

# **Barriers to Entering Medical Specialties**

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## Research Questions

- 1) Why do specialists earn so much more than primary care physicians?

### **Supply-side explanations**

- equalizing differences
- returns to ability
- liquidity constraints

### **Demand-side explanations**

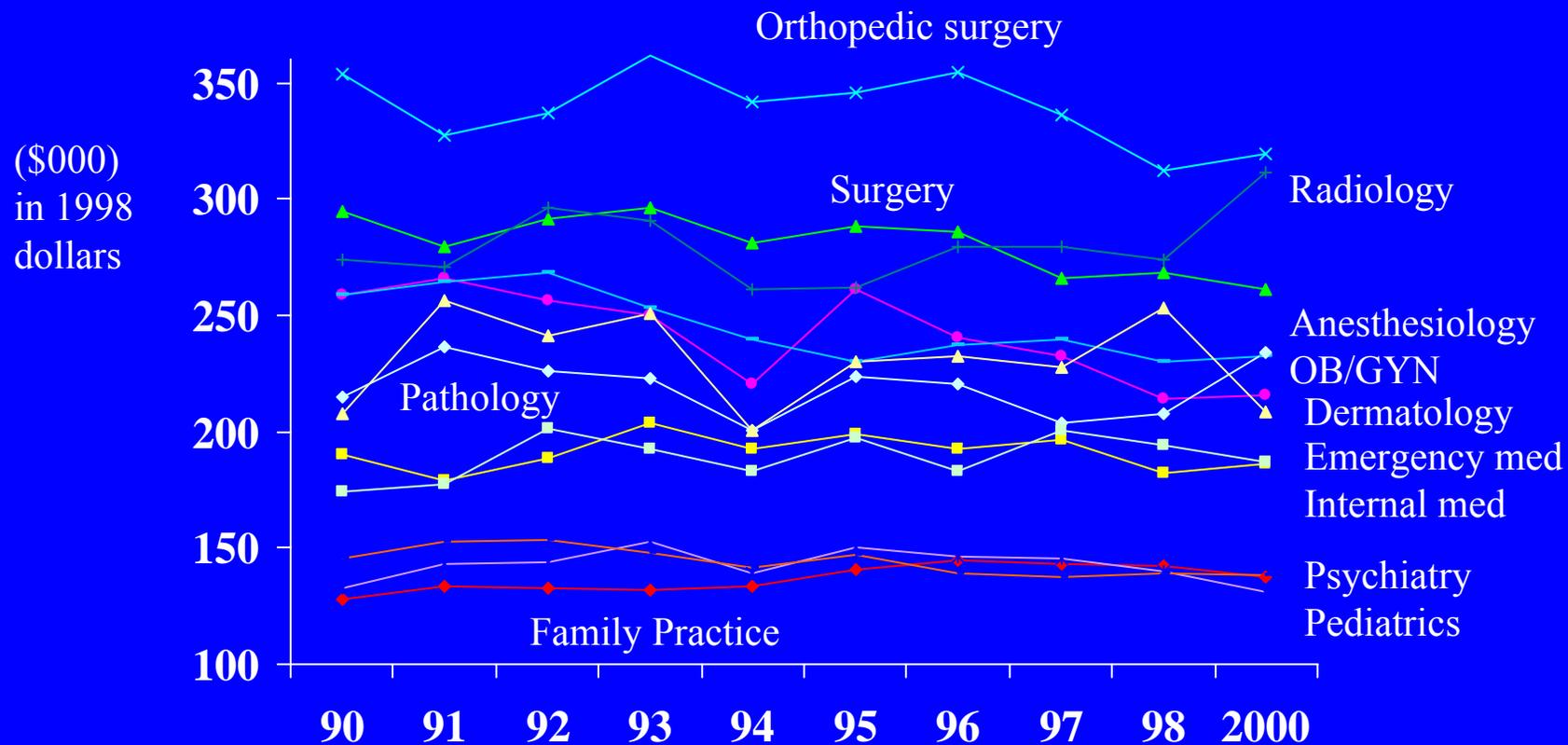
- cartel behavior by residency review committees
- insufficient teaching material (patients)
- wage regulation

- 2) How would the supply of physicians by specialty change if the market for residents were able to clear?
- 3) What would the rates of return to specialization be in this new, better-functioning market?
- 4) How might social welfare change?

## How the Supply of Physicians is Determined in the U.S.

- medical students must receive at least 1 year of residency training in a residency program accredited by the Accreditation Council of Graduate Medical Education (ACGME) in order to be licensed as a physician.
- 1,200 teaching hospitals offer residency programs in 26 specialties. Training ranges from 3 years in primary care specialties to 5 years in surgery and orthopedics.
- most residency positions filled in National Resident Matching Program (“the Match”). In 2001 Match, 24,000 applicants applied for 22,900 residency positions.
- students rank programs in order of preference; residency programs rank students in order of preference; and a computer algorithm assigns students to programs.
- residency program assignment is binding and there is little difference in residents’ wage across specialties.
- a class action lawsuit has been filed recently against the ACGME and the other organizations involved in the Match

# Mean Physician Income by Specialty, 1990-2000



Source: Physician Socioeconomic Characteristics, AMA.

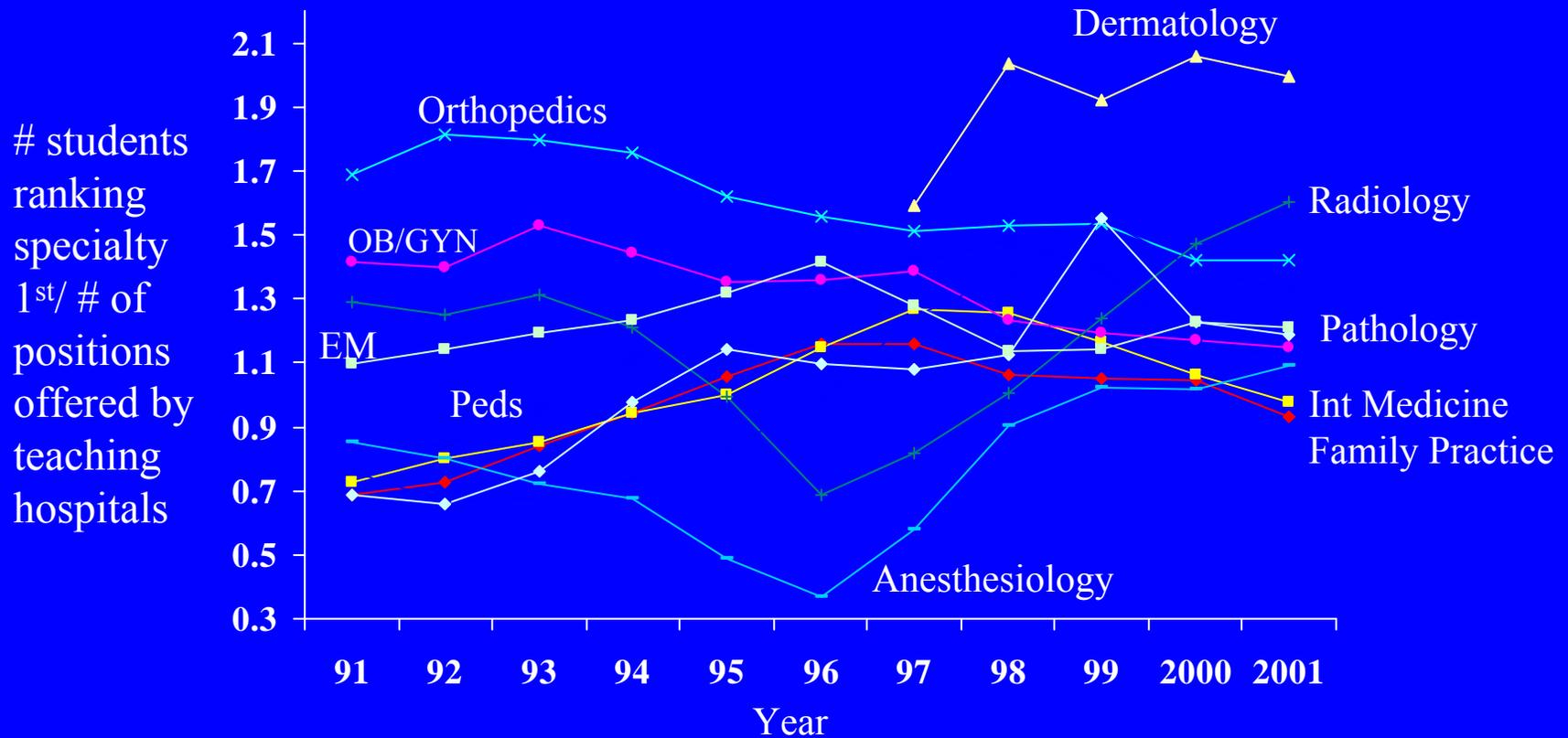
## Cross-Section Rates of Return to Specialization, 1990-1998 (relative to family practice)

<u>Specialty</u>	<u>Years of Training</u>	<u>1986</u>	<u>1990</u>	<u>1992</u>	<u>1994</u>	<u>1996</u>	<u>1998</u>
Radiology	4	107	89.2	N/A	119	173	83.3
Anesthesiology	4	105	N/A	235	216	N/A	46.5
OB/GYN	4	45.4	132	82.3	70.9	119	49.8
Psychiatry	4	41.0	61.6	123	49.8	12.8	17.2
Orthopedic surgery	5	71.7	74.2	59.9	60.8	48.8	38.9
General surgery	5	43.5	43.3	41.7	40.0	26.2	25.1

## Possible Explanations for High Rates of Return to Specialization

- medical students sort into specialties by ability. Specialists have absolute advantage and/or there is scarcity in the abilities required of a specialist. Not consistent with Bhattacharya (2000).
- equalizing differences.
- liquidity constraints
- barriers to entry:
  - a) MD cartels purposefully hold down the number of residency positions to gain rents.
  - b) regulation prevents residents' wage from adjusting to clear the market.
  - c) insufficient teaching “raw material” (number and variety of patients) in certain specialties to accommodate medical students' preferences.

# Ratio of Supply:Demand of Residents by Specialty (1991-2001) Consistent With Barriers to Entry

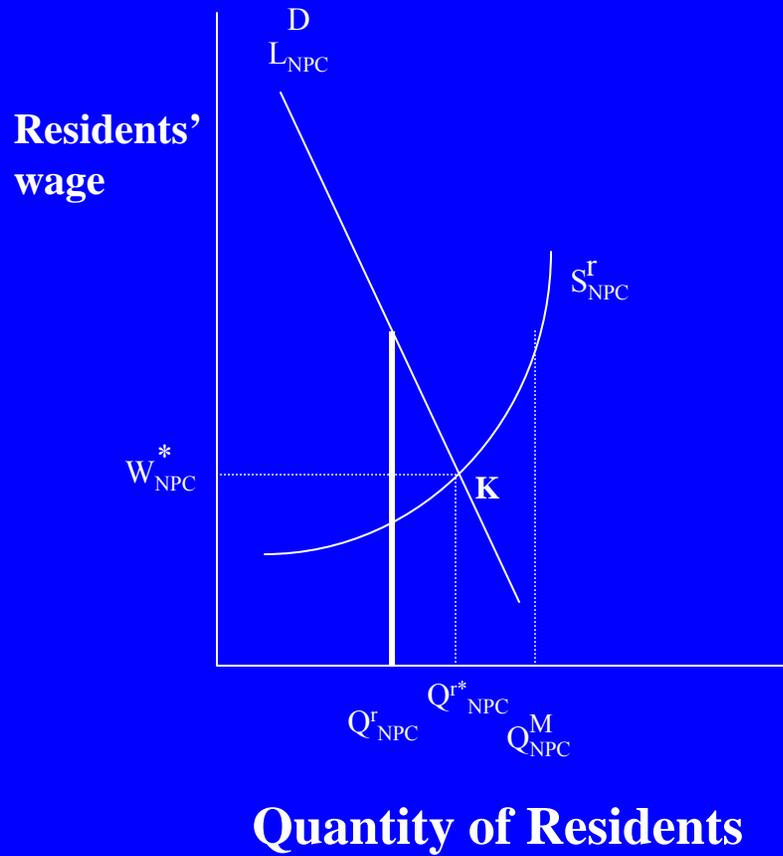


Source: Results and Data, National Resident Matching Program.

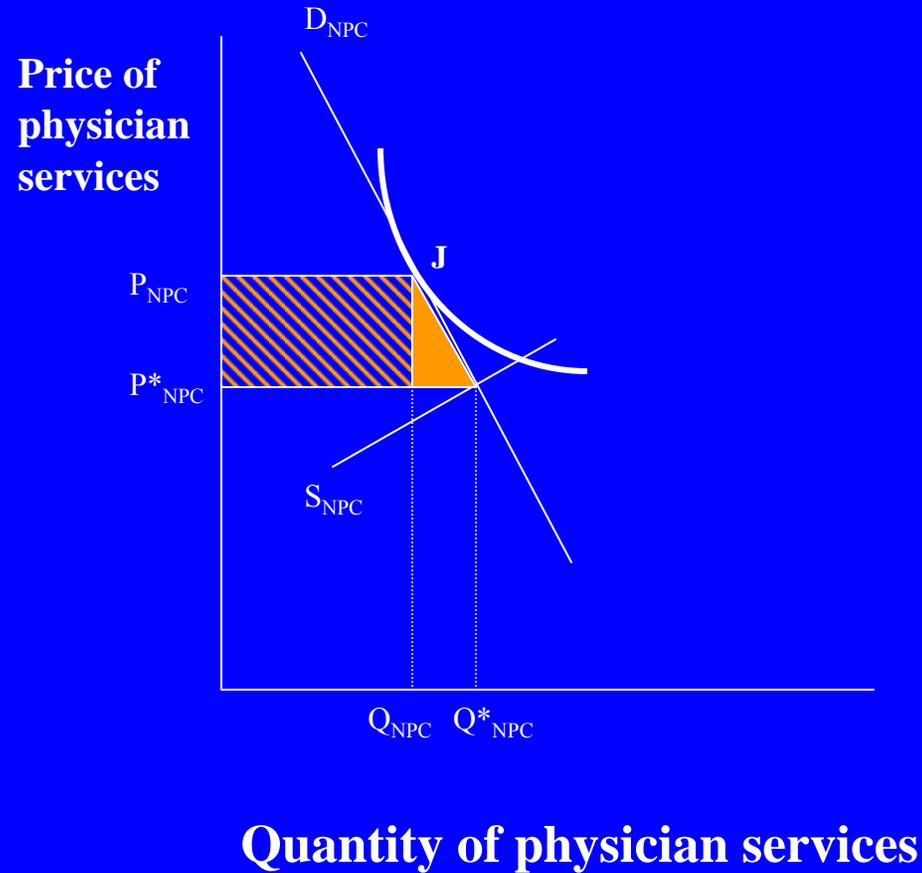
# Accreditation Council of Graduate Medical Education: Regulating the Market for Residents

- ACGME: a private organization responsible for setting policies on residency training and accrediting specific residency programs. Develop General Requirements for all residency programs (e.g., maximum number of hours/week a resident can work).
- each sponsoring organization (AMA, AHA, Association of American Medical Colleges, American Board of Medical Specialties, and Council of Medical Specialty Societies) appoints 4 voting representatives to the ACGME. Federal government appoints 1 non-voting rep.
- 26 Residency Review Committees (RRC) establish Special Requirements for each specialty. Each RRC has 6-15 representatives, almost all physicians. No government representative.
- RRCs review residency programs to determine if they are in compliance with the General and Special Requirements. Accredite programs that are meeting the requirements.
- “The RRC does not approve the number of residents, as such. When it evaluates a program it judges the adequacy of the resources in relation to the proposed resident complement...Of particular concern are the patient population, number of faculty, space...It is unwise to increase the complement (of residents) in the absence of adequate resources.”  
- [www.acgme.org](http://www.acgme.org) , in the Family Practice section

**Panel A: Market for Non-primary Care (NPC) Residents**



**Panel B: Market for NPC Physician Services**



\* = market-clearing price and quantity.

## Wage Regulation and Scarce Teaching Material Could Also Act as Barriers to Entry

- ACGME's original statement regarding residents' compensation:

“All residents at similar levels of experience and training in all of an institution's programs should receive a comparable level of support. Exceptions must be justified to the institution's Graduate Medical Education Committee” (Directory of GME, 1986).

- ACGME's current statement on residents' compensation:

“Adequate financial support of residents is necessary to ensure that residents are able to fulfill the responsibilities of their educational programs.” ([www.acgme.org](http://www.acgme.org)).

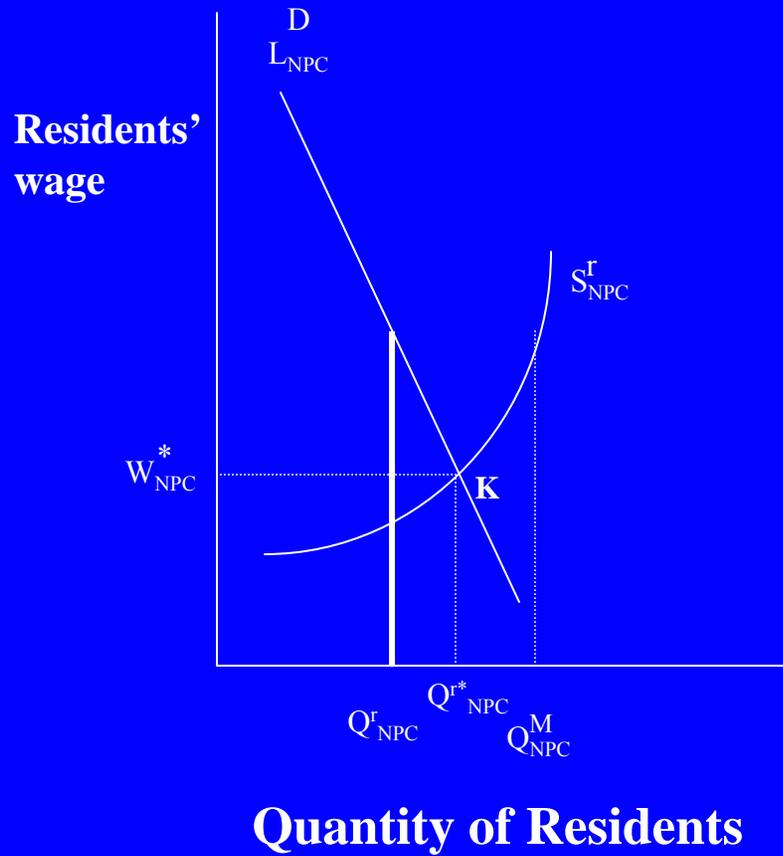
## Minimum Numbers for Operative Experience: Thoracic Surgery

Lungs, pleura and chest wall	50
Esophagus, mediastinum diaphragm	15
Congenital heart	30
- as surgeon (full credit)	10
- as 1 <sup>st</sup> assistant	20
Adult cardiac	100
Pacemaker implantations	10
Endoscopy	30
Video-assisted thoracic surgery	10

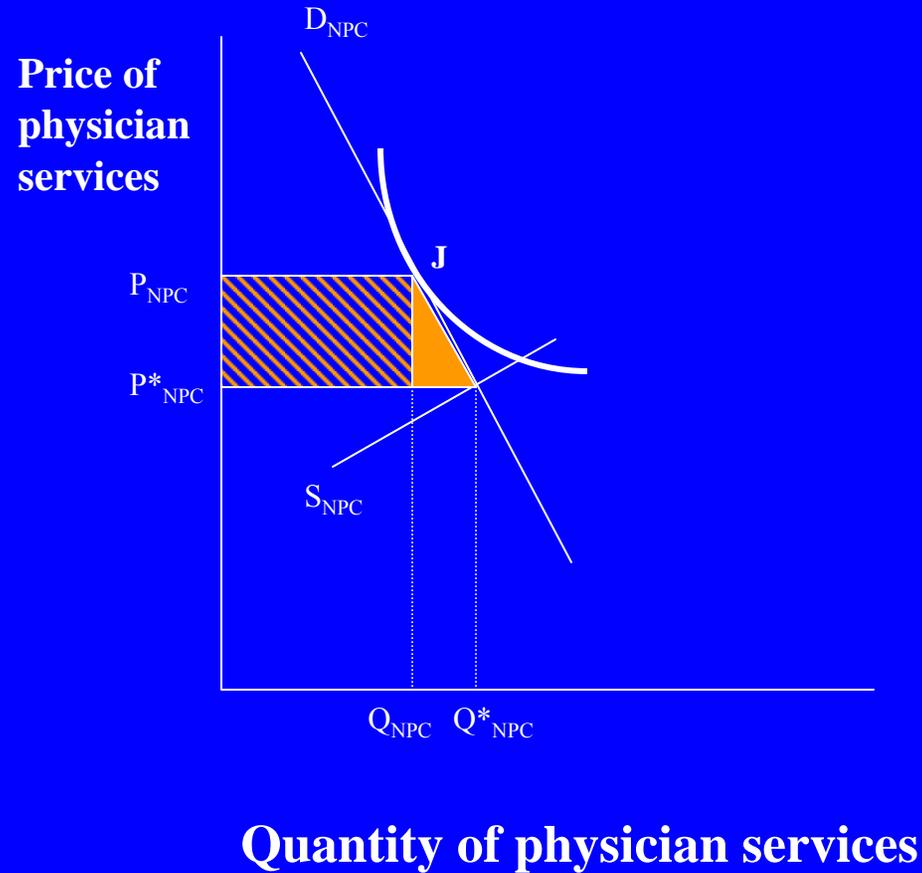
### Operative Requirements are Rarely Publicized

“The expected number of deliveries (for family practice residents) were Discussed widely when the 1997 version of the requirements were in the process of development. The expected numbers (of patients/cases) were publicized but the RRC was encouraged to eliminate them from the document and did so.” ([www.acgme.org](http://www.acgme.org))

**Panel A: Market for Non-primary Care (NPC) Residents**



**Panel B: Market for NPC Physician Services**



\* = market-clearing price and quantity.

## Deriving Market-Clearing Quantities and Wages in 4 Specialties Experiencing an Excess Supply of Residents

$$(1) \quad Q^* = Q^s \left(1 + \eta^s \frac{(W^* - W)}{W}\right) \qquad (2) \quad Q^* = Q^d \left(1 + \eta^d \frac{(W^* - W)}{W}\right)$$

$Q^*$  and  $W^*$ : market-clearing quantity of residents and wage.

$Q^s$  : # of medical students who rank a specialty 1<sup>st</sup> in the Match (observed).

$Q^d$  : # of residency positions available in the Match (observed).

$W$  : current residents' wage (\$34,000).

$\eta^s$  : elasticity of resident supply (derived next).

$\eta^d$  : elasticity of teaching hospitals' demand for residents of  $-0.08$   
taken from Nicholson and Song (2001).

Partial equilibrium model:

- students' income expectations do not explicitly depend on the number of medical students entering a specialty.
- probability a student ranks a specialty first in the Match does not explicitly depend on the number of positions offered (and therefore on a person's probability of being accepted).

## Estimating the Income Elasticity of the Supply of Medical Students to Residency Programs

$$\log(Q_{jt}^s) = \beta_0 + \beta_j \text{Specialty}_j + \beta_1 \log(\text{mean MD income})_{j,t-1} + \varepsilon_{jt}$$

$Q^s$  = number of students ranking a specialty first in the Match

$j$  = specialty (12 specialties)

$t$  = year (1986, 1991-1999)

Supply estimated separately for US and international med students

Use MD income rather than residents' wage because there is little variation between or within specialties over time in the residents' wage.

Convert  $\beta_1$  into a comparable elasticity in terms of a residents' wage by determining the change in a residents' wage that has the same impact on lifetime earnings as a one percent change in a MD's practice income.

## Simulating Specialty-Specific Resident Wages That Would Clear the Market

Assumptions:  $\eta^s = 1.35$                        $\eta^d = -0.08$

<u>Specialty</u>	<u>1<sup>st</sup>-year Positions Offered, 2001</u>	<u>Excess Supply</u>	<u>Estimated Equilibrium</u>	
			<u>Wage</u>	<u>Offered Positions</u>
Dermatology	252	153	-\$94,600	328 (+30%)
General surgery	1,041	297	-\$33,200	1,125 (+8%)
Radiology	875	219	-\$25,700	924 (+6%)
Orthopedic surgery	566	139	-\$24,600	625 (+10%)

**Excess supply:** US medical students only who ranked a specialty first in the 2001 Match and did not receive a position in that specialty in the Match.

Baseline residents' wage: \$34,000

## Simulation Assuming More Price-Responsive Demand and Supply

Assumptions:  $\eta^s = 2.00$                        $\eta^d = -0.16$

<u>Specialty</u>	<u>1<sup>st</sup>-year Positions Offered, 2001</u>	<u>Excess Supply</u>	<u>Estimated Equilibrium</u>	
			<u>Wage</u>	<u>Offered Positions</u>
Dermatology	252	153	-\$40,000	340 (+35%)
General surgery	1,041	297	-\$4,000	1,227 (+18%)
Radiology	875	219	\$300	1,014 (+16%)
Orthopedic surgery	566	139	\$900	654 (+16%)

**Excess supply:** US medical students only who ranked a specialty first in the 2001 Match and did not receive a position in that specialty in the Match.

Baseline residents' wage: \$34,000

## Impact of Simulated Residents' Wage on Rates of Return and Hospital Expenses

<u>Specialty</u>	<u>Cross-section Rate of Return</u>	
	<u>1998</u>	<u>With Lower Wage</u>
Dermatology	46.9	12.4
General surgery	25.1	11.6
Orthopedics	38.9	18.5
Radiology	83.3	23.4

### Decrease in Teaching Hospitals' Resident Wage Payments

Dermatology	\$110 million
General surgery	\$508 million
Orthopedics	\$171 million
Radiology	<u>\$218 million</u>
Total	\$1.007 billion

Teaching hospitals' wage payments to residents in 2000: \$3.6 billion

## Conclusions

- specialist physicians in the U.S. receive abnormally high rates of return.
- rents appear to be generated, in part, by barriers to entry stemming from:
  - stipulation by the ACGME that the residents' wage must be adequately high to prevent residents from moonlighting, and/or
  - insufficient teaching "raw material," and/or
  - MD cartels that purposefully restrict the # of residency positions offered.
- if the market for residents cleared, I estimate that medical students would be willing to pay to enter 4 specialties that currently have high rates return.
- supply of physicians would increase by an estimated 6%-30% in these 4 specialties and rates of return would approach real discount rate.
- teaching hospitals would save an estimated \$1.0 billion/year in residents' wages (a transfer from physicians to educational institutions).
- long-run impact of this policy on welfare depends on the ability/willingness of physicians to induce demand when supply of MDs increases.