NBER WORKING PAPER SERIES

DO FEMALE PHYSICIANS CAPTURE THEIR SCARCITY VALUE? THE CASE OF OB/GYNS

Jessica Wolpaw Reyes

Working Paper 12528
http://www.nber.org/papers/w12528

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 2006

The author wishes to thank David Autor, David Cutler, Martin Feldstein, Claudia Goldin, Daniel Hammermesh, Caroline Minter Hoxby, Christopher Jencks, Lawrence Katz, Joseph Newhouse, Justin Wolfers, and participants in the Harvard Labor and Public Economics Lunch for valuable advice. Any remaining errors are my own. This research was supported by grants from the National Science Foundation, the National Bureau of Economic Research, and the National Institute on Aging. The views expressed herein are those of the author(s) and do not necessarily reflect the views of the National Bureau of Economic Research.

Do Female Physicians Capture Their Scarcity Value? The Case of OB/GYNs
Jessica Wolpaw Reyes
NBER Working Paper No. 12528
September 2006
JEL No. I1,J16,J44

ABSTRACT

This paper analyzes how the imperfectly competitive market for Obstetricians and Gynecologists clears in the face of an excess demand for female OB/GYNs. This excess demand results from the convergence of three factors: i) all OB/GYN patients are women, ii) many women prefer to be treated by a female OB/GYN, iii) only a small portion of OB/GYNs are female. The paper finds that both money and non-money prices adjust: female OB/GYNs charge higher fees and also have longer waiting times. Furthermore, these effects are mediated by institutional structure: in contract settings in which money prices are rigid (i.e. managed care), waiting times are more likely to adjust, and in settings in which money prices are more flexible, the reverse occurs. In the end, female OB/GYNs are able to capture some of the value of the preferred service they provide but do not entirely close the gender income gap.

Jessica Wolpaw Reyes
Department of Economics
Amherst College
Amherst, MA 01002
and NBER
jwreyes@amherst.edu

I. Introduction

Over the past three decades, the number of female physicians has increased dramatically. While women represented only 8% of physicians in 1970, by the year 2000 they represented 24%.[1] Patient demand for female doctors has also risen over this period: not only do women make 40% more visits to doctors each year than men, but more women express a preference for women doctors.[2] These increases in demand for female physicians appear to have outpaced increases in supply, particularly in certain medical specialties. This raises the interesting question of how the imperfectly competitive market for physicians' services achieves equilibrium in response to this excess demand.

To investigate this question, I focus on the specialty of Obstetrics and Gynecology (OB/GYN) where the excess demand for female physicians is especially pronounced. On the demand side, not only are all OB/GYN patients women, but more and more women prefer to see a female physician when discussing matters of a personal and sexual nature (studies indicate that more than 50% of women prefer a female physician).[3] On the supply side, only a small portion of OB/GYNs are female (22% in 1990). These factors combine to produce a large excess demand for female OB/GYNs.[4]

If the pricing of doctors' visits was set in an open, competitive market and if the supply of doctors was elastic in the medium or long run, then the excess demand for female doctors would have two primary effects. In the short run, the demand shock would raise the price of visits to female doctors. In the medium or long run, the supply of female doctors would increase,

[1] *American Medical Association*.
[2] *Statistical Abstract of the United States*, 1997.
[3] Thorne (1994); Chandler et al (2000).
[4] Although the supply of female OB/GYNs has increased, it appears to have been outpaced by increases in demand. It is likely that there has always been a latent demand for female OB/GYNs, but that since there was virtually no supply this demand was not expressed. Once the supply of female OB/GYNs rose to non-negligible levels, this latent demand may have suddenly been expressed, appearing as an outward demand shock. The apparent demand

eliminating any price gaps. However, healthcare markets are far from competitive, both in the short run and the long run. In the short run, both doctors' fees and the price to patients of a doctor's visit are determined by a number of non-competitive factors: physician contracts, hospital agreements, insurance payment schedules, and coinsurance rates. As a result, visits are often rationed by mechanisms other than money price: waiting times to get an initial appointment or waiting times between appointments are possible non-money prices. In the long run, the supply of doctors in total and in each specialty is far from elastic. Not only is there a lag of nearly eight years in the production of physicians from entry into medical school to the completion of a residency, but the Accreditation Council of Graduate Medical Education (ACGME) essentially sets the number of residencies available in any single medical specialty. Lastly, only a small number of physicians are new each year, so even large adjustments in the flow will take many years to significantly alter the stock. It is doubtful that this market will produce the right number of male and female physicians in each specialty. More generally, it is doubtful this market will do a good job providing the appropriate mix of physicians to satisfy patient preferences and needs. Moreover, obstetrics and gynecology, as a surgical sub-specialty, has not historically been particularly welcoming to women physicians, and may have presented additional barriers that slowed women's entry. Overall, both prices and quantities in this market will probably be inflexible and/or slow to adjust in both the short run and the long run, and it seems unlikely that the competitive equilibrium would be reached. That is where this investigation steps in.

This paper investigates how the imperfectly competitive market for OB/GYN services clears *in the short run* in the face of the excess demand for female OB/GYNs. There are many possible ways that this excess demand might affect the relative outcomes of female OB/GYNs.

---

shock could easily exceed the initial supply increase, and it might then take quite a while for supply to increase

It could be reflected in higher fees, longer waiting times, higher incomes, more hours worked, or even different health outcomes for patients.[5] The question is of interest for a number of reasons. First, the market itself is of interest. Economic theory provides clear predictions for how non-price markets may clear, and this situation provides an opportunity to test these predictions. In addition, health care markets themselves are of independent interest, particularly as health care institutions experiment with and launch diverse market structures. This investigation is able to study one of these markets – the market for physicians' services – during a period of great change, the advent of managed care in the late 1980s. The physicians services market itself is also of much interest to health economists. Second, gender discrimination in professional occupations, and in medicine in particular, is of independent interest, and this analysis will provide insight into the nature of such discrimination.

I use detailed data on young physicians in the late 1980s and early 1990s to investigate these questions. To preview the results, the paper finds that both money and non-money prices adjust: female OB/GYNs charge higher fees and also have longer waiting times. Furthermore, these effects are mediated by institutional structure: in contract settings in which money prices are rigid (i.e. managed care), waiting times are more likely to adjust, and in settings in which money prices are more flexible, the reverse occurs. In addition, female OB/GYNs do close the gender gap in weekly income significantly, but not completely.

The paper proceeds as follows. Section II discusses background material on female physicians, female OB/GYNs, and gender differences. Section III outlines a simple theoretical model for the markets for male and female OB/GYN services. Section IV sets out the empirical

---

enough to match the demand.

[5] One additional possibility is that other types of female healthcare providers, such as nurse practitioners or midwives, may enter the market and provide more female care. The current analysis does not investigate this possibility.

strategy, and Section V details the empirical results. Section VI discusses the implications of the results, and Section VII concludes.

II. Background

A. Many female patients prefer female physicians

Much of the medical literature and the popular media appears to assume that female patients' preferences for female physicians are so obvious that they do not need to be established. There has, however, been some exploration of this assumption. Among a sample of a military population in 1998, 52% of patients said they would prefer a female gynecologist, 4% would prefer a male, and for 44% expressed no preference.[6] Among a general sample of the Canadian population in 1990, 26% of women said they were more comfortable with a female health practitioner (16% with a male), but among younger women 56% reported being more comfortable with a female (10% with a male). Overall, there is significant evidence in the medical literature that many female patients prefer to be treated by a female physician, and that these preferences are more pronounced in gynecology, psychotherapy, and in areas of sexual abuse. It also appears that these preferences have become stronger over time as gender attitudes changed significantly from the 1970s to the 1990s.[7]

In addition, both patients and doctors confirm that many patients do express a preference for being treated by a female OB/GYN.[8] Some patients express a preference for a female physician because they believe a woman will provide better care: "A female doctor understands -blank-." Some admit that they have no *real* reason to prefer a female: "My preference for a

[6] Chandler et al (2000).

[7] Both a patient's sex role (Weyrauch (1990)) and her attitude towards the appropriate role of the physician (Elstad (1994)) are strongly related to her preference (or not) for a female physician. As these roles and attitudes change, it is likely that patients' preferences for female physicians will change as well.

female is more of a quirk. I feel more comfortable confiding my concerns with a woman... This isn't the case for other types of physicians." In fact, 86% of the patients reporting a preference for a female doctor in the military sample attribute their preference to a belief that women are better able to understand their problems.[9] Many patients argue that feeling comfortable with a physician, not the gender of the doctor, is most important. Lastly, some patients write that they had a preference but that it was not confirmed by experience. Some of these patients report that they then changed their preference, while others say they retained it.

On the other end, male OB/GYNs do report discrimination against them, in the form of lower patient demand and lower incomes. Many young male OB/GYNs are even concerned about their employment prospects. One male physician, who works in a practice group consisting of three males and one female, recounts an instance in which a patient "waxed rhapsodic" about the emergency treatment she received from one of the male physicians but then requested that her follow-up appointment be with the female physician (whom she had never met) because she "could never see a male gynecologist." Interestingly, he concludes that they "have chalked it up to a testicle tax." Another male OB/GYN states that the low number of female OB/GYNs, combined with their high demand, causes significant matching problems.[10] In addition, one male OB/GYN reports that his wife, also an OB/GYN with nearly identical training, "could have commanded a 10% higher salary than I, had we chosen to work for someone else, exclusively because she is a woman." However, he also reports that since insurance payments are centrally set, women in private practice are less likely to reap these benefits. Overall, the situation is serious enough that and the American College of Obstetricians

[8] The following quotes are excerpted from correspondence circa 1999 in an online OB/GYN forum (http://forums.obgyn.net/). These quotes are similar in character to quotes in several articles in the medical literature, including Thorne (1994), Haar et al (1975), and Chandler et al (2000).
[9] Chandler et al (2000).
[10] In particular, this physician reports that "everywhere [he has] worked there has been a Muslim community who feel strongly that women should see a female doctor" but that this is often impossible.

and Gynecologists directly acknowledges the mismatch and works hard to encourage *men* to pursue OB/GYN.[11]

Thus, whether or not male and female OB/GYNs actually provide different care, many patients think that they do. Since the good being provided is a personal service, patient perception can affect the market valuation of the good: if a patient *thinks* a female doctor is better, she may be willing to pay more to see a female doctor. In addition, patient perception can affect a doctor's actual productivity: if a patient *thinks* a female doctor is better, that may actually *make* that doctor better by improving communication, patient satisfaction, and health outcomes. Does this productivity effect legitimate the discrimination? That is a more difficult question.[12] But it remains that patient preference can change market valuation of the good and productivity.

B. Female physicians provide different care

There is mixed evidence that female physicians provide quantitatively different care. Several studies have concluded that female physicians are both more aware of patients' concerns and are more likely to prescribe certain therapies and routine tests, and that female OB/GYNS are less likely to perform cesarean sections and hysterectomies. Other studies have found only small gender differences.[13] There is some evidence that female physicians provide qualitatively different care – that they have a different approach to caring for their patients. Several authors find that women physicians appear more able to communicate sensitivity to patients, more able

[11] The American College of Obstetricians and Gynecologists, in its policy statement "Women's health care: a career in obstetrics & gynecology," specifically states that "a higher percentage of female obstetrician-gynecologists reflects the new balance in medical schools and residency education programs in the United States… However, male students should not be discouraged from choosing obstetrics and gynecology as a career; there are numerous practice opportunities for competent clinicians of both genders."

[12] Curtis (2001) argues that the discrimination is unjust and the OB/GYN community should engage in open discussion to prevent discrimination against male OB/GYNs and to encourage males to enter the profession. On the other hand, Reddy (2000) reports a legal case in which a male OB/GYN sued for gender discrimination. The appellate court held that patient preference may legitimate accommodation of that preference: "female patients may have a legitimate privacy interest in seeking to have female doctors perform their gynecological examinations."

to communicate effectively with their patients, and more likely to feel personal responsibility for them.[14] On the contrary, other studies have found that male OB/GYNS expressed more concern and partnership with their patients, and engaged in more thorough communication.[15]

C. Discrimination against female physicians

There is significant evidence for the persistence of discrimination against and sexual harassment of female physicians and medical students. In national surveys and smaller studies, more than 50% of female physicians report experiencing discrimination and more than 25% report experiencing harassment.[16] Several authors find that women medical school faculty are promoted more slowly and that women's lower ranks in the academic hierarchy are not explained by productivity or by differential attrition. Women also face significant obstacles in entering surgical and other prestigious specialties, and drop out of medical school at consistently greater rates than men.[17] MacLeod reports comments from the Canadian Medical Association workshop in which female physicians reported isolation, excessive time demands, and sexism.

Thus, the literature confirms that some female patients do prefer to be treated by female physicians, female physicians provide quantitatively and qualitatively different care, and female physicians experience gender discrimination.

D. Gender wage differentials in medicine

Although medicine is one of the highest paying professions, female physicians have historically earned less than their male counterparts even after relevant characteristics (such as hours worked, practice setting, and medical specialty) are taken into account. Raw income gaps have barely changed: in 1977 women earned approximately 57% of what men earned, while in

[13] Mitler et al. (2000); Bickell et al (1994); Ayanian and Guadagnoli (1996); Seto et al. (1996); Ghali (1997); Lurie et al. (1997).
[14] Arnold et al. (1988); Kreuter et al (1995).
[15] Roter et al. (1999); van Dulmen et al (2000).
[16] Cook et al. (1996); Lenhart et al. (1991); Schiffman and Frank (1995, 1998); Capek and Mackinnon (1997).

1991 women earned 59% of what men earned.[18] However, these gaps are largely explained by differences in characteristics, particularly specialty choices and weeks or hours worked. Since the 1980s, the unexplained gender differentials in hourly earnings are small - less than 13% in most analyses.[19] Among OB/GYNs, the unexplained differential may be even smaller: recent income gaps appear to match up reasonably well with measured productivity gaps. Females' mean net income is 85% of males', and their productivity (measured by hours worked, or the relative numbers of various procedures performed) was also 83% to 90% of males.[20]

III. Theory

Physicians in different medical specialties engage in very different types of interaction with both colleagues and patients. On the colleague side, certain specialties, such as surgery, have reputations for more gender discrimination by male physicians against female physicians. On the patient side, different specialties address different health concerns and therefore involve different doctor-patient relationships. Some health concerns are such that patients may have a strong preference for or against female physicians whereas for other health concerns patients may not care either way (they may not even have much close personal interaction with their physician).

For this paper, the first key fact is that all OB/GYN patients are women. The second is that many women express a strong preference for being treated by a female OB/GYN. The third is that only a minority of OB/GYNs are female: less than 30% throughout the period covered by the data (1986-1996). Together, these facts produce a large excess demand for female

[17] Tesch et al. (1995); Notzer and Brown (1995); Abeshaus et al. (1993); Capek and Mackinnon (1997); Fitzpatrick and Wright (1995).
[18] Langwell (1982) using 1977 AMA data, Baker (1996) using the 1991 Young Physicians Survey.
[19] Kehrer (1976); Langwell (1982); Ohsfeldt and Culler (1986); Ohsfeldt, Culler, and Becker (1987); Baker (1996).
[20] Pearse et al (2001). Data is from The 1998 Socioeconomic Survey of American College of Obstetricians and Gynecology Fellows.

OB/GYNs. Although female patients may also have a gender preference for physicians in other specialties, these effects are likely to be much smaller. For example, because patients have significant long-term interaction with their primary care physician, female patients may also prefer to be treated by a female General Practitioner (GP). However, since not all GP patients are female and since the medical issues addressed by General Practitioners are less likely to be personal or sexual, this effect is probably much smaller. The effect is certainly smaller for most other specialties and close to negligible in specialties in which there is little interaction between physicians and patients, such as anesthesiology, radiology, or pathology.

As a theoretical structure, I consider a simple supply-demand model augmented by a model of customer discrimination following Becker. The good is a visit to a physician in a certain specialty, further defined by physician characteristics such as gender.[21] The demand is the number of patients desiring visits with physicians of that gender in that specialty, and is determined by the percentage of patients who are women and the preference (if any) for female physicians as opposed to male physicians. The supply is the number of physicians of a certain gender in a certain specialty, and the relative supply of women within a certain specialty is the percentage of physicians in that specialty who are women. (This supply is fixed in the short run, and possibly flexible in the long run.[22]) The price is both money and time. The money price is the fee for the visit, and is largely determined and paid by insurance companies. The consumer

[21] This model employs a simplified definition of the good in question: a visit to a physician in a certain specialty, further defined by physician characteristics such as gender. This ignores several more subtle points. The good might be health, a positive health outcome, an hour of the doctor's time, or an hour of "quality time" with the doctor. It also assumes that the patient's assessment of value is most relevant. However, there are many other possibilities for whose assessment matters: the medical profession, male or female doctors, male or female patients, or various institutions.

[22] Long-term supply may not be very responsive to demand pressures. The supply of doctors is far from elastic. AMA accredited medical schools have close to a monopoly over the production of doctors, the Accreditation Council for Graduate Medical Education (ACGME) controls the specialty distribution, and it is doubtful that they this process will supply exactly the right male/female ratio. There is some elasticity from foreign medical graduates and from individuals' choices of specialties within the ACGME framework.

faces only a small or negligible portion of this price. The time price is how long a patient is willing to wait for the visit. The consumer pays all of this price.

Prices and quantities will adjust until the market clears. This adjustment should be observable in prices such as fees, waiting times, and incomes and in quantities such as hours worked, patients seen, or numbers of physicians in specialty-gender cells. The crucial features that will produce actual price differentials between male and female OB/GYNs are the high patient preference for female OB/GYNs and the relatively low and inelastic supply of female OB/GYNs.[23] Assuming quantity adjustment is somewhat inelastic (patients either do or do not need to see a doctor, physicians only work so much and there are substantial entry barriers), price differentials will need to be non-zero in equilibrium. Given that anti-discrimination law at least indirectly restricts many money prices within a specialty to be equal across genders, non-money prices may be more likely to adjust.

Figures 1a and 1b illustrate this simple supply-demand model for the market for female OB/GYN services. Both figures show price (both fee and wait) on the vertical axis and quantity on the horizontal axis. Figure 1a shows the equilibrium reached if male and female physicians' fees are constrained to be equal at *Fee**. If fees are so constrained and no other prices are available, the excess demand for female is shown by the length of line *de*. If other prices are available – if waiting times adjust to achieve equilibrium – then a large waiting time *Wait** for female physicians eliminates this excess demand. In this case, the market is in equilibrium at the quantity *Q** and the combined price *Fee** + *Wait**. However, this equilibrium presents significant welfare losses: the lost consumer and producer surplus is shown by the area *B*+*C*+*E*. This entire area is wasted due to the inflexibility of fees. Patients spend the area *B*+*C* waiting,

[23] Entry barriers should make the supply of female OB/GYNs inelastic. As discussed above, there is a long lag in the production of physicians, and the flow is small enough relative to the stock that compositional changes are likely

and physicians give up the area *C* in the form of lost income. The area *E* is a traditional deadweight loss. However, it is important to note that in fact the entire area *B*+*C*+*E* is a deadweight loss, since time spent waiting is not revenue that is transferred to anyone, it is just wasted.

Figure 1b shows the equilibrium reached if male and female physicians' fees are allowed to be different. In this case, money prices clear the market and no waiting time adjustment is necessary. Female physicians charge higher fees (Fee^*_{female} rather than Fee^*_{male}) and make correspondingly higher income in the areas *C*+*G*. Patients pay higher *money* fees in the areas *C*+*G*. However, patients no longer pay higher time prices (they now pay *C* as money and do not pay *B* at all). The total payment made by patients -- money plus time -- is lower than it was when fees were rigid. Furthermore, there is no deadweight loss and the equilibrium quantity is greater. The adjustment of fees permits a Pareto improvement that benefits patients by saving them time and benefits female physicians by increasing their income. In this scenario, female physicians are able to capture the rents generated by their scarcity value.

Of course, which of these scenarios best describes how the market for physicians' services reaches equilibrium largely depends on the institutional constraints on the market. The primary institutions acting in this market are those that employ physicians (HMOs, hospitals, private practice) and those that pay for medical care (HMOs, PPOs, IPAs, traditional insurance companies). This market is clearly not competitive. It is a vertically integrated market in which doctors sell their services as an input to healthcare providers and the providers then sell these services to patients. The price to the patient of a doctor's visit is determined by a number of non-competitive factors, primarily various contract arrangements.

---

to be slow. Even if *all* new OB/GYNs were female, the share female among OB/GYNs would increase by only 20 percentage points in 10 years.

Since physicians do not receive payment for their services directly from patients, third party payers play an important role in this market. Under a traditional insurance plan with *retrospective* payment, a physician submits a bill to the insurance company who then pays the physician with little negotiation about the amount. Physicians are essentially independent and compete on both price and quality. Under an insurance plan with *prospective* payment, the insurance company pays the physician a pre-determined "usual and customary fee" for the service, a price set by the insurance company based on what it deems reasonable and generally discounted relative to what the physician would like to charge. Physicians' prices are therefore somewhat constrained, and therefore physicians compete more on quality than price. A physician may enter into a contract arrangement, called a Preferred Provider Organization (PPO), with certain insurance companies under which he or she agrees to accept these usual and customary fees. Patients are then given financial incentives to go to physicians who are members. In more strictly managed care, prices are even less competitive, in many cases non-existent. In this case, patients pay a flat fee to be a member of a Health Maintenance Organization (HMO) which agrees to provide all necessary healthcare. Physicians are then employed by the HMO, and are paid primarily on a salaried basis rather than receiving fees directly from patients or insurance companies. Many physicians remain in private practice and yet agree to provide services to an HMO through an Independent Practice Arrangement (IPA). In this paper, a physician is said to be in a contract arrangement if he or she is a member of an HMO, PPO, or IPA, and not in a contract arrangement if he or she is not a member of any such organization. This distinction is intended to divide physicians into two groups based on their freedom to set their own prices. We expect that physicians in contract arrangements are somewhat limited in this respect, and that physicians not in contract arrangements have relatively more freedom. It is important to note that, during the time period covered by the data (mid

1980s to the 1990s), physicians were neither largely out of contracts nor largely in contracts: there were substantial numbers in each category. This diverse organizational structure is precisely what provides the opportunity to investigate this question. (It is also important to note that the results are generally robust to alternate definitions of contracting.)

The market for physicians' services is imperfectly competitive for other reasons as well. It is characterized by asymmetric information, because physicians know much more about health and illness than patients do, and by significant search costs, because patients have difficulty obtaining accurate information about physicians. Physicians are in limited supply and sell differentiated, non-substitutable products. They compete on both quality and price. Patients have heterogeneous preferences over perceived quality, match, and characteristics. Patients also do not bear the full price, and shop for physicians both on price and quality. The combination of heterogeneous products and preferences with significant switching costs gives physicians market power. The market is therefore best described as monopolistically competitive, with lower elasticities of demand for each individual physician than for the market as a whole. Price differentials can persist in such a market, and the greater the informational imperfections and price frictions, the lower each physician's individual demand elasticity and the larger the sustainable price differentials between physicians.

However, the institutional structures discussed above inhibit the flexibility of money prices, and physicians' services are therefore likely to be rationed by additional mechanisms other than money price. For physicians in contract arrangements, we would expect the relatively low flexibility of fees in response to patient demand to produce a larger adjustment of waiting times for physicians. Patients may queue up to wait for the physician they want to see. On the other hand, for physicians not in contract arrangements, we would expect the relatively higher flexibility of the fees in response to patient demand to produce larger adjustment of fees and

smaller adjustment of waiting times.[24] Economic theory predicts that prices should clear the markets in the most efficient manner, subject to institutional constraints. Thus, Figure 1a may come closest to describing the market for the services of physicians in contract arrangements, while Figure 1b may be best for describing the market for the services of physicians *not* in contract arrangements.

While both money and non-money prices effectively ration supply, they do not operate in the same manner. As seen in Figure 1a, the implicit price for a good is the sum of the explicit money price and the value of the time spent waiting. When money prices do not or cannot adjust, waiting time functions as a tax to raise the implicit price and thereby reduce demand. However, when time prices are used to reduce demand, both the traditional deadweight loss (area E) and the revenue (area $B+C$) are pure waste: the patient pays her time but the physician does not receive any payment. This structure has two important consequences. First, the optimal tax structure is exactly opposite from the standard optimal taxation result. In this case, total waste is minimized when the tax in the form of the time price is the highest for the most *elastically* demanded goods. However, this also maximizes the rents *lost* by producers of the desirable good: female OB/GYNs may lose out if demand for their services is reduced by longer waiting times (which provide them few benefits) rather than higher fees (which do provide them monetary benefits). Second, since time is cheaper for those with lower income, using time prices

[24] The non-competitive nature of the market is both an advantage and a disadvantage for the current analysis. On the negative side, these non-competitive factors interfere with the adjustment mechanism (of prices, quantities, quality). For example, managed-care places controls on healthcare that restrict the movement of prices and quantities, altering the supply response. If a doctor signs a contract for a certain income and there is little flexibility, her wage may not be able to adjust and she may just work more hours or have longer waiting times. This could also be complicated by individual preferences causing selection bias into flexible or inflexible practice environments. On the positive side, the market in itself is interesting. Determining the response to the exogenous demand shock may enable us to characterize the market for physicians, obtaining structural information about the nature of the market that would be universally applicable. This could eventually provide important insights about the interactions between discrimination, patient preference, monopsonistic behavior of insurance companies, and monopolistic behavior of medical schools in a highly organized labor market.

essentially creates a sliding scale by income. This may provide social benefits in the form of implicit transfers from the rich to the poor.

In sum, in a competitive market, female physicians should be able to extract rents for providing a desirable good available in limited quantities. However, due to the non-competitive features of this market, adjustment may happen on several different margins. I now outline a strategy for studying what actually occurs.

IV. Empirical Approach

An ideal investigation of this question would take advantage of an extensive and detailed dataset on outcomes for physicians in different specialties. I would examine the movement of prices and quantities in both the short run and the long run, and investigate the outcomes of female OB/GYNs relative to male OB/GYNs. In fact, my current data and analysis come reasonably close to this ideal investigation for the short run. I will first outline the prices and quantities I investigate and discuss the econometric specification, and then I will describe the data.

A. Prices and Quantities

To determine how the market for physician visits equilibrates, I examine relevant prices and quantities. The prices are: standard fee for a routine visit with the physician, waiting time in weeks for an initial visit, annual income (in logs), and weekly income (in logs). The fees and waiting times are given the most attention because they are the purest prices and are most likely to be flexible. To the extent that physicians can set their own fees, standard fees may be flexible. However, as prospective insurance payments set fees centrally and managed care arrangements start to eliminate fees, standard fees will become more sticky. Waiting times are extremely flexible: since there are few regulations and little awareness of these non-money prices for

physician services, they are most likely to be able to adjust in response to supply and demand pressures. The income measures are actually both prices (the price that an employer such as an HMO pays for a doctor) and aggregate outcome measures (the product of fees and patients seen). Therefore, incomes may exhibit less clear adjustment in response to market pressures either because they are set by a variety of non-competitive factors or because they are aggregated measures rather than pure prices.

The quantities investigated are: patients seen per week and hours worked per week. The quantities that are more likely to adjust in the short run are those under the control of the individual physician: patients seen and hours worked. However, these variables are also labor supply variables, and consequently should be treated cautiously. In addition, I do not investigate quantities of physicians because supplies of physicians are fixed in the short run and the data do not span a long enough time period to evaluate long-run changes in supply.

B. Specification

The basic model is a regression of a price or quantity on the female dummy, indicators for thirteen medical specialty categories,[25] the interactions of those specialty categories with the female dummy, and other controls. The other controls include basic demographics: age, race, region, a quadratic in experience, a married dummy, and a parent dummy. The other controls also include professional demographics: indicator variables for AMA membership, board certification, private practice, a contract arrangement, and salaried pay.[26] Models in which observations are pooled across years include a linear time trend and the interaction of this time

[25] The thirteen medical specialty categories are: general family practice, general internal medicine, specialty with no subspecialties, medical subspecialty, general surgery, surgical specialty/subspecialty, pediatrics, OB/GYN, radiology, psychiatry, anesthesiology, pathology, and other. See Appendix Table 1 for more detail. All dollar values in pooled specifications are in 1986 dollars.

[26] A more detailed specification also includes parent, number of children, and interactions of these with gender, and malpractice claims in the past. However, the results are not sensitive to the inclusion of these variables.

trend with the female dummy, with the specialty categories, and with the interaction of the female dummy and specialty categories.[27]

The goal is to determine whether female OB/GYNs have significantly different outcomes than male OB/GYNs in excess of general gender differentials among physicians. Thus, the model estimated is as follows:

$$\text{Outcome}_i = \alpha_0 + \alpha_1 \text{I(female)}_i + \alpha_2 \text{I(OB/GYN)}_i + \alpha_3 \text{I(female)}_i * \text{I(OB/GYN)}_i + \sum_{\text{specialties}} [\delta_j \text{I(specialty)} + \gamma_j \text{I(female)* I(specialty)}] + X_i \beta + \varepsilon_i$$

Eqn. 1. [28]

The coefficient of interest is α_3 : the interaction between the female dummy and the OB/GYN dummy. The specification employed for Equation 1 is ordinary least squares with Huber-White robust standard errors.

The main question is: exactly how do female OB/GYNs compare to male OB/GYNs? Does gender play a different role in OB/GYN than in other specialties? I will focus primarily on the behavior of money and time prices -- standard fees and waiting times – since these prices might be more likely to be flexible and accurately measured, thereby providing a clearer picture of the manner in which the market equilibrates.

C. Data

The primary data sources are the Young Physicians Surveys (YPS) conducted in 1987, 1991, and 1997 by the Robert Wood Johnson Foundation, Mathematica Policy Research, and the American Medical Association (AMA). These surveys collected information about the practice patterns and perceptions of the medical profession from 5,868 physicians in 1987, 6,053 in 1991,

[27] For waiting times and standard fees, only those specialties that have relevant values of these variables were included in the analysis. Physicians in certain specialties may not see patients directly, and therefore may not have a standard fee for a regular visit or a waiting time for an initial appointment. Such specialties include Radiology, Anesthesiology, Pathology, Public Health, Emergency Medicine, and Aerospace Medicine. These specialties are excluded from analyses of standard fees and waiting times.

and 1,452 in 1997. Some of these are multiple observations of particular individuals: the total 13,373 observations include 5,011 individuals with a single year of data, 2,996 individuals with two years of data, and 790 individuals with three years of data (see Appendix Table 2).

The samples were drawn from the AMA Socioeconomic Monitoring System master file to include physicians who had been in practice for two to nine years and who were less than 40 years old (45 in 1991). By choosing young physicians less than nine years out of medical school, the sample is designed to be relatively homogeneous. This conveniently eliminates biases that would otherwise be present due to the difference between the installed base of physicians (older and primarily male) and the flow of new physicians (younger and more female). It also provides a sample that includes substantially more women of all specialties and a significant number of female OB/GYNs.[29] The data use weights designed to adjust for differential response rates within the eligible sample across identifiable sample subgroups and for selection of an oversample of black and Hispanic individuals.[30]

The survey covered a wide range of topics including practice setting, numbers and types of patients seen, income, hours, and physicians' perceptions of their careers, the medical profession, and discrimination.[31,32] The key variables available in these data (and unavailable

---

[28] The base case is a male physician in general practice in the Northeast. The function I(·) is an indicator function; e.g. I(female) is 0 for male physicians and 1 for female physicians.

[29] It is crucial for the current analysis that the data include a substantial number of female OB/GYNs. Because female OB/GYNs represented only 1.2% of all physicians in 1990, available datasets covering physicians of all ages generally include very few female OB/GYNs. A sample of young physicians not only includes many more female OB/GYNs, but also provides a sample with less confounding heterogeneity in labor market experience and other characteristics. Both of these aspects of the data are critical.

[30] These weights were provided by the Principal Investigator. More detail on the construction of these weights can be found in the codebooks for the data sets. Weights were made consistent across the different years of data by a similar procedure.

[31] In addition, data from the Student and Applicant Information Management System database (SAIMS) file is included for about half of the observations. This database includes information collected throughout each individual's medical school career.

[32] The 1987 YPS also includes encrypted geographic codes that provide access to characteristics of the local health care market. Variables of particular interest in these data are: numbers of physicians within each specialty and by gender; and population composition by age, race, income, and household size. These can be used to test specific hypotheses about the role of local supply and demand conditions. Unfortunately, population numbers by gender are not available.

elsewhere) are *standard fees* and *waiting times*. Standard fees are in answer to the question "In this practice, what is your current usual fee for an office visit with an established patient including an examination and/or treatment for the same or new illness?"[33] While the "typical" office visit may certainly vary across OB/GYNs depending on the focus of their practice (e.g. low-risk obstetrics vs. gynecologic oncology), this standard fee variable is the best variable available (in this or other datasets) to measure the price of a relatively uniform medical good across physicians.

Waiting times are in answer to the question "How many days does a new patient wishing to see you in this practice typically have to wait for an appointment?" The waiting time therefore represents the time from an initial phone call to the physician's office to the soonest possible appointment. It is *not* the number of hours a patient sits in the waiting room before seeing the physician.[34] Lastly, it is important to note that the standard fee and waiting time variables are only available in the 1987 and 1991 surveys. For this reason, I use only those years of data in the full analysis. Furthermore, although repeat observations are available on some individual physicians, I use only the first observation on any one physician. This insures that physicians are homogeneous in their years of experience: all first interviews have less than five years of experience out of medical school.

A second data source is from the American Medical Association (AMA), which collects data about all of its members in its Physician Masterfile, the most comprehensive source of information about physicians in the United States. The AMA publishes summary tables from these data annually or biannually, providing detailed tabulations of the distribution of physicians

[33] Fees did not require any cleaning beyond removing extreme values.
[34] Although the physicians quoted their waiting times in days, I have recoded them to weeks. The raw data clearly indicated that some individuals were counting 5-day weeks while others were counting 7-day weeks. The re-coding algorithm created a consistent measure of waiting time in weeks. It also truncated waiting times at a maximum of 26 weeks to remove extreme values.

by specialty, gender, type of practice, etc. These data are the source for the gender distribution within each specialty in each year.

D. Basic facts

Summary statistics of the main variables from the YPS are provided in Table 1, separated by sex. Women are relatively well represented: the sample is 23% female in 1987 and 29% female in 1991. In addition, the sample is relatively evenly split between physicians who are in contract arrangements and those who are not in such arrangements: this share is approximately one-third in 1987, and rises to one-half in 1991. This will be important for the later analysis investigating the role of contract setting. Women's net income is significantly lower: approximately 70% of men's in both years. Furthermore, women work fewer hours per week (approximately 50 vs. 60), see fewer patients per week (approximately 10% fewer than men), and have longer waiting times for an initial appointment (more than 40% longer). They are also slightly less likely to be in private practice. They have similar age and race distributions, but are less likely to be married and have fewer children. An Oaxaca decomposition of the income differential shows that most of the 30% difference in annual income is explained by differences in characteristics such as specialty.[35]

Medical specialties are important in determining the values of many of these variables. (Appendix Table 1 provides a list of specialties and major specialty categories.) Table 2 and Figure 2 show the female share within each specialty from 1970 to 2000. The percentage female overall has risen from 7.6% in 1970 to 24% in 2000. However, this increase has not been

[35] The Oaxaca decomposition of the income differential is shown in Appendix Table 3. The log annual income difference of 30 to 45% is largely explained by differences in characteristics. Approximately 1/4 to 1/3 of the difference is explained by specialty and practice setting characteristics (13 large specialty categories, 6 categories for practice setting, and whether the physician is in a contract arrangement), while 1/2 to 2/3 can be explained by adding personal and physician demographics (age, experience, experience squared, marriage, children, race, region, AMA membership, board certification, prior malpractice claims, patients per week, hours per week). Differential returns to family variables such as marriage, children, and a non-working spouse are a significant source of the remaining differential.

distributed equally across specialties. The primary differences are the higher shares of women in psychiatry, obstetrics and gynecology, and especially pediatrics, and the extremely low share of women in surgery. The dissimilarity index is another way to measure the distribution of men and women across specialties. This index reflects the share of individuals who would need to switch specialties to make the distributions equal for men and women. In the late 1990s, this index was 0.20, which is small relative to dissimilarity indices for overall gender occupational segregation, which generally exceed 0.60.[36]

Within obstetrics and gynecology, the share of physicians who are female has risen from 7.1% in 1975 to 22.4% in 1990 and to 35.1% in 2000. The increase in the female share of OB/GYN residents has been even more dramatic: from 13% in 1975 to 58% in 1995 and further to 65% in 1998.[37] Thus, the flow into OB/GYN is increasingly female, but since the annual flow replaces only 2% of the stock, it takes quite a while for the stock to become more female. Table 3 shows the gender comparison within OB/GYN. The gender gap in income is somewhat smaller than that among all physicians. Male and female OB/GYNs are also similar on many important measures -- weeks worked, hours worked, patients seen. Men are slightly more likely to be in private practice, board certified, or in a contract arrangement. Women are less likely to be married or to have children. The waiting time differential is striking: the average waiting time for a male OB/GYN in 1987 is 2.16 weeks, and for a female is 3.79 weeks. In 1991, these numbers are 2.52 and 5.03 respectively. There is also a slight differential in standard fees: the average standard fee in 1987 for a male OB/GYN is $40.25, and for a female is $45.25. In 1991, these numbers are $58.33 and $62.40, respectively. These differentials will be investigated more carefully in the subsequent analysis, but they are a first indication that excess patient demand for

[36] See Cutler, Glaeser, Vigdor (1999) for details about the dissimilarity index, and Goldin (1990) for more discussion of gender segregation. This index was calculated using the 1997 AMA data.
[37] American College of Obstetricians and Gynecologists.

female OB/GYNs may produce relatively longer waiting times for female OB/GYNs, and possibly higher fees.[38]

V. Empirical Results

I now discuss the primary empirical results. Tables 4, 5, and 6 show these results using the 1987 and 1991 YPS data for waiting times, standard fees, log annual income, log weekly income, log hourly income, log patients seen per week, and log hours worked per week. Each table has six columns. Columns 1, 3, and 5 show the results for specifications that include a single dummy for 1991, but do not include any interactions of the 1991 dummy with other variables. They therefore show only three coefficients for each regression: the coefficient on the female dummy, the coefficient for the OB/GYN dummy, and the coefficient for the interaction of the two. Columns 2, 4, and 6 show the results for specifications that include a single dummy for 1991 and also include interactions of the 1991 dummy with other variables. These columns therefore show six coefficients for each regression: the coefficient on the female dummy, the coefficient for the OB/GYN dummy, and the coefficient for the interaction of the two, plus the interactions of these three coefficients with a dummy indicating 1991. Furthermore, the columns of the tables show analysis on different samples: columns 1 and 2 show results for all physicians, both inside and outside of contract arrangements; columns 3 and 4 show results for physicians *not* in contract arrangements; columns 5 and 6 show results for physicians *in* contract arrangements. As discussed above, a physician is said to be in a contract arrangement if he or

[38] For reference, the same gender comparison by year for physicians in General Practice is shown in Appendix Table 4.

she is a member of an HMO, PPO, or IPA, and not in a contract arrangement if he or she is not a member of any such organization.[39]

Furthermore, the coefficients shown in the tables represent the effect of OB/GYN relative to the base specialty of General Practice, and the effect of the female interaction with OB/GYN relative to a *weighted average of all other specialties.* That is, the coefficients are those from a simplified specification that omits the interaction of the female dummy with the other specialty categories:

$$\text{Outcome}_i = \alpha_0 + \alpha_1 \text{I(female)}_i + \alpha_2 \text{I(OB/GYN)}_i + \alpha_3 \text{I(female)}_i * \text{I(OB/GYN)}_i + X_i \beta + \sum_{\text{specialties}} [\, \delta_j \text{I(specialty)} \,] + \varepsilon_i$$

Eqn. 2. [40]

This provides a clearer picture of gender-specific within-OB/GYN differentials. However, in all cases the full specification shown in Equation 1 has also been tested, as well as a specification without any specialty dummies at all. Wald tests on those coefficients confirm the results discussed below, and hence it is acceptable to omit the more detailed set of interactions. Lastly, recall that this specification is run as ordinary least squares on the pooled 1987 and 1991 data. Other specifications and samples have also been employed, and the results confirm those discussed herein.[41]

A. Spot Prices: Waiting Times and Fees

Results for the Full Sample

[39] While the analysis is performed with this particular definition of "contracted" versus "not contracted" physicians, the main results are robust to alternate definitions.

[40] The function I(·) is an indicator function; e.g. I(female) is 0 for male physicians and 1 for female physicians.

[41] Analyses performed on a cross-section within a given survey year confirm all quoted results. Analyses performed on the unbalanced panel of all observations from all three survey years use a random effects specification to adjust for likely covariance among repeated observations on a given physician. Although individual-specific fixed effects due to selection on ability are of concern, random effects is more appropriate because physicians rarely change specialties and a fixed effects specification would not provide sufficient identification. Three versions of a random effects specification have been run: pooled OLS with clustered errors, maximum likelihood random effects and

Results for waiting times and fees in the pooled OLS specification for the full sample are shown in Table 4. Waiting times exhibit the most significant and interesting market adjustment. The gender-specific within-OB/GYN waiting time differential is 1.27 weeks, highly significant with a p-value less than 0.0005 (column 1).[42] This gender-specific within-OB/GYN coefficient of more than one week is in addition to the significant gender coefficient of 0.38 weeks. The inclusion of time interactions changes the coefficient only slightly, showing that the coefficient is slightly higher in 1991 (column 2). Since the waiting time is the time from an initial phone call to the physician's office to the soonest available appointment with that physician, it represents the length of the queue.[43] This differential indicates that patients do in fact wait longer for an appointment with a female OB/GYN, as one method of paying for this desirable good. Patients should be willing to wait to the point where the marginal cost of waiting equals the marginal benefit of seeing a female OB/GYN rather than a male OB/GYN. It appears that in this case patients are able to pay higher time prices by waiting nearly a week and a half longer to see a female OB/GYN.

The results for standard fees are also interesting. The gender-specific within-OB/GYN fee differential is $3.77, which is almost significant with a p-value of 0.13 (column 1).[44] Since a physician's standard fee is his or her usual fee for a normal visit with an established patient, the differential indicates that female patients do in fact pay more money to see a female OB/GYN rather than a male OB/GYN. Furthermore, this effect is specific to OB/GYN and not uniform

---

feasible generalized least squares. The results are robust to the choice of specification, and also confirm the OLS results discussed in the paper.

[42] This differential is similar in a Tobit specification. A Tobit specification is employed for waiting times because many physicians appear to report actual waiting times of zero days (which have been recoded into weeks). The Tobit appropriately corrects for left truncation at zero. There appears to be little difference in the results. It also might be expected that waiting time results would be non-linear as waiting times become excessively large, but no correction has been made for such non-linearity. It does not appear to be a significant issue.

[43] Note that this is the waiting time until the first available appointment for a *new* patient, so it represents the length of the queue for new patients only. The standard fee, on the other hand, is a recurring event.

[44] This effect is slightly sensitive to the specification, but is similar in all three random effects specifications.

across specialties: the market for physician services does appear to allow money prices to adjust competitively, at least somewhat. In addition to paying higher time prices, patients are able to pay higher money prices to obtain the more desirable good. However, inclusion of time interactions shows that this effect is almost entirely confined to 1987: the gender-specific within-OB/GYN coefficient in column 2 is $4.81, while the interaction with the 1991 dummy is –$4.87. Thus, it appears that by 1991 patients are not paying higher money prices to see a female OB/GYN.

Segregating by contract arrangement: what is the role of market restrictions?

Contract arrangements clearly restrict the flexibility of physicians' fees. In a contract arrangement we would expect the low flexibility of fees in response to patient demand to produce a larger adjustment of waiting times. On the other hand, for those physicians not in contract arrangements, we would expect the relatively high flexibility of the fees in response to patient demand to produce smaller adjustment of waiting times and larger adjustment of fees. To test this hypothesis, I rerun the above model segregated by whether a physician does or does not have a contract arrangement of any kind.[45] A contract arrangement is defined as an HMO, a PPO, or an IPA.[46] The percentage of physicians of each gender who do or do not have such contract arrangements is shown in Table 7. These percentages are similar for men and women, and rise steeply from 35% in 1987 to 87% in 1997, reflecting the advent of managed-care. It is important for this analysis that the time period considered is one in which both methods of physician reimbursement coexisted (rather than earlier years when managed care was a minor

[45] I run separate regression segregated by contract arrangement (rather than including interactions with contract arrangement) because there are reasons to expect that many aspects of the labor market are different inside and outside of contract arrangements.

[46] The definition of various types of contract arrangements has evolved over time. Possibly more importantly, physicians' knowledge of these definitions has become more accurate. For these reasons, it seems most accurate to use a variable indicating any type of contract arrangement rather than a specific type of arrangement.

presence or later years when managed care came to be nearly universal.) Table 7 confirms that this is the case.

The results shown in Table 4 directly confirm the hypothesis that waiting times will adjust for physicians in contract arrangements, whereas fees will adjust for physicians not in contract arrangements. Columns 3 and 5 of Table 4 show the results for physicians with no contract arrangement and physicians with a contract arrangement, respectively. Among physicians who have no contract arrangement, standard fees for female OB/GYNs are $10.67 higher than their male counterparts'. At the same time, their waiting times are slightly higher but insignificantly so – the coefficient is 0.76 weeks, with a standard error of 0.48. These physicians, not constrained by contract arrangements, are able to charge higher fees for their more desirable services, and their appointments are not rationed by waiting times. The standard fee effect is more than twice that found when all physicians, regardless of contract arrangement, are included.

Among physicians who do have contract arrangements, the story is exactly the reverse. Standard fees for female OB/GYNs are insignificantly higher than those of male OB/GYNs, while their waiting times are 1.59 weeks longer. These physicians, constrained by contract arrangements, appear to be unable to charge higher fees, and simply have much longer waiting times. They do not appear to gain monetarily from the excess demand for their services, and their visits seem to be rationed by waiting times.

Thus, patients who go to physicians without contract arrangements pay more money to see a female OB/GYN while patients who go to physicians with contract arrangements pay more time to see a female OB/GYN. The percentage premium for fees is approximately 20% whereas the percentage premium for waiting times is close to 80%. Patients pay in whatever manner the contract arrangement permits. Physicians do not earn money directly from waiting times, and

only physicians not in contract arrangements receive higher fees for their desirable services. The elasticities of patient demand with respect to these two different prices are probably different, but unfortunately the current data do not permit identification of these elasticities. However, in light of the literature indicating patients' low willingness to pay for medical care and their strong sense of entitlement to medical care, it is not surprising that patients pay proportionately smaller money premia as compared with time premia. It is also important to remember that these are not straightforward prices: patients pay very little of the money price directly (much is paid by insurance companies), and the waiting time price is a complex combination of inconvenience, impatience, and possibly deteriorating health.

Changes between 1987 and 1991

The inclusion of interactions with the time dummy shows that these results carry through for 1991 (columns 2, 4, and 6 of Table 4). For waiting times, in the full sample, the significant differential is changed only slightly (1.14 plus 0.29). Furthermore, the waiting time differentials remain consistent with the institutional story, but the contrast between non-contracted and contracted physicians is neither as large nor as significant in 1991 as in 1987. For fees, the differential in the full sample is negative and insignificant in 1991 (a net effect of -0.06). The results by contract arrangement are not significantly changed: the contrast between non-contracted and contracted physicians may have widened somewhat, but the change is imprecisely estimated.

Overall, the evidence in 1991 shows that patients are still paying higher time prices, but are no longer paying significantly higher money prices, to see a female OB/GYN. These results could very well be related to the high penetration of managed care in 1991. Even for physicians not in contract arrangements, by 1991 more and more fees were centrally set by insurance companies. In addition, there were many fewer non-contracted physicians, and it is reasonable

to assume that there may have been selection effects between non-contracted and contracted status. It is also possible that there were selection effects for patients: as more patients got their health care through contracted physicians, those who remained with non-contracted physicians may have been more likely to have strong preferences about the provision of their care. Both types of selection – physician and patient – among different health plans are well documented in the literature, and might contribute to the attenuation of the waiting time differential by 1991.

B. Income Measures

Results for the Full Sample

We might expect female OB/GYNs to earn higher incomes for two reasons. First, we saw above that in some cases they charge higher fees. This may carry over to higher incomes. Second, physicians in some contract arrangements may be paid at least partially on a salaried basis rather than fee basis, and employers may recruit female OB/GYNs by offering them higher salaries. The data provide support for both of these stories. The results for annual, weekly, and hourly income are shown in Table 5. They show an insignificant gender-specific within-OB/GYN premium of 8% in annual income and a significant premium of 13% in weekly income. However, because the *overall* female differential is -26% in annual income and -22% in weekly income, female OB/GYNs still earn less than male OB/GYNs. There is thus mild evidence that women in OB/GYN earn differentially more than women in other specialties: while women in other specialties earn approximately 22% less *weekly* income than men in those specialties, women in OB/GYN earn approximately 9% less. It appears that women in OB/GYN may gain some income from the excess preference for the service they provide. They close the gender income gap partially, but not completely.

By contract arrangement

Segregation by contract arrangement provides some additional insight into the gender income differentials. Among physicians who have no contract arrangement, there is no gender-specific within OB/GYN differential in annual income. For weekly income, however, the effect is positive and insignificant: 15% with a standard error of 10%. Adding these to the overall gender differential, among non-contracted physicians, women in OB/GYN earn 20% less annual income but only 5% less weekly income than men in OB/GYN (controlling for other characteristics). This 5% differential in weekly income is remarkably small: female physicians' weekly incomes are much closer to those of their male counterparts within OB/GYN than they are in other specialties. Given that this differential is much smaller for weekly incomes, one possibility is that non-contracted female OB/GYNs choose to use their slightly higher standard fees to increase their weekly income while slightly reducing the number of weeks they work, keeping their annual income unchanged. However, these results are *not* statistically significant, and should therefore be viewed as merely suggestive rather than conclusive.

Among physicians who do have a contract arrangement, there are significant within-OB/GYN gender differentials of 14% in annual income and 14% in weekly income. Among contracted physicians, female OB/GYNs also earn higher incomes than women in other specialties. Their incomes are still approximately 14% lower than those of contracted men in OB/GYN, but this is the smallest gender gap within any specialty. Thus, in contract arrangements, female OB/GYNs definitively reduce the gender gaps in both annual and weekly income by more than one-half.

These results – that female OB/GYNs close the gender gap both outside and inside of contract arrangements – lend support to the common beliefs among physicians that female OB/GYNs both make larger incomes in private practice and are sought after by managed-care employers with offers of higher salaries. These results provide some support for the hypothesis

that female OB/GYNs' bargaining power works both on patients and on employers. It appears that, while bargaining with patients may yield longer waiting times and slightly higher fees, neither of these translates directly into increasing income substantially. On the other hand, bargaining with employers in managed care contracts appears to yield more tangible effects on income.

Furthermore, the inclusion of time interactions (columns 2, 4, and 6) suggests that, for physicians not in contract arrangements, the net gender income premia within OB/GYN might actually be *positive* by 1991. These effects of greater than 10% in annual and weekly income are far from statistically significant, however, so should be treated as suggestive only. It is possible that, by 1991, female OB/GYNs not in contract arrangements are quite able to translate larger fee differentials (suggested in column 4 of Table 4) into larger annual and weekly incomes (suggested in column 4 of Table 5). For female OB/GYNs in contract arrangements, the results for 1991 are not significantly different from the results for 1987.

Lastly, the analysis of hourly income shows small and insignificant within-OB/GYN gender differentials. The coefficients do suggest that female OB/GYNs might have received slightly higher hourly incomes by 1991, particularly outside of contract arrangements.

C. Quantities: Patients and Hours

Results for the Full Sample

In addition to charging higher fees, female OB/GYNs could be making this extra income by seeing more patients each week or working more hours each week. This is confirmed by the data, as shown in Table 6. The gender-specific within-OB/GYN coefficient shows a 19% premium for patients and a 15% premium for hours. When these coefficients are added to the overall gender differentials of -16% and -23%, female OB/GYNs see similar numbers of patients as male OB/GYNs (3% more) and work slightly fewer hours (8% fewer). The salient point is

that, while female physicians normally see fewer patients and work fewer hours, female OB/GYNs see approximately the same number of patients and work almost the same hours. Female OB/GYNs may be meeting excess demand by seeing more patients and working slightly more hours each week.

By contract arrangement

The results for patients and hours are not significantly affected by the segregation by contract arrangement. The results from the complete sample carry through: while female physicians normally see fewer patients and work fewer hours than male physicians, female OB/GYNs both inside and outside of contract arrangements see similar numbers of patients and work similar hours. There is some weak evidence that female OB/GYNs in contract arrangements see slightly fewer patients and that female OB/GYNs not in contract arrangements work slightly fewer hours, but this is not significant.

VI. Discussion

The results just presented provide substantial insight into the question at hand: how does the imperfectly competitive market for OB/GYN services clear in the short run in the face of an excess demand for female OB/GYNs? The results indicate that female patients do in fact pay higher time and money prices to see female OB/GYNs rather than male OB/GYNs. The adjustment of waiting times is much larger than that of standard fees: the waiting time premium is approximately 58% (a 1.3 premium on top of a male waiting time of 2.2) whereas the standard fee differential is approximately 10% ($3.8 on top of $40). Patients are more able and/or willing to pay with time than with money, and these time prices do adjust. At the same time, fees adjust slightly and female OB/GYNs may earn slightly more income per week than they otherwise

would. They also work almost the same hours and see almost as many patients as male OB/GYNs, whereas female physicians usually work fewer hours and see fewer patients.

How well do these various differentials explain the within-OB/GYN gender differentials in income? On average, female OB/GYNs work 8% fewer hours, see 3% more patients, and charge 8% higher standard fees. So, if we calculate a predicted weekly income as the product of *hours* and fees, the gender differential should be about zero. If we calculate predicted weekly income as the product of *patients* and fees, the gender differential should be a *positive* 11%. However, in reality the gender differential in weekly income is a *negative* 9%. It is plausible that factors other than revenue generated from standard appointments are contributing to income and can explain this discrepancy. One possibility is that, while women may be able to charge higher fees for a given task, they perform a less expensive mix of tasks and thereby generate less income. Women may choose to work a more standard week with less time on-call, and therefore do more standard office visits and fewer middle-of-the-night expensive procedures. This different mix of tasks might explain the gap between actual weekly income and weekly income that would be predicted from multiplying number of patients seen per week times the standard fee to see a patient in a routine office visit. This is also supported by the fact that the net gender gap within OB/GYN is smaller for physicians in contract arrangements, who might be expected to have less flexibility in their choice of work schedule or procedure mix.[47]

Thus, while it is true that female OB/GYNs are charging slightly higher fees and are gaining higher weekly income from the excess demand for their services, they are not fully closing the gap. Although they do command higher prices, they do not appear to be capturing the full value of the rents they generate. Figure 3 illustrates this with a simple supply-demand model for the market for female OB/GYN services. Like Figures 1a and 1b, the graph shows

price (both fee and wait) on the vertical axis and quantity on the horizontal axis. The excess demand present at the *initial* fee (the fee for a male physician), Fee_0, is shown by the length of line *ae*. The lost consumer and producer surplus in this initial case is shown by the entire area *A+B+C+D+E*. Now assume that the market allows some adjustment of female OB/GYN fees relative to male OB/GYN fees, and some increase in the quantity of female OB/GYN visits. The equilibrium quantity is marked as *Q**, while the equilibrium prices are marked as *Fee** and *Wait**. A small adjustment of female OB/GYN fees, ΔFee, does slightly reduce the welfare losses due to market inefficiency. Patients wait slightly less and gain area *A* in the value of time saved, while female physicians charge slightly higher fees and gain area *D* in the form of higher income. Due to the limited quantity adjustment and the limited flexibility of fees, however, there is still significant waste. Patients pay with both time and money (they pay *Fee** + *Wait**) and spend significant time waiting (area *B+C*). The cost imposed on the patient of the higher time price is, however, not clear: some patients may find it inconveniences them very little to wait an extra week. On the other hand, physicians do not receive payment for the full value of their services (they only receive *Fee** x *Q**, and lose the area *C*). While these losses are first-order, there is also a second-order deadweight loss (area *E*). Overall, female OB/GYNS appropriate only a small portion of the rents created by their scarcity value.

Segregating physicians by whether or not they have a contract arrangement adds more structure to the main results. Female patients do pay higher time and money prices to see female OB/GYNs rather than male OB/GYNs. However, the fees of physicians in contract arrangements are inflexible or nonexistent. Therefore, patients seeing physicians in such arrangements do not pay higher money prices but do pay significantly higher time prices, on the order of two weeks more. On the other hand, patients seeing physicians not in such

[47] Further work will use detailed data (obtained from ACOG) on the practice patterns of OB/GYNs to investigate

arrangements do pay higher money prices but do not wait significantly longer. The flexibility of fees outside of contract arrangements allows the market to equilibrate almost entirely through money prices rather than time prices.

However, this does not mean that female OB/GYNs in contract arrangements receive no benefits from the excess demand for their services. Even though female OB/GYNs in contract arrangements cannot charge higher fees for their more desirable services, they do receive an income premium. Their incomes are closer to those of male OB/GYNs than they would be in other specialties. Both inside and outside of contract arrangements, female OB/GYNs have weekly incomes closer to those of their male counterparts than they would in other specialties. They also work similar hours and see similar numbers of patients per week. Female OB/GYNs in contract arrangements appear to close the gender gap with higher salaries, while those outside of such arrangements close the gap with higher fees. However, as stated above, although they capture some of the increased value they provide, they almost certainly do not capture all of it.

On the patient side, the appropriate interpretation of the waiting time price is also intriguing: to what extent is this actually a cost imposed on patients? In many countries with national health insurance, time prices are one of the primary mechanisms by which health care goods are allocated. If waiting times are costless and equally so for different groups, this could be an efficient and equitable to allocate goods and provide a relatively easy way to reduce moral hazard. However, if the waiting times are in fact very burdensome to patients, or if waiting times are distributed inequitably, this mechanism could be both inefficient and inequitable. The results of this paper imply that, as money prices play an increasingly smaller role in the allocation of health care in the United States, we may see similar allocative inefficiencies and inequities arise.

---

these hypotheses.

VI. Conclusion

I began this paper by arguing that the increase in demand for female OB/GYNs has outpaced the increase in supply and asking what outcomes this excess demand would produce given that the market for physicians' services is imperfectly competitive. The answer is that female patients pay both higher time and higher money prices to see female OB/GYNs rather than male OB/GYNs. The adjustment of waiting times is much larger than that of standard fees, and the relative price adjustments differ by contract arrangement in precisely the ways that theory would predict. When money prices are sticky or nonexistent, patients pay with time. When money prices can adjust, patients pay with money and do not pay with higher waiting times. For physicians, this means that female OB/GYNs outside of contract arrangements can more directly reap the benefits of the higher demand for their services. However, female OB/GYNs subject to contract arrangements also appear to earn an income premium, possibly as a result of reportedly aggressive and preferential recruitment by health care organizations.

Thus, in some manner, prices adjust to equilibrate the high relative demand for female physicians with the low relative supply. The market for physicians' services is far from competitive, and it reaches equilibrium in a complex manner that includes the adjustment of non-traditional prices and an important role for health care institutions. Outside of contract arrangements, patients pay more money for the desired services. Inside contract arrangements, patients are unable to pay with money and therefore pay with time. Either way, female OB/GYNs appear to earn higher incomes relative to male OB/GYNs than they would if they were in another specialty. However, they do not appear to capture the full value of the preferred good they provide. Since much of the adjustment occurs on waiting times, patients pay in time but little monetary payment is transferred to the physician. Gender discrimination on the part of patients alleviates gender gaps among physicians partially, but not completely. Market

adjustment occurs but is incomplete. If unfettered markets generally do a good job allocating goods, this situation is an example of a restricted market that does not do a particularly good job allocating goods. In this case, both patients and physicians lose out due to market rigidities. The larger implications for the matching of patients to physicians and the optimal allocation of health care goods, as well for gender discrimination in professional occupations, are of great interest and will be the subject of further work.

Bibliography

Abeshaus, D.B., L.C. Epstein, A.B. Kane, and L.A. Monteiro, 1993. "The status of women in medicine at the Brown University School of Medicine," *Rhode Island Medicine*, 76(7), p. 337-9.

American College of Obstetricians and Gynecologists, 1999. "Women's Health Care: A Career in Obstetrics and Gynecology," http://www.acog.org/.

American Medical Association Education and Research Foundation. *Practice Patterns of Young Physicians*, 1987: United States, Computer File. Chicago, IL: American Medical Association Education and Research Foundation [producer], 1987. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 1990.

American Medical Association, 1986, 1992, 1996, and 1999. *Physician Characteristics and Distribution in the U.S.* Department of Data Release Services, AMA: Chicago.

Arnold, R.M., S.C. Martin, R.M. Parker, 1988. "Taking care of patients – does it matter whether the physician is a woman?", *Western Journal of Medicine*, 149(6), p. 729-33.

Ayanian, J.Z. and E. Guadagnoli, 1996. "Variations in breast cancer treatment by patient and provider characteristics." *Breast Cancer Research & Treatment*, 40(1), p. 65-74.

Baker, Lawrence C., 1996. "Differences in Earnings Between Male and Female Physicians," *The New England Journal of Medicine*, 334(15), p. 960-964.

Barbezat, Debra A., and James W. Hughes, 1990. "Sex Discrimination in Labor Markets: The Role of Statistical Evidence: Comment," *The American Economic Review*, 80(1), p. 277-286.

Becker, Gary S., 1971. *The Economics of Discrimination*¸ 2nd Ed. University of Chicago Press: Chicago.

Becker, Gary S., 1993. *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*, 3rd Ed. University of Chicago Press: Chicago.

Cantor J.C., *et al*, 1996. "Physician service to the underserved: implications for affirmative action in medical education," *Inquiry*, 33(2), p. 167-80.

Capek, L., D.E. Edwards, and S.E. Mackinnon, 1997. "Plastic surgeons: a gender comparison," *Plastic & Reconstructive Surgery*, 99(2), p. 289-99.

Chandler, P. J., C. Chandler, et al., 2000. "Provider gender preference in obstetrics and gynecology: a military population," *Military Medicine*, 165(12): p. 938-40.

Cook, Deborah J. *et al*, 1996. "Residents' Experiences of Abuse, Discrimination and Sexual Harassment During Residency Training," *Canadian Medical Association Journal*, 154, p. 1657-1665.

Curtis, M. G., 2001. "A guest editorial: is "male ob/gyn" a new oxymoron?" *Obstetrical & Gynecological Survey*, 56(6): p. 317-21.

Cutler, David, Edward Glaeser, and Jake Vigdor, 1999. "The Rise and Decline of the American Ghetto", *Journal of Political Economy*, 107(3), p. 455-506.

Dranove, David and Mark Satterthwaite, 1999. "The Industrial Organization of Health Care Markets," in *Handbook of Health Economics*, Culyer and Newhouse, editors.

Elstad, J. I. and O. N. Institute of Applied Social Research, 1994. "Women's priorities regarding physician behavior and their preference for a female physician," *Women & Health*, 21(4).

Fitzpatrick, Kevin M. and Marilyn P. Wright, 1995. "Gender Differences in Medical School Attrition Rates, 1973-1992," *Journal of the American Medical Women's Association*, 50(6).

Frank E., 1995. "The Women Physicians' Health Study: background, objectives, and methods," *Journal of the American Medical Women's Association*, 50(2), p. 64-6..

Frank E., D. Brogan, and M. Schiffman, 1998. "Prevalence and correlates of harassment among U.S. women physicians," *Archives of Internal Medicine*, 158(4), p. 352-8.

Frech, H.E. and William C. Lee, 1987. "The Welfare Cost of Rationing-By-Queuing across Markets: Theory and Estimates from the U.S. Gasoline Crises," *The Quarterly Journal of Economics*, 102 (1), p. 97-108.

Gaynor, Martin, 1994. "Issues in the Industrial Organization of the Market for Physicians," *Journal of Economics and Management Strategy*, 3(1), p. 211-255.

Ghali, William A., 1997. "Menopausal Hormone Therapy: Physician Awareness of Patient Attitudes," *American Journal of Medicine*, 103, p. 3-10.

Goldin, Claudia, 1990. *Understanding the Gender Gap.* New York: Oxford University Press.

Haar, E., V. Halitsky, et al., 1975. "Factors related to the preference for a female gynecologist," *Medical Care*, 13(9): p. 782-90.

Hadley, Jack. *Practice Patterns of Young Physicians*, 1991: United States, Computer file. ICPSR version. Washington, DC: Georgetown University, Center for Health Policy Studies [producer], 1993. Ann Arbor, MI: Inter-university Consortium for Political and Social Research [distributor], 1995.

Hadley, Jack. *Practice Patterns of Young Physicians*, 1997: United States, Computer file. Obtained through personal correspondence with the Principal Investigator.

Hampton, Mary B., and John S. Heywood, 1993. "Do Workers Accurately Perceive Gender Wage Discrimination?," *Industrial and Labor Relations Review*, 47(1), p. 36-49.

Kehrer, Barbara H., 1976. "Factors Affecting the Incomes of Men and Women Physicians: An

Exploratory Analysis," *Journal of Human Resources*, 11(4), p. 526-545.

Kreuter MW., V.J. Strecher, R. Harris, S.C. Kobrin, and C.S. Skinner, 1995. "Are patients of women physicians screened more aggressively? A prospective study of physician gender and screening," *Journal of General Internal Medicine*, 10(3) p. 119-25.

Kuhn, Peter, 1987. "Sex Discrimination in Labor Markets: The Role of Statistical Evidence," *The American Economic Review*, 77(4), p. 567-583.

Langwell, Kathryn M., 1980. "Real Returns to Career Decisions: The Physician's Specialty and Location Choices," *Journal of Human Resources*, 15(2), p. 278-286.

Langwell, Kathryn M., 1982. "Factors Affecting the Incomes of Men and Women Physicians: Further Explorations," *Journal of Human Resources*, 17(2), 261-275.

Lenhart, S.A., F. Klein, P. Falcao, E. Phelan, and K. Smith, 1991. "Gender bias against and sexual harassment of AMWA members in Massachusetts," *Journal of the American Medical Womens Association*, 46(4), p. 121-5.

Lurie, N., K.L. Margolis, P.G. McGovern, P.J. Mink, and J.S. Slater, 1997. "Why do patients of female physicians have higher rates of breast and cervical cancer screening?," *Journal of General Internal Medicine*, 12(1), p. 34-43.

MacLeod, K., 1996. "Isolation, excessive time demands and sexism face female MDs," *Canadian Medical Association Journal*, 154(5), p. 708-9.

Maheux B., N. Haley N., M. Rivard, and A. Gervais, 1997. "Do women physicians do more STD prevention than men?," *Canadian Family Physician*, 43, p. 1089-95.

Majeroni, BA., J. Karuza, C. Wade, M. McCreadie, and E. Calkins, 1993. "Gender of physicians and patients and preventive care for community-based older adults," *Journal of the American Board of Family Practice*, 6(4), p. 359-65.

Manning, Willard G, J. P. Newhouse, N. Duan, E. B. Keeler, A. Leibowitz, 1987. "Health Insurance and the Demand for Medical Care: Evidence from a Randomized Experiment," *The American Economic Review*, 77(3), p. 251-277.

Mattila-Lindy S., et al., 1997. "Physicians' gender and clinical opinions of reproductive health matters," *Women & Health*, 26(3), p. 15-26.

Mitchell, Janet B., 1984. "Why Do Women Physicians Work Fewer Hours than Men Physicians?," *Inquiry*, 21(4), p. 361-368.

Mustard, Cameron A., 1998. "Sex Differences in the Use of Health Care Services," *New England Journal of Medicine*, 338: p. 1678-1683.

Nichols, David, E. Smolensky, and T.N. Tideman, 1971. "Discrimination in Waiting Time in Merit Goods," *The American Economic Review*, 61(3), p. 312-23.

Notzer N. and S. Brown, 1995. “The feminization of the medical profession in Israel,” *Medical Education*, 29(5), p. 377-81.

Oaxaca, Ronald, 1973. “Male-Female Wage Differentials in Urban Labor Markets,” *International Economic Review*, 14(3), p. 693-709.

Ohsfeldt, Robert L., and Steven D. Culler, 1986. “Differences in Income between Male and Female Physicians,” *Journal of Health Economics*, 5(4), p. 335-46.

Ohsfeldt, Robert L., Steven D. Culler, and Edmund R. Becker, 1987. “Sex Differences in the Economic Advantages of Physician Board Certification,” *Southern Economic Journal*; 54(2), p. 343-50.

Reddy, V., 2000. "Employment: no discrimination for accommodation of patients' preference for female doctors,” *The Journal of Law, Medicine & Ethics*, 28(4): p. 409-10.

Root MJ, 1987. “Communication Barriers Between Older Women and Physicians,” *Public Health Reports Supplement*, p. 152-5.

Schiffman, Melissa and Erica Frank, 1995. “Harassment of Women Physicians,” *Journal of the American Medical Women’s Association*, 50(6).

Schwartz, William B., Joseph P. Newhouse, Bruce W. Bennet, and Albert P. Williams, “The Changing Geographic Distribution of Board-Certified Physicians,” *New England Journal of Medicine*, 303(18), p. 1032-1038.

Seto, Todd B., 1996. “Effect of Physician Gender on the Prescription of Estrogen Replacement Therapy,” *Journal of General Internal Medicine*, 11, p. 197-203.

Stiglitz, Joseph E., 1973. “Approaches to the Economics of Discrimination,” *The American Economic Review*, Papers and Proceedings of the Eighty-fifth Annual Meeting of the American Economic Association. 63(2), p. 287-295.

Tesch, BJ., et al., 1995. “Promotion of women physicians in academic medicine: glass ceiling or sticky floor?,” *JAMA*, 273(13), p. 1022-5.

Thorne, S., 1994. "Women show growing preference for treatment by female physicians,” *Canadian Medical Association Journal*, 150(9): p. 1466-7.

U.S. Bureau of the Census, 1997. *Statistical Abstract of the United States: 1997* (117th Ed.), Washington D.C.

U.S. Dept. of Health and Human Services, National Center for Health Statistics. *National Ambulatory Medical Care Survey*, 1990 Computer file. Hyattsville, MD: U.S. Dept. of Health and Human Services, National Center for Health Statistics producer, 1992. Ann Arbor, MI: Inter-university Consortium for Political and Social Research distributor, 1992.

West C., 1993. “Reconceptualizing gender in physician-patient relationships,” *Social Science & Medicine*, 36(1), p. 57-66.

Weyrauch, K. F., P. E. Boiko, et al., 1990. "Patient sex role and preference for a male or female physician,” *The Journal of Family Practice,* 30(5): p. 559-62.

Williams, A.P., et al., 1993. “Women in medicine: toward a conceptual understanding of the potential for change,” *Journal of the American Medical Women’s Association*, 48(4), p. 115-21.

Wilson, M.P., 1987. “Making a difference – women, medicine, and the twenty-first century,” *Yale Journal of Biology & Medicine*, 60(3), p. 273-88.

Young, A.F., J.E. Byles, and A.J. Dobson, 1998. “Women's satisfaction with general practice consultations,” *Medical Journal of Australia*, 168(8), p. 386-9.

Table 1. Summary Statistics for All Physicians.

	1987					*1991*				
Variable	***Men***		***Women***		***Gender Gap***	***Men***		***Women***		***Gender Gap***
Annual income ($k)	98.25	(67.29)	68.42	(37.07)	29.83	124.68	(82.15)	85.13	(50.43)	39.54
Weekly income ($k)	2.07	(1.45)	1.47	(0.81)	0.60	2.64	(1.76)	1.88	(1.21)	0.77
Log annual income	4.42	(0.58)	4.09	(0.57)	0.33	4.66	(0.58)	4.30	(0.56)	0.36
Weeks worked	47.7	(2.8)	46.67	(4.3)	1.08	47.4	(3.1)	45.52	(6.9)	1.92
Hours last week	59.6	(16.5)	50.83	(18.5)	8.81	61.7	(17.1)	49.49	(19.0)	12.24
Patients last week	82.7	(59.3)	76.50	(51.4)	6.23	97.5	(63.4)	80.82	(52.4)	16.67
Waiting time in weeks	1.12	(2.25)	1.56	(2.82)	-0.44	1.38	(2.18)	2.11	(3.02)	-0.73
Standard fee ($)	35.06	(25.19)	36.67	(51.98)	-1.62	49.23	(45.18)	48.97	(27.44)	0.26
% with contract [a]	0.37	(0.48)	0.31	(0.46)	0.06	0.52	(0.50)	0.52	(0.50)	0.00
% in private practice	0.68	(0.47)	0.53	(0.50)	0.14	0.68	(0.47)	0.58	(0.49)	0.10
% board certified	0.70	(0.46)	0.63	(0.48)	0.07	0.75	(0.43)	0.74	(0.44)	0.01
Age	33.77	(2.39)	33.57	(2.50)	0.20	34.02	(2.23)	33.75	(2.30)	0.28
% white	0.83	(0.38)	0.74	(0.44)	0.09	0.85	(0.36)	0.81	(0.39)	0.03
% married	0.84	(0.36)	0.76	(0.43)	0.08	0.83	(0.38)	0.77	(0.42)	0.06
% parents	0.72	(0.45)	0.60	(0.49)	0.12	0.69	(0.46)	0.61	(0.49)	0.08
N	4543		1322			2082		847		

[a] Percentage with contract indicates the share of physicians with an HMO, PPO, or IPA contract.

Notes. Data is from the Young Physicians Survey 1987 and Young Physicians Survey 1991. Values for 1991 include only new respondents. Means are shown, with standard deviations in parentheses. Means are weighted by weights designed to adjust for differential response rates within the eligible sample across identifiable sample subgroups and selection of an oversample of black and Hispanic individuals. These weights were provided by the Principal Investigator. More detail on the construction of these weights can be found in the codebooks for the data sets.

Table 2. Percentage Female within Medical Specialty Categories, 1970-2000.

		Year						
Specialty Category		1970	1975	1980	1985	1990	1995	2000
General Family Practice	GP	4.3	5.3	7.8	11.9	15.0	21.4	26.2
General Internal Medicine	IM	5.7	7.4	11.4	16.6	19.5	24.0	27.6
Specialty with no Subspecialties	SP	8.9	10.1	9.5	14.2	17.6	21.4	23.5
Medical Subspecialty	MS	4.5	4.1	4.4	5.5	6.6	8.5	9.6
General Surgery	GS	1.0	1.8	3.4	5.2	6.3	8.8	11.0
Surgical Specialty/Subspecialty	SS	1.3	1.5	2.3	3.6	4.7	6.4	7.3
Pediatrics	PD	20.8	23.1	28.4	34.5	38.3	44.7	48.6
OBGYN	OB	7.1	8.2	12.3	18.1	22.4	29.8	35.1
Radiology	RD	5.0	6.2	8.6	11.8	14.1	17.5	18.2
Psychiatry	PS	12.7	14.3	17.1	21.5	24.4	28.7	31.0
Anesthesiology	AN	14.0	14.1	15.0	16.8	17.7	19.5	20.5
Pathology	PA	12.2	14.1	16.4	20.7	23.0	27.4	29.7
Other	OT	14.2	14.6	18.0	16.1	16.5	17.1	27.2
Total	Tot	7.6	9.0	11.6	14.6	16.9	20.7	24.0

Source: American Medical Association, 1986, 1992, 1996, 1999, 2005. Physician Characteristics and Distribution in the U.S. Department of Data Release Services, AMA: Chicago.

Table 3. Summary Statistics for Obstetricians and Gynecologists.

	1987					*1991*				
Variable	***Men***		***Women***		***Gender Gap***	***Men***		***Women***		***Gender Gap***
Annual income ($k)	110.81	(79.27)	83.02	(36.08)	27.78	153.56	(97.19)	127.04	(76.17)	26.52
Weekly income ($k)	2.30	(1.59)	1.78	(0.79)	0.52	3.22	(2.02)	2.91	(2.08)	0.31
Log annual income	4.56	(0.52)	4.28	(0.71)	0.28	4.88	(0.56)	4.69	(0.55)	0.18
Weeks worked	48.1	(1.8)	46.78	(3.3)	1.35	47.8	(2.2)	45.49	(5.1)	2.35
Hours last week	66.9	(18.7)	64.59	(20.0)	2.31	70.0	(19.0)	60.96	(18.6)	9.00
Patients last week	89.9	(36.5)	90.78	(37.8)	-0.84	90.3	(41.9)	96.04	(39.4)	-5.77
Waiting time in weeks	2.04	(2.85)	3.62	(4.42)	-1.58	2.29	(2.49)	4.42	(3.97)	-2.13
Standard fee ($)	40.25	(17.89)	50.34	(132.35)	-10.09	58.19	(29.45)	59.38	(34.42)	-1.19
% with contract [a]	0.52	(0.50)	0.44	(0.50)	0.08	0.70	(0.46)	0.74	(0.44)	-0.04
% in private practice	0.76	(0.43)	0.70	(0.46)	0.06	0.86	(0.35)	0.73	(0.45)	0.13
% board certified	0.46	(0.50)	0.34	(0.48)	0.12	0.40	(0.49)	0.29	(0.46)	0.11
Age	33.81	(2.28)	33.35	(2.20)	0.47	34.02	(1.96)	33.94	(2.23)	0.08
% white	0.78	(0.41)	0.77	(0.42)	0.01	0.78	(0.41)	0.78	(0.42)	0.01
% married	0.88	(0.32)	0.80	(0.40)	0.08	0.85	(0.36)	0.66	(0.48)	0.19
% parents	0.76	(0.43)	0.60	(0.49)	0.15	0.74	(0.44)	0.64	(0.48)	0.10
N	265		125			103		64		

[a] Percentage with contract indicates the share of physicians with an HMO, PPO, or IPA contract.

Notes. Data is from the Young Physicians Survey 1987 and Young Physicians Survey 1991. Values for 1991 include only new respondents. Means are shown, with standard deviations in parentheses. Means are weighted by weights designed to adjust for differential response rates within the eligible sample across identifiable sample subgroups and selection of an oversample of black and Hispanic individuals. These weights were provided by the Principal Investigator. More detail on the construction of these weights can be found in the codebooks for the data sets.

Table 4. Regression results for waiting times and standard fees.

		All		***No Contract*** [a]		***Contract*** [a]	
Dependent Variable	*Independent Variable*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Waiting Time (weeks)	*female*	0.38 **	0.28 **	0.33 **	0.31 **	0.45 **	0.28 **
		(0.09)	(0.09)	(0.12)	(0.13)	(0.12)	(0.13)
	obgyn	1.53 **	1.45 **	1.99 **	1.87 **	1.18 **	1.06 **
		(0.16)	(0.19)	(0.26)	(0.30)	(0.21)	(0.23)
	female*obgyn	1.27 **	1.14 **	0.76	0.57	1.59 **	1.72 **
		(0.36)	(0.41)	(0.48)	(0.47)	(0.51)	(0.69)
	*female*I(1991)*		0.26		0.15		0.32
			(0.18)		(0.29)		(0.23)
	*obgyn*I(1991)*		0.25		0.55		0.32
			(0.38)		(0.59)		(0.47)
	*female*obgyn*I(1991)*		0.29		0.56		-0.27
			(0.78)		(1.38)		(1.05)
Standard Fee (dollars)	*female*	-0.73	-0.78	-1.84	-1.60	0.07	-0.07
		(0.84)	(1.10)	(1.26)	(1.57)	(1.11)	(1.53)
	obgyn	15.44 **	13.65 **	13.96 **	12.15 **	15.97 **	14.42 **
		(1.40)	(1.50)	(2.15)	(1.75)	(1.78)	(2.14)
	female*obgyn	3.77	4.81 **	10.67 **	8.68 **	-0.66	1.61
		(2.51)	(2.63)	(4.70)	(3.78)	(2.78)	(3.54)
	*female*I(1991)*		0.82		-0.72		0.79
			(1.70)		(2.65)		(2.23)
	*obgyn*I(1991)*		6.49 *		9.48		4.41
			(3.57)		(7.99)		(4.03)
	*female*obgyn*I(1991)*		-4.87		12.09		-6.45
			(6.03)		(18.39)		(5.84)

[a] A physician is classified as in a contract arrangement if he or she is a member of an HMO, PPO, or IPA (columns 5 and 6). A physician is classified as not in a contract arrangement if he or she is not a member of any such organization (columns 3 and 4).

Table 4 (Continued).

Notes to Table 4. Regressions shown are pooled ordinary least squares on the sample of new observations on physicians in the 1987 and 1991 Young Physicians Surveys. (They do not include observations from the 1997 sample nor repeat observations in 1991 on physicians who were first interviewed in 1987.) Standard errors are Huber-White robust and are shown in parentheses. Significance levels are indicated by ** for p-values less than 5% and * for p-values less than 10%. All models include controls for: sex, age, race, region (northeast, south, midwest, west), a quadratic in experience, a married dummy, a parent dummy, large specialty category (as listed in Appendix Table 1: general family practice, general internal medicine, specialty with no reported subspecialties, medical subspecialty, general surgery, surgical specialty/subspecialty, pediatrics, OB/GYN, radiology, psychiatry, anesthesiology, pathology, other), interaction of the female dummy with the OB/GYN dummy, dummies for AMA membership and for board certification, and practice setting dummies indicating private practice, a contract arrangement, and salaried pay, and a dummy for 1991. Practice setting dummies are omitted in specifications that are segregated by contract arrangement. The base case is a male physician in general practice in the Northeast in 1987. The models shown in columns 2, 4, and 6 include a dummy for 1991 and the interaction of that dummy with the following variables: female, OB/GYN, female*OB/GYN, the region dummies, the married dummy, the parent dummy, and other specialty dummies. Column 2 includes the interaction of the 1991 dummy with the contract arrangement variable. All dollar values are in 1986 dollars. Models are weighted by weights designed to adjust for differential response rates within the eligible sample across identifiable sample subgroups and selection of an oversample of black and Hispanic individuals. These weights were provided by the Principal Investigator. More detail on the construction of these weights can be found in the codebooks for the data sets. Weights were made consistent across the different years of data by a similar procedure.

Table 5. Regression results for income.

		All		***No Contract*** [a]		***Contract*** [a]	
Dependent Variable	*Independent Variable*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Annual income (log)	*female*	-0.26 **	-0.24 **	-0.24 **	-0.23 **	-0.29 **	-0.29 **
		(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)
	obgyn	0.43 **	0.42 **	0.38 **	0.37 **	0.48 **	0.48 **
		(0.04)	(0.04)	(0.06)	(0.06)	(0.05)	(0.06)
	female*obgyn	0.08	0.03	0.04	-0.03	0.14 **	0.13 **
		(0.07)	(0.09)	(0.13)	(0.15)	(0.07)	(0.09)
	*female*I(1991)*		-0.03		-0.02		-0.01
			(0.03)		(0.04)		(0.06)
	*obgyn*I(1991)*		0.07		0.05		0.04
			(0.09)		(0.14)		(0.12)
	*female*obgyn*I(1991)*		0.12		0.34		-0.03
			(0.15)		(0.30)		(0.15)
Weekly income (log)	*female*	-0.22 **	-0.21 **	-0.20 **	-0.20 **	-0.26 **	-0.26 **
		(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.04)
	obgyn	0.44 **	0.42 **	0.38 **	0.37 **	0.48 **	0.47 **
		(0.04)	(0.04)	(0.06)	(0.06)	(0.05)	(0.05)
	female*obgyn	0.13 **	0.09	0.15	0.08	0.14 **	0.13 *
		(0.06)	(0.06)	(0.10)	(0.10)	(0.07)	(0.09)
	*female*I(1991)*		-0.02		-0.01		-0.01
			(0.03)		(0.04)		(0.05)
	*obgyn*I(1991)*		0.08		0.06		0.05
			(0.09)		(0.14)		(0.11)
	*female*obgyn*I(1991)*		0.08		0.31		-0.03
			(0.13)		(0.30)		(0.15)

[a] A physician is classified as in a contract arrangement if he or she is a member of an HMO, PPO, or IPA (columns 5 and 6). A physician is classified as not in a contract arrangement if he or she is not a member of any such organization (columns 3 and 4).

Table 5. (continued) Regression results for income.

		All		***No Contract*** [a]		***Contract*** [a]	
Dependent Variable	*Independent Variable*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Hourly income (log)	*female*	-0.02	-0.03	0.01	-0.01	-0.05	-0.10 **
		(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.04)
	obgyn	0.31 **	0.30 **	0.20 **	0.18 **	0.41 **	0.44 **
		(0.04)	(0.04)	(0.06)	(0.07)	(0.06)	(0.06)
	female*obgyn	-0.01	-0.07	0.03	-0.02	-0.02	-0.08
		(0.07)	(0.07)	(0.11)	(0.11)	(0.09)	(0.10)
	*female*I(1991)*		0.05		0.06		0.08
			(0.04)		(0.05)		(0.06)
	*obgyn*I(1991)*		0.05		0.11		-0.07
			(0.10)		(0.13)		(0.13)
	*female*obgyn*I(1991)*		0.15		0.21		0.12
			(0.15)		(0.28)		(0.19)

[a] A physician is classified as in a contract arrangement if he or she is a member of an HMO, PPO, or IPA (columns 5 and 6). A physician is classified as not in a contract arrangement if he or she is not a member of any such organization (columns 3 and 4).

Notes. See Notes to Table 4.

Table 6. Regressions results for patients and hours.

		All		***No Contract*** [a]		***Contract*** [a]	
Dependent Variable	*Independent Variable*	*(1)*	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*
Patients (log)	*female*	-0.16 **	-0.14 **	-0.20 **	-0.15 **	-0.11 **	-0.11 **
		(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)
	obgyn	-0.25 **	-0.22 **	-0.26 **	-0.22 **	-0.23 **	-0.19 **
		(0.04)	(0.04)	(0.06)	(0.06)	(0.05)	(0.05)
	female*obgyn	0.19 **	0.14 **	0.22 **	0.13 *	0.16 **	0.11 **
		(0.06)	(0.07)	(0.09)	(0.09)	(0.07)	(0.11)
	*female*I(1991)*		-0.07		-0.18 **		-0.02
			(0.05)		(0.09)		(0.06)
	*obgyn*I(1991)*		-0.15 **		-0.19		-0.13
			(0.08)		(0.14)		(0.10)
	*female*obgyn*I(1991)*		0.19		0.33		0.15
			(0.12)		(0.24)		(0.15)
Hours (log)	*female*	-0.22	-0.19 **	-0.22 **	-0.20 **	-0.20 **	-0.16 **
		(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
	obgyn	0.13	0.12 **	0.18 **	0.19 **	0.07 **	0.03
		(0.02)	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)
	female*obgyn	0.13	0.15 **	0.12 **	0.10 *	0.14 **	0.18 **
		(0.04)	(0.04)	(0.05)	(0.06)	(0.05)	(0.06)
	*female*I(1991)*		-0.08 **		-0.09 **		-0.08 **
			(0.03)		(0.04)		(0.04)
	*obgyn*I(1991)*		0.02		-0.07		0.12 **
			(0.05)		(0.08)		(0.05)
	*female*obgyn*I(1991)*		-0.05		0.07		-0.11
			(0.08)		(0.12)		(0.11)

[a] A physician is classified as in a contract arrangement if he or she is a member of an HMO, PPO, or IPA (columns 5 and 6). A physician is classified as not in a contract arrangement if he or she is not a member of any such organization (columns 3 and 4).

Notes. See Notes to Table 4.

Table 7. Percentages of Physicians in Contract Arrangements.

Year	*Men*	*Women*	*All*
1987	37%	31%	35%
1991	53%	52%	53%
1997	88%	81%	87%

Notes. Percentages are calculated from YPS sample in each year. Contract arrangement is defined as any HMO, PPO, or IPA contract.

Appendix Table 1. Medical Specialties.

Large Specialty Category		*Specialty*	
GP	General Family Practice	FP	FAMILY PRACTICE
		GP	GENERAL PRACTICE
IM	General Internal Medicine	IM	INTERNAL MEDICINE
SP	Specialty with no reported subspecialties	A	ALLERGY
		AI	ALLERGY & IMMUNOLOGY
		AM	AEROSPACE MEDICINE
		D	DERMATOLOGY
		EM	EMERGENCY MEDICINE
		GPM	GENERAL PREVENTIVE MEDICINE
		IG	IMMUNOLOGY
		N	NEUROLOGY
		OM	OCCUPATIONAL MEDICINE
		PH	PUBLIC HEALTH
		PM	PHYSICAL MEDICINE & REHABILITATION
MS	Medical Subspecialty	CD	CARDIOVASCULAR DISEASES
		DIA	DIABETES
		DLI	DIAGNOSTIC LABORATORY IMMUNOLOGY
		END	ENDOCRINOLOGY
		GE	GASTROENTEROLOGY
		GER	GERIATRICS
		HEM	HEMATOLOGY
		ID	INFECTIOUS DISEASES
		NEP	NEPHROLOGY
		NTR	NUTRITION
		ON	ONCOLOGY
		PDA	PEDIATRIC ALLERGY
		PDC	PEDIATRIC CARDIOLOGY
		PUD	PULMONARY DISEASES
		RHU	RHEUMATOLOGY
GS	General Surgery	GS	GENERAL SURGERY
SS	Surgical Specialty/Subspecialty	CDS	CARDIOVASCULAR SURGERY
		CRS	COLON & RECTAL SURGERY
		HNS	HEAD AND NECK SURGERY
		HS	HAND SURGERY
		NS	NEUROLOGICAL SURGERY
		OPH	OPHTHALMOLOGY
		ORS	ORTHOPEDIC SURGERY
		OTO	OTOLARYNGOLOGY
		PDS	PEDIATRIC SURGERY
		PS	PLASTIC SURGERY
		TRS	TRAUMATIC SURGERY
		TS	THORACIC SURGERY
		U	UROLOGICAL SURGERY
		VS	VASCULAR SURGERY
PD	Pediatrics	PD	PEDIATRICS
OB	OBGYN	OBG	OBSTETRICS & GYNECOLOGY
RD	Radiology	DR	DIAGNOSTIC RADIOLOGY
		R	RADIOLOGY
		RO	RADIATION ONCOLOGY
		TR	THERAPEUTIC RADIOLOGY
PS	Psychiatry	CHP	CHILD PSYCHIATRY
		P	PSYCHIATRY
AN	Anesthesiology	AN	ANESTHESIOLOGY
PA	Pathology	FOP	FORENSIC PATHOLOGY
		PTH	PATHOLOGY
OT	Other	OS	OTHER SPECIALTY
		US	UNSPECIFIED

Appendix Table 2. Numbers of observations in YPS, shown by years for which data is available.

Data available in year?			*Number*
1987	1991	1997	*of obs.*
Y			2744
	Y		2267
Y	Y		2334
Y	Y	Y	790
	Y	Y	662

Notes. Data are for Young Physicians Surveys, 1987, 1991, 1997.

Appendix Table 3. Oaxaca decomposition of log annual income differentials.

A. Gender differential

$= \beta m^{*}Xm - \beta f^{*}Xf$

Sample			*Controls*		
Year	*Sample*	*Gender Differential*	*specialty*	*setting*	*demographics*
1987	All	0.33	no	no	no
1991	New	0.36	no	no	no
1991	Repeat	0.45	no	no	no
1997	Repeat	0.40	no	no	no

B. Portion explained by differences in characteristics

$= \beta^{*}(Xm - Xf)/ (\beta m^{*}Xm - \beta f^{*}Xf)$

Sample		*Coefficients used*			*Characteristics used*		
Year	*Sample*	*uniform*	*male*	*female*	*specialty*	*setting*	*demographics*
1987	All	0.31	0.28	0.15	yes	yes	no
1991	New	0.33	0.28	0.27	yes	yes	no
1991	Repeat	0.26	0.21	0.10	yes	yes	no
1997	Repeat	0.25	0.16	0.14	yes	yes	no
1987	All	0.64	0.59	0.39	yes	yes	yes
1991	New	0.59	0.50	0.42	yes	yes	yes
1991	Repeat	0.55	0.43	0.46	yes	yes	yes
1997	Repeat	0.45	0.34	0.29	yes	yes	yes

Notes. Panel A: Each value shown in Panel A is the raw gender differential, i.e. the coeffficient on the female dummy in the regression of log annual income on the female dummy and a constant. Panel B: Each value shown in Panel B is the portion explained by differences in characteristics, applying the same returns to characteristics for both men and women. The columns show the use of uniform coefficients, male coefficients, and female coefficients respectively. In panel B, three sets of characteristics are used: i) specialty dummies: dummies for 13 large specialty categories as listed in Appendix Table 1; ii) variables for practice setting (private practice, a contract arrangement, and salaried pay) and contract type; iii) demographics: age, race, region (northeast, south, midwest, west), a quadratic in experience, a married dummy, a parent dummy, number of children, hours worked per week, patients seen per week, AMA membership, board certification, and malpractice claim ever. All regressions are weighted by weights designed to adjust for differential response rates within the eligible sample across identifiable sample subgroups and selection of an oversample of black and Hispanic individuals. These weights were provided by the Principal Investigator. More detail on the construction of these weights can be found in the codebooks for the YPS data sets. Weights were made uniform across the different years of data by a similar procedure.

Appendix Table 4. Summary Statistics for General Practitioners.

	1987					1991				
Variable	*Men*		*Women*		*Gender Gap*	*Men*		*Women*		*Gender Gap*
Annual income ($k)	69.19	(34.05)	52.43	(20.09)	16.76	90.24	(63.18)	67.95	(38.71)	22.30
Weekly income ($k)	1.43	(0.70)	1.13	(0.43)	0.30	1.87	(1.32)	1.49	(0.83)	0.38
Log annual income	4.13	(0.50)	3.88	(0.44)	0.25	4.36	(0.56)	4.09	(0.51)	0.27
Weeks worked	48.4	(2.2)	46.60	(3.6)	1.82	48.3	(2.3)	45.60	(5.1)	2.69
Hours last week	59.3	(15.7)	48.81	(16.4)	10.46	60.4	(16.6)	47.01	(21.2)	13.39
Patients last week	114.8	(49.9)	93.49	(51.8)	21.27	133.4	(58.3)	93.39	(56.1)	40.03
Waiting time in weeks	0.63	(1.09)	1.21	(2.00)	-0.58	0.90	(1.48)	1.35	(2.26)	-0.46
Standard fee ($)	25.21	(6.43)	25.77	(10.47)	-0.56	32.98	(18.57)	33.50	(11.81)	-0.52
% with contract [a]	0.39	(0.49)	0.34	(0.48)	0.04	0.64	(0.48)	0.59	(0.49)	0.05
% in private practice	0.73	(0.44)	0.54	(0.50)	0.19	0.72	(0.45)	0.55	(0.50)	0.17
% board certified	0.73	(0.44)	0.72	(0.45)	0.01	0.84	(0.37)	0.80	(0.40)	0.04
Age	32.71	(2.43)	32.83	(2.47)	-0.11	33.14	(2.23)	33.07	(2.25)	0.07
% white	0.87	(0.34)	0.83	(0.38)	0.04	0.86	(0.35)	0.82	(0.39)	0.04
% married	0.86	(0.35)	0.79	(0.41)	0.07	0.85	(0.36)	0.77	(0.42)	0.08
% parents	0.71	(0.45)	0.66	(0.48)	0.05	0.72	(0.45)	0.64	(0.48)	0.08
N	708		187			268		109		

[a] Percentage with contract indicates the share of physicians with an HMO, PPO, or IPA contract.

Notes. Data is from the Young Physicians Survey 1987 and Young Physicians Survey 1991. Values for 1991 include only new respondents. Means are shown, with standard deviations in parentheses. Means are weighted by weights designed to adjust for differential response rates within the eligible sample across identifiable sample subgroups and selection of an oversample of black and Hispanic individuals. These weights were provided by the Principal Investigator. More detail on the construction of these weights can be found in the codebooks for the data sets.

Figure 1a. The market for female OB/GYN services, with no relative fee adjustment, just waiting time.

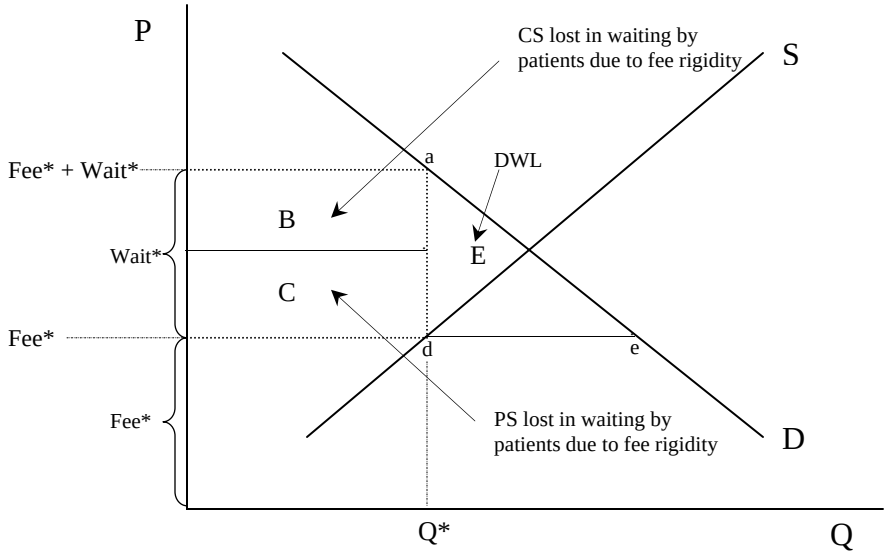


Figure 1b. The market for female OB/GYN services, with relative fee adjustment, but no waiting time.

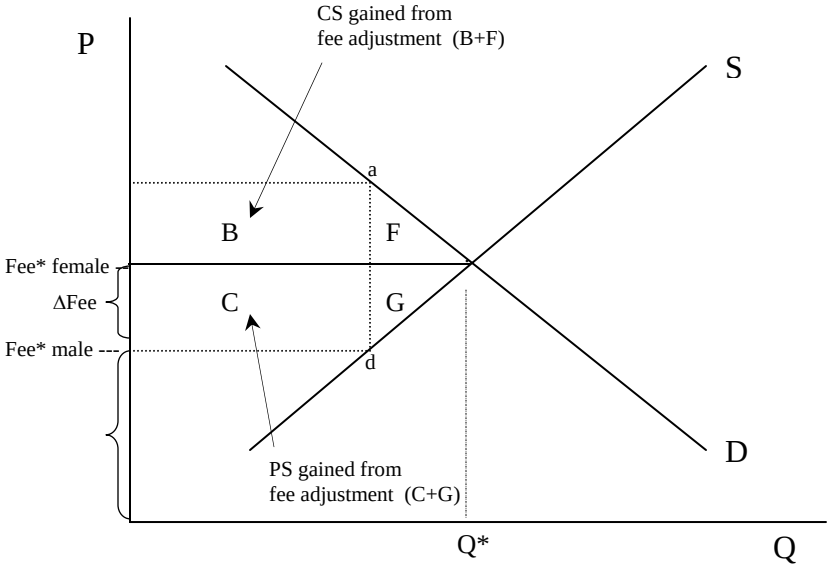
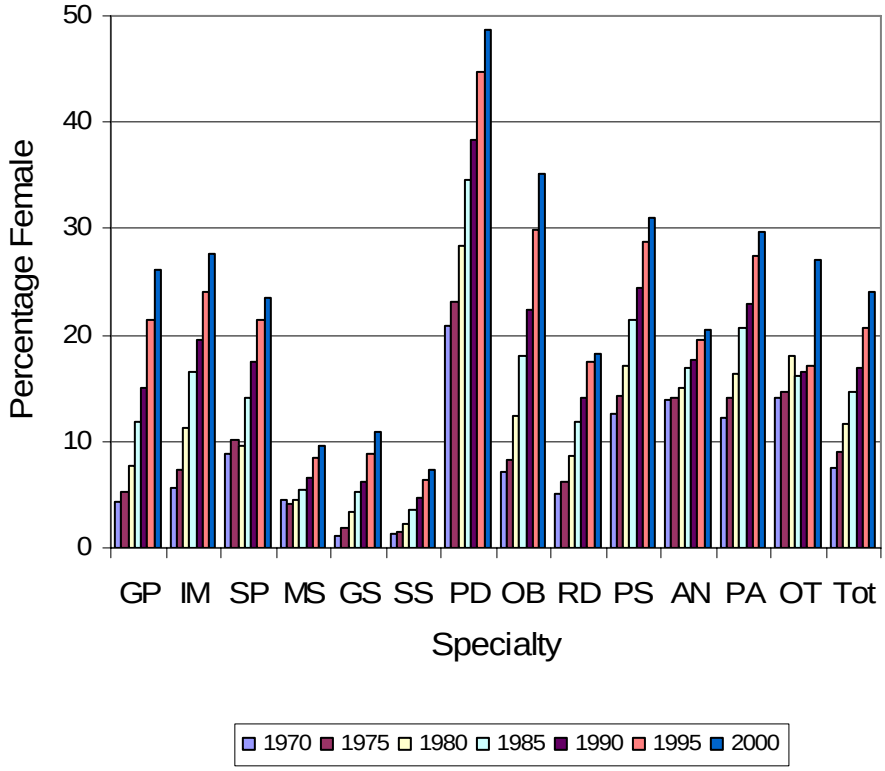


Figure 2. Percentage Female within Medical Specialty Categories 1970-2000.



Source: American Medical Association, 1986, 1992, 1996, 1999, and 2005. *Physician Characteristics and Distribution in the U.S.* Department of Data Release Services, AMA: Chicago.

Figure 3. The market for female OB/GYN services, with adjustment of both fee and waiting time.