

2. Over time, the average membership size of HMO's has risen, often as a result of mergers and acquisitions. Can this be explained by economies of scale in managing HMO's? (Wholey et. al. & Given, 1996)

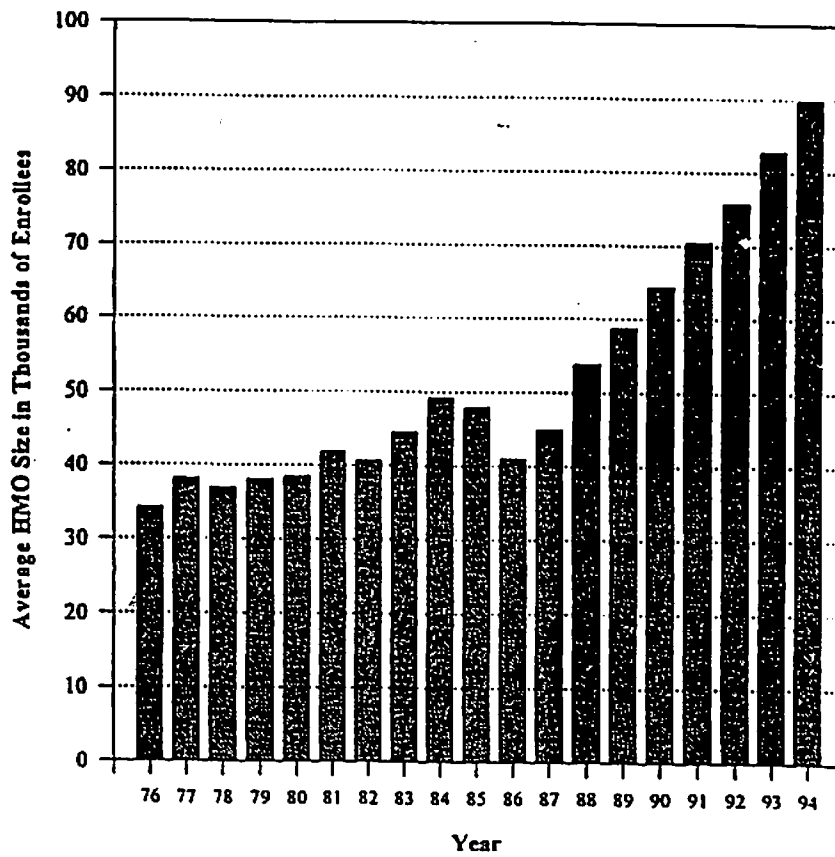


Fig. 1. Average HMO Size by Year, 1976 - 1994.

Predicted average cost for non-Medicare member months in 1991 as a function of enrollment.

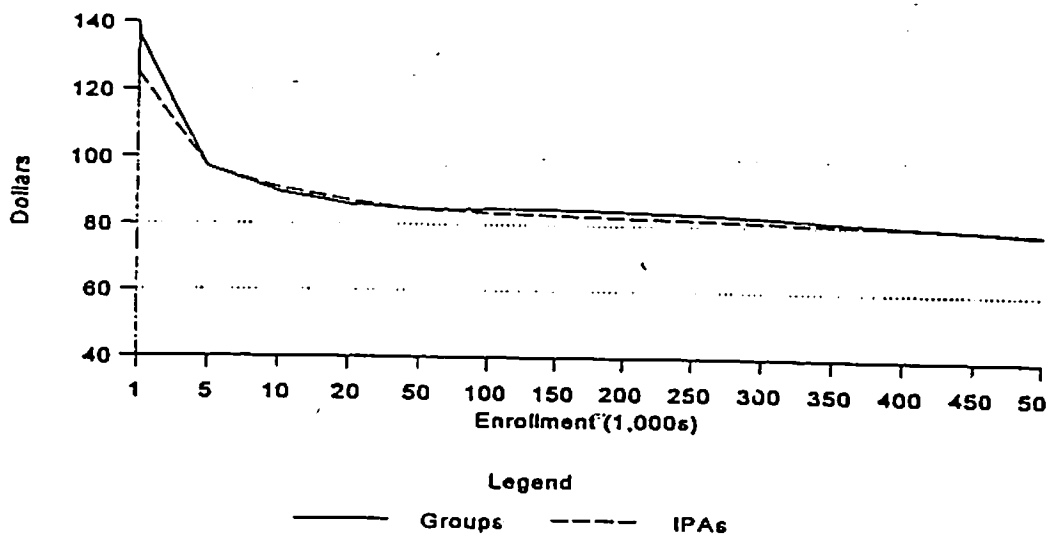


Fig. 1.

Predicted average cost for a Medicare member month in 1991

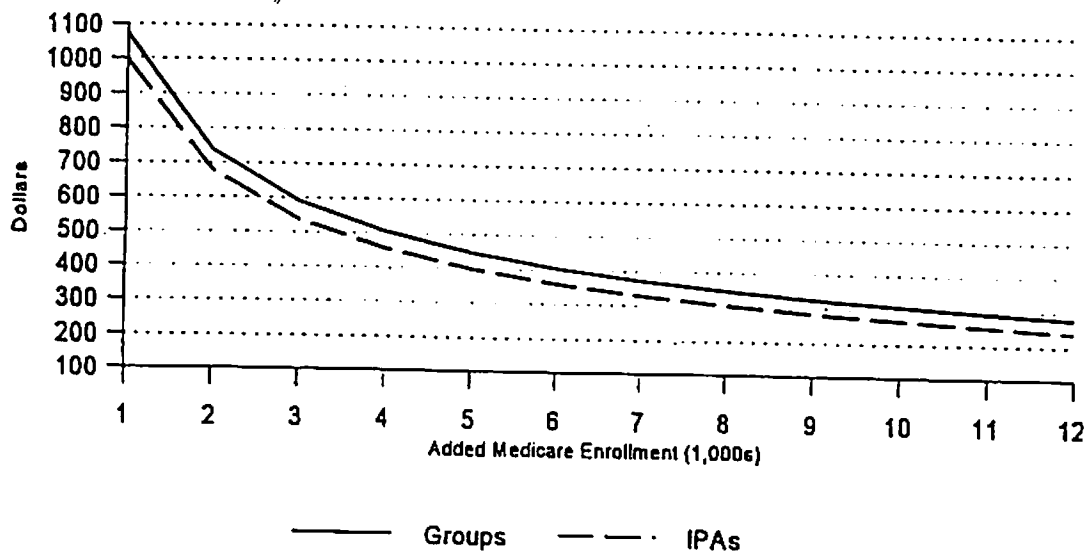


Fig. 3.

**HEALTH ECONOMICS  
PRACTICE PROBLEM  
SANTERRE & NEUN, CHAPTER 7**

Santerre & Bennett (1992) estimated the short-run total variable cost function for a sample of 55 for-profit hospitals in Texas (t-statistics are in parentheses below the estimated coefficients).

$$\ln \text{STVC} = 1.31 + 0.47 \ln q + 0.80 \ln w + 0.73 \ln \text{QUALITY} + 0.11 \ln \text{CASEMIX} + \\ (0.69) \quad (3.31) \quad (4.42) \quad (2.58) \quad (1.48) \\ 0.29 \ln k + 0.07 \ln \text{DOC} + \text{Other factors} \\ (3.16) \quad (0.88)$$

Adjusted  $R^2 = 0.95$        $N=55$

where STVC = short-run total variable cost,  $q$  = a measure of output (total inpatient days),  $w$  = average wage rate or price of labor, QUALITY = a measure of quality (number of accreditations), CASEMIX = an indicator of patient case-mix (number of services),  $k$  = a measure of capital (beds), and DOC = number of admitting physicians. All variables are expressed as natural logarithms (ln), so the estimated coefficients can be interpreted as elasticities.

How much of the variation in STVC is explained by the explanatory variables? How do you know that?

Which of the estimated coefficients are not statistically significant? Explain.

Does the estimated coefficient on output represent short-run economies or diseconomies of scale? Explain.

What are the expected signs of the coefficient estimates on  $w$ , QUALITY, and CASEMIX? Explain.

Provide an economic interpretation of the magnitude of the estimated coefficient on  $w$ .

# Interpreting an Estimated Cost Function

## Examples:

1. On the Estimation of Hospital Cost Functions (D.F. Vitaliano, 1987)

$$\begin{aligned}
 \text{Total Cost} = & -1,317,441 + 64,303 \text{ Beds} + 24.57 \text{ Beds}^2 \\
 & \quad (-2.49) \quad (10.22) \quad (2.30) \\
 & + 5,194,528 \text{ Med. schl.} + 206,373 \text{ Urban} \\
 & \quad (3.85) \quad (1.73)
 \end{aligned}$$

(t-statistics in parentheses)

<i>Beds</i>	<i>Beds</i> <sup>2</sup>	<i>Total Cost</i>	<i>Average Cost</i>	<i>Marginal Cost</i>
100	10,000	\$5,385,559	\$53,586	---
150	22,500	8,880,834	59,206	\$70,445
200	40,000	12,525,959	62,630	72,903
250	62,500	16,293,934	65,176	75,360
300	90,000	20,184,759	67,283	77,817
350	122,500	24,198,434	69,138	80,274
400	160,000	28,334,959	70,837	82,731