# The Taste for Leisure, Career Choice, and the Returns to Education: Evidence from the Medical Field

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**Abstract**

We examine the role of the taste for leisure in educational and occupational choices. Existing studies typically weigh the monetary costs of schooling (tuition and forgone wages) against a higher-wage career using a common-hours NPV calculation, neglecting labor / leisure preferences. We show this omission matters, and develop a simple methodology to correct for heterogeneity of tastes. Using information from the wages and hours of internal medicine physicians and internal medicine physician assistants (PAs), we show that the typical PA works approximately 33% fewer hours than the typical doctor, even following the training (residency) period in which doctors work exceptionally long hours at low wages. We show that the relative attractiveness of each profession depends critically on whether the doctor's hours or the PA's hours are used as the common-hours basis. We then calibrate a Stone-Geary utility function to each group's choice of working hours to identify their labor-leisure preferences. The utility cost to the median PA of being forced to work the hours required by physician training programs appears prohibitively large. We show that the behavior of doctors and PAs is consistent with a model in which differing tastes for leisure govern the choice of whether to become a PA or doctor.

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# 1 Introduction

Studies of the returns to education typically consider the monetary costs of education, the income foregone during education, and the income stream earned later in life. However, making and exploiting an investment in human capital requires the individual to sacrifice not only consumption, but also leisure and time for home production. This creates two distinct problems in measuring the returns to education. First, for many professions, the training period may require not only the displacement of effort from income generating activities to training, but may entail a distortion of the preferred labor-leisure choice. For example, the median medical student reports working sixty-five hours per week during their residency. They generally are not able to choose to sacrifice marginal consumption in order to obtain more leisure during this training period.[1] Second, following training, in order to earn a return on human capital investments, individuals must sacrifice leisure. Individuals with high tastes for leisure who work few hours following training will not earn as large a return on training investments as those who will work many hours. This may lead those with a high taste for leisure to optimally sort into occupations with lower training costs and lower post-training wages. For example, surveys reveal that the median internal medicine physician assistant works approximately $2/3^{rds}$ the weekly hours of the median internal medicine physician, even though both are working "full time" schedules.

Leisure considerations raise two concerns with common practices in the returns to education literature. First, perhaps due to data limitations, the literature commonly calculates foregone income during training without an hours adjustment. That is, a medical student foregoes the earnings of a typical college-educated worker, not a worker choosing a sixty-five hour work-week, despite the fact that data suggest that medical students on clinical rotations work extremely long hours. There is, furthermore, no adjustment made for the utility cost of being required to work so many hours per week. Second, the literature commonly reports incomes adjusted to a common annual hourly basis.[2] However, when comparing professions in which the typical worker chooses very different hours, the calculated relative

[1] Croasdale (2006) reports that fewer than 4% of residency programs offer a part-time option.

[2] This methodology was, to our knowledge, first proposed in Eckaus (1973) and is used in most recent work on the returns to education. See, for example Fang (2006) and Miller, Mulvey, and Martin (1995) for recent examples. Alternative treatments of the hours-leisure issue is not raised in surveys of the econometric issues involved in estimating the returns to education such as Card(2001) or Griliches (1977).

value of educational investment choices is not neutral to the common hourly basis used.

In this paper, we demonstrate that leisure considerations can be important in calculating the returns to schooling. We illustrate that these issues are important in the context of measuring the returns to education for two alternative medical careers—physicians specializing in internal medicine and physicians assistants (PAs) specializing in internal medicine. We compare the net present value of becoming a PA and becoming a physician. We show that, if we use the physician's annual working hours as the common hourly basis to compare the physician and PA, we find that becoming a physician is a much higher net present value investment than becoming a PA. However, when using the typical PA's working hours as the common hourly basis to compare the physician and PA, we find that the NPV of becoming a PA is slightly higher than becoming a physician. Further, using a simple calibration of median physician and PA behavior with Stone-Geary utility, we show that the behavior of the two groups is consistent with a model in which individuals with a higher taste for leisure select into the PA profession. We relate these findings to recent survey data showing the rapid feminization of the Physician Assistant profession.

The paper proceeds as follows. In Section 2 we survey the existing and related literature. In Section 3, we describe the data and compute simple common-hours basis NPV calculations. In Section 4, we describe utility-theory approaches to this problem. In Section 5, we conclude.

## 2 Related literature

Our work of course contributes to the vast literature on the returns to education. The literature also discusses the human capital investments and career choices of workers who may expect employment intermittency (starting with Mincer and Polachek (1974) and Polachek (1981)). Several papers have examined the labor supply of part-time workers and on the job training investments by part-time workers. For an early example, Jones and Long (1978) or, more recently Blank (1994). Much of this work has as its focus using human capital theory to explain male-female earnings differentials. Some of these issues are addressed in the context of nurses, an occupation closely related to those we study in a series of papers by Beurhaus, Auerbach, and Staiger (see 2004).

In contrast to these papers, we focus on differences in hours worked for full-time workers across disparate occupations. Considerable recent attention has been paid to the aggregate hours supply of workers, addressing the puzzle of why these hours have not fallen (Jones, Manuelli, and McGrattan 2003, Prescott 2004, and Knowles 2005). However, to our knowledge, there is not a literature examining the human capital investment implications of hours disparities among full-time workers in different occupations.

## 3 Data and basic NPV calculations

We compare the educational investments, income, and hours of Physicians and Physician Assistants specializing in internal medicine for varying levels of experience. Clearly, one might be interested in the full distribution of incomes to account for uncertainty and other characteristics of the data; we focus only on median incomes and hours due to data constraints and to isolate the hours mechanisms of interest.

For the examples that follow, we assume that the doctor or PA enrolls in the appropriate program at Duke University (a school which educates both physicians and physician assistants), using tuitions for the 2006-2007 academic year.[3] There is no database that we are aware of that calculates hours worked at school activities for students in medical or PA programs. Thus, for the PA program's 2 years, and for the first 2 years of medical school, when students take classes, we set the hours worked at 40 (our results are not sensitive to this choice).

Following medical school, internists must complete a 3 year residency. We calculate median wages for internal medicine residents and median hours using the AMA's Fellowship and Residency Electronic Interactive database. Because the American Association of Medical Colleges recommends that medical school students doing clinical service observe the same hours limits that were adopted by residency programs in 2002, we assume that medical students in their 3rd and 4th years work identical hours to first year internal medicine residents.

For internal medicine physicians, median wages by experience level for 2004 were obtained from the Medical Group Management Association's Physician Compensation and Production Survey (2005). While this database contains detailed wage data, it only con-

[3] As long as we use the same university's tuition for the PA and doctor calculations, the relative magnitude of the doctor and PA NPVs is relatively stable across schools.

tains data on the clinical service hours of physicians, but not total hours engaged in professional activities. We obtained hours in professional activities for internists from the AMA's Socioeconomic Monitoring System, an annual survey which was discontinued in 2002. Unfortunately, this dataset does not detail hours by experience level. We rescale the hours in professional activities obtained from the AMA to match the experience path of clinical service hours over the lifecycle of the physician reported in the MGMA data. Using the experience categories in the MGMA data, we calculated median wages and hours for the same experience categories from Custom analysis of the 2004 AAPA Physician Assistant Census, American Academy of Physician Assistants (2006).

Note that, in using wages by experience for a single timepoint we do not account for inflation, and assume that the experience path of wages will be the same for physicians and PAs going forward as it is in the present. Because the wages are, effectively, real wages, we should use a real interest rate in the NPV calculation. Assuming that borrowing takes place at the prime rate plus 1% (a common interest rate for private medical school loans) minus the current annual rate of inflation of 3.25% leads us to choose a 6% annual interest rate as a benchmark. Because we are not examining risk or the probability of mortality, we calculate the NPV deterministically, for either a doctor or PA entering graduate school at age 22 and retiring at age 60.

Table 1 shows a summary of the data used in the NPV calculation and summarizes the NPV calculations. As explained before, while doctors do have higher wages post-graduation, they work longer hours post-graduation, have a longer training period, and work very long hours in the training period. We use these data to analyze the net present value of becoming a doctor versus a PA.

We first calculate an NPV for the doctor and the PA, unadjusted for hours differences. The NPV of the physician is $1.63 million, while the NPV of the PA investment is $0.95 million. Of course, a completely unadjusted NPV calculation of this sort would be uncommon in the labor economics literature.

We next calculate the NPV for the PA and the doctor investment using, for each experience year in the lifetime, the median doctor's hours of work as the common hourly basis. That is, the PA's annual wages are scaled up as if the PA could work additional hours each week at the median PA wage. An inspection of wanted advertisements from Google suggests that moonlighting opportunities for PAs are common. Indeed, in the AAPA survey, approximately 15% of PAs report working as a PA in two or more jobs; it seems likely that PAs could, if desired, adjust hours. In this "common hours" approach, the difference between the NPV of the two professions shrinks versus the unadjusted case, but remains large. The NPV of the physician investment remains at $1.63 million, while the NPV of the PA investment is $1.45 million.

Next, we consider the NPV for the two professions using the PA's hours as the common hourly basis. This presents several problems. First, we understand that the doctor cannot work the PA's hours during medical school and residency, even if she preferred them. Also, since the doctor is earning negative wages during the clinical period of medical school, but working many more hours than the positive-waged PA, it is not entirely clear how to construct the constant hours basis wage. Our approach is to rescale the PA wage to the doctor's hours during the doctor's training period, then rescale the doctor's wages to the PA's hours following training. This approach leads to a slight NPV *advantage* of the PA over the doctor, reversing the original calculation. Here, the NPV of either the physician or PA investment is roughly $1.105 million.

Thus, since the path of earnings is different in the two professions, as are typical hours worked, the way in which the hours correction is done can have a large effect on the calculated return to investment in each opportunity. We can see this more starkly if we consider the distribution of hours reported by Physician Assistants. Arranging PAs by hours worked in their primary clinical position reveals that the 25 percent of PAs surveyed work 36 hours per week or less. If, in the post-training period, we rescale earnings to a 36 hour workweek for both doctors and PAs, we see that the NPV of the doctor is significantly lower than the NPV of the PA, $0.99 million versus $1.03 million.

## 4 Utility analysis

In one of the examples in the previous section, we consider the earnings the PA would make at the PA wage rate but the physician's hours. Of course, the PA in that example earns significantly more income than does the median PA in our data, since the median PA chooses to work much less than a medical student, resident, or doctor's hours. Since the PA chooses to work fewer hours (and since moonlighting opportunities appear to abound), it must be that the typical PA's utility when forced to work the medical student/resident/doctors' hours is lower the PA's utility from working his/her chosen hours. This raises two concerns about the analysis of the previous section. First, the previous analysis does not fully reflect the utility cost to the PA of enduring the doctor's training period, which should be larger than the difference between the PA's potential income during the training period and the doctor's. Second, during the post-training earning period, the doctor and the PA have some freedom to choose their hours. If the PA population and the doctor population have systematically different tastes for leisure, then neither common hours experiment – the PA working the doctor's hours nor the doctor working the PA's hours represents the unconstrained behavior of either the PA or the doctor.

To consider the utility costs and benefits of training, we first examine the revealed labor/leisure trade-offs of the median PA and median doctor by calibrating each group's labor-leisure tradeoff. This is identified by each group's choice of working hours in their post-training period, where each group is assumed to chose their hours at the prevailing (and observed) wage.

We then use the fit utility function to ask a simple question; what lump-sum monetary amount would be needed to make the median PA (doctor) indifferent between the educational investment / wage path they chose, and that of the median doctor (PA)? Conceptually, this utility calibration will let us account for differential disutility of labor between physicians and PAs and the resulting different choices of hours. We will also discuss the choice of which hours basis use when computing this compensation, an issue similar to the real-wage index number literature.[4]

### 4.1 Stone-Geary utility

We calibrate a simple utility function to each group's behavior in their post-education careers, when both are presumably unconstrained in their choice of hours. Consider a simple utility function defined over two goods, leisure and annual income. Let leisure be denoted as $L$, in units of hours per week, and let annual income denoted as $I$, in units of thousands of dollars.

[4]The choice of which hours to use when computing the income required to compensate for a change in wages is analogous to the difference between a Paasche and Laspeyres price index. We will report the results of using either the pre or post wage-change hours choice, as well as their geometric mean (the equivalent of the Fisher index).

Let $P_L$ be the price of leisure and $P_I$ be the price of income. Normalizing the price of leisure to 1, if the observed annual income of a worker in year $t$ is $I_t$ while working $H_t$ hours per week, the price of income in that year is given by:

$$P_I = \frac{H_t}{I_t} \tag{1}$$

where leisure is just hours spent not working, or:

$$L_t = 24 * 7 - H_t = 168 - H_t \tag{2}$$

Following a long literature in labor economics, we assume a simple Stone-Geary direct utility function. The use of the Stone-Geary functional form has been favored in the labor literature since at least Abbott and Ashenfelter (1976), both because it leads to convenient estimating equations and because it has tended to fit observed labor and consumption patterns well. Letting a worker's labor-leisure choices in any year $t$ maximize:

$$U_t(L_t, I_t) = \alpha * \ln(L_t) + (1 - \alpha) * \ln(I_t + \gamma) \tag{3}$$

Assuming a worker can freely choose their hours at the prevailing wage and suppressing year subscripts, the first-order condition determining their optimal hours is:

$$FOC \Leftrightarrow \frac{\frac{\partial U(L,I)}{\partial L}}{\frac{\partial U(L,I)}{\partial I}} = \frac{P_L}{P_I} \tag{4}$$

Plugging in the Stone-Geary utility form yields expressions for leisure and income:[5]

$$\frac{L}{168} = \frac{\alpha * (I + \gamma)}{I + \alpha\gamma}, I = \frac{(168 - L)\alpha\gamma}{L - 168\alpha} \tag{5}$$

# 5 Calibration

In our Stone-Geary utility function the parameter $\alpha$ intuitively calibrates a worker's taste for leisure, while $\gamma$ is intuitively the lowest annual income the agent would ever be willing to

[5] Note that we assume that agents maximize a static problem defined over annual income, rather than an intertemporal problem. Since incomes are rising for both groups, this is akin to assuming that agents have a limited ability to borrow against future income. The static assumption that we use makes the doctor career choice look more attractive relative to the PA choice than it would look in the fully dynamic problem. This is because the leisure distortion of doctors occurs in a low- income period. Since the marginal utility of income is therefore high, relatively little income must be given to the doctor to compensate her for the leisure distortion. Allowing consumption smoothing would lower the marginal utility of income and thus, increase the compensation required to compensate for the doctor's leisure distortion.

accept. In our data on physician and physician assistant choices the median student earns a negative annual income during their training period, paying a total tuition of approximately 40 thousand dollars. In our calibration exercise we assume a value for $\gamma$ of negative fifty thousand dollars so that we can fit the same utility function to both the pre and post training periods of both groups. This allows us to focus entirely on heterogeneity in a worker's taste for leisure $\alpha$, (both between and within our two groups) as driving their observed behavior. The average hours and annual income in our data lead to values for $\alpha$ of 0.59 for the median physician and 0.66 for the median physician assistant.

Since leisure is a normal good, both the doctor and the PA would work more hours at higher wages, but, given the different preference parameters we estimate, we expect the doctor types to work more hours than the PA types at a given wage. For example, the preference parameters imply that, at the median doctor wages, the doctor types would work the observed 59 hours while the PA types would work 46 hours. At the median PA wages, the doctor types would work 54 hours, while the PA types would work the observed 40 hours.

Using these fitted values of $\alpha$, we can now do a basic utility correction to the NPV calculation we discussed earlier. First, a doctor is constrained in how many hours she must work during her medical schooling and residency, therefore for that period we compare her to a PA forced to work residency hours at a PA salary. We then ask how much the median PA would have to be compensated (in a lump-sum increase to their annual income) to compensate them for the disutility of labor-leisure distortion of this training regime. Figure one illustrates this compensation, which is weakly larger when measured at the 65 hours a week demanded by the residency (distance b in figure 1) instead of the 40 hours a week the median PA works (distance a). Intuitively this is due to the fact that in the Stone-Geary utility form leisure and income are complements; at low levels of leisure the utility gains from income are low. After the doctor's residency period, both PAs and doctors can choose their hours relatively flexibly. Therefore we then ask how much (in a lump-sum increase to their annual income) would it be worth to the median PA to experience the wage profile of the median doctor? This calculation is illustrated in figure 2. Again, this compensation is slightly smaller when measured at the median PA's PA-wage ("old") hours (distance a in figure 2) rather than the "new' hours he would work if their earned the median doctor's wage (distance b) because of the complementarity of leisure and income.

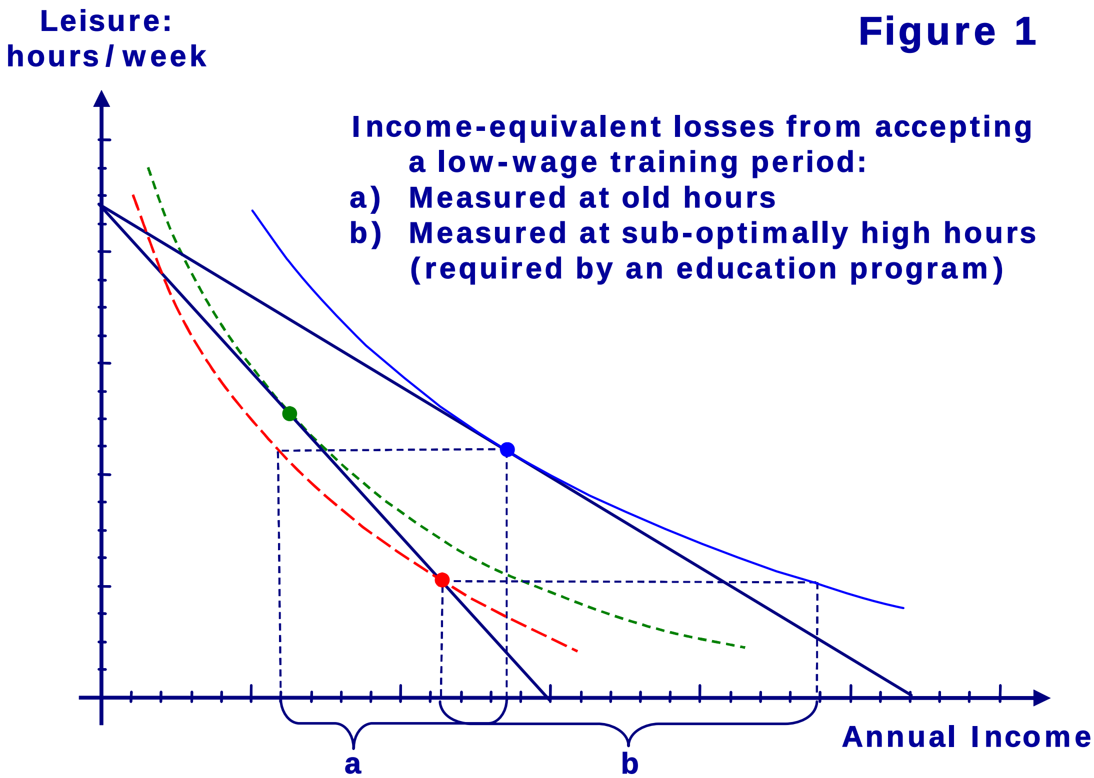


Figure 1: Utility correction when a PA evaluates a medical residency, measured at their old hours, and those required by the residency.

In Table 2, we compute the present discounted value of these income compensations. Note that moving from the training and wage profile of a PA to that of a doctor is not unambiguously attractive if measured from the hours profile chosen by a PA facing PA wages. Using the "old' PA hours as a base, the PA takes a smaller utility sacrifice during the doctor's residency but gains less from the higher wage. In aggregate, though, the prospect of medical school and a doctor's wage profile is more attractive when measured at the hours profile of the median PA; this is because the hours a doctor is asked to work during their residency would be hugely distortionary for the median PA. At the median PAs hours going to medical school is worth a present discounted sum of roughly 79 thousand dollars, while when measured at the hours they would choose at the doctor's wage they would suffer a 32 thousand dollar loss from becoming a doctor.

The two utility corrections in Table 2 suggest that the utility corrected NPV to an individual with the median PA's estimated preferences of becoming a doctor is between

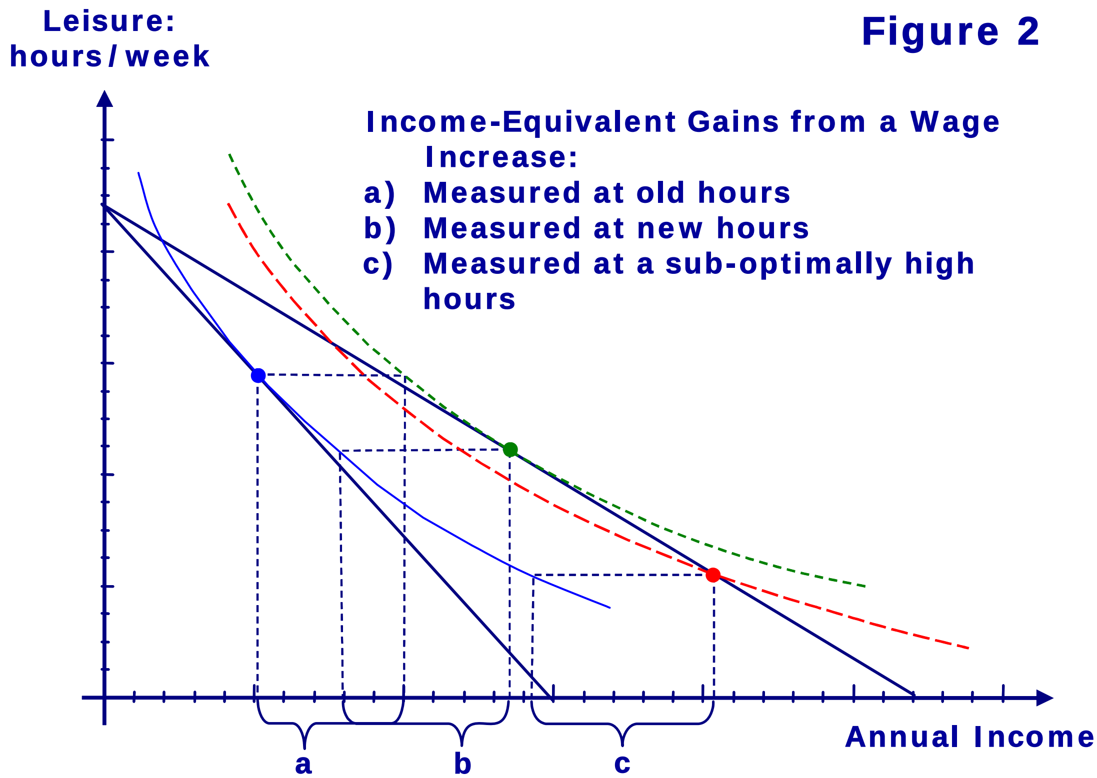


Figure 2: Utility correction when a PA evaluates the high wages of doctors, at their old hours, their new optimal hours, and those of the median doctor.

-$32,205 and $78,967, depending on the utility correction used. Calculating the NPV of the sum of Fisher ideal utility corrections leads to an estimate of the NPV adjustment of becoming a doctor for the PA of $30,522. Given the various assumptions involved in the calculations, we consider that sum to be very similar to 0. Recall that, based on hours worked by the median PA, we calculate the Stone-Geary alpha parameter to be 0.66 for the median PA. The Fisher ideal utility sum would equal exactly 0 for an individual with an alpha of 0.67. At the median PA wage in the dataset, an alpha of 0.67 implies that the PA would choose to work 37 hours per week. More than one-third of the PAs in the AAPA survey choose to work 37 hours per week or fewer.

The results for the median PAs and physicians are consistent with a model in which individuals sort into the PA and physician professions based on their tastes for leisure. That is, the typical PA would not have preferred to be a doctor. However, our model fails to explain the behavior of PAs who work much more than the median number of hours (approximately 10% of PAs work more than 48 hours per week at their primarily clinical job, and approximately 15% work a second job). For those PAs, it must be the case that either medical school was unavailable as an option to them, they have a preference for the type of work that a PA does, or their tastes for leisure or home production are time-varying over the life cycle. We similarly cannot explain the behavior of doctors who work much less than the median number of hours. However, according to the AMA socioeconomic survey, in 1998, the 25% percentile of the total professional hours distribution for internal medicine physicians was 48 hours. Thus, for the majority of those who choose the MD profession, their post-training behavior is consistent with their having a low enough taste for leisure that the MD profession dominates the PA profession.

# 6 Hours and the feminization of the physician assistant profession

Our results examine the fragility of NPV calculations of the returns to education to differing treatment of the labor-leisure tradeoffs. However, our example from medicine has specific implications for medical care markets. Our results suggest that the returns to becoming a doctor relative to a PA are highly dependent on the individual's taste for leisure. Due to family responsibilities, women may have a high taste for leisure or have high productivity in home production. Consistent with our findings, Lindsay (2005), reports results from a survey of female PAs suggesting that a significant number of PAs choose the profession because it allows women to "practice medicine" without the "demanding schedule" of the physician training and post-training period. Her study includes a tabulation from the 2002 PA survey demonstrating that female PAs work significantly fewer hours than their male counterparts, and she suggests that the lifestyle aspect of the profession may account for the recent rapid feminization of the profession. The PA profession originated as an attempt to provide medical professionals to the military during WWII, and the first PA program, founded at Duke in 1965, recruited ex-military personnel and was exclusively male. By 2002, approximately 68% of new graduates of PA programs were female. While the medical profession has shown an increase in the number of women, it has been less dramatic. The American Association of Medical Colleges reports that 6.9% of medical school graduates in 1965 were women, a number that had climbed to 44% by 2002 (AAMC, 2004). Although we focus on PAs, a historically male profession, similar tradeoffs may exist in the choice to become a LPN, RN, or nurse practitioner, historically female professions. Buerhaus, Staiger and Auerbach (2004) and Staiger, Auerbach, and Buerhaus (2000) examine the labor market for nurses. They do not focus on the taste for leisure. However, they show that expanding alternative careers for women lowered entry into the nursing profession, although they report a recent surge in entry into nursing school following the creation of two year Associate Degree in Nursing alternative to the traditional four year Bachelor of Science in Nursing.

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Table 1: Data Summary and Basic NPV Calculations

| | MD | PA |
|---|---|---|
| Median income at 3 years experience | $158,473 | $69,722 |
| Median income at 20 years experience | $181,221 | $81,740 |
| Median hours residency | 65 | 65 |
| Median hours at 3 years experience | 56.5 | 40 |
| Median hours at 20 years experience | 59.5 | 40 |
| 25th percentile hours | 48 | 36 |
| NPV of education (unadjusted) | $1.63 m | $0.95 m |
| NPV at Doctor's hours | $1.63 m | $1.45 m |
| NPV at PA's hours* | $1.11 m | $1.11 m |
| Alpha implied by post-training hours | 0.59 | 0.66 |

Note: The NPV at the PA's hours (*) is calculated by applying the doctor's hours to the doctor and the PA through the time period of the doctor's training, then switching both to the PA's chosen work hours.

Table 2: The Effects of Dr vs. PA Career Choice for the Median PA

| Time period if career chosen is: | | Year | Aver hrs worked under wage of: | | Change in income from PA to Dr. Utility Compensated: | | |
|---|---|---|---|---|---|---|---|
| PA | Dr | Range: | PA | Dr | No | At old hrs. | At new hrs. |
| school | school | 1-2 | 40* | 40* | -$9,802 | -$9,802 | -$9,802 |
| working | school | 3-4 | 42 | 65* | -$100,812 | -$104,839 | -$155,914 |
| working | residency | 5-7 | 41 | 65* | -$23,090 | -$55,026 | -$83,283 |
| work until 60 | | 8+ | 40 | 46 | $57,689 | $41,615 | $45,629 |
| | | | | | Present discounted sum: | | |
| | | | | | $318,390 | $78,967 | -$32,205 |

Note: Hours with a (*) are imposed by the school or hospital, all other hours are chosen by an agent with the median PA's preferences when faced with different wages. In the first two years of school, income differences are generated solely by differences in tuition.