# Market entry

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# Part I

# Overview of market entry

# References

- Reviews:
    - Aguirregabiria (2021) chapter 5
    - Sutton (1991) theory
    - Aradillas-López (2020), Kline, Pakes, and Tamer (2021) econometrics
    - Levin (2009)
- Key papers:
    - Bresnahan and Reiss (1991)

# Section 1

# Introduction

# Introduction 1

- Models of entry:
  - Dependent variable = firm decision to operate or not in a market
    - Enter industry, open new store, introduce new product, release a new movie, bid in an auction
  - Sunk cost from being active in market
  - Payoff of being active depends on how many other firms are in the market (game)

$$a_{im} = 1\{\Pi_{im}(N_m, X_{im}, \epsilon_{im}) \geq 0\}$$

- Estimate $\Pi$ using revealed preference
- Static models: entry $\approx$ being in active in market; not transition in/out

# Why estimate models of entry?

- Why not just estimate payoff function using demand and production estimation techniques?
  - Answers new questions: source of market power
  - Efficiency: entry conditions provide additional information about payoffs, so using them can give us more precise estimates
  - Identification: some parameters (e.g. fixed costs) can only be identified from entry
  - Requires less data: price and quantity data not needed for some entry models
  - Controlling for selection

# Starc (2014) 1

- What are the sources and consequences of insurer market power?
- Sutton (1991):
  - Model with price competition & fixed costs implies number of firms $\to\infty$ as market size $\to\infty$
  - Model with price competition & endogenous fixed costs implies number of firms $\to$ constant as market size $\to\infty$
  - Illustrative simplified model from Schmalensee (1992)
    - Exogenous, $p, c$, endogenous $A_i$ (advertising)

$$\pi_i = (p-c)S\frac{A_i^e}{\sum_{j=1}^N A_j^e} - A_i - \sigma$$

    - Symmetric Nash equilibrium:

$$0 = (1/N^*)(1-e) + (1/N^*)^2 e - (\sigma/S)(1/(P-c))$$

if $e \in (1,2]$, then $N^* \to e/(e-1)$ as $S \to \infty$

- Entry model:
  - Mutual of Omaha: fixed cost of entry (including advertising) in market $m$ is $\Theta_{Mm}$
  - Assume:
    1. Mutual of Omaha is profitable $\Pi_{Mm}(1,1) - \Theta_{Mm} \geq 0$
    2. It is not profitable for another firm to mimic Mutual of Omaha and enter $\Pi_{Mm}(1,2) - \Theta_{Mm} \leq 0$

    implies $\mathrm{E}[\Pi_{Mm}(2,1)] \leq \mathrm{E}[\theta_{Mm}] \leq \mathrm{E}[\Pi_{Mm}(1,1)]$
  - Similar for United Health, but they pay a single national suck cost $\Phi_U$ each year and

$$\mathrm{E}[\sum_m \Pi_{Um}(2,1)] \leq \mathrm{E}[\Phi_U] \leq \mathrm{E}[\sum_m \Pi_{Um}(1,1)]$$

# Source of market power

**TABLE A7 Fixed and Sunk Cost Estimates**

| | Lower Bound | Upper Bound |
|---|---|---|
| Sunk cost, | $99, 261, 645.01 | $487, 935, 210.41 |
| UnitedHealth | ($1, 530, 902, 861, 706.31) | ($23, 031, 614, 127.02) |
| Fixed cost, | $445, 010.32 | $796, 342.56 |
| Mutual of Omaha | ($225, 593.04) | ($3, 578, 033.82) |

**TABLE A8 Marketing Expenditure and Advertising Value**

| | United Health | Mutual of Omaha |
|---|---|---|
| L.B. of sunk (fixed) cost/consumer | $23.65 | $8.37 |
| U.B. of sunk (fixed) cost/consumer | $73.09 | $14.81 |
| Average marginal cost/consumer | $98.27 | $238.67 |
| L.B. of total marketing cost/consumer | $121.92 | $247.05 |
| U.B. of total marketing cost/consumer | $171.36 | $253.48 |

Notes: Compensating variation is calculated as the average across consumers within a market using the standard log-sum formula; the number reported is the median across markets.

# Section 2

# Bresnahan and Reiss (1991)

# Bresnahan and Reiss (1991)

- Can learn a lot from market entry with very limited data
- Cross-section of isolated markets where we observe
  - Number of firms
  - Some market characteristics (prices and quantities not needed)
- Identify:
  - Fixed costs
  - Degree of competition: payoffs $= f$(number of firms)

# Motivating theory

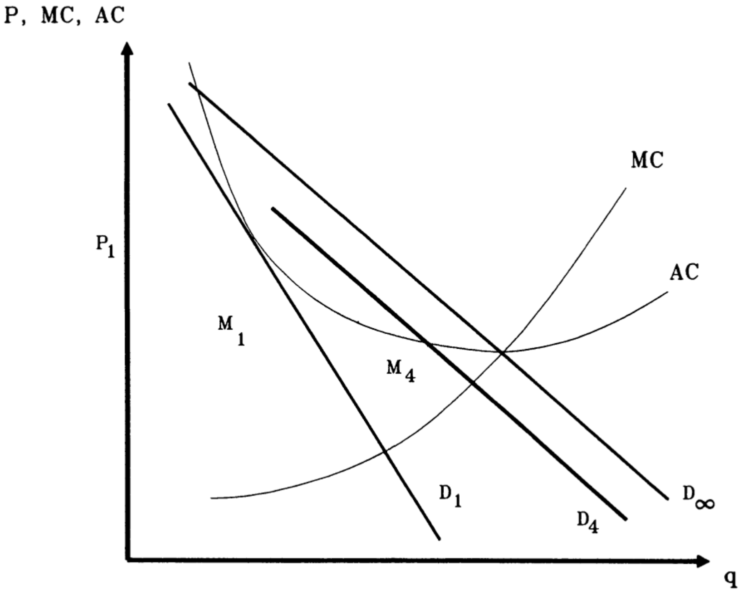



FIG. 1.—Breakeven firm demand and margins

# Motivating theory

- Demand $= d(P) \underbrace{S}_{\text{market size}}$
- Monopolist entry:

$$0 = (P_1 - AVC(q_1))d(P_1)S_1 - F$$

$$S_1 = \frac{F}{(P_1 - AVC(q_1))d(P_1)}$$

- Symmetric market with $n$ firms, demand per firm = $d(P)S/n$, entry threshold for $n$th firm

$$S_n = \frac{F}{(P_n - AVC(q_n))d(P_n)}$$

- $P_n$, $q_n$, depend on "competitive conduct" (form of competition, residual demand for firm who deviates from equilibrium $P_n$)
- As $n \to \infty$, $S_n/n \to s_\infty =$ minimal market size per firm to support entry when $P, q$ competitive
- $S_{n+1}/S_n$ measures how competitive conduct changes

# Setting

- Questions:
    - Degree of competition: how fast profits decline with $n_m$
    - How many entrants needed to achieve competitive equilibrium (contestable markets)
- Data:
    - Retail and professional industries (doctors, dentists, pharmacies, car dealers, etc.), treat each industry separately
    - $M$ markets
    - $n_m$ firms per market
    - $S_m$ market size
    - $x_m$ market characteristics

# Model 1

- $N$ potential entrants
- Profit of each firm when $n$ active $= \Pi_m(n)$
  - $\Pi_m$ decreasing in $n$
- Equilibrium:

$$\Pi_m(n_m) \geq 0 \text{ and } P_m(n_m + 1) < 0$$

- Profit function:

$$\begin{aligned}\Pi_m(n) = & \underbrace{V_m(n)}_{\text{variable}} - \underbrace{F_m(n)}_{\text{fixed}} \\ = & S_m v_m(n) - F_m(n) \\ = & S_m \left(x_m^D \beta - \alpha(n)\right) - \left(x_m^c \gamma + \delta(n) + \epsilon_m\right)\end{aligned}$$

where

- $\alpha(1) \leq \alpha(2) \leq \cdots \leq \alpha(N)$

# Model 2

- $\delta(1) \leq \delta(2) \leq \cdots \leq \delta(N)$
    - Entry deterrence, firm heterogeneity, real estate prices
- Key difference between variable and fixed profits is that variable depend on $S_m$, fixed do not

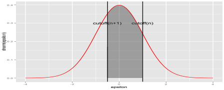
# Estimation 1

- Parameters $\theta = (\beta, \gamma, \alpha, \delta)$
- MLE

$$\hat{\theta} = \arg\max_{\theta} \sum_{m=1}^{M} \log \mathrm{P}(n_m | x_m, S_m; \theta)$$

- Assume $\epsilon_m \sim N(0,1)$, independent of $x_m, S_m$

$$\begin{aligned}
\mathrm{P}(n|x_m, S_m; \theta) = & \mathrm{P}\left(\Pi_m(n) \geq 0 > \Pi_m(n+1)\right) \\
= & \mathrm{P}\begin{pmatrix} S_m x_m^D \beta - x_m^C \gamma - S_m \alpha(n) - \delta(n) \geq \epsilon \\ \epsilon > S_m x_m^D \beta - x_m^C \gamma - S_m \alpha(n+1) - \delta(n+1) \end{pmatrix}
\end{aligned}$$

$=$ 


$$\begin{aligned}
= & \Phi\left(S_m x_m^D \beta - x_m^C \gamma - S_m \alpha(n) - \delta(n)\right) - \\
& - \Phi\left(S_m x_m^D \beta - x_m^C \gamma - S_m \alpha(n+1) - \delta(n+1)\right)
\end{aligned}$$

# Data

- 202 isolated local markets
    - Population 500-75,000
    - $\geq$ 20 miles from nearest town of 1,000+
    - $\geq$ 100 miles from city of 100,000+
- 16 industries: retail and professions, each estimated separately

TABLE 3

SAMPLE MARKET DESCRIPTIVE STATISTICS

| Variable | Name | Mean | Standard Deviation | Min | Max |
|---|---|---|---|---|---|
| Firm counts: | | | | | |
| Doctors | DOCS | 3.4 | 5.4 | .0 | 45.0 |
| Dentists | DENTS | 2.6 | 3.1 | .0 | 17.0 |
| Druggists | DRUG | 1.9 | 1.5 | .0 | 11.0 |
| Plumbers | PLUM | 2.2 | 3.3 | .0 | 25.0 |
| Tire dealers | TIRE | 2.6 | 2.6 | .0 | 13.0 |
| Population variables (in thousands): | | | | | |
| Town population | TPOP | 3.74 | 5.35 | .12 | 45.09 |
| Negative TPOP growth | NGRW | −.06 | .14 | −1.34 | .00 |
| Positive TPOP growth | PGRW | .49 | 1.05 | .00 | 7.23 |
| Commuters out of the county | OCTY | .32 | .69 | .00 | 8.39 |
| Nearby population | OPOP | .41 | .74 | .01 | 5.84 |
| Demographic variables: | | | | | |
| Birth ÷ county population | BIRTHS | .02 | .01 | .01 | .04 |
| 65 years and older ÷ county population | ELD | .13 | .05 | .03 | .30 |
| Per capita income ($1,000's) | PINC | 5.91 | 1.13 | 3.16 | 10.50 |
| Log of heating degree days | LNHDD | 8.59 | .47 | 6.83 | 9.20 |
| Housing units ÷ county population | HUNIT | .46 | .11 | .29 | 1.40 |
| Fraction of land in farms | FFRAC | .67 | .35 | .00 | 1.27 |
| Value per acre of farm-land and buildings ($1,000's) | LANDV | .30 | .23 | .07 | 1.64 |
| Median value of owner-occupied houses ($1,000's) | HVAL | 32.91 | 14.29 | 9.90 | 106.0 |

SOURCE.—Firm counts: American Business Lists, Inc.; population variables: U.S. Bureau of the Census (1983) and *Rand McNally Commercial Atlas and Marketing Guide* (annual); demographic variables: U.S. Bureau of the Census (1983).

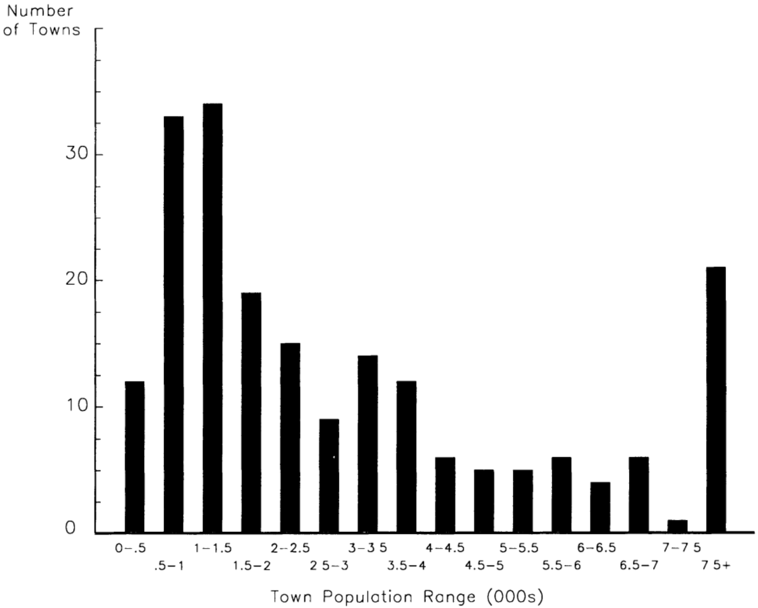



FIG. 2.—Number of towns by town population

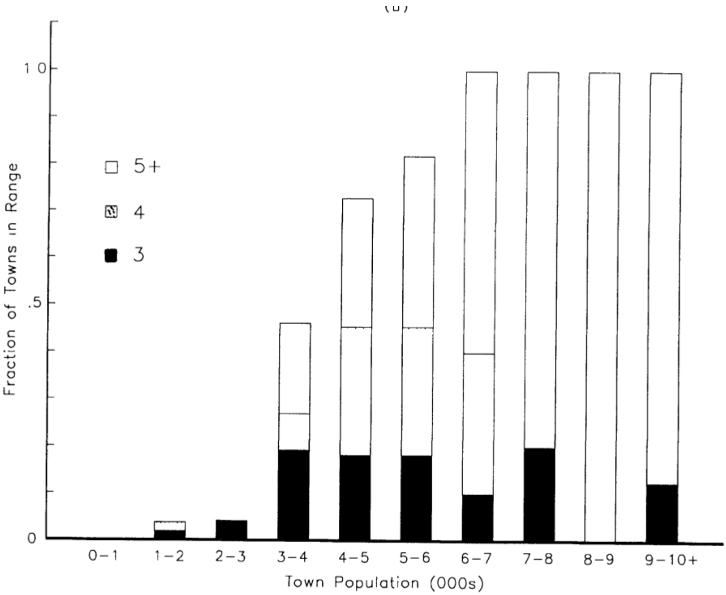



Fig. 3.—Dentists by town population

# Results

- For most industries, $\alpha(n)$ and $\delta(n)$ increase with $n$
- Define $S(n) =$ minimal $S$ such that $n$ firms enter

$$S(n) = \frac{x_m^C \gamma + \delta(n)}{x_m^D \beta - \alpha(n)}$$

  - Varies across industries
- $\frac{S(n)}{n} \approx$ constant for $n \geq 5$
  - Contestable markets (Baumol, Panzar, and Willig, 1982) : an industry can be competitive even with few firms if there is easy entry

TABLE 5

A. Entry Threshold Estimates

| Profession | Entry Thresholds (000's) $S_1$ | $S_2$ | $S_3$ | $S_4$ | $S_5$ | Per Firm Entry Threshold Ratios $s_2/s_1$ | $s_3/s_2$ | $s_4/s_3$ | $s_5/s_4$ |
|---|---|---|---|---|---|---|---|---|---|
| Doctors | .88 | 3.49 | 5.78 | 7.72 | 9.14 | 1.98 | 1.10 | 1.00 | .95 |
| Dentists | .71 | 2.54 | 4.18 | 5.43 | 6.41 | 1.78 | .79 | .97 | .94 |
| Druggists | .53 | 2.12 | 5.04 | 7.67 | 9.39 | 1.99 | 1.58 | 1.14 | .98 |
| Plumbers | 1.43 | 3.02 | 4.53 | 6.20 | 7.47 | 1.06 | 1.00 | 1.02 | .96 |
| Tire dealers | .49 | 1.78 | 3.41 | 4.74 | 6.10 | 1.81 | 1.28 | 1.04 | 1.03 |

B. Likelihood Ratio Tests for Threshold Proportionality

| Profession | Test for $s_4 = s_5$ | Test for $s_3 = s_4 = s_5$ | Test for $s_2 = s_3 = s_4 = s_5$ | Test for $s_1 = s_2 = s_3 = s_4 = s_5$ |
|---|---|---|---|---|
| Doctors | 1.12 (1) | 6.20 (3) | 8.33 (4) | 45.06* (6) |
| Dentists | 1.59 (1) | 12.30* (2) | 19.13* (4) | 36.67* (5) |
| Druggists | .43 (2) | 7.13 (4) | 65.28* (6) | 113.92* (8) |
| Plumbers | 1.99 (2) | 4.01 (4) | 12.07 (6) | 15.62* (7) |
| Tire dealers | 3.59 (2) | 4.24 (3) | 14.52* (5) | 20.89* (7) |

Note.—Estimates are based on the coefficient estimates in table 4. Numbers in parentheses in pt. B are degrees of freedom.
* Significant at the 5 percent level.

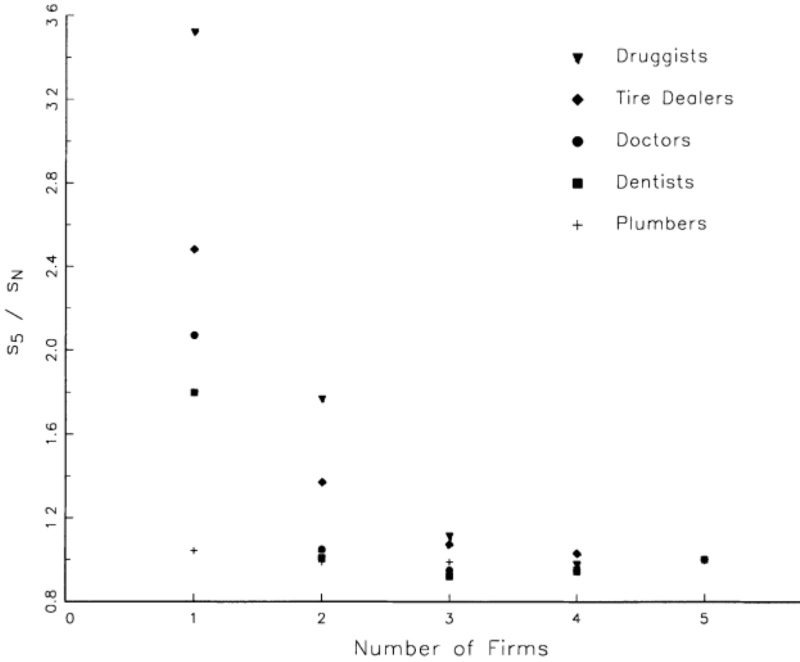



FIG. 4.—Industry ratios of $s_5$ to $s_N$ by $N$

# Further evidence - prices

TABLE 10

TIRE PRICE SAMPLE DESCRIPTIVE STATISTICS

| | Number of Tire Dealers in the Market | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 1.5 | Urban |
| Candidate phone listings | 39 | 66 | 48 | 64 | 75 | * | 200+ |
| Surveyed by us | 36 | 22 | 19 | 28 | 21 | 20 | 19 |
| At listed number | 32 | 19 | 19 | 24 | 21 | 17 | 18 |
| Would respond | 28 | 19 | 19 | 23 | 20 | 14 | 17 |
| Total prices quoted | 76 | 52 | 50 | 64 | 49 | 36 | 62 |
| Usable price quotations | 42 | 31 | 40 | 57 | 45 | 17 | 59 |
| | Sample Means | | | | | | |
| Price | 54.9 | 55.7 | 54.4 | 51.6 | 52.0 | 53.8 | 45.6 |
| Tire mileage rating (000) | 44.5 | 47.0 | 47.7 | 45.4 | 43.8 | 43.0 | 45.3 |
| | Sample Medians | | | | | | |
| Price | 53.9 | 55.0 | 52.9 | 50.9 | 49.8 | 51.7 | 43.2 |
| Tire mileage rating (000) | 45 | 45 | 50 | 40 | 40 | 40 | 45 |

* Unknown.

# Further evidence - prices

TIRE PRICE REGRESSIONS ($N$ = 282)

| VARIABLE NAME | ORDINARY LEAST SQUARES (1) | ORDINARY LEAST SQUARES (2) | LEAST ABSOLUTE DEVIATIONS (3) |
|---|---|---|---|
| Constant term | 26.4<br>(4.69) | 29.9<br>(4.87) | 29.5<br>(4.43) |
| Monopoly market dummy | 1.88<br>(2.12) | .26<br>(2.33) | .54<br>(2.12) |
| Duopoly market dummy | 1.88 | −.62<br>(2.42) | .96<br>(2.30) |
| Triopoly market dummy | −1.80<br>(2.05) | −2.60<br>(2.34) | −2.12<br>(2.11) |
| Quadropoly market dummy | −1.80 | −3.36<br>(2.21) | −2.53<br>(2.01) |
| Quintopoly market dummy | −1.80 | −1.99<br>(2.22) | −2.00<br>(2.01) |
| Urban market dummy | −12.1<br>(2.62) | −11.0<br>(2.62) | −11.4<br>(2.38) |
| Mileage rating | .43<br>(.05) | .38<br>(.05) | .39<br>(.05) |
| County retail wage | 1.00<br>(.53) | .62<br>(.53) | .74<br>(.49) |
| Other dummy variables | Michelin brand | 11 brands | 11 brands |
| Regression $R^2$ | .43 | .51 | |
| $F$ or $\chi^2$ hypothesis tests: | | | |
| $\alpha_1 = \alpha_2$ | .01 | .01 | 1.1 |
| $\alpha_3 = \alpha_4 = \alpha_5$ | .68 | .70 | 2.3 |
| $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5$ | 2.82* | 2.86* | 448* |

NOTE.—The omitted category is all towns not satisfying our monopoly market definition. The numbers in parentheses are asymptotic standard errors.
* Significant at the 5 percent level.

# Section 3

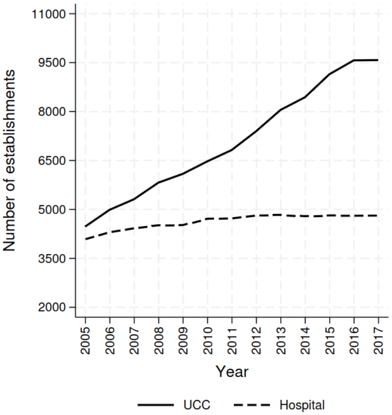
# Magnolfi et al. (2024)

# “The Rise of Urgent Care Centers: Implications for Competition and Access to Health Care”

Magnolfi et al. (2024)

# Growth in Urgent Care Centers

FIGURE 1: Urgent Care and Hospital Sector Growth




*Note:* Data for UCCs come from the Your Economy Time Series (YTS) database, which contains establishment-level information on all businesses in the United States, matched to Solv Health. Data for hospitals come from CMS' Hospital Compare, which contains all Medicare-certified hospitals.

# Introduction

- Questions:
  1. to what degree UCCs compete with each other and with hospitals and their affiliated UCCs
  2. whether UCCs' location decisions expand access in underserved markets
- Entry model of hospitals and UCCs
  - in spirit of Bresnahan and Reiss (1991)
  - Variation in Certificate-of-Need laws to identify effect of hospitals
  - Compare entry thresholds in typical to underserved markets

# What are Urgent Care Centers?

- Urgent Care Centers:
  - Walk-in
  - Extended hours
  - imaging, testing, diagnostics, screening
  - physicians, nurses, radiology technicians
  - Entry requirements: physician licensing, malpractice insurance
- Hospitals:
  - Emergency: 2/3 of visits for conditions also treated by UCCs
  - Certificate-of-Need required for entry (regulations vary by state)
- Retail clinics:
  - Respiratory infections, vaccinations
  - Within retail store (CVS, Walmart) with normal business hours
  - Nurse practitioners

# Data

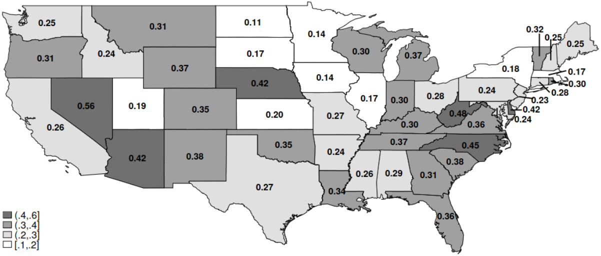
- YE Time Series establishments for US since 1997
- Hospital Compare database from CMS
- Demographics from ACS

TABLE 1: Market Characteristics by Number of UCCs

| | Full sample | Number of UCCs | | | |
|---|---|---|---|---|---|
| | | 0 | 1 | 2 | >=3 |
| Population (1,000s) | 47.9 (73.9) | 18.5 (21.5) | 46.2 (38.7) | 64.3 (51.2) | 146.7 (124) |
| Rural | 0.38 (0.42) | 0.51 (0.44) | 0.25 (0.34) | 0.20 (0.31) | 0.10 (0.19) |
| Per cap. Income ($10K) | 3.04 (1.14) | 2.91 (1.11) | 3.09 (1.17) | 3.23 (1.16) | 3.36 (1.11) |
| Hispanic | 0.11 (0.16) | 0.09 (0.14) | 0.11 (0.16) | 0.13 (0.16) | 0.16 (0.17) |
| Black | 0.01 (0.07) | 0.02 (0.09) | 0.01 (0.04) | 0.01 (0.03) | 0.01 (0.02) |
| High school or more | 0.46 (0.06) | 0.45 (0.06) | 0.46 (0.06) | 0.47 (0.05) | 0.47 (0.05) |
| Age 65 and over | 0.18 (0.06) | 0.19 (0.06) | 0.17 (0.06) | 0.17 (0.05) | 0.16 (0.05) |
| Uninsured | 0.09 (0.05) | 0.09 (0.06) | 0.09 (0.05) | 0.09 (0.05) | 0.09 (0.05) |
| CMS wage index | 0.97 (0.17) | 0.96 (0.16) | 0.99 (0.18) | 0.99 (0.19) | 1.00 (0.18) |
| Any hospital | 0.53 (0.50) | 0.42 (0.49) | 0.59 (0.49) | 0.66 (0.47) | 0.80 (0.40) |
| Any AUCC | 0.16 (0.37) | 0.07 (0.26) | 0.16 (0.37) | 0.24 (0.43) | 0.46 (0.50) |
| $T$ | 6,696 | 4,010 | 994 | 581 | 1,111 |

*Note:* Table presents means and, in parentheses, standard deviations, of market characteristics in the full sample and in subsamples conditional on the number of UCCs, and total number of markets in the final row. Rural, Hispanic, Black, high school or more, age 65 and over, and uninsured are proportions of total population. Any hospital is the fraction of markets in the sample with at least one hospital. Any AUCC is the fraction of markets in the sample with at least one hospital-affiliated UCC.

FIGURE 2: Number of UCCs per 10,000 State Residents in 2015




*Note:* Data come from the Your Economy Time Series (YTS) database, which contains establishment-level information on all businesses in the United States.

# UCC Entry

- UCC profits:

$$\underbrace{\pi_t}_{\text{market}}(\underbrace{n_t}_{\text{number of UCCs}}, \underbrace{n_t^h}_{\text{number of hospitals}}) = \overbrace{\underbrace{S_t}_{\text{market size}} v(n_t, n_t^h, \underbrace{x_t}_{\text{demand and cost shifters}}, )}^{\text{variable profits}} - \overbrace{F(n_t, \underbrace{w_t}_{\text{cost shifters}})}^{\text{fixed costs}}$$

# Hospital Entry

- Hospital profits:

$$\underbrace{\pi_t^h(n_t^h)}_{} = \overbrace{V^h(n_t^h, x_t, S_t)}^{\text{variable profits}} - \overbrace{F^h(n_t^h, w_t, z_t)}^{\text{fixed costs}}$$

(number of hospitals: $n_t^h$; demand and cost shifters: $x_t$; market size: $S_t$; UCC cost shifters: $w_t$; hospital cost shifters: $z_t$)

- Hospital entry does not respond to UCCs
- Cost shifter for hospitals excluded from UCC cost

# Equilibrium and Entry Thresholds

- Number of UCCs

$$\pi(n_t, n_t^h) \geq 0 \geq \pi(n_t + 1, n_t^h)$$

- $n_t$ firms requires size

$$S_t \geq \frac{F(n_t, w_t)}{v(n_t, n_t^h, x_t)}$$

- Minimal size per firm for $n$ firms in market with average characteristics:

$$\tau_n = \frac{1}{n} \frac{F(n, \bar{w}_n)}{v(n, \bar{n}^h, \bar{x}_n)}$$

# Estimation

- Profit Function parameterization

$$\pi_t(n_t, n_t^h) = S_t \left( x_t\theta_x + n_t^h\delta + \theta_1 - \sum_{i=2}^{n_t} \theta_i \right) - w_t\gamma_w - \gamma_1 + - \sum_{i=2}^{n_t} \gamma_i + \epsilon_t$$

$$\pi_t^h(n_t^h) = S_t \left( x_t\theta_x^h + \theta_1^h \right) - w_t\gamma_w^h - z_t\gamma_z^h - \gamma_1^h + \epsilon_t^h$$

$$\begin{pmatrix} \epsilon_t \\ \epsilon_t^h \end{pmatrix} \sim N\left(0, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}\right)$$

- $z_t = CON_t$ important for identification, especially $\rho$ vs $\delta$ (exclusion in nonlinear simultaneous equations)
- Estimate by maximum likelihood

# Sample restricted to isolated markets

Appendix Table 2: Market Characteristics by Number of UCCs

| | Main sample | Number of UCCs | | | |
|---|---|---|---|---|---|
| | | 0 | 1 | 2 | >=3 |
| Population (1,000s) | 96.0 (139) | 15.2 (13.1) | 55.6 (48.5) | 81.7 (73.8) | 219 (177) |
| Rural | 0.34 (0.35) | 0.52 (0.38) | 0.34 (0.29) | 0.29 (0.28) | 0.13 (0.18) |
| Per cap. Income ($10K) | 2.74 (0.63) | 2.61 (0.60) | 2.59 (0.50) | 2.78 (0.52) | 2.98 (0.69) |
| Hispanic | 0.15 (0.18) | 0.14 (0.18) | 0.15 (0.21) | 0.12 (0.15) | 0.15 (0.18) |
| Black | 0.04 (0.13) | 0.08 (0.19) | 0.02 (0.06) | 0.02 (0.04) | 0.01 (0.01) |
| High school or more | 0.44 (0.05) | 0.43 (0.06) | 0.43 (0.05) | 0.45 (0.04) | 0.46 (0.04) |
| Age 65 and over | 0.18 (0.06) | 0.19 (0.06) | 0.18 (0.05) | 0.17 (0.04) | 0.15 (0.04) |
| Uninsured | 0.10 (0.05) | 0.11 (0.06) | 0.11 (0.05) | 0.09 (0.04) | 0.10 (0.04) |
| CMS wage index | 0.95 (0.14) | 0.96 (0.11) | 0.94 (0.15) | 0.94 (0.13) | 0.95 (0.16) |
| Any hospital | 0.90 (0.30) | 0.81 (0.39) | 0.96 (0.19) | 0.97 (0.17) | 0.96 (0.19) |
| Any AUCC | 0.35 (0.48) | 0.13 (0.33) | 0.30 (0.46) | 0.51 (0.50) | 0.59 (0.49) |
| $T$ | 673 | 273 | 111 | 65 | 224 |

*Note:* Table presents means and, in parentheses, standard deviations, of market characteristics in the main estimation sample and in subsamples conditional on the number of UCCs, and total number of markets in the final row. Rural, Hispanic, Black, high school or more, age 65 and over, and uninsured are proportions of total population. Any hospital is the fraction of markets in the sample with at least one hospital. Any AUCC is the fraction of markets in the sample with at least one hospital-affiliated UCC.

TABLE 2: Entry Model Estimates

| | | Univariate | | Bivariate | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Hospitals | | UCCs | | |
| | | coef | se | coef | se | coef | se | sim |
| | | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| Variable Profit Parameters: | | | | | | | | |
| $\delta$ | Additional hospital presence | -23.6 | (14.4) | — | | -67.0 | (19.2) | -20.5 |
| $\theta_x, \theta_x^h$ | Rural | 52.2 | (43.5) | 117.5 | (45.4) | 59.5 | (42.8) | 4.0 |
| | Income per capita | -39.9 | (11.3) | 0.6 | (8.9) | -33.2 | (11.1) | -9.8 |
| | Hispanic | -69.3 | (51.0) | -102.9 | (32.6) | -77.7 | (48.6) | -5.9 |
| | Black | -300.9 | (242.3) | 422.1 | (242.0) | -239.0 | (240.7) | -13.5 |
| | High school or more | 382.8 | (232.6) | -206.2 | (156.4) | 315.5 | (225.8) | 3.7 |
| | Age 65 or more | 308.0 | (189.5) | 356.2 | (154.0) | 294.3 | (184.3) | 3.7 |
| | Uninsured | 93.7 | (192.6) | 101.4 | (151.6) | 111.0 | (185.5) | 1.5 |
| $\theta_n, \theta_n^h$ | $\theta_1$ | 373.4 | (104.6) | 143.4 | (66.5) | 390.0 | (102.0) | — |
| | $\theta_2$ | 279.5 | (37.5) | — | | 254.8 | (39.1) | — |
| | $\theta_3$ | 5.4 | (10.8) | — | | 3.4 | (10.0) | — |
| Fixed Cost Parameters: | | | | | | | | |
| $\gamma_w, \gamma_w^h$ | CMS wage index | 0.2 | (0.5) | 0.9 | (0.5) | 0.3 | (0.5) | -0.3 |
| $\gamma_z$ | CON Laws | — | | 0.7 | (0.2) | — | | — |
| $\gamma_n, \gamma_n^h$ | $\gamma_1$ | 1.3 | (0.5) | 0.4 | (0.5) | 1.3 | (0.5) | — |
| | $\gamma_2$ | 0.0 | (0.1) | — | | 0.1 | (0.1) | — |
| | $\gamma_3$ | 0.5 | (0.1) | — | | 0.5 | (0.1) | — |
| $\rho$ | | — | | — | | 0.4 | (0.1) | — |
| $T$ | | 673 | | 673 | | 673 | | |

*Note*: Coefficients and standard errors of the univariate ordered probit of UCC entry are reported in columns 1 and 2, respectively. Coefficients and standard errors for the bivariate ordered probit are reported in columns 3 and 4 for hospitals, and in columns 5 and 6 for UCCs. Column 7 reports the simulated percent change in the mean number of UCCs across markets in the bivariate model due to a standard deviation increase in that covariate (or due to setting all hospital or rural indicators to 1).

# Results

- Column (1) takes hospital entry as fixed, column (5) models hospital entry
- Column (3) as first stage
- Column (7) percent change in number UCCs from 1 standard deviation change in variables

# Entry Thresholds

TABLE 3: Per-Firm Entry Thresholds and Ratios

| | Univariate | | Bivariate | | | |
|---|---|---|---|---|---|---|
| | | | Hospitals | | UCCs | |
| | coef | se | coef | se | coef | se |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Thresholds: | | | | | | |
| $\tau_1$ | 30.83 | (1.51) | 55.47 | (2.90) | 31.16 | (1.51) |
| $\tau_2$ | 37.04 | (1.84) | — | | 36.24 | (1.69) |
| $\tau_3$ | 37.99 | (1.49) | — | | 38.77 | (1.46) |
| Ratios: | | | | | | |
| $\tau_2/\tau_1$ | 1.20 | (0.08) | — | | 1.16 | (0.08) |
| $\tau_3/\tau_2$ | 1.03 | (0.03) | — | | 1.07 | (0.03) |
| $T$ | 673 | | 673 | | 673 | |

*Note*: Table reports entry thresholds and entry ratios for UCCs from the univariate ordered probit in columns (1) and (2) and the bivariate ordered probit in columns (5)-(6). Columns (3) and (4) present the entry threshold for a monopoly hospital from the bivariate ordered probit. Entry thresholds are measured in 1,000s of people per-firm. Standard errors based on the delta method are reported in parenthesis.

# Entry Thresholds

- Ratios decreasing, but $> 1$, implies more entry increases competition, but even with 3 still have market power
- Hospitals make UCCs more competitive (next table)

TABLE 4: Per-Firm Entry Thresholds and Ratios, Conditional on Number of Hospitals

| | Number of hospitals | | | |
|---|---|---|---|---|
| | <=1 | | >1 | |
| Thresholds: | | | | |
| $\tau_1$ | 30.31 | (1.44) | 34.91 | (2.28) |
| $\tau_2$ | 32.18 | (1.87) | 44.09 | (3.12) |
| $\tau_3$ | 30.97 | (1.93) | 44.01 | (2.55) |
| Ratios: | | | | |
| $\tau_2/\tau_1$ | 1.06 | (0.07) | 1.26 | (0.10) |
| $\tau_3/\tau_2$ | 0.96 | (0.03) | 1.00 | (0.04) |
| $T$ | 438 | | 235 | |

*Note*: Table reports entry thresholds and entry ratios for UCCs from the bivariate ordered probit conditional on the number of hospitals and evaluated at the full sample means of demographics and CMS wage index. Entry thresholds are measured in 1,000s of people per-firm. Standard errors based on the delta method are reported in parenthesis.

# Access to Care

TABLE 5: Per-Firm Entry Thresholds and Ratios in Demographic Subsamples

| | Percent uninsured | | Per capita income | | SVI | |
|---|---|---|---|---|---|---|
| | High | Low | Low | High | High | Low |
| Thresholds: | | | | | | |
| $\tau_1$ | 29.74 | 33.09 | 30.56 | 32.06 | 31.44 | 31.51 |
| | (1.95) | (2.34) | (1.69) | (2.73) | (2.04) | (2.32) |
| $\tau_2$ | 35.08 | 35.58 | 31.37 | 36.96 | 31.24 | 39.01 |
| | (2.60) | (2.25) | (1.98) | (2.67) | (1.96) | (2.82) |
| $\tau_3$ | 29.88 | 39.71 | 32.93 | 38.35 | 31.95 | 40.81 |
| | (2.19) | (1.96) | (1.67) | (2.41) | (1.93) | (2.50) |
| Ratios: | | | | | | |
| $\tau_2/\tau_1$ | 1.18 | 1.08 | 1.03 | 1.15 | 0.99 | 1.24 |
| | (0.13) | (0.09) | (0.09) | (0.11) | (0.09) | (0.13) |
| $\tau_3/\tau_2$ | 0.85 | 1.12 | 1.05 | 1.04 | 1.02 | 1.05 |
| | (0.04) | (0.05) | (0.03) | (0.07) | (0.04) | (0.08) |
| $T$ | 336 | 337 | 337 | 336 | 336 | 337 |

*Note*: Table reports entry thresholds and ratios for UCCs from bivariate ordered probits estimated from subsamples of PCSAs: below median income, above median income, above median percent uninsured, below median percent uninsured, above median Social Vulnerability Index (SVI), and below median SVI. Entry thresholds are measured in 1,000s of people per-firm. Standard errors in parentheses.

# Access to Care

- Entry thresholds about the same in subsamples

# Robustness

- Market definition
- Model hospital affiliated UCCs separately

# Conclusions

- Growth of UCCs has expanded access to care
- Evidence that UCCs have market power
- Future work: quality, cost savings, welfare

# Section 4

# Eliason (2021)

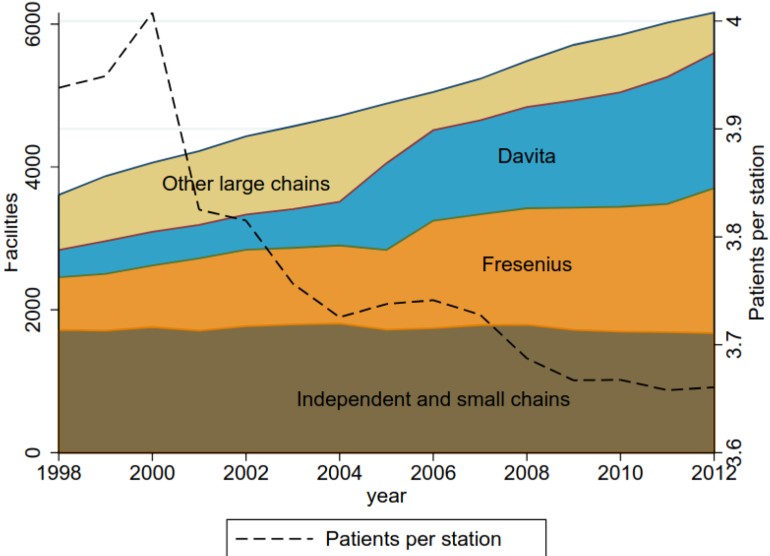
# "Price Regulation and Market Structure: Evidence from the Dialysis Industry"

- Eliason (2021), revised version of Eliason (2017)

- 80% of dialysis patients in Medicare
- Medicare price regulation affects:
  - Short run: quality competition
  - Longer run: entry & investment (market structure)

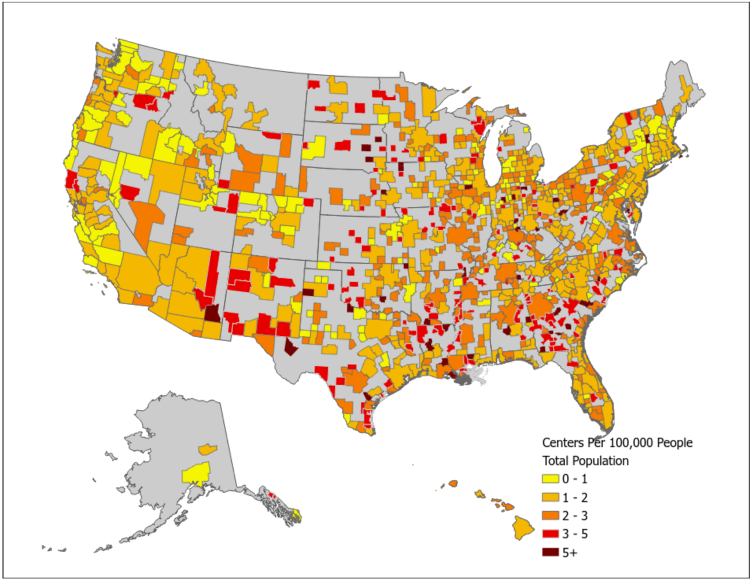
# Dialysis Growth

Figure 1: Industry Growth



# Spatial Dispersion

Figure 2: Dialysis Centers Per Capita (65+)



# Measuring Quality

$$
\begin{aligned}
y_{ijt} =& X_{it}\beta + \mu_{jt} + \epsilon_{ijt} \\
Q_{jt} =& \bar{X}\hat{\beta} + \hat{\mu}_{jt}
\end{aligned}
$$

# Quality Variation

Table 1: Facility Quality

| | Mean | St. Dev |
|---|---|---|
| **Unadjusted Mean Outcomes** | | |
| Survival Rate | 83.01 | (9.01) |
| Hospitalizations (Count) | 1.74 | (0.56) |
| Hosp. for Infection Rate | 7.52 | (7.45) |
| Dialysis Adequacy Rate | 87.91 | (9.64) |
| **Risk-Adjusted Quality Scores** | | |
| Survival Rate | 83.18 | (8.15) |
| Hospitalizations (Count) | 1.72 | (53.89) |
| Hosp. for Infection Rate | 6.79 | (5.77) |
| Dialysis Adequacy Rate | 88.14 | (9.50) |
| **Correlation between Quality Score and Logged Patient Count** | | |
| Survival Rate | 0.043 | |
| Hospitalizations (Count) | -0.045 | |
| Hosp. for Infection Rate | -0.024 | |
| Dialysis Adequacy Rate | 0.028 | |

Notes. The top panel includes summary statistics for average facility-year outcomes. The middle panel includes facility-year quality scores recovered from estimating Equation 1. The bottom

# Competition Increases Quality

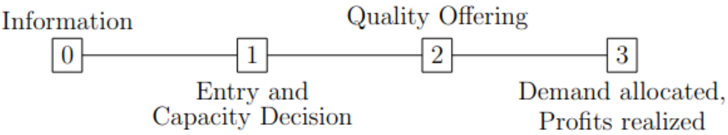
Table 2: Determinants of Quality, Risk-Adjusted Survival

| | (1) OLS | (2) OLS | (3) OLS | (4) IV | (5) IV | (6) IV |
|---|---|---|---|---|---|---|
| Log(Patients) | -0.654*** | -0.652*** | -0.723*** | -1.624*** | -1.470*** | -2.896*** |
| | (0.113) | (0.113) | (0.136) | (0.274) | (0.262) | (0.416) |
| Log(Stations) | 0.637** | 0.720*** | 1.344*** | 1.826*** | 1.722*** | 3.413*** |
| | (0.195) | (0.197) | (0.199) | (0.383) | (0.370) | (0.430) |
| Has Rival within 10 miles | | 0.574** | 0.533* | | 0.570** | 1.167** |
| | | (0.186) | (0.232) | | (0.188) | (0.359) |
| Year FE | Y | Y | Y | Y | Y | Y |
| Chain FE | N | N | Y | N | N | Y |
| Market FE | N | N | Y | N | N | Y |
| Additional Controls | N | N | Y | N | N | Y |
| Dependent Var Mean | 83.18(pp) | 83.18(pp) | 83.18(pp) | 83.18(pp) | 83.18(pp) | 83.18(pp) |
| First Stage F-Statistic | | | | 598.8 | 596.4 | 82.5 |
| Observations | 38,264 | 38,264 | 38,239 | 38,264 | 38,264 | 38,239 |

Notes: +, *, ** and *** indicate significance at the 10%, 5%, 1% and 0.1% level, respectively. Standard errors are clustered at the facility level and shown in parentheses. An observation is a facility-year pair. Observations with a dependent variable more than three standard deviations from the mean are excluded. Additional controls include log of facility age, for-profit status, an indicator for freestanding facility, share of patients

# Model

Figure 3: Model Timing



# 3. Demand

- Patient $i$ chooses facility $j \in \tilde{\mathcal{J}}_i$ from firm $f$

$$j = \arg\max_{j \in \tilde{\mathcal{J}}_i} u_{ijf} + \epsilon_{ijf}$$

where

$$u_{ijf} = \begin{cases} \overbrace{g(d_{ijf}, \mathcal{I}_i)}^{\text{distance}} + \underbrace{\Gamma(\mathcal{I}_i)}_{\text{individual characteristics}} \overbrace{\mathcal{H}_{jf}}^{\text{facility characteristics}} + \xi_{jf} & \text{if } j \neq 0 \\ \lambda(\mathcal{I}_i) & \text{otherwise} \end{cases}$$

- Market shares

$$S_{jf} = \sum_i \underbrace{\frac{e^{u_{ijf}}}{\sum_{j' \in \mathcal{J}_i} e^{uij',f'}}}_{\equiv s_{ijf}(\mathcal{H}, \mathcal{M}, \xi; \beta)}$$

# 2. Quality Competition

- Firm chooses quality of its facilities

$$\max_{\mathcal{Q}_{jf} \in [0, \bar{\mathcal{Q}}]} \sum_{r \in \mathcal{J}_f} \sum_{i} \left( P_i - MC_{rf}(\mathcal{H}_{rf}, \nu_{rf}; \alpha) \right) s_{irf}(\mathcal{H}, \mathcal{M}, \xi; \beta)$$

- Expected profits $= \tilde{\pi}_{jf}(\mathcal{Q}^*_{jf})$

# 3. Entry & Capacity

- Firm has set of potential facilities $\mathcal{J}_f$
- Chooses capacity $\mathcal{K}_{rf} \geq 0$ for each potential facility
- Non-entry $\equiv \mathcal{K}_{rf} = 0$
- Capacity affects marginal costs and demand (included in $\mathcal{H}_{jf}$)

$$\max_{\{\mathcal{K}_{jf}\}_{j \in \mathcal{J}_f}} \mathrm{E}\left[\sum_{r \in \mathcal{J}_f} \tilde{\pi}_{rf}(\mathcal{Q}^*_{rf}) - fc(\kappa_{rf}; \gamma) + \eta_r^{\kappa_{rf}}\right]$$

# Demand Estimation

- Estimate demand (micro-BLP)
  1. Individual level multinomial logit to estimate

$$u_{ijf} = \mathcal{I}_i \beta \mathcal{H}_{jf} + \delta_{jf}$$

  2. 2SLS with predicted patients based on geography as instruments for quality and congestion

$$\hat{\delta}_{jt} = \mathcal{H}_{jf} \alpha + \xi_{jf}$$

# Marginal costs

- Specify linear marginal cost function, use IV on firm first order conditions
- Predicted patients based on geography as instruments for quality and congestion

# Fixed Costs

- Model gives probability of entry and capacity choice
- Estimate fixed costs parameters by Pseudo-MLE

Table 4: Demand Estimates

| First Stage: Heterogeneous Preferences | Coefficient (Std. Err.) |
|---|---|
| Distance | -0.2258 |
| | (0.0149) |
| Distance Squared | 0.0016 |
| | (0.0003) |
| Distance*Pop. Density | -0.0067 |
| | (0.0028) |
| Distance*Private Insurance | 0.0106 |
| | (0.0064) |
| Distance*Employed | 0.0160 |
| | (0.0049) |
| Quality*Private Insurance | 1.3387 |
| | (0.6399) |
| Quality*Employed | 0.6680 |
| | (0.4435) |
| Congestion*Private Insurance | 0.0608 |
| | (0.0177) |
| Congestion*Employed | 0.0631 |
| | (0.0178) |
| Stations*Private Insurance | 0.0037 |
| | (0.0048) |
| Stations*Employed | 0.0083 |
| | (0.0031) |
| Outside Option*Private Insurance | 1.7547 |
| | (0.6382) |
| Outside Option*Employed | 1.4368 |
| | (0.5936) |

| Second Stage: Decomposition of Mean Utility | OLS | 2SLS |
|---|---|---|
| Quality | -1.9075 | 0.4854 |
| | (0.6155) | (0.1384) |
| Congestion (Patients per station) | 0.2024 | -0.3647 |
| | (0.0267) | (0.1414) |
| Number of Dialysis Stations | 0.0096 | 0.0427 |
| | (0.0047) | (0.0097) |
| For-profit | -0.2622 | 0.1292 |
| | (0.1067) | (0.2176) |
| $\sigma_\xi$ | 1.0894 | 1.0671 |
| | (0.1451) | (0.1313) |
| Chain FEs | Y | Y |
| Outside Option × Market FEs | Y | Y |

*Notes:* Standard errors based on 100 bootstrap iterations. Distance is the geodesic distance from the centroid of each patient's ZIP code to the facility. Population density is the ratio of people (in thousands) to square miles in the patient's ZIP code. Congestion is measured as the ratio of patients to dialysis stations at a facility. Mean utility from the outside option is interacted with the market fixed effects and omitted from the table.

Table 5: Mean Elasticities of Demand, Selected

| | All Patients | Medicare Patients | Privately Insured Patients |
|---|---|---|---|
| Distance | -0.9223 | -0.9234 | -0.9022 |
| | (0.0521) | (0.0531) | (0.0542) |
| Quality | 0.3510 | 0.2970 | 1.1595 |
| | (0.1382) | (0.1301) | (0.1271) |
| Congestion | -0.6150 | -0.6228 | -0.4869 |
| | (0.2512) | (0.2484) | (0.2374) |

*Notes:* Standard errors based on 100 bootstrap iterations.

Table 6: Marginal Cost Estimates

| | Coefficient (Std. Err.) |
|---|---|
| Quality | 15,256.4 |
| | (5,323.1) |
| Quality$^2$ | -8,338.4 |
| | (2,769.3) |
| Congestion | 5,805.5 |
| | (2,015.8) |
| Chain | 436.5 |
| | (381.2) |
| Congestion*Quality | -9,123.0 |
| | (2,606.6) |
| Congestion*Quality$^2$ | 5,320.0 |
| | (2,673.4) |
| Chain*Quality | -2,063.0 |
| | (1,085.8) |
| Chain*Quality$^2$ | 1,431.0 |
| | (737.6) |
| Constant | 8,956.0 |
| | (1,967.8) |
| $\sigma_\nu$ | 12,143.0 |
| | (82.1) |

*Notes:* Standard errors based on 100 bootstrap iterations.

Table 7: Fixed Cost Estimates

| | Estimates (Dollars) (1) | (2) |
|---|---|---|
| Constant | 956,591 | |
| | (358,852) | |
| Chain | -254,900 | -481,388 |
| | (108,932) | (211,135) |
| Stations | 81,515 | 56,588 |
| | (3,246) | (3,884) |
| Stations*Chain | -24,711 | -14,106 |
| | (4,112) | (3,238) |
| Log(Median Income of ZIP) | | 1,640,584 |
| | | (65,268) |
| $\sigma_{\eta^\kappa}$ | 1,369,986 | 856,104 |
| | (325,412) | (392,979) |
| Market Dummies | N | Y |

Standard errors based on 100 bootstrap iterations.

Table 8: Counterfactuals: Changing the Medicare Reimbursement Rate

| | Medicare Rate Increases | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 5% | | 10% | | 15% | | 100% | |
| | Partial (1) | Full (2) | Partial (3) | Full (4) | Partial (5) | Full (6) | Partial (7) | Full (8) |
| | Percent Change, Relative to Baseline | | | | | | | |
| Number of Entrants | - | 5.81 | - | 11.13 | - | 14.17 | - | 72.33 |
| Total Capacity | - | 9.56 | - | 15.52 | - | 19.89 | - | 115.54 |
| Average Facility Congestion, Weighted by Patients | -0.20 | -4.91 | 0.09 | -9.84 | 0.24 | -12.13 | 1.33 | -45.84 |
| | Level Changes, Relative to Baseline | | | | | | | |
| Average Risk Adj. Survival, Weighted by Patients | 0.98 | 1.32 | 2.10 | 2.63 | 3.01 | 3.80 | 14.85 | 21.84 |
| Expenditures ($ Millions) | 417 | 417 | 833 | 833 | 1,250 | 1,250 | 8,335 | 8,335 |
| Total Welfare ($ Millions) | 335 | 442 | 679 | 1,039 | 1,020 | 1,489 | 6,791 | 7,686 |
| Producer Surplus ($ Millions) | 332 | 267 | 670 | 716 | 1,007 | 1,075 | 6,715 | 5,938 |
| Consumer Surplus ($ Millions) | 3 | 175 | 10 | 323 | 13 | 415 | 76 | 1,748 |
| Change in CS from: | | | | | | | | |
| Distance | 0 | 35 | -2 | 73 | -3 | 110 | -16 | 316 |
| Congestion | 0 | 82 | -1 | 143 | -3 | 177 | -10 | 636 |
| Quality | 4 | 9 | 13 | 18 | 18 | 27 | 90 | 150 |
| Δ Welfare - Δ Expenditures ($ Millions) | -82 | 26 | -154 | 205 | -230 | 239 | -1,614 | -649 |
| Expected Number of Life-Years Saved | 3,364 | 4,535 | 7,216 | 9,018 | 10,328 | 13,048 | 51,011 | 75,023 |
| Cost Per Life-Year Saved ($ Millions) | 0.124 | 0.092 | 0.116 | 0.092 | 0.121 | 0.096 | 0.163 | 0.111 |

Expenditures include both private and Medicare spending. The components of the change in consumer surplus—distance, congestion, and quality—do not necessarily add up to the overall change in consumer surplus. Resorting of patients may result in changes beyond these factors.

Table 9: Counterfactuals: Medicare For All Dialysis Patients

| | M4A Dialysis | | M4A Dialysis, Plus | |
|---|---|---|---|---|
| | Partial (1) | Full (2) | Partial (3) | Full (4) |
| | Percent Change, Relative to Baseline | | | |
| Number of Entrants | - | -5.94 | - | 0.73 |
| Total Capacity | - | -7.56 | - | 0.79 |
| Average Facility Congestion, Weighted by Patients | -0.28 | 3.44 | 0.06 | -2.33 |
| | Level Changes, Relative to Baseline | | | |
| Average Risk Adj. Survival, Weighted by Patients | -5.29 | -5.01 | -3.92 | -3.20 |
| Expenditures ($ Millions) | -577 | -577 | 0 | 0 |
| Total Welfare ($ Millions) | -462 | -627 | 5 | 174 |
| Producer Surplus ($ Millions) | -435 | -451 | 26 | 174 |
| Consumer Surplus ($ Millions) | -27 | -175 | -20 | -0.3 |
| Change in CS from: | | | | |
| Distance | 10 | -50 | 7 | 18 |
| Congestion | 7 | -45 | 6 | 25 |
| Quality | -36 | -33 | -25 | -23 |
| Δ Welfare - Δ Expenditures ($ Millions) | 15 | -497 | 5 | 174 |
| Expected Number of Life-Years Saved | -18,189 | -17,211 | -13,450 | -11,011 |
| Savings Per Life-Year Lost ($ Millions) | 0.032 | 0.034 | 0.000 | 0.000 |

Expenditures include both private and Medicare spending. The broken-out components of the change in consumer surplus—distance, congestion, and quality—do not add up to the overall change in consumer surplus. Resorting of patients may result in changes beyond these factors.

# Section 5

# Other applications

# Other applications

- Supermarkets:
  - Bronnenberg, Dhar, and Dubé (2009)
  - Jia (2008)
  - Ellickson (2007)
- Airlines:
  - Berry (1992)
  - Ciliberto and Tamer (2009)
- Radio: Sweeting (2009)
- Urgent care: Magnolfi et al. (2024)

Aguirregabiria, Victor. 2021. “Empirical Industrial Organization: Models, Methods, and Applications.” URL http://aguirregabiria.net/wpapers/book_dynamic_io.pdf.

Aradillas-López, Andrés. 2020. “The Econometrics of Static Games.” *Annual Review of Economics* 12 (1):135–165. URL https://doi.org/10.1146/annurev-economics-081919-113720.

Baumol, WJ, JC Panzar, and RD Willig. 1982. *Contestable markets and the theory of industry structure*. New York [etc.]: Harcourt Brace Jovanovich.

Berry, S.T. 1992. “Estimation of a Model of Entry in the Airline Industry.” *Econometrica: Journal of the Econometric Society* :889–917URL http://www.jstor.org/stable/10.2307/2951571.

Bresnahan, Timothy F. and Peter C. Reiss. 1991. “Entry and Competition in Concentrated Markets.” *Journal of Political Economy* 99 (5):pp. 977–1009. URL http://www.jstor.org/stable/2937655.

Bronnenberg, B.J., S.K. Dhar, and J.P.H. Dubé. 2009. “Brand history, geography, and the persistence of brand shares.” *Journal of Political Economy* 117 (1):87–115. URL http://www.jstor.org/stable/10.1086/597301.

Ciliberto, F. and E. Tamer. 2009. “Market structure and multiple equilibria in airline markets.” *Econometrica* 77 (6):1791–1828. URL http://onlinelibrary.wiley.com/doi/10.3982/ECTA5368/abstract.

Eliason, P. 2021. “Price Regulation and Market Structure: Evidence from the Dialysis Industry.” Tech. rep., Working Paper. URL https://www.dropbox.com/s/6q4ya5051wxuvlg/ESRD_Eliason.pdf?dl=0.

Eliason, Paul J. 2017. "Market Power and Quality: Congestion and Spatial Competition in the Dialysis Industry." URL https://api.semanticscholar.org/CorpusID:44200870.

Ellickson, P.B. 2007. "Does Sutton apply to supermarkets?" *The RAND Journal of Economics* 38 (1):43–59. URL http://onlinelibrary.wiley.com/doi/10.1111/j.1756-2171.2007.tb00043.x/abstract.

Jia, P. 2008. "What Happens When Wal-Mart Comes to Town: An Empirical Analysis of the Discount Retailing Industry." *Econometrica* 76 (6):1263–1316. URL http://onlinelibrary.wiley.com/doi/10.3982/ECTA6649/abstract.

Kline, Brendan, Ariel Pakes, and Elie Tamer. 2021. "Chapter 5 - Moment inequalities and partial identification in industrial organization." In *Handbook of Industrial Organization, Volume 4, Handbook of Industrial Organization*, vol. 4, edited by Kate Ho, Ali Hortaçsu, and Alessandro Lizzeri. Elsevier, 345–431. URL https://www.sciencedirect.com/science/article/pii/S1573448X21000054.

Levin, Jonathan. 2009. "Entry and market structure." Lecture notes. URL http://www.stanford.edu/~jdlevin/Econ%20257/Entry%20and%20Market%20Structure.pdf.

Magnolfi, Lorenzo, Corina Mommaerts, Natalia Serna, and Christopher Sullivan. 2024. "The Rise of Urgent Care Centers: Implications for Competition and Access to Health Care." *Journal of Political Economy Microeconomics* forthcoming (0):forthcoming. URL https://doi.org/10.1086/727821.

Schmalensee, Richard. 1992. "Sunk Costs and Market Structure: A Review Article." *The Journal of Industrial Economics* 40 (2):125–134. URL http://www.jstor.org/stable/2950504.

Starc, Amanda. 2014. "Insurer pricing and consumer welfare: evidence from Medigap." *The RAND Journal of Economics* 45 (1):198–220. URL http://dx.doi.org/10.1111/1756-2171.12048.

Sutton, J. 1991. *Sunk costs and market structure: Price competition, advertising, and the evolution of concentration*. MIT press.

Sweeting, Andrew. 2009. "The Strategic Timing Incentives of Commercial Radio Stations: An Empirical Analysis Using Multiple Equilibria." *The RAND Journal of Economics* 40 (4):pp. 710–742. URL http://www.jstor.org/stable/25593735.