

# The taste for leisure, career choice, and the returns to education <sup>☆</sup>

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## Abstract

We develop a simple methodology to estimate the returns to education despite heterogeneous labor/leisure preferences. The labor supply behavior of doctors and physician assistants is consistent with people choosing between the two careers based on differing tastes for leisure.

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## 1. Introduction

Making and exploiting an investment in human capital requires individuals to sacrifice not only consumption, but also leisure. When estimating the returns to education, existing studies typically weigh the monetary costs of schooling (tuition and forgone wages) against increased wages, neglecting the associated labor/leisure tradeoff.

Heterogeneity in the taste for leisure raises three concerns with common practices in the returns to education literature. First, the literature commonly calculates NPVs using incomes adjusted to a common annual hourly basis.<sup>1</sup> However, workers with high tastes for leisure will optimally sort into professions

with lower upfront training costs and lower wages. When comparing professions in which the typical worker chooses very different hours, the calculated relative value of entering these professions is not neutral to the common hourly basis used. For example, surveys reveal that the typical “full-time” internal medicine physician assistant (PA) works approximately *two-thirds* the weekly hours of the median internal medicine physician. Second, perhaps due to data limitations, the literature commonly calculates foregone income during training without an hour’s adjustment. For example, a medical student is assumed to forego the earnings of a typical college-educated worker, not a worker choosing a 65-hour work week, despite the fact that data suggest that medical students on clinical rotations, by institutional design, work long hours. Third, there is no adjustment made for the utility cost of distorting the labor–leisure tradeoff during the training period.

We illustrate these issues in the context of measuring the returns to education for two alternative medical careers—physicians specializing in internal medicine and physician assistants (PAs) specializing in internal medicine. 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.

The paper proceeds as follows. In Section 2 we describe the data and compute simple common-hours basis NPV calculations.

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<sup>1</sup> 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 et al. (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).

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.

In Section 3 we describe utility-theory approaches to this problem. In Section 4 we conclude.

## 2. Data and basic NPV calculations

We use data from the 2004 AAPA Physician Assistant Census (AAPA, 2006), the AMA's 2002 Socioeconomic Monitoring System, the Medical Group Management Association's 2005 Physician Compensation and Production Survey, and the AMA's Fellowship and Residency Electronic Interactive Database to obtain or estimate wages and hours for medical students, physician assistant students, medical residents, and practicing physicians and PAs with varying years of experience. We use data from the PA and medical programs at Duke University (a school which educates both physicians and physician assistants) to estimate tuitions.<sup>2</sup> Details are available in Chen and Chevalier (2007). Our NPV calculations consider a PA or doctor entering graduate study at age 22 and retiring at age 60, and facing an interest rate of 6% p.a.<sup>3</sup>

Table 1 shows a summary of the data used in the NPV calculation and summarizes the NPV calculations. As Table 1 illustrates, calculating an NPV unadjusted for differences in hours leads to a large NPV advantage for physicians. Correcting for hours differences using the physician's typical hours as the common-hours basis retains a large NPV advantage for the physician, an NPV of \$1.63 million for the physician versus \$1.45 million for the PA.

Next, we consider the NPV for the two professions using the PA's hours as the common hourly basis, rescaling the PA's wage to the doctor's hours during the doctor's training period (when doctors are institutionally constrained to work long hours), then rescaling the doctor's wages to the PA's hours following training. This approach leads to a slight NPV ad-

<sup>2</sup> 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.

<sup>3</sup> Note that in using wages by experience for a single timepoint we do not account for inflation, and assume that the returns to experience for physicians and PAs will remain constant. Because of this we should use the real interest rate in our NPV calculation. Assuming that borrowing takes place at the prime rate plus 1% (common 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.

vantage of the PA over the doctor, reversing the original calculation. Here, the NPV of either the physician or PA investment is roughly \$1.11 million.

While the literature gives no guidance as to which of the two hours corrections is more appropriate, we see that the way in which the hour correction is done can have a large effect on the calculated return to investment in each profession.

## 3. Utility analysis

Next, to incorporate the utility costs of a leisure-poor training period, we examine the revealed labor–leisure tradeoffs of the median PA and median doctor. This is identified by each group's choice of working hours in their post-training period, where each group is assumed to choose their hours at the observed wage.

We use a utility function fit to these choices to ask: 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.

Assume utility is a function of leisure and annual income.<sup>4</sup> Leisure ( $L$ ) is measured in units of hours per week, and annual income ( $I$ ), in units of thousands of dollars.

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

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

where leisure is just:

$$L_t = (24 \times 7) - H_t = 168 - H_t.$$

Following a long literature in labor economics we use Stone-Geary utility. The use of Stone-Geary utility has been favored 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. Workers maximizes:

$$\sum_{t=0}^T U_t(L_t, I_t) = \sum_{t=0}^T \alpha^* \ln(L_t) + (1 - \alpha)^* \ln(I_t + \gamma).$$

<sup>4</sup> 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, which in our analysis is the more conservative assumption. 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.

Table 2  
The effects of Dr vs. PA career choice for the median PA

Time period if career chosen is:		Year range	Average hours worked under wage of:		Change in income from PA to Dr. utility compensated:		
PA	Dr		PA	Dr	No	At old hours	At new hours
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 discount 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.

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

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

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

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

4. Calibration

The parameter  $\alpha$  calibrates a worker’s taste for leisure, while  $\gamma$  is the lowest annual income the agent would ever be willing to accept. In our calibration exercise we assume a value for  $\gamma$  of negative fifty thousand dollars. The average hours and annual income in our data lead to calculated values for  $\alpha$  of 0.59 for the median physician and 0.66 for the median physician assistant.

Both the doctor and the PA would work more hours at higher wages, but the calculated  $\alpha$ s imply that the doctor types will work more hours than the PA types at a given wage. For example, at doctors’ wages, the median doctor works 59 h while the median PA would work 46 h (predicted).

We can now 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 undertaking this training regime. Note that there are two ways to do these corrections—using the PA’s hours as a base (the “old” hours) or using the doctor’s hours as a base (the “new” hours).<sup>5</sup> These two methodologies, analogous to Paasche and Lespeyres price indices, have the familiar index number problem of leading

to different answers, as shown in Table 2. Fig. 1 illustrates this compensation, which is weakly larger when measured at the 65 h a week demanded by the residency (distance b in Fig. 1) instead of the 40 h a week the median PA works (distance a). After the doctor’s residency period, both PAs and doctors can choose their hours relatively flexibly. Similarly to the above, in Table 2, we 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.

Finally, we compute the present-discounted value of these income compensations. The utility-corrected NPV to an individual with the median PA’s estimated preferences of becoming a doctor is between –\$32,205 and \$78,967, depending on which index number basis is 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 essentially 0.

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, there is no particular reason to believe from our analysis that the typical PA would have preferred to be a doctor. 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 them to “practice medicine” without the “demanding schedule” of the physician training and post-training periods.

Our model, however, 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 h/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, they experienced unanticipated shocks to their marginal utility of consumption, or their tastes for leisure or home production are time-varying over the lifecycle. Similarly we cannot explain the behavior of doctors who work much less than the median number of hours. However, according

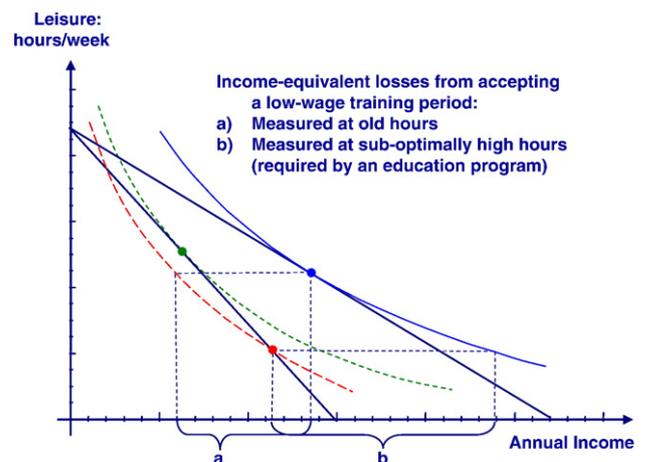


Fig. 1. Utility correction when a PA evaluates a medical residency, measured at their old hours, and those required by the residency.

<sup>5</sup> Recall that the doctors are constrained as to how many hours they must work during their medical schooling and residency.

to the AMA socioeconomic survey, in 1998 the 25% percentile of the total professional hours distribution for internal medicine physicians was 48 h. 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.

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