About 55 percent of all full-time pharmacists are

employed in retail today, 25 percent hospitals, and the remaining 20 percent in the other sectors. But in 1974 almost 75 percent of all pharmacists were in retail sales.

The vast majority of pharmacists are now employees, either staff members or managers. Of all pharmacists in 2000, just 7.6 percent were owners or partners and a mere 5.6 percent were self-employed in 2007. Men were owners at four times the rate of women in both years. In contrast, more than 35 percent of all pharmacists were self-employed in 1970 and 30 percent were owners or partners in 1974. Increased pharmaceutical employment in chain stores and supermarkets has been the largest single reason for these industry changes.[11]

The fraction of pharmacists who are owners or employees in independent practice also declined substantially, a fact that is related to the decline of ownership and the decreased fraction of pharmacists in retail. In the late 1950s about 75 percent of all pharmacists were owners or were employed by an independent practice; in 1974 45 percent were and today just 14 percent are. All of these changes occurred just in the retail sector, even though the data given are for all pharmacists, and therefore, their impact on retail establishments alone is much larger.[12]

Each of the changes just mentioned has had major implications for the pharmacy work environment and has decreased the cost to pharmacists of working part-time, part-year, and not being owners or equity stakeholders. The impact on female pharmacists has, in consequence, been large and these changes are probably the single most important factors prompting the enormous increase in female pharmacists.

Interestingly, female pharmacists in the 1950s were employed part-time to about the same extent they are today. They located part-time work in independent pharmacies as assistants to the owner. Their earnings were considerably less than those of the owners who were the residual claimants and the main decision makers. As chain stores expanded, however, more pharmacists became employees. Their earnings no longer included a premium to compensate for the added risk and responsibility and their hours were reduced.

The large organizational and structural changes in the pharmacy industry decreased the costs of offering job amenities in the retail sales. The changes in retail sales reduced the compensating differential to ownership, long hours, and being the residual claimant. Structural changes in pharmacy (and for similar reasons in optometry) were rooted in larger shifts in retailing in America, and elsewhere in the world, that increased the benefits of large scale. It would be hard to assign credit for the spread of WalMart, Target, Costco, CVS, Rite Aid, Walgreens, and other chains that have pharmacies to women's increased numbers in the pharmacy profession.[13]

D. Professional Incomes, Hours, and Self Employment since the 1970s

Data from the U.S. decennial censuses from 1970 to 2000 and the American Community Surveys (ACS) for 2006-08 allows us to compile information on incomes, hours, and self employment for most of the professions just discussed as well as for some others. We present that information in Table 5 for six professions – dentists, lawyers, optometrists,

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[11] The 2000 figure comes from Midwest Pharmacy Workforce Research Consortium (2000) and is nearly identical to the 2000 figure from the U.S. population census in Table 5. The 2007 figure is from Table 5. The 1970 figure is from Table 5 and that for 1974 is from Northrup et al. (1979).
[12] See sources in Figure 7; ownership data are from Northrup et al. (1979, table III-10).
[13] See Bottero (1992) for a similar discussion of United Kingdom data.

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pharmacists, physicians, and veterinarians – for the decennial census years from 1970 to 2000 and for 2007.[14] The main findings concern the relative number of women in each profession, the fraction working part-time, the fraction self employed, and the relative income of women to men in the profession.

The most obvious change is the relative increase in women across all professions. These "stock" data reinforce the findings from the "flow" data in Figure 2. In almost all cases and in all years, the fraction of male professionals working part time was considerably less than that for females. In addition, for most professions the fraction part time by sex underwent only small changes during the past 40 years.[15] Male dentists are the exception and they greatly increased their fraction part time. Mean hours of work decreased for men in all the professions except law.

An important, and surprising, fact is that female professionals have had a fairly large fraction working part time ever since 1970. Because women's share of total employment in these professions increased, the fraction working part time for the entire group increased.

In most of these professions something changed that enabled women and some men to work part time. That change, it appears, was a decrease in the benefit of the disamenity to the firm and in some cases it is related to the decrease in self employment.

Self employment fell for men in all the professions in Table 5. In some cases, such as medicine and pharmacy, the decrease was considerable. In 1970 60 percent of all male physicians were self employed (75 percent were in 1940); today just over a third are self employed. In 1970 38 percent of male pharmacists were self employed (40 percent were in 1940), but just 9 percent are today.

The decrease in self employment is consistent with the theory outlined above in which change was caused by a factor that decreased the cost to firms of providing the amenity. The change from owners to employees meant that these professionals became better substitutes for each other. Whereas an owner of a pharmacy worked or was on-call whenever the pharmacy was open, pharmacists working as employees under a manager can put in as many hours as they want at a constant hourly rate.

Relative earnings of women increased in all of the professions listed, less so in law than in the health-related professions. Without a micro-analysis of the data it is not clear what factors account for the change. We explore that in the next section.

E. Integrating the Vignettes, the Data, and the Model

Each of the vignettes concerned a profession with a rapidly rising female presence during the past four decades. Although some experienced little change in work flexibility during those decades, most underwent substantial change. These organizational changes greatly impacted the ability of these professionals to work fewer hours, engage in part-time work, have job interruptions, and partake in self employment to suit their living styles.

We noted that some professions and specialties were greatly affected by technological change. That was the case, for example, in colon and rectal surgery, a specialty that had a large influx of female physicians largely because of the

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[14] We combine the ACS for 2006, 2007, and 2008 to obtain a 3 percent sample comparable to that for the other years. We also have data for 1920 to 1960, but because the samples are small (1 percent of the population) the number of individuals in each profession, especially for women, is often too small to use.
[15] Stasis in the fraction part time extends for several more decades into the past (not shown in the table).

diffusion of a technology used in a scheduled procedure. Organizational and structural changes occurred in other professions, as in veterinary medicine and pharmacy. Some, however, experienced little or no change. We showed that many of the occupations that employ MBAs impose large penalties for deviance from the norm of long hours and no job interruptions and that some medical specialties still require night, weekend, and on-call hours.

We have made a case for the exogeneity of change in the pharmacy and optometry sectors with the rise of chain and multi-good stores with pharmacies and eye glass dispensaries. Similarly, in veterinary medicine scale advantages in the use of expensive medical equipment and the hiring of veterinary specialists prompted the rise of regional veterinary hospitals. These hospitals enable veterinarians in private practice to eliminate night, weekend, and vacation hours. The appearance of emergency veterinary facilities preceded the increase of female veterinarians, but these facilities took off after the expansion in female veterinarians. Some of the growth of regional veterinary hospitals may, therefore, have been an endogenous response to an increased demand by veterinarians for shorter and more flexible hours.

Similarly, for some medical specialties, such as pediatrics, the high and increasing fraction female of the total group may have led to changes in practice settings and enabled greater amounts of part-time work. Surveys of the American Academy of Pediatrics show that the fraction of female pediatricians working part-time increased from 28 percent in 2000 to 32 percent in 2003, and to 36 percent in 2006 (Cull et al. 2010). That for male pediatricians increased from 4 to 8 percent from 2000 to 2006. The increase, moreover, was found across all age groups but was greatest for younger and older pediatricians.

The compensating differentials framework contains two cases to understand the dynamics of workplace flexibility and gender differences in the workplace. In one, the change in workplace flexibility comes about because of an increase in the group with the greater demand for the amenity (that is, an increase in the group willing to pay more for it) or a change in preferences for the amenity. That is the demand side case. In the other case, the costs to firms of providing the amenity or of reducing the amount of the disamenity decreases. That is the supply side case.

Case 1: Increased demand for the amenity, meaning an increased willingness of some workers to pay for the amenity. Implications:
   (a) Increase in the cost of the amenity, and by implication an increase in the gender gap of earnings;
   (b) Increase in the fraction of the total workforce with the amenity (but a decrease in the fraction of men with the amenity since its price rises).

Case 2: Increased supply of the amenity, meaning a decreased cost of providing the amenity. Implications:
   (a) Decrease in the cost of the amenity, and by implication a decrease in the gender gap of earnings;
   (b) Increase in the fraction of the total workforce with the amenity (and an increase in the fraction of men with the amenity since its price decreases).

In both cases a higher fraction of workers take the amenity after the change, although it will be greater in Case 2. One major difference between the two cases concerns the equilibrium wage rate differences. In the first case it rises and in the second case it falls.

The changes noted in the previous section concerning the decrease in self employment and the increase in part time work, would probably have decreased the earnings of those who placed only a small value on the amenity. That is, in some professions the ratio of female to male earnings should have increased. The evidence in Table 5 supports that

implication. Relative earnings of women increased in almost all professions and especially in those, like pharmacy, optometry, and veterinary medicine, in which self employment declined and probably did so for exogenous reasons.

Regressions using the micro-data for the ACS (2006 to 2008) confirm that the decrease in self employment could have increased the relative earnings of women in many professions. Across all high-education professions in which the self employed are a relatively high fraction, men who are self employed earn more than their employee counterparts but women do not.[16] The same holds for veterinarians, and the detailed information on veterinarians given above corroborates that ownership increases earnings generally.[17]

Another implication of the theory is that as the cost of providing the amenity decreases the group that values it most (generally women) will increase relative to the group that values it least (generally men). As the premium to residual claimants and owners decreases, those who prefer ownership will leave for, or train, in another occupation. In professions such as pharmacy and veterinary medicine, the increase in the fraction female may have been fostered both by an increase in women, who wanted the amenity at lower cost, *and* a decrease in men, who wanted the higher compensation awarded to those who were willing to accept the disamenity. In professions like dentistry and chiropractic medicine, self employment decreased far less and the fraction female did not increase as much as in other professions.

F. A Bigger Picture and a Conclusion

We have examined a small number of important, high end occupations in details. We have found that family friendliness differs in terms of the "cost" to the workers and to the firm, and that exogenous and endogenous changes have altered these costs.

To understand earnings differences between men and women more generally and the implicit role of workplace amenities, we examine the relative incomes of men and women in the top 87 occupations by male income.[18] After accounting for potential experience, hours worked, weeks worked, and other observable factors, the remaining difference between men and women by occupation is largely due to the penalties imposed on women for greater job interruptions and their need for more flexibility. The results for 2006-2008 given in Figure 8 are striking.

Each dot is one of the 465 occupations listed in the census. The horizontal axis gives (male) income in logs and the vertical axis gives the earnings gap in log points (approximately the percentage penalty) between the average man and woman in an occupation given potential job experience, hours of work, weeks of work, region, and race.[19] The occupations are divided into those that concern business, health, science, technology, and all others.

The first thing to note is that all 87 occupations are situated just at or below the horizontal axis. That is, in all occupations women make less than men given the somewhat rich group of covariates included in the regression. More interesting is the manner in which the occupations group. The business occupations (squares) are generally the most negative, whereas the technology occupations (light triangles) are the most positive. The health occupations

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[16] Eleven occupations are considered for which the fraction self employed exceeds around 25 percent and mean years of education exceeds 16. The regression of log income (including business and farm income) holds various factors constant, such as potential job experience, hours, weeks, years of education, race and region. The regression excludes lawyers for whom self employment is more ambiguous.

[17] Earnings is higher for owners and, in addition, is higher by the amount of equity invested.

[18] The top 87 by male income includes all of those above and including post-secondary school teachers.

[19] The sample includes 25 to 64 year olds who work full-time (> 34 hours per week), full-year (> 39 weeks per year).

(diamonds) are mixed with those having the greatest fraction self employed being the most negative and the ones that had decreases in self employment being the least negative.

We previously saw that business occupations place heavy penalties on employees who deviate from the norm. But why do the technology occupations appear to penalize women far less? One possibility is that the technology occupations are so recent that their work organizations are structured to deal better with a labor force that needs greater work flexibility.

We have estimated the same equation across all occupations in 1980. The results (not shown here) reveal the enormous change in the presence of women in high-end occupations and in their relative (corrected) remuneration during the four decades that separate the two periods. In 1980 the various health professions were at the very low end of the female coefficient distribution, meaning that they penalized women the most. The business professions were also low but there were not as many of them. The technology occupations penalized women the least but not as low as in 2006-08. And far fewer women were employed in upper-end occupations.

In sum, we have examined the relationships among workplace conditions, the costs and the benefits of various workplace amenities, and the fraction female in professions requiring substantial educational investment. We have accomplished this by studying several professions in detail and the implications of a model of compensating differentials. Our main findings are that occupations differ in the degree to which workplace amenities related to flexibility are effectively taxed. Furthermore, these amenities have become less expensive in many health-related occupations as well as in the technology sector.

Table 1: Penalties from Job Interruptions by Highest Degree: Log Earnings Regressions for Four Career Tracks using the Harvard and Beyond Data

Log (Annual Earnings) in 2005	(1) MBA	(2) JD	(3) MD	(4) PhD
Female	-0.441 (0.0979)	-0.370 (0.0667)	-0.332 (0.0466)	-0.310 (0.0509)
Job interruptions ≥6 months				
Any	-0.449 (0.103)	-0.299 (0.0743)	-0.0637 (0.0687)	-0.368 (0.0664)
Share of post-BA years	-0.819 (0.487)	-0.463 (0.351)	-1.09 (0.382)	-0.297 (0.276)
GPA at Harvard	0.711 (0.127)	0.580 (0.0902)	0.114 (0.0690)	0.226 (0.0790)
SAT math $\times 10^{-2}$	-0.0670 (0.0721)	0.0377 (0.0501)	0.0311 (0.0431)	0.0527 (0.0442)
SAT verbal $\times 10^{-2}$	-0.149 (0.0689)	-0.0419 (0.0498)	-0.112 (0.0352)	-0.107 (0.0428)
Dummy variables				
Part-time, full-year	-0.452 (0.193)	-0.661 (0.145)	-0.464 (0.143)	-0.625 (0.129)
Full-time, part-year	-0.785 (0.162)	-0.786 (0.112)	-0.608 (0.0707)	-0.734 (0.0969)
Part-time, part-year	-1.67 (0.149)	-1.67 (0.123)	-1.88 (0.126)	-1.43 (0.103)
49 Harvard concentrations	Yes	Yes	Yes	Yes
Year of Harvard graduation	Yes	Yes	Yes	Yes
R^2	0.433	0.387	0.442	0.401
Number of observations	944	1,381	1,064	1,190
Penalty from job interruptions of 0.1 of post-BA years	53.1 log points	34.5 log points	17.3 log points	39.8 log points

Sources: Harvard and Beyond data. See Goldin and Katz (2008). The full sample is used here and consists of three "cohorts" of Harvard College graduates: graduating 1969-1972 (plus women from 1973), 1979-1982, 1989-1992.

Notes: The dependent variable is annual earnings in 2005. Standard errors are in parentheses under the coefficients. The omitted dummy for work status is full-time, full-year. Dummy variables for missing GPA and missing SAT are included. The last line ("penalty from job interruptions of 0.1 of post-BA years") is computed form the coefficients under "job interruptions."

Table 2: Professional and Other Degrees Awarded during 2007/08

Degree Type	All	Females	Fraction female
First Professional Degrees	91,309	44,693	0.490
Dentistry (D.D.S. or D.M.D.)	4,795	2,134	0.445
Medicine (M.D.)	15,646	7,711	0.493
Optometry (O.D.)	1,304	859	0.659
Osteopathic medicine (D.O.)	3,232	1,651	0.511
Pharmacy (Pharm.D.)	10,932	7,216	0.660
Podiatry (Pod.D., D.P., or D.P.M.)	555	250	0.451
Veterinary medicine (D.V.M.)	2,504	1,924	0.768
Chiropractic medicine (D.C. or D.C.M.)	2,639	956	0.362
Naturopathic medicine	182	146	0.802
Law (LL.B. or J.D.)	43,769	20,572	0.470
Theology (M.Div., M.H.L., B.D., or Ord.)	5,751	1,974	0.343
Masters			
M.B.A.	155,637	69,379	0.446
Doctorates, all	63,712	32,497	0.510
Selected doctorate fields:			
Biological and biomedical sciences	6,918	3,515	0.508
Education	8,491	5,718	0.673
Engineering	8,112	1,744	0.215
Health professions and related clinical sciences	9,886	7,212	0.730
Psychology	5,296	3,856	0.728

Source: U.S. Department of Education, *Digest of Education Statistics* (2009), tables 289, 292, 295.
http://nces.ed.gov/programs/digest/2009menu_tables.asp

Table 3: Gender Gap in Earnings among Veterinarians, 2007

Dependent variable = ln (annual income)	(1)	(2)	(3)	(4)	(5)
Female (= 1)	-0.400 (0.0199)	-0.309 (0.0216)	-0.176 (0.0191)	-0.166 (0.0180)	-0.0871 (0.0433)
Experience		0.0424 (0.00298)	0.0393 (0.00261)	0.0280 (0.00253)	0.0276 (0.00254)
Experience squared × 10^{-2}		-0.0889 (0.00753)	-0.0731 (0.00658)	-0.0528 (0.00623)	-0.0525 (0.00625)
Ln (hours per week)			0.607 (0.0241)	0.556 (0.0226)	0.557 (0.0226)
Ln (weeks per year)			0.576 (0.0337)	0.558 (0.0312)	0.558 (0.0311)
Any time off (= 1)				-0.0901 (0.0206)	-0.0903 (0.0206)
Corporate sector (= 1)				0.319 (0.0320)	0.318 (0.0320)
Gov't employee (= 1)				-0.0591 (0.0233)	-0.0583 (0.0233)
Owner of all or part of practice (= 1)				0.231 (0.0200)	0.229 (0.0200)
Board certified (= 1)				0.215 (0.0279)	0.213 (0.0279)
Residency ever (= 1)				0.105 (0.0304)	0.104 (0.0304)
Internship ever (= 1)				0.0204 (0.0240)	0.0233 (0.0240)
Ever married (= 1)					0.0963 (0.0392)
Ever married × female					-0.0876 (0.0468)
Community-size dummies	No	No	No	Yes	Yes
Constant	11.6 (0.0131)	11.2 (0.0291)	6.62 (0.147)	7.01 (0.139)	6.93 (0.143)
Number of observations	3,382	3,299	3,299	3,299	3,299
R^2	0.107	0.162	0.375	0.475	0.476

Source: AVMA (2009), Report on Veterinary Compensation, survey micro-data. (The 2009 survey report refers to 2007 data.)

Notes: Observations are excluded if the implicit hourly wage is < $13 or > $500. Hours are total and include regular and emergency. Experience is the current year minus the year the individual graduated from veterinary school minus all job interruptions including those for further education. Community-size categories are: < 2,500; 2,500 to < 50,000; 50,000 to < 500,000; 500,000+.

Table 4: Gender Gap in Earnings in 2006 among University of Chicago Booth School MBAs Graduating from 1990 to 2006

| | Dependent Variable = Ln (Annual Earnings) | | | | |
	(1)	(2)	(3)	(4)	(5)
Female (= 1)	-0.287	-0.190	-0.094	-0.064	-0.038
	(0.035)*	(0.033)*	(0.029)*	(0.029)§	(0.025)
MBA GPA		0.429	0.369	0.351	0.347
		(0.054)*	(0.051)*	(0.051)*	(0.043)*
Fraction finance classes		1.833	1.758	1.737	0.430
		(0.211)*	(0.199)*	(0.194)*	(0.180)§
Actual post-MBA exp				0.085	0.029
				(0.071)	(0.064)
Actual post-MBA exp^2				0.005	0.007
				(0.004)	(0.003)§
Any no work spell				-0.228	-0.173
				(0.062)*	(0.054)*
Dummy variables:					
Weekly hours worked	No	No	Yes	Yes	Yes
Pre-MBA characteristics	No	Yes	Yes	Yes	Yes
Reason for choosing job	No	No	No	No	Yes
Job function	No	No	No	No	Yes
Employer type	No	No	No	No	Yes
Cohort × year	Yes	Yes	Yes	Yes	Yes
Constant	12.156	9.493	8.08	7.525	8.324
	(0.018)*	(0.585)*	(0.603)*	(0.694)*	(0.547)*
Observations	18,272	18,272	18,272	18,272	18,272
R^2	0.15	0.31	0.40	0.41	0.54

Source and Notes: See Bertrand, Goldin, and Katz (2010). Standard errors are in parentheses under coefficients.

Table 5: Income, Hours, and Self Employment by Profession, 1970 to 2007

U.S. Census 1970-2000 IPUMS and ACS 2006-08 using Contemporaneous Profession Classifications for 25 to 64 Year Old Workers

Occupation	Males					Females				
	1970	1980	1990	2000	2007	1970	1980	1990	2000	2007
Dentistis										
Mean hours/week	--	41.2	41.7	40.9	39.9	--	36.2	36.0	37.3	36.9
Fraction part time	0.118	0.163	0.176	0.190	0.218	0.363	0.387	0.387	0.321	0.340
Fraction self employed	0.898	0.855	0.767	0.754	0.724	0.411	0.298	0.446	0.505	0.505
Mean income	$26,121	$49,870	$87,114	$156,916	$199,721	$13,886	$20,134	$51,743	$90,917	$132,384
Median income	$22,950	$42,005	$72,150	$114,000	$155,763	$8,250	$14,045	$40,000	$65,000	$103,842
Number of observations	4,508	5,396	6,231	5,812	3,736	124	352	928	1,309	1,246
Lawyers										
Mean hours/week	--	45.4	47.7	48.8	48.5	--	39.4	43.0	44.1	43.7
Fraction part time	0.053	0.058	0.048	0.047	0.047	0.180	0.189	0.154	0.141	0.139
Fraction self employed	0.575	0.508	0.435	0.436	0.370	0.345	0.165	0.189	0.231	0.200
Mean income	$23,439	$40,444	$82,212	$126,431	$169,952	$14,779	$21,385	$52,826	$84,387	$117,005
Median income	$18,600	$31,010	$65,129	$90,000	$122,000	$10,550	$18,965	$43,800	$65,000	$90,000
Number of observations	13,269	19,715	25,056	27,326	20,488	577	3,224	8,311	12,067	10,991
Optometrists										
Mean hours/week	--	41.9	43.9	44.0	41.8	--	36.8	36.7	36.9	34.6
Fraction part time	0.068	0.117	0.075	0.079	0.130	0.194	0.316	0.329	0.299	0.395
Fraction self employed	0.831	0.806	0.697	0.666	0.679	0.484	0.304	0.361	0.374	0.397
Mean income	$20,138	$37,169	$65,648	$108,525	$124,228	$15,327	$17,804	$43,009	$70,648	$88,416
Median income	$18,050	$31,505	$55,000	$84,000	$103,842	$9,250	$13,258	$39,000	$62,000	$86,498
Number of observations	919	1049	1006	951	716	31	92	186	391	433
Pharmacists										
Mean hours/week		45.4	44.8	43.7	42.9		35.4	37.3	37.0	37.0
Fraction part time	0.050	0.057	0.061	0.058	0.078	0.361	0.345	0.286	0.269	0.272
Fraction self employed	0.380	0.287	0.190	0.117	0.094	0.159	0.050	0.041	0.027	0.024
Mean income	$14,248	$24,334	$47,268	$79,518	$116,267	$8,552	$17,762	$35,920	$61,817	$96,144
Median income	$12,950	$22,905	$44,419	$70,000	$106,788	$8,550	$18,060	$39,000	$62,000	$100,000
Number of observations	4,645	4,819	5,177	4,819	3,334	618	1,407	2,846	4,287	3,908

|									
Physicians									
Mean hours/week		56.1	55.6	55.7	54.7		48.4	48.5	50.4	49.1
Fraction part time	0.041	0.040	0.047	0.048	0.048	0.180	0.172	0.167	0.142	0.152
Fraction self employed	0.605	0.518	0.457	0.351	0.325	0.314	0.227	0.248	0.192	0.195
Mean income	$32,334	$59,543	$111,163	$176,907	$223,363	$17,665	$31,793	$65,312	$112,054	$143,395
Median income	$27,150	$50,840	$100,000	$140,000	$186,916	$12,050	$22,365	$50,000	$88,000	$112,128
Number of observations	13,315	17,036	20,400	22,975	16,146	1,263	2,770	5,509	8,766	8,109
Veterinarians									
Mean hours/week		50.9	51.7	51.3	50.5		42.3	45.1	44.9	42.5
Fraction part time	0.045	0.047	0.041	0.049	0.061	0.321	0.211	0.191	0.178	0.230
Fraction self employed	0.662	0.630	0.580	0.588	0.554	0.377	0.227	0.316	0.301	0.261
Mean income	$20,387	$34,325	$61,737	$102,702	$124,844	$12,644	$17,022	$34,863	$57,871	$80,247
Median income	$17,050	$29,405	$50,000	$74,000	$97,000	$9,050	$14,805	$30,000	$49,500	$72,690
Number of observations	997	1,418	1,798	1,786	1,139	53	198	689	1,251	1,270

Source: 1970 to 2000 U.S. Census of Population; 2006-2008 American Community Survey (ACS). 1970 aggregates six 1% samples and is a 6% sample; 1980 to 2000 are 5% samples. The ACS is a 1% sample and the three years are aggregated. The census data are produced and distributed by the IPUMS.

Notes: The sample for each year consists of individuals who worked at least one week in the previous year. Professions are identified using the contemporaneous occupation codes in each respective census. In most years lawyers were classified as "lawyers and judges" and often also include magistrates. Physicians were classified as "physicians and surgeons" in 2000, but presumably include surgeons in other years as well. Hours are based on "usual hours worked in a week." Part time means less than a 35-hour work week. Mean and median incomes are based on wage earnings plus business and farm earnings, unadjusted for changes in the price level. The estimates of mean and median incomes include only those worked full-time and full-year (that is, more than 39 weeks per year and more than 34 hours per week) with implicit hourly earnings greater than one-half the minimum wage in that year. Top-coded incomes are multiplied by 1.4 in all years. "2007" includes 2006 to 2008.
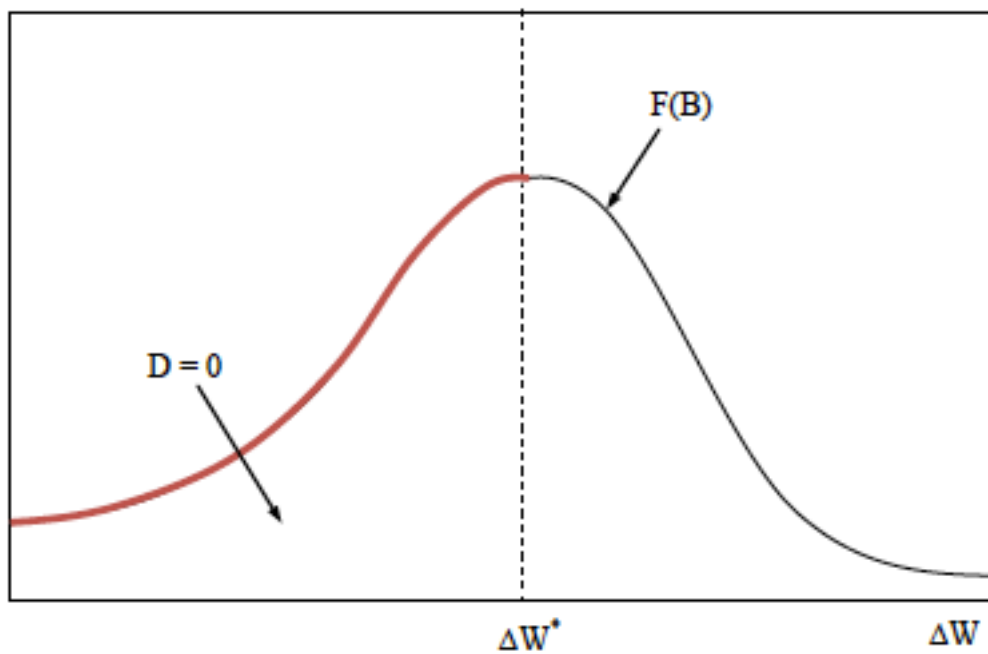
"--" indicates that data for particular survey year or sub-sample were not available.

Figure 1: Schematic Representation of the Market for an Occupational Amenity (D = 0)
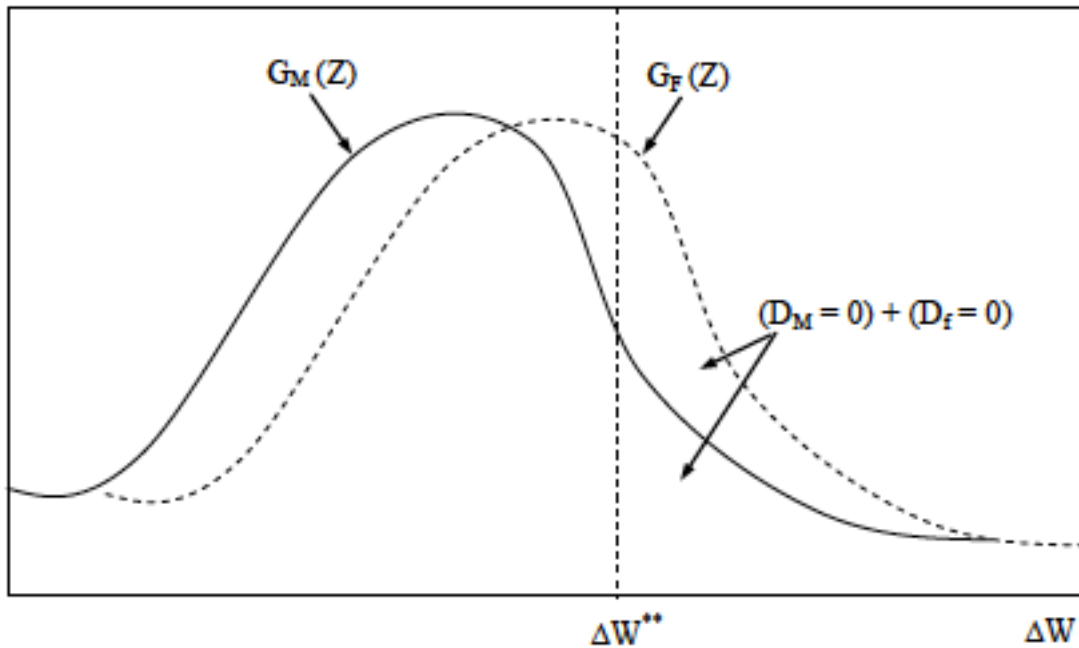
Part A: Amenity demand by workers
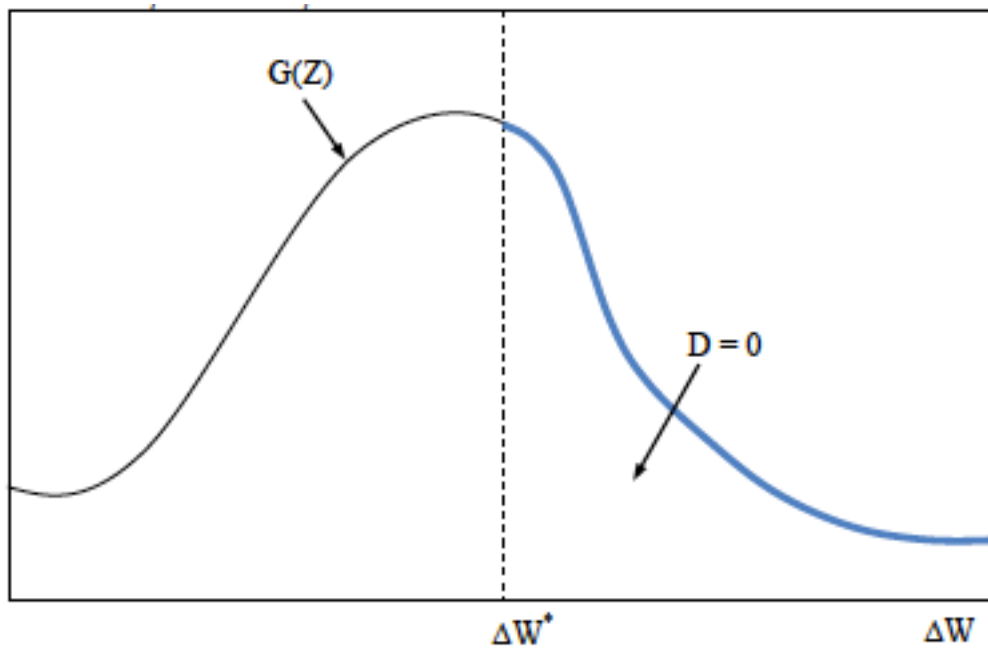
Part B: Amenity supply by firms

Part C: Amenity demand by two types of workers

Note: D = 1 represents the disamenity and D = 0 represents the amenity. G(Z) is the distribution of Z and F(B) is the distribution of B. $G_M(Z)$ and $G_F(Z)$ are the same for males and females. ΔW is the compensating differential between the occupation without the amenity and that one with the amenity. For workers it is a compensating payment; for firms it is a benefit (a negative cost). ΔW*and ΔW** are hypothetical earnings differentials that workers receive and firms pay. See text for a more complete explanation.

Figure 2: Fraction Female among Professional School Graduates, c.1955 to c.2010
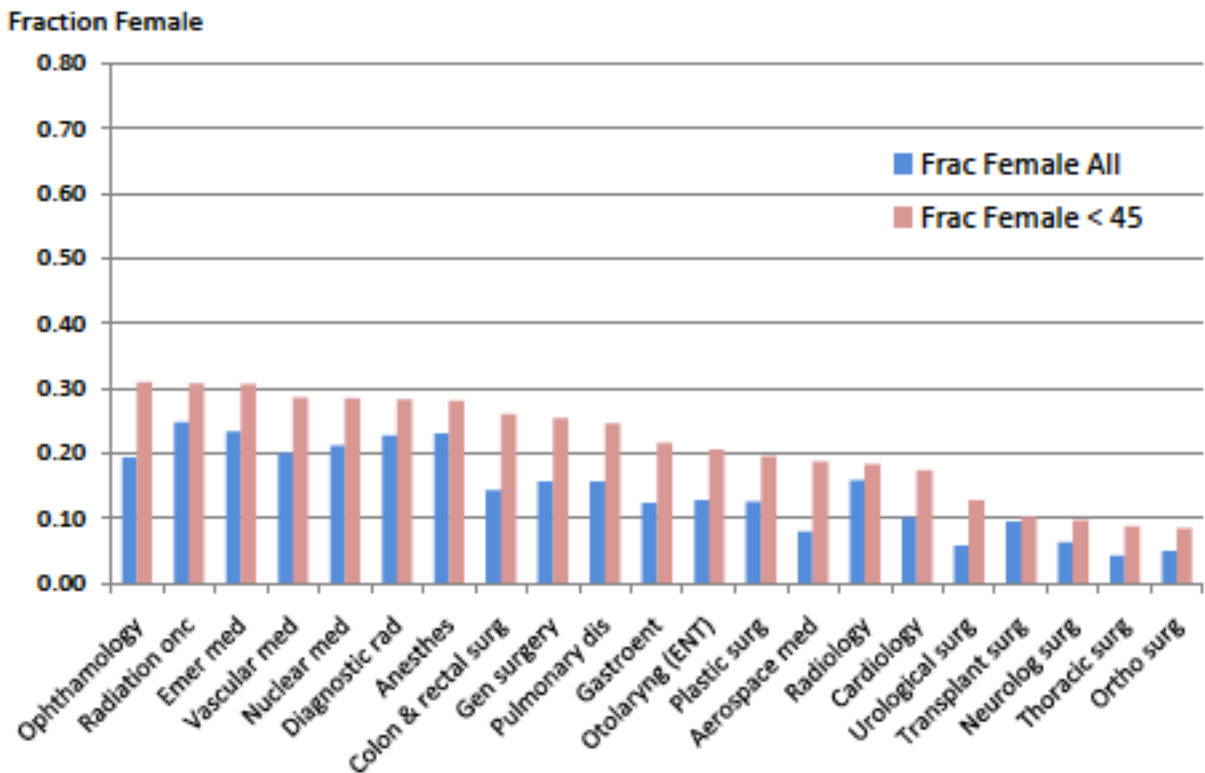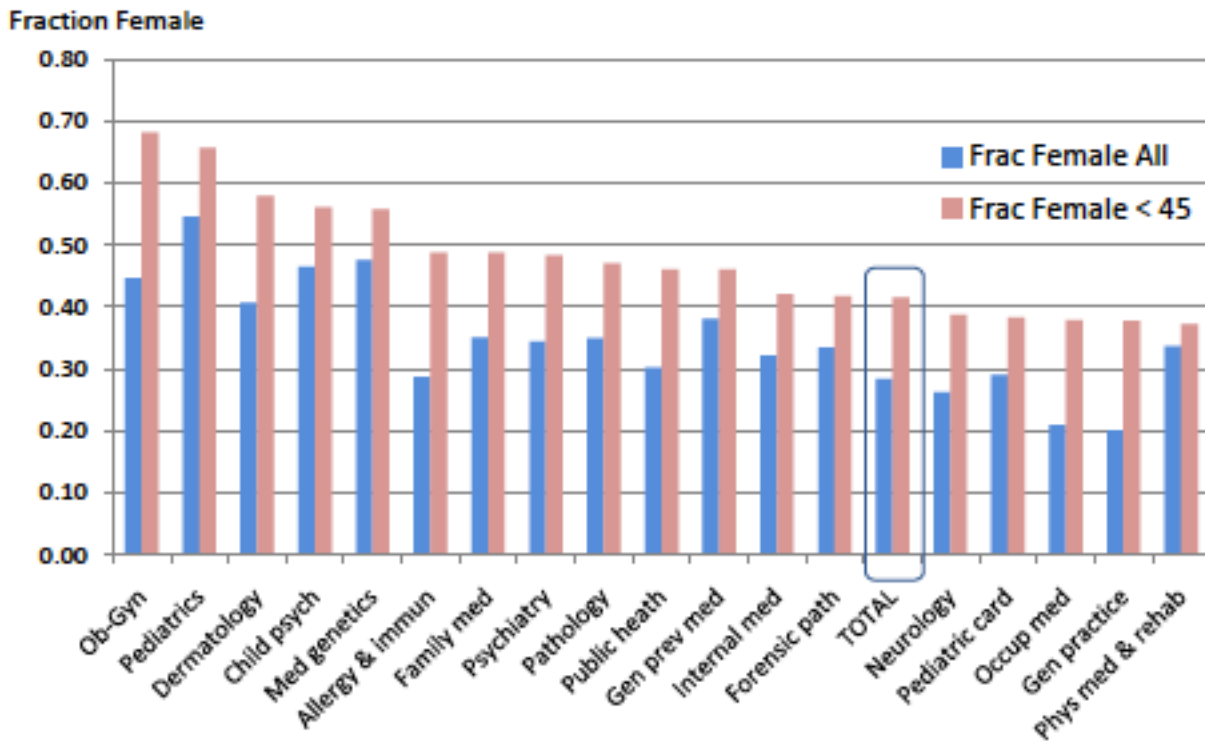
Part A: Four Larger Professions
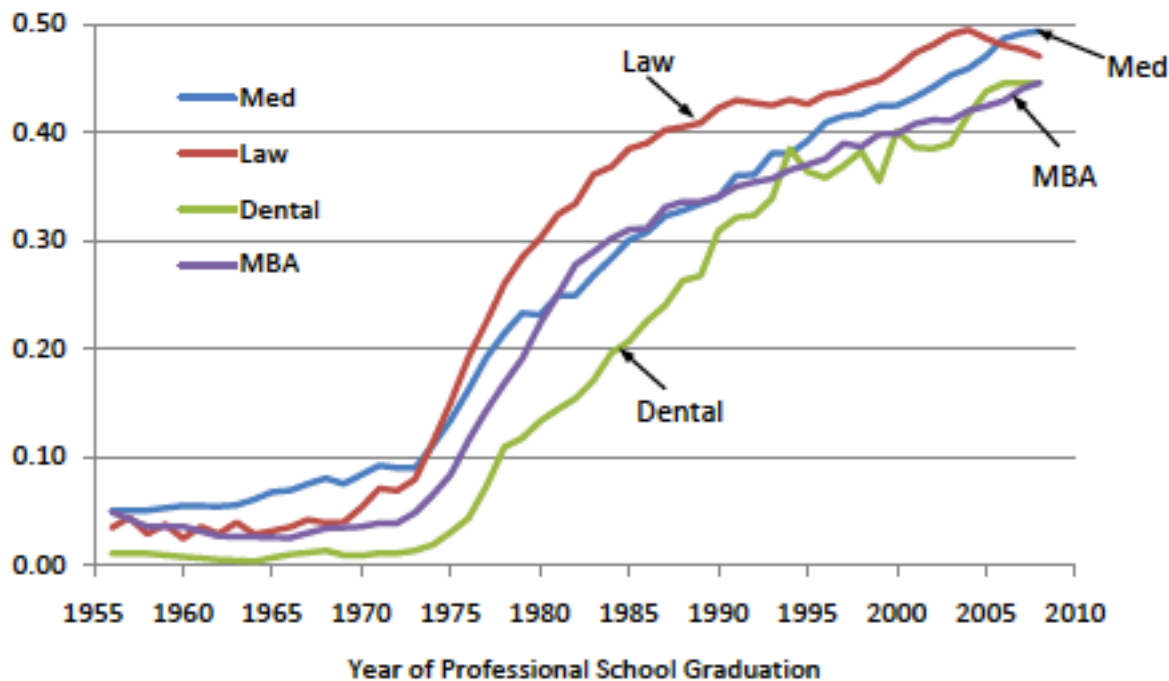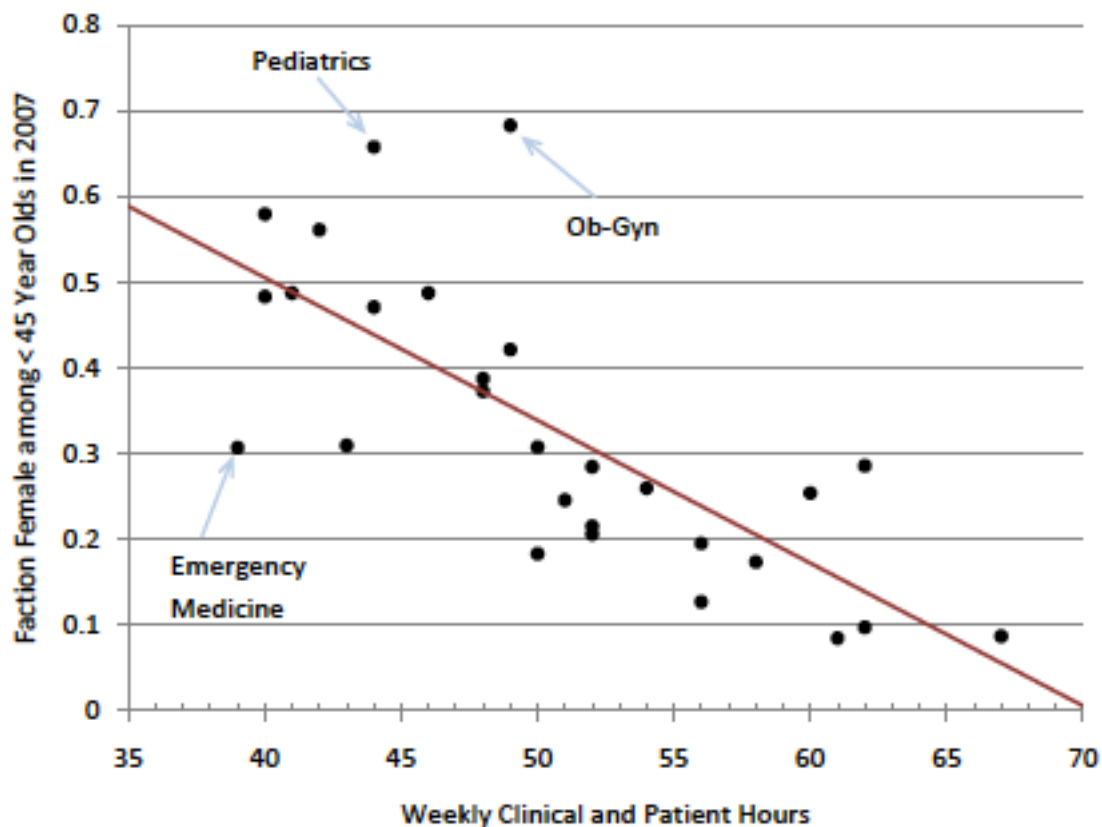

Part B: Four Smaller Professions
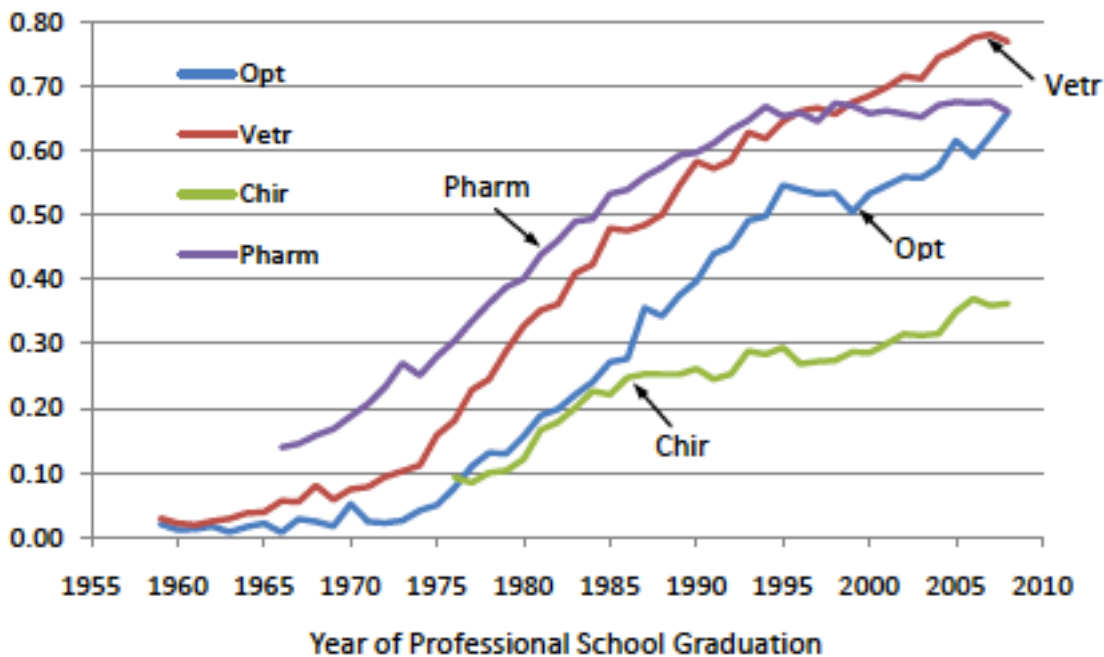
Sources: See Data Appendix.

Figure 3: Fraction Female by Physician Specialty and Age of Physician, 2007

*Source*: American Medical Association (2009).

Figure 4: Fraction Female in 2007 and Weekly Hours of Clinical or Patient Work by Physician Specialty
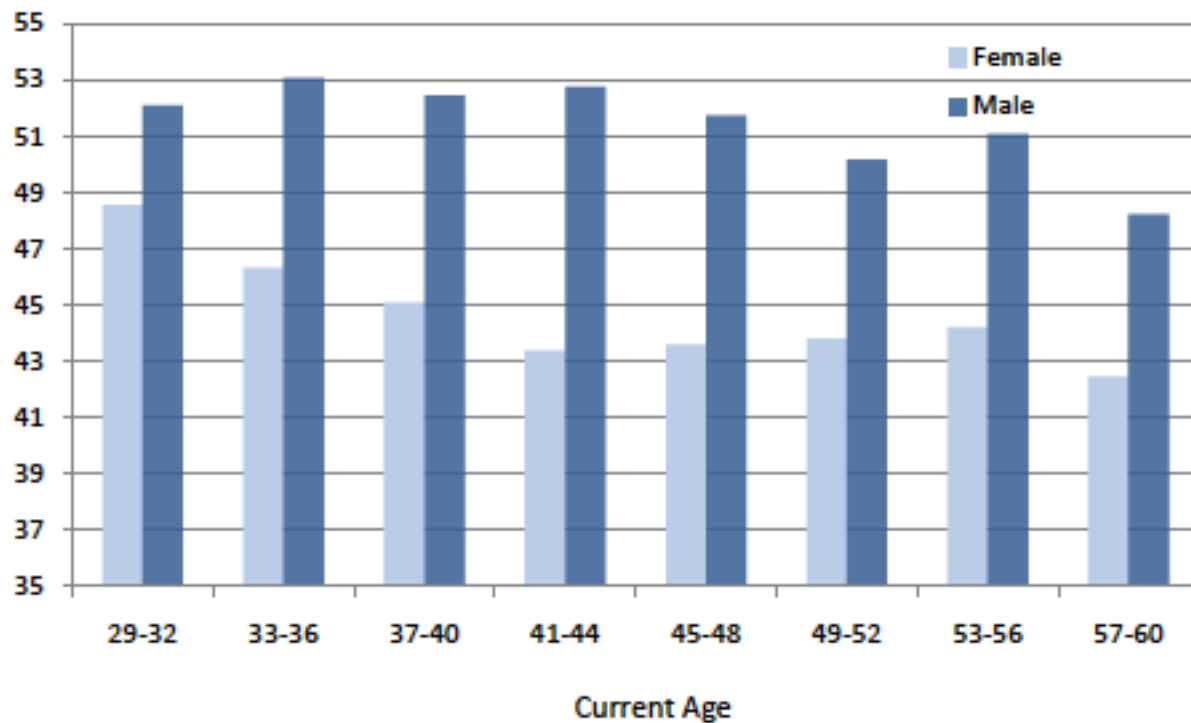

Sources: Hours of work from Freeman (2004); fraction female (less than 45 years old) for various physician specialties in 2007 from American Medical Association (2009)

Figure 5: Veterinarians: Fraction Female, Mean Hours, Fraction Part-time, and Equity Stake
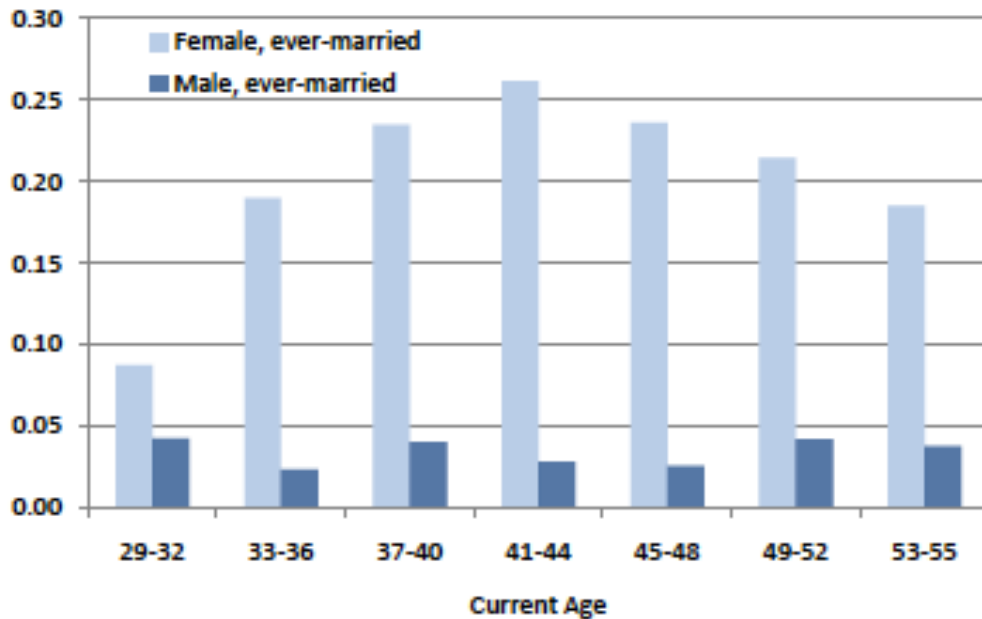
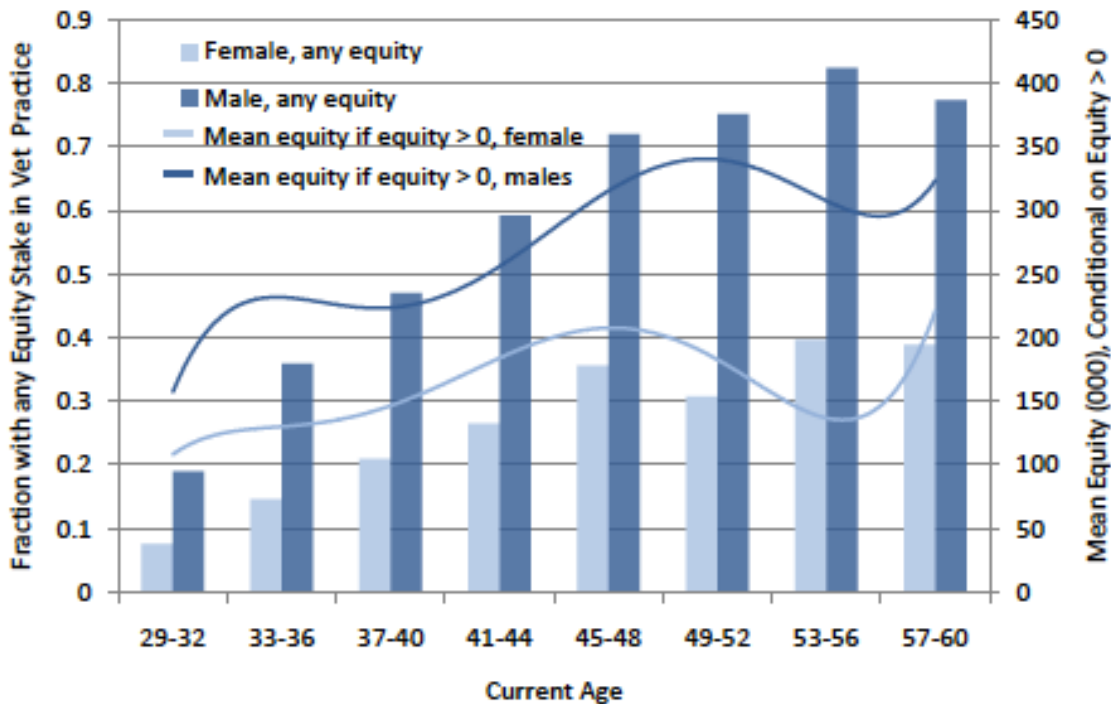Part A: Fraction female by graduation year and age
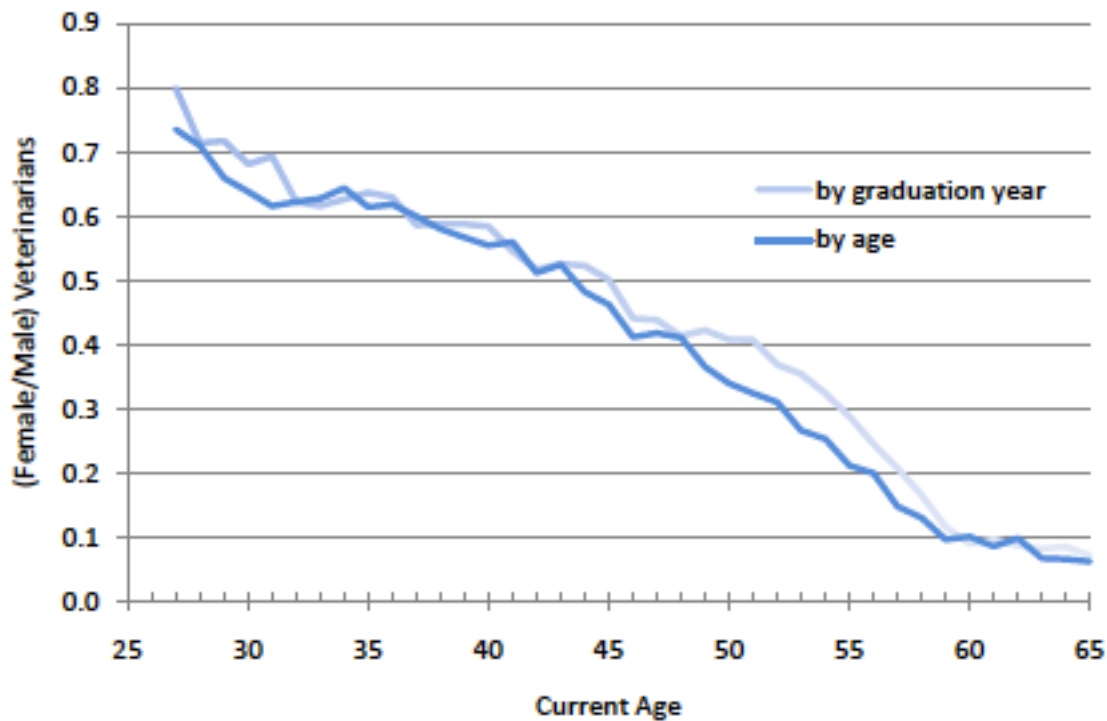
Part B: Mean weekly hours (regular and emergency) by age and sex

Part C: Fraction part time by age and sex for ever-married individuals

Part D: Fraction with any equity stake in their veterinary practice, by age and sex

Source: AVMA (2008), *Biennial Economic Survey*.

Figure 5 Notes: Part A, "by graduation year" assumes that veterinarians are 27 years old at graduation; both lines are three year moving averages. Parts B, and C use equal weights by year of age. Part D is conditional on being in private practice. Older female veterinarians are disproportionately in government positions relative to older male veterinarians and are, therefore, less often than comparable male veterinarians in private practice.
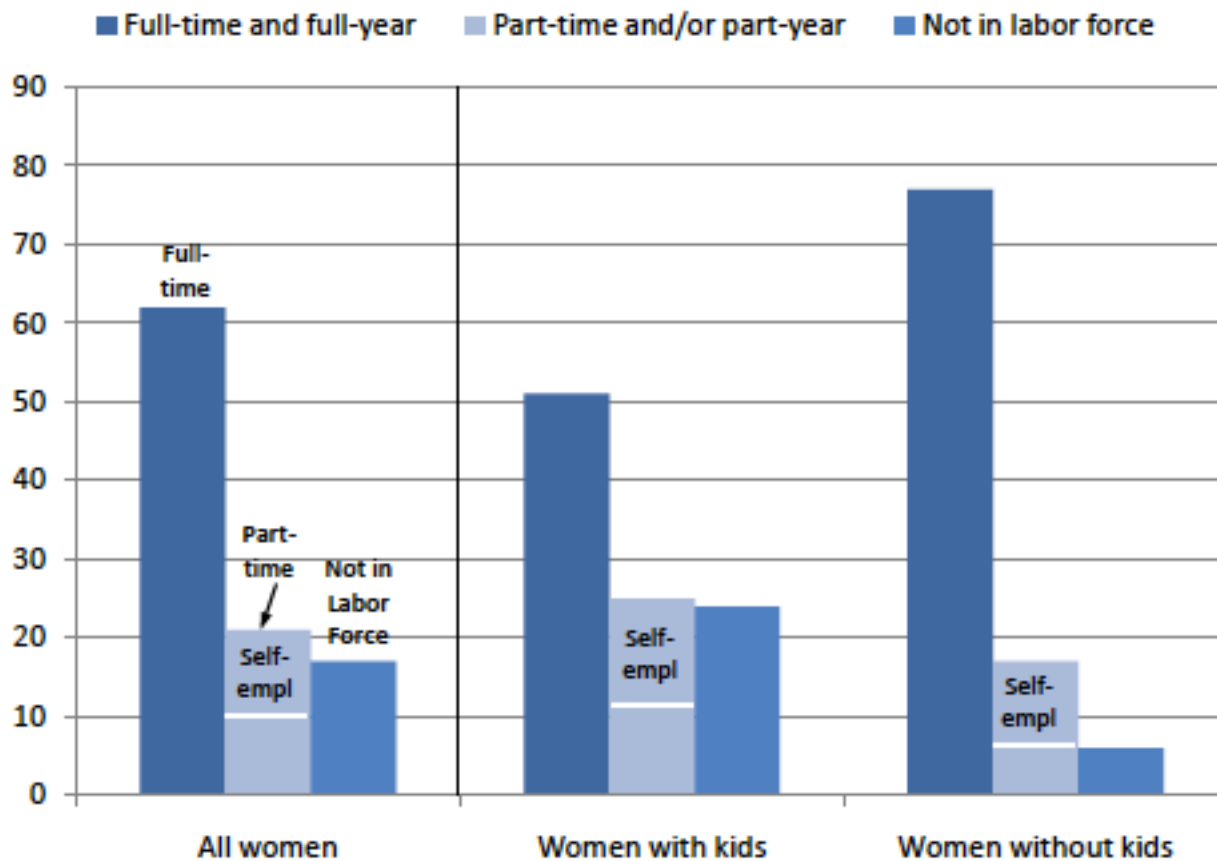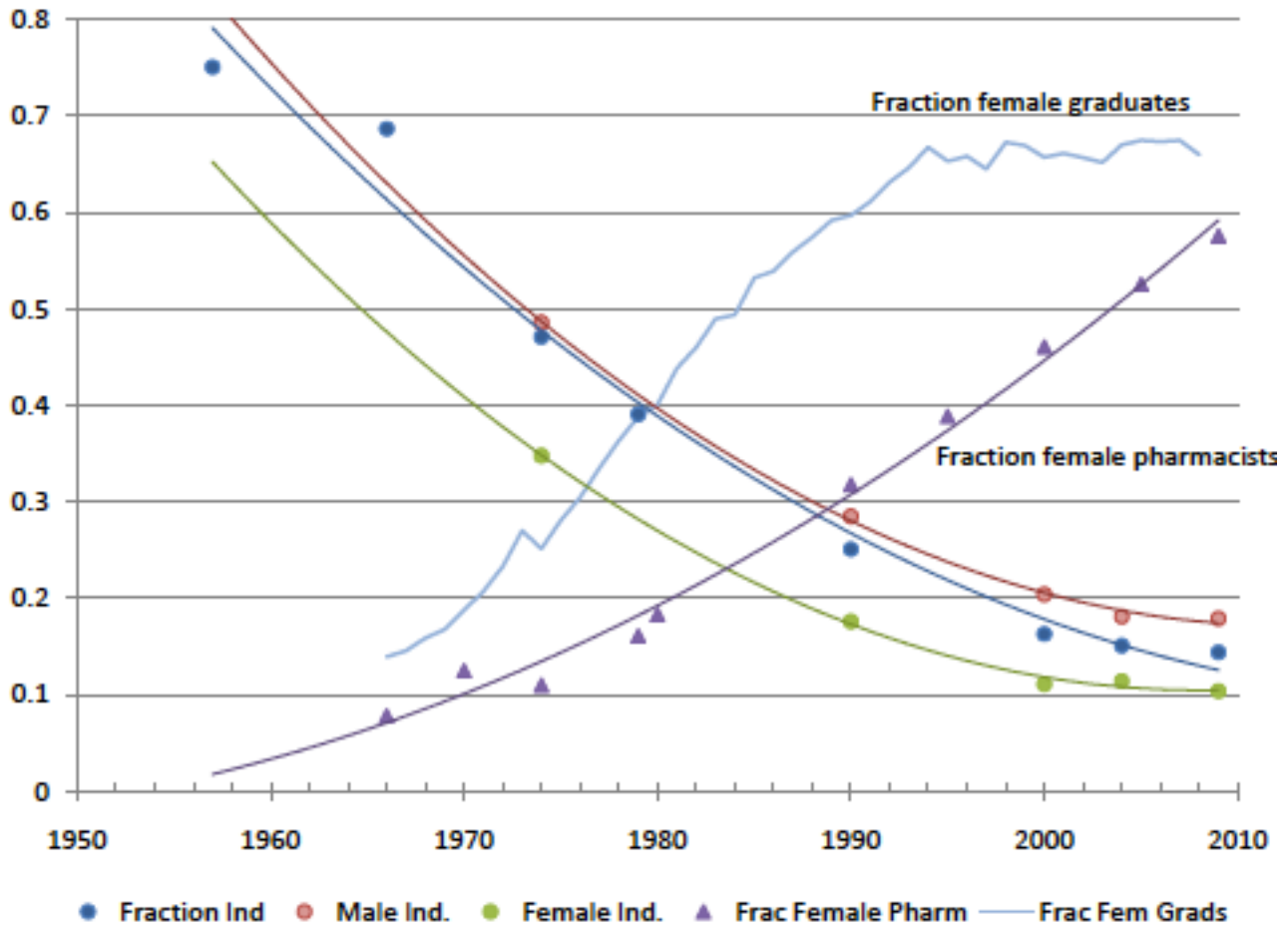
Source: See Bertrand, Goldin, and Katz (2010).

Figure 7: Pharmacists: Fraction Female and Fraction Working in Independent Pharmacies


Sources: Fraction female: U.S. Department of Health, Education and Welfare (1969), U.S. Department of Health, Education and Welfare (1978), Mott, et al. (2002), Midwest Pharmacy Workforce Consortium (2000). Fraction independent pharmacists: U.S. Department of Health, Education and Welfare (1969), Fulda (1974), U.S. Department of Health, Education and Welfare (1978), Kapantais (1982), U.S. Department of Health and Human Services (2000). Fraction female graduates of pharmacy programs: see notes to Figure 2.

Notes: A pharmacist in independent practice can be an owner or an employee. By "independent practice" is meant a unit or series of units for which one of the owners makes the majority of the decisions. Independent practices can have several stores, but are not "chains" in the sense that they are not run by large corporations. Pharmacists can be employed by retail establishments, hospitals, industry, academia, and government. The fraction in independent practice is obtained by taking the number in independent retail practice relative to all active pharmacists.

Figure 8: Female Earnings Differentials for the 87 Highest Paid Occupations, 2006 to 2008
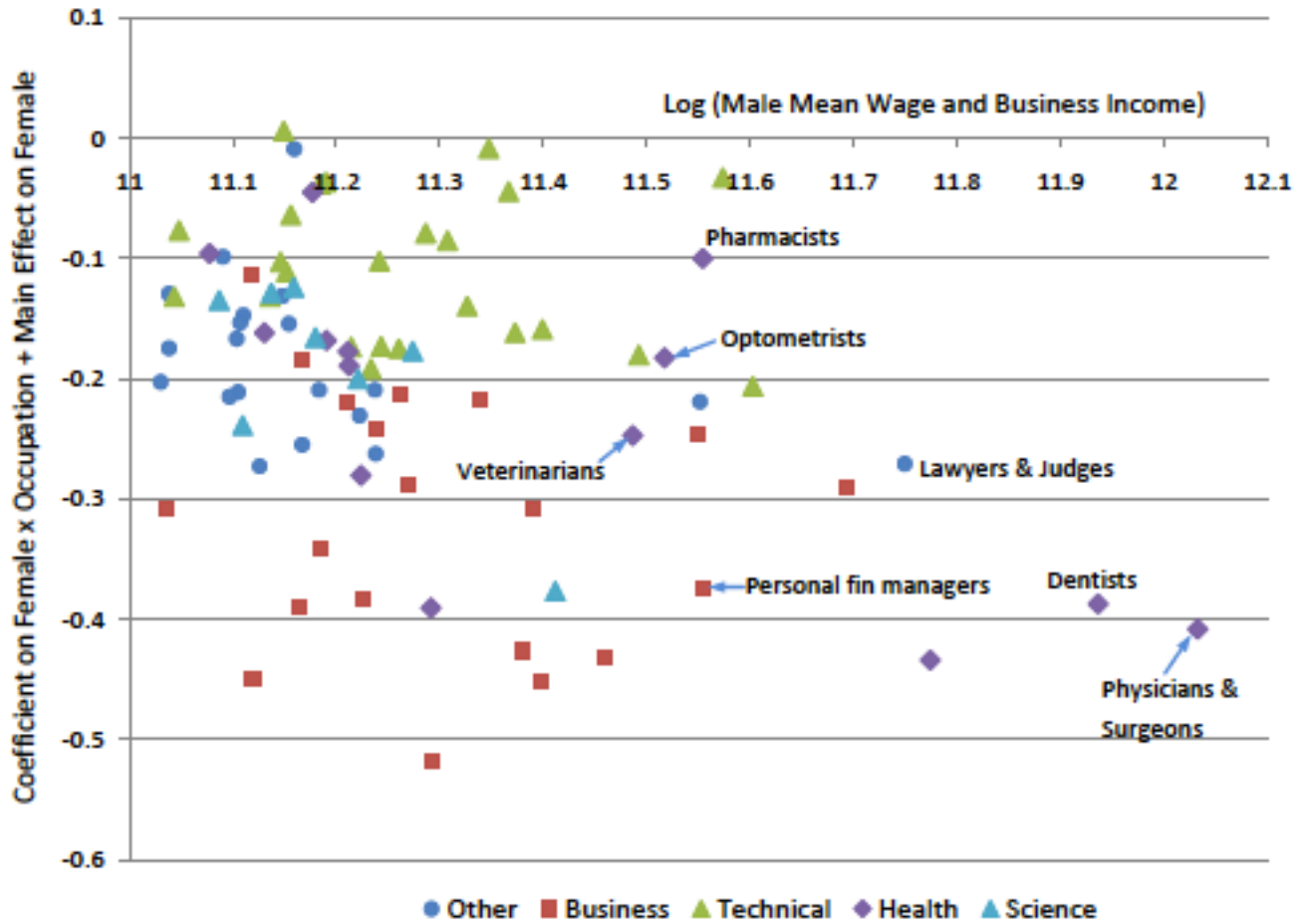
Source: American Community Survey (2006, 2007, 2008)

Notes: The vertical axis is the coefficient on female × occupation plus the main coefficient from a (log) annual earnings (wage plus business and farm income) estimation on female full-time (> 35 hours), full-year (> 40 weeks) workers. The covariates included are age, age squared, and race. The regressions were run over 3,176,730 individual observations. The main effect on the female dummy variable is -0.2026. The entire sample contains 465 census occupations. The group shown in the figure consists of only the top 87 occupations ranked by male wage and business income.

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