Ph sician Marke Po er and Medical-Care E pendi res

A D A H S *y

S 14, 2011

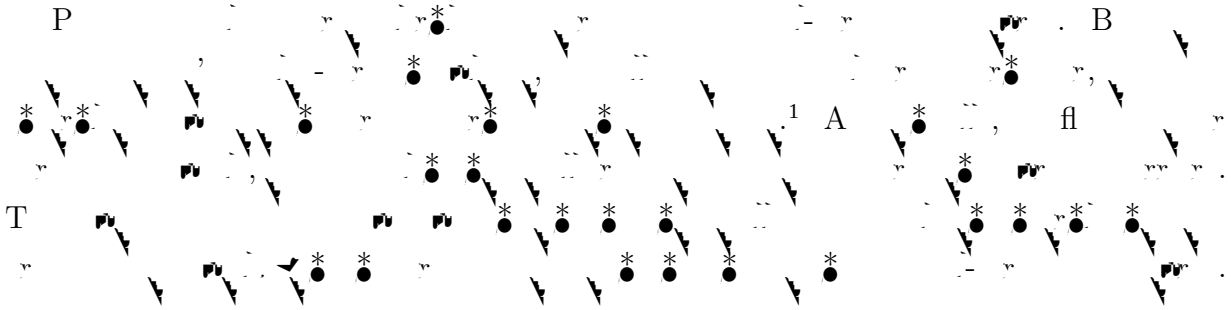
Abstract

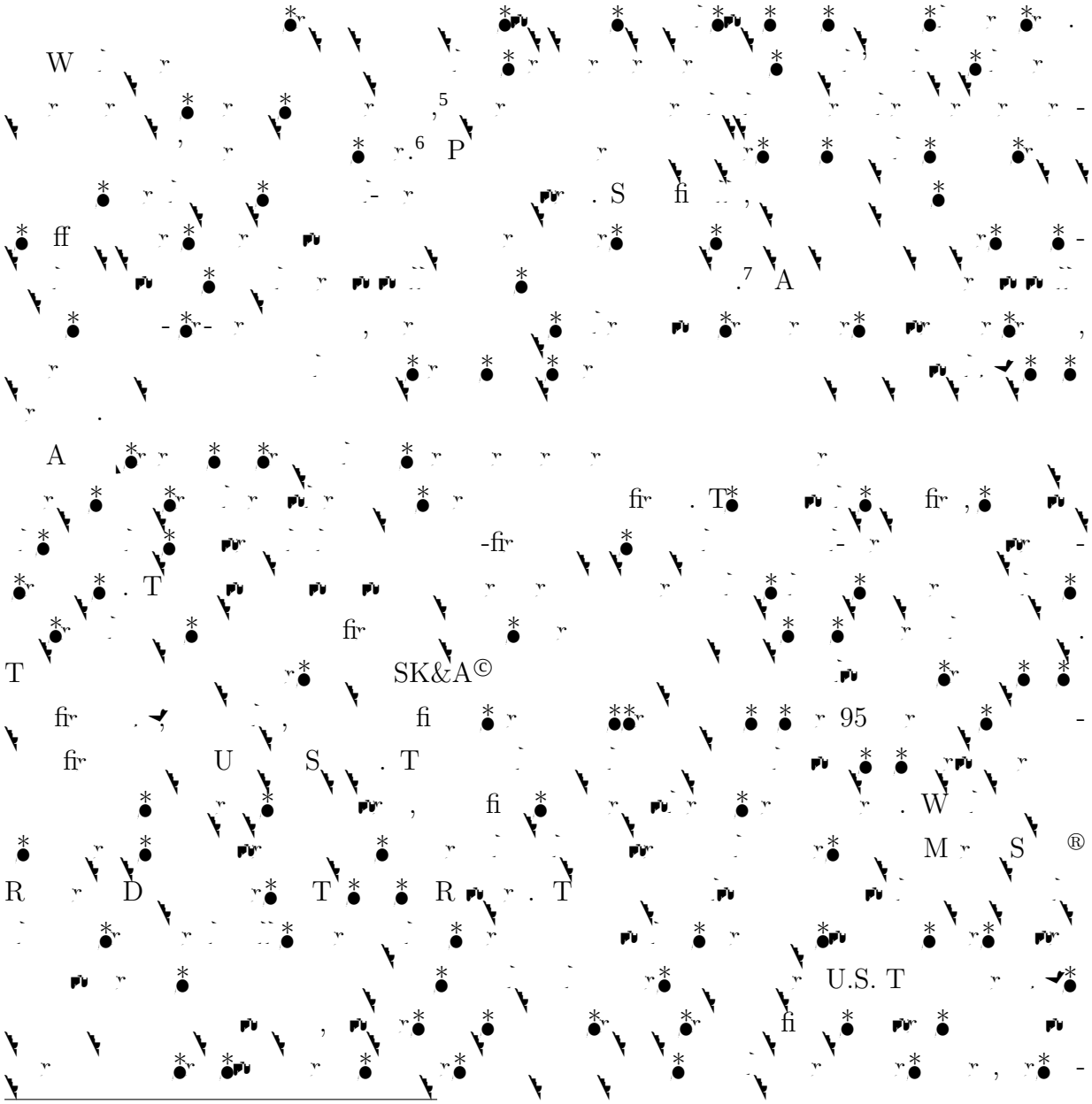
Physicians play a critical role in determining medical-care expenditures. In this study, we empirically assess the degree to which physicians exploit their bargaining leverage over insurance carriers as a means to raise service prices. We also examine the degree to which these potentially higher payments may translate into di erent levels of service utilization. We find that physicians are able to translate bargaining leverage into both higher fees and higher service utilization. *Ce i , ib* , a cardiologist with high market power (concentration in the 90th percentile) will charge 25 percent higher prices and perform 22 percent more services than a cardiologist with low market power (concentration in the 10th percentile). The corresponding orthopedist will charge 24 percent higher prices and perform 4 percent more services. We provide evidence that the e ect of bargaining leverage on service utilization may be explained by physicians responding to the negotiated service prices.

*We thank Seidu Dauda and Eli Liebman for excellent research assistance.

†Bureau of Economic Analysis

1 Introduction





and politicians have raised some concerns that the new health care law may spur additional consolidation and harm consumers (America's Health Insurance Plans (AHIP) (2011), Berenson, Ginsburg, and Kemper (2010), and \Hearing on Health Care Industry Consolidation" September 2011).

[5]See Noether (1988), Dranove, Shanley, and White (1993), Lynk (1995), and Keeler, Melnick, and Zwanziger(1999), Town and Vistnes (2001), Capps, Dranove, and Satterthwaite (2003).

[6]Research regarding physician market competition has primarily focused on identifying whether or not physicians actually possess monopoly power. As explained by Gaynor (1995), most of these studies have aimed to infer the presence of market power by searching for monopoly rents and supra-normal returns on investment to education (Sloan 1970, Le er and Lindsay 1980, Burstein and Cromwell 1985).

[7]It appears that di erent incentives are at work in hospital markets. Indeed, Dafny (2005) finds that hospitals respond to price changes (diagnosis-specific prices) by \upcoding" patients to diagnosis codes associated with large reimbursement increases.

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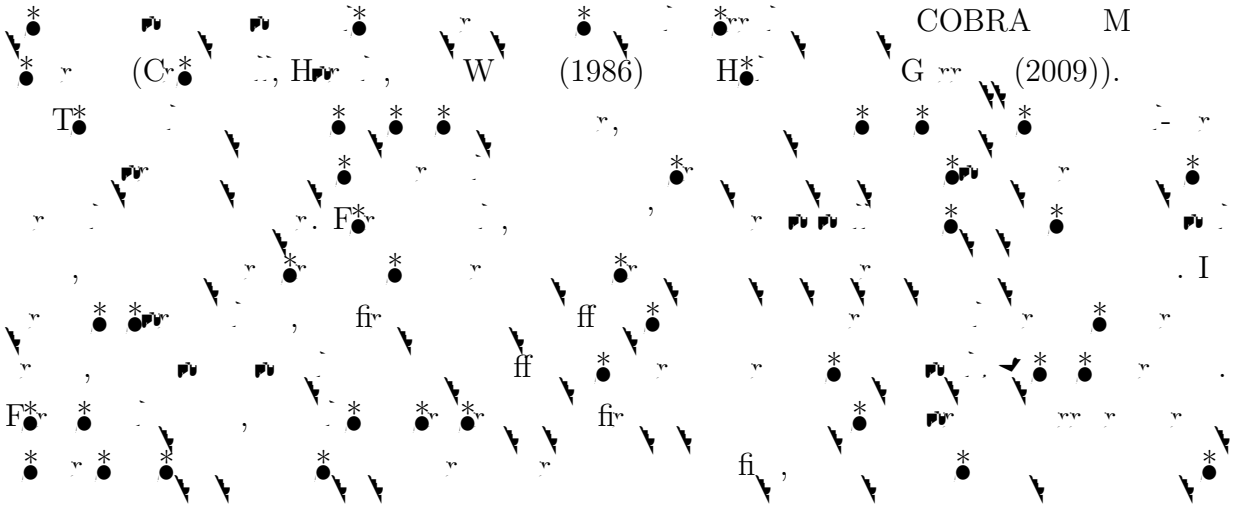
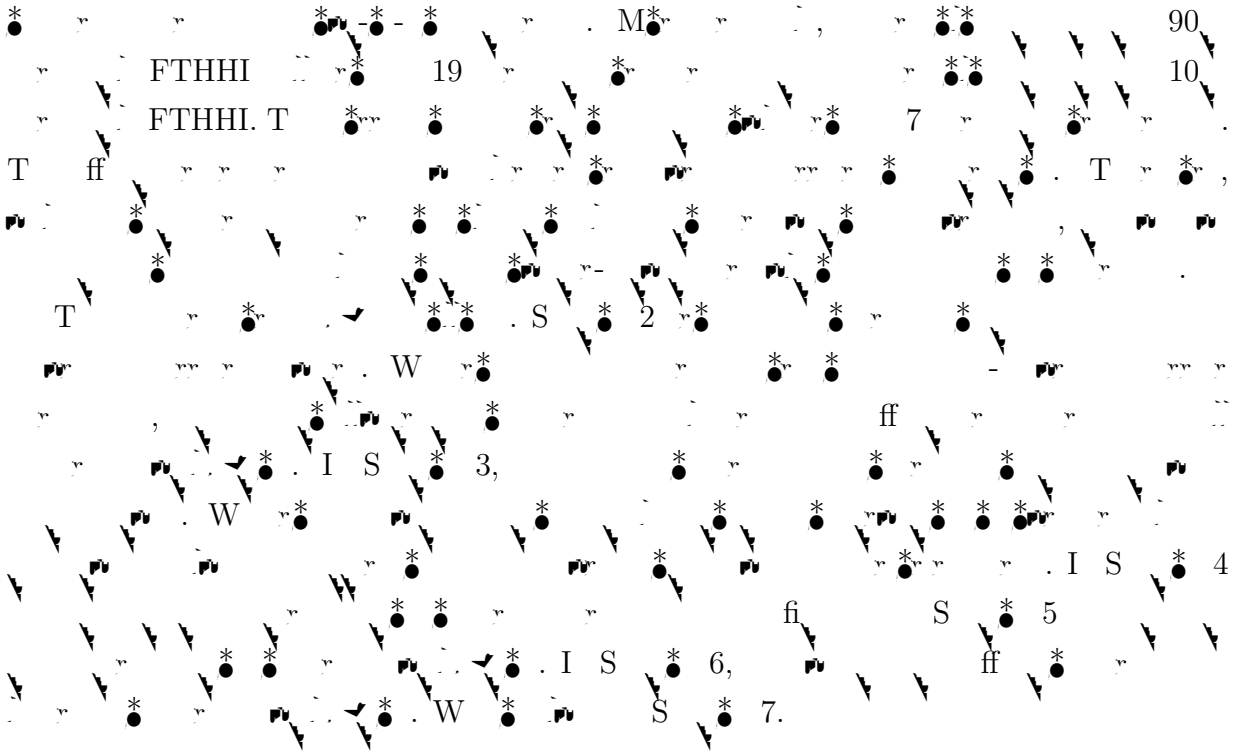


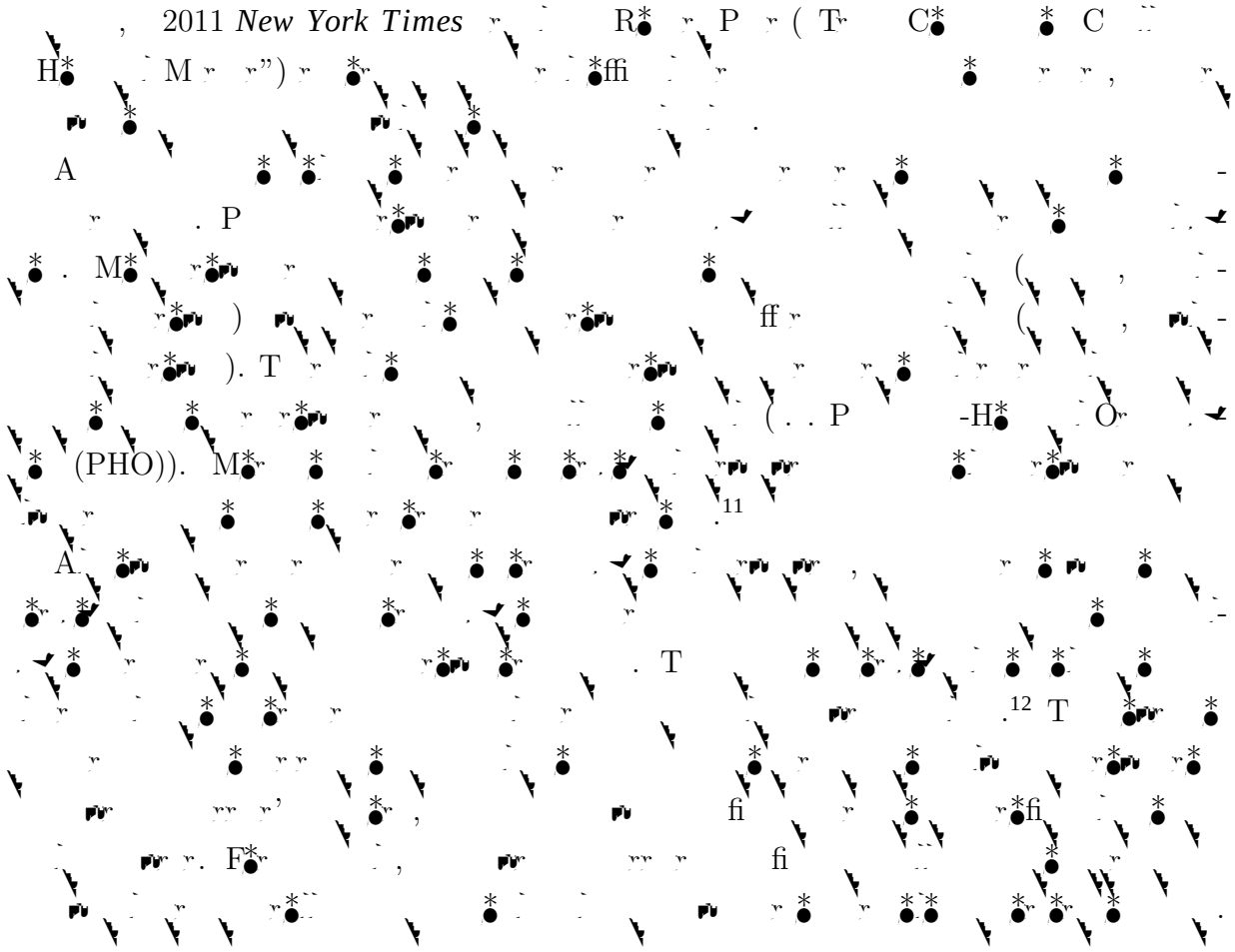


2 Physician and Health Insurance Carrier Organizations

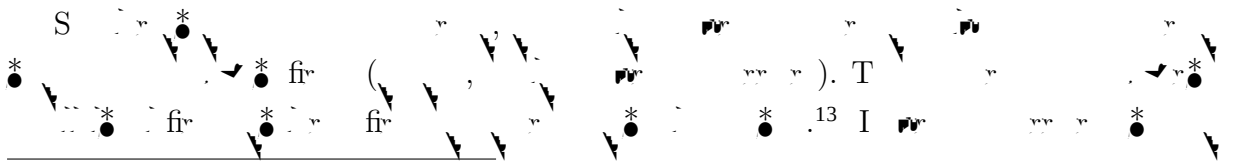
2.1 Physician Organization

T . H , . I 1965 10 , 1991 30 (S (2006)). T 1990 2000 . B , 1996-1997 - fi 40.7 32.5 2004-2005 (L (2007)). T 2010 A C O (ACO).[10] F

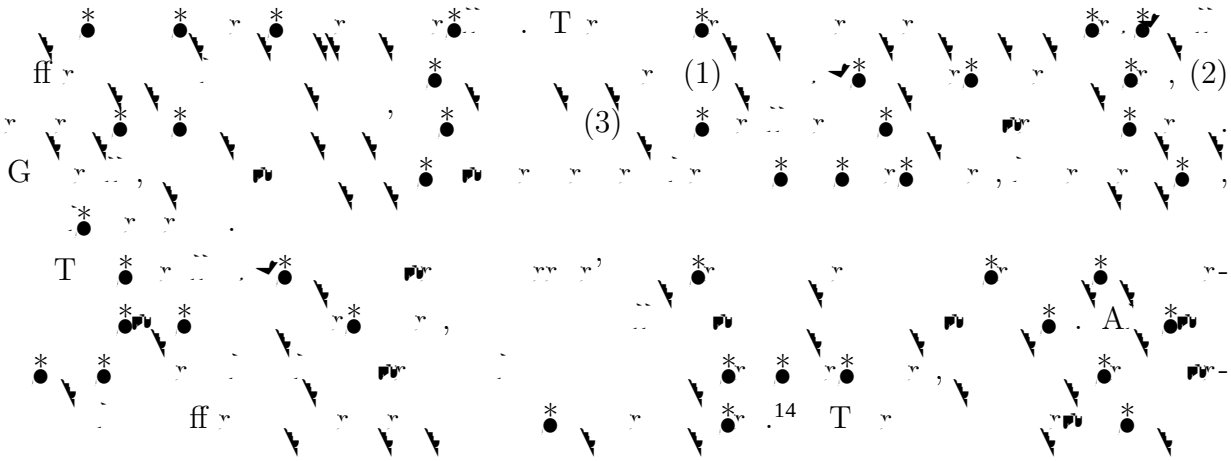
[10] An ACO is a network of providers that share the provision of care to patients. An ACO would normally include both physicians and hospitals and would encourge greater coordination of care among providers through financial incentives.



2.2 Insurance Carrier Organization



[11] For example, 73% of Physician Groups Analyzed (Medical Group Management Association, 2006, p. 34).



2.3 Physician-Insurance Carrier Bargaining

. S fi , , fi , fi . I ," , Q_n^*, .

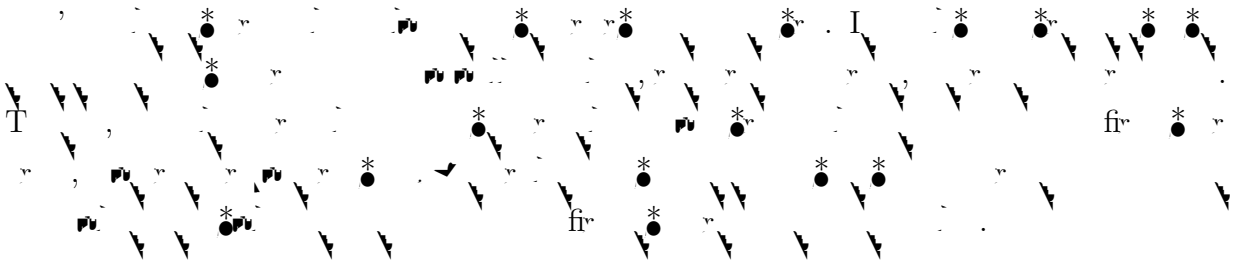
2.3.1 First-Period

A fi , α_n^*, (. . D (2011) D (2010)). S fi , ff fi (, α_n). F , fi , $\alpha_n^* = \alpha$.

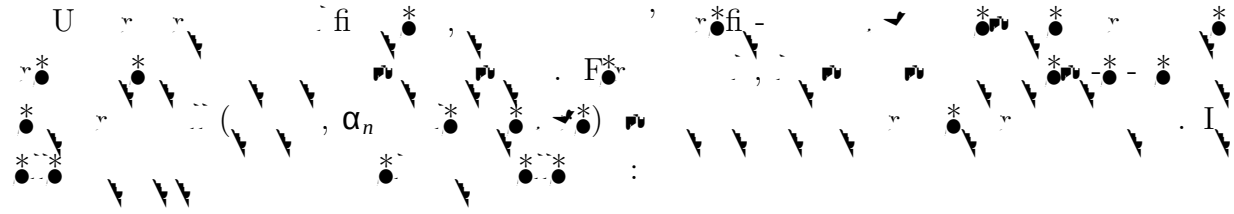
T (,) - . S fi , , Z, . O Z : $Z = \left(\frac{HHI_{phys}}{HHI_{plan}}\right)$, HHI_{phys} HHI_{ins} . T Z, :

Z_1 1) C P , M I C .
Z_2 1) M P , C I C .

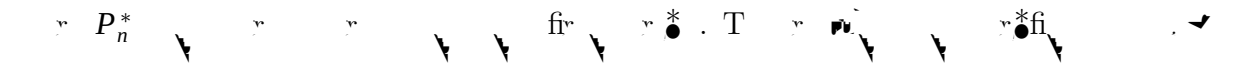
M Z_1 Z_2, . U Z_1 . T $P = (\underline{Q})$, . B , Z_2, . S fi , , $P_n = \frac{V}{}$, . T , ff . T . I , . T ,



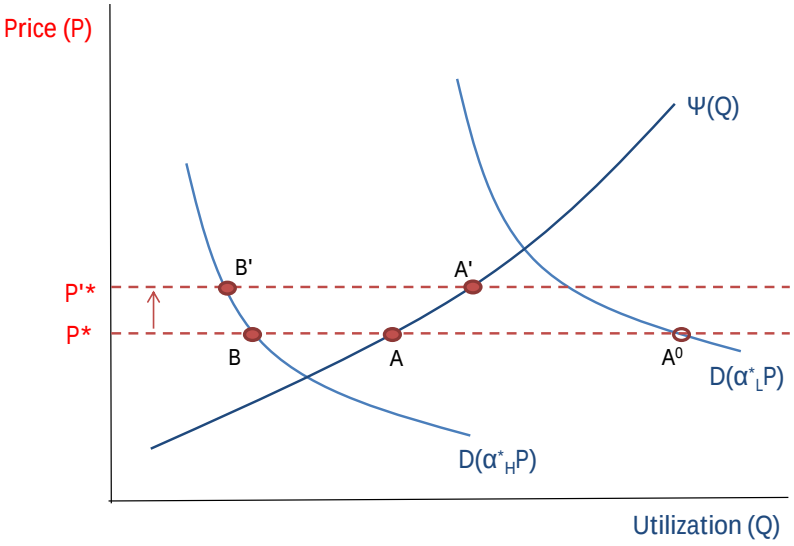
2.3.2 Second-Period



$$Q_n P_n^* \int_{Q}^{Q_n} (s)ds \qquad (1)$$



F r 1: S * -P * U * D *



[illegible]

. T , E (1974), F (1978), D (1988).[25]

3 Data

I , F , M S ® . W - , . S , SK&A© , , fi , , U

T C C E D (ESI)- . E fi ” ; I ff ( ). F , . T ff W M S ’ ” fi fi . S fi , - . M S ® , .[26]

3.1.1 Physician Expenditure of an Episode of Care

T M E G ® (MEG). T , T R , . S ID”, n, .[27] L Γ_n n fi MEG. T n :

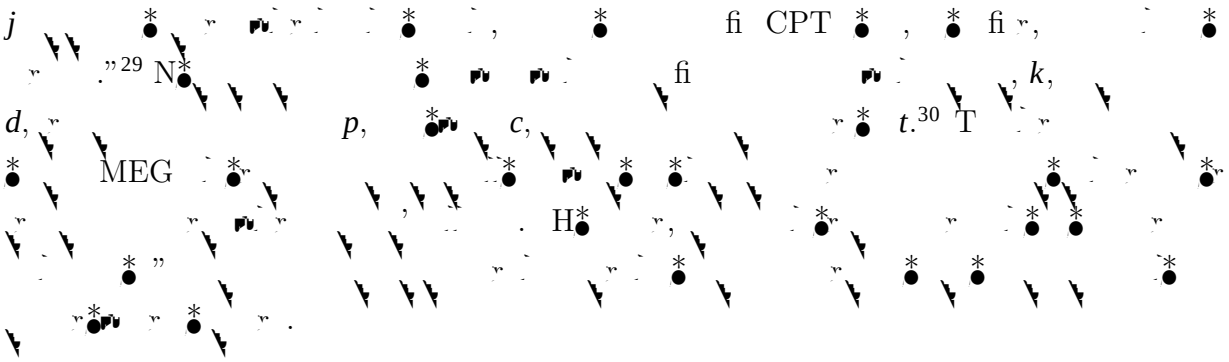
$$TE_n = \sum_{j \in \Gamma_n} p_{jn} \tag{3}$$

p_{jn} (, -) j n.[28] P fi fi M S ® . W

[26] Approximately 3 percent of our sample are capitated episodes. These observations are likely to include closed HMO systems such as Kaiser-Permanente patients.

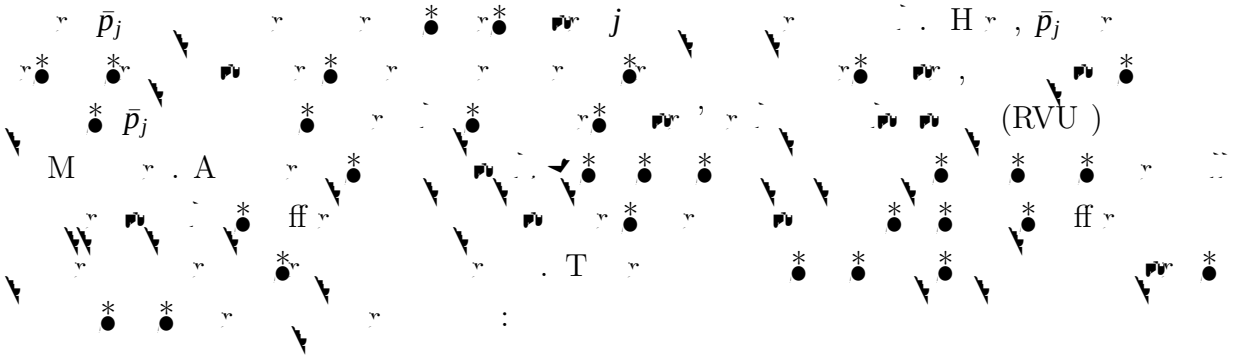
[27] We isolated episodes where the patient sees the same physician for the entire episode of care, however, results were not sensitive to this exclusion.

[28] Note that each episode occurs only once in the data, thus we do not have a panel of episodes.



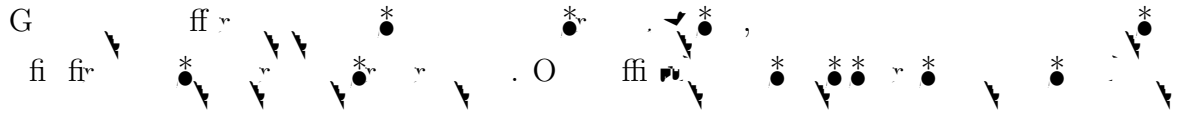
3.1.2 Decomposing the Expenditure of an Episode of Care

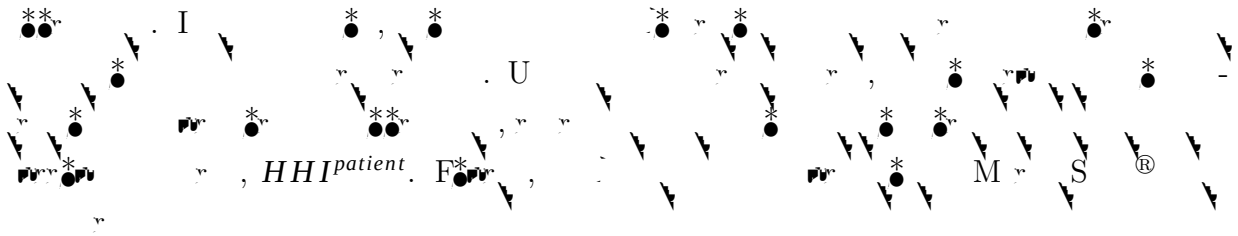
$$Q_n = \sum_{j \in n} \bar{p}_j \tag{4}$$



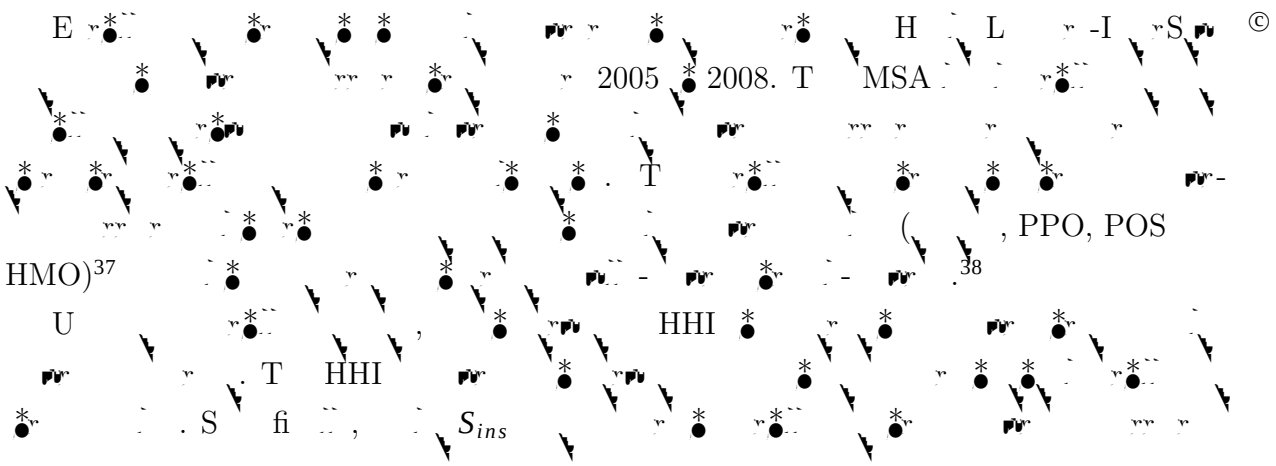
$$\ (TE_n) = \ (Q_n) + \ (P_n) \tag{6}$$

3.2 SK&A c Data





3.3 HealthLeaders-InterStudy[c] Data



[redacted]

4 Estimation of First Period: E ects of Market Power on Service Price and Benefits

[redacted]

4.1 Determinants of Service Price

[redacted]

$$(P_n) = \beta_1 (FTHHI_{phys}) + \beta_2 (HHI_{ins}) + \delta' COST + \kappa' QUAL + \lambda' PAT + \zeta_{at} + \zeta_d + \varepsilon_n: \quad (7)$$

[redacted]

[40] Some of the sources included Census, the American Hospital Associat7.97T4ydata tmerican Mdical-TJ-17.59-1

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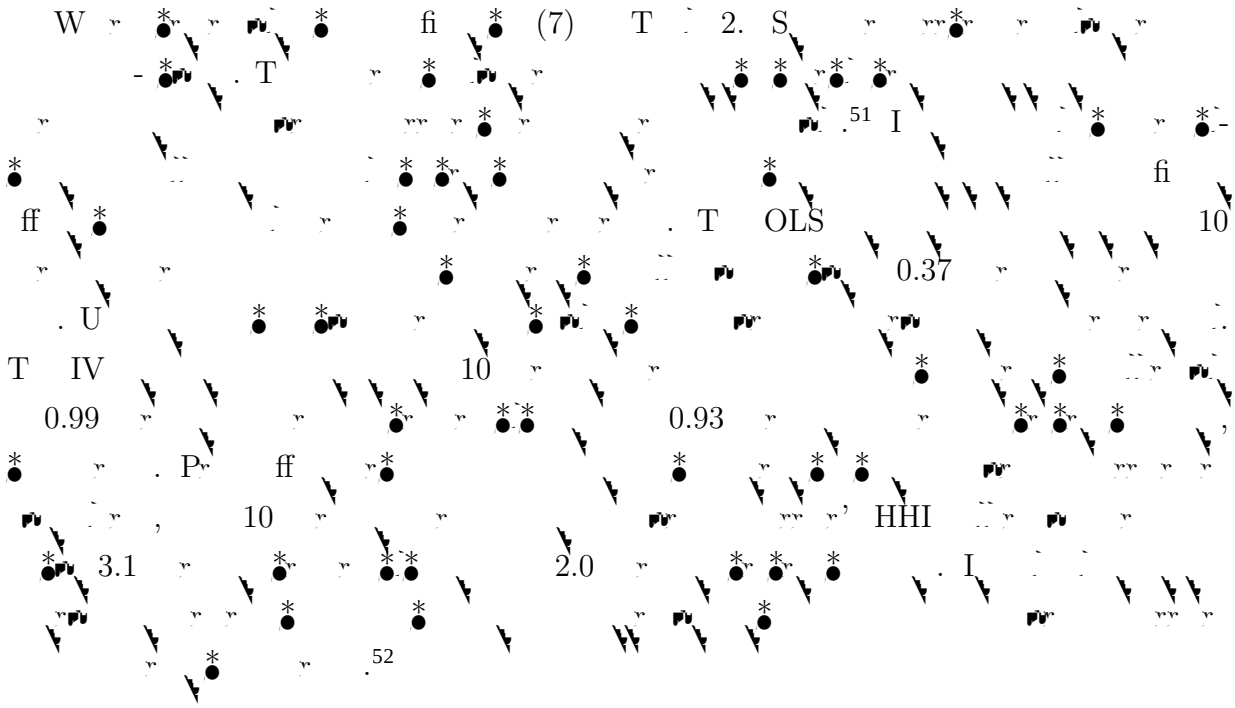
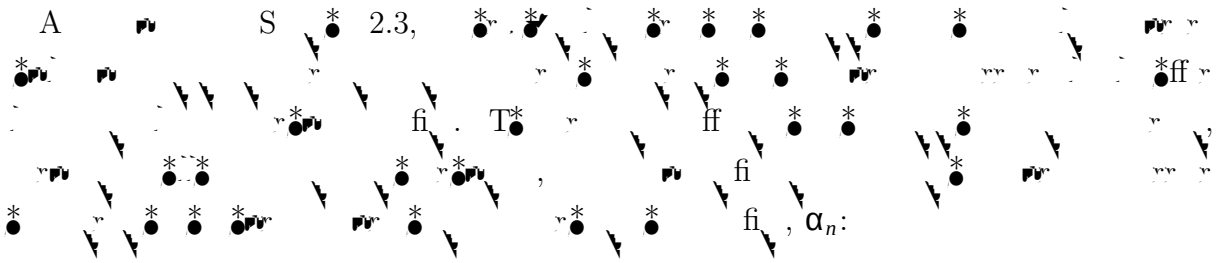
T ` 2: D ,ˇ ˇ S ˇ P ˇ

	OLS		IV	
	C ˇ ˇ	O ˇ ˇ	C ˇ ˇ	O ˇ ˇ
` $(FTHHI_{phys})$	0.037***	0.032***	0.099***	0.093***
	(0.005)	(0.004)	(0.014)	(0.017)
` (HHI_{ins})	0.019**	0.025***	-0.311***	-0.197**
	(0.010)	(0.008)	(0.094)	(0.087)
` $(medval_{phys})$	0.057**	0.064***	0.056***	0.069***
	(0.024)	(0.023)	(0.022)	(0.020)
` $(rent_{phys})$	-0.042	-0.115***	-0.096**	-0.136***
	(0.044)	(0.039)	(0.048)	(0.038)
` $(facwage_{phys})$	0.004	0.017***	-0.001	0.016***
	(0.006)	(0.005)	(0.007)	(0.006)
` $(medinc_{flow})$	-0.032**	0.041***	-0.029	0.065***
	(0.013)	(0.014)	(0.021)	(0.017)
UNIV	0.022**	0.016*	0.013	0.003
	(0.009)	(0.009)	(0.013)	(0.013)
` $(medinc_{pat})$	0.033***	0.015**	0.029***	0.013*
	(0.007)	(0.006)	(0.008)	(0.007)
` $(educ_{pat})$	0.079***	0.163***	0.153***	0.205***
	(0.026)	(0.028)	(0.036)	(0.035)
EPO	-0.034***	-0.037***	-0.032***	-0.025***
	(0.007)	(0.007)	(0.007)	(0.008)
HMO	-0.033***	-0.004	-0.040***	-0.005
	(0.006)	(0.006)	(0.006)	(0.006)
POS	-0.013***	-0.002	-0.017***	-0.004
	(0.005)	(0.005)	(0.005)	(0.005)
PPO	0.005	0.009**	0.001	0.007*
	(0.004)	(0.004)	(0.004)	(0.004)
HDHP	-0.001	0.001	-0.002	0.005
	(0.011)	(0.006)	(0.011)	(0.007)
CDHP	0.033***	0.037***	0.030***	0.038***
	(0.005)	(0.004)	(0.005)	(0.004)
EMPLOYER	-0.004	0.026***	-0.006	0.024***
	(0.009)	(0.005)	(0.008)	(0.007)
O ˇ ˇ	3668963	4135610	3664382	4131612



4.2 Determinants of Benefits



$$\ln(\alpha_n) = \beta_3 \ln(\widehat{HHI_{ins}}) + \lambda' PAT + \zeta_{at} + \zeta_d + \varepsilon_n. \quad (8)$$

and under 65 for the MSA and for the county (four total instruments). No qualitative results changed, however standard errors grew a bit.

[51] We also estimated a different specification of the episode price, P, regression where we used procedure price, p, as the dependent variable while including procedure fixed effects. This specification will be identical to specification (7) if physicians bargain with insurance carriers according to a discount on *all* procedures. That is, if $p = \bar{p}\ \forall\ j$ for some j $j < 1$, then it follows that $\ln(P) = \ln(\frac{jn}{\bar{j}})$, which is equivalent to $\ln(\ )$ as the dependent variable. No results changed using this specification indicating that, on average, physicians likely bargain over their entire fee schedule.

[52] As an alternative to the OLS results, we also estimate the fee regression using county fixed-effects and we obtain a similar coefficient on the physician $FTHHI$ coefficient, although it is slightly lower. The county fixed-effects will control for all factors unique to a provider in a county that are not captured by other variables. Although the county fixed effects make identification more difficult, we are still able to identify competitive effects from the fact that different providers compete in a different fashion for patients in neighboring counties.

(7).[53] H HHI_{ins} fi PAT - - - fi ff , ff , [54] W - fi ff , ζ_{at}. S H-W T 3 β_3 . A , - . S fi , 1.4 α_n 2.2 T ff ff . [55] T fi fi , D (2010) D . (2011) fi fi .

5 Estimation of Second Period: Service Utilization

H fi- fi . A , fi- fi . A fi ff . W , P_n, , - , P_n^{pock}, fi $P_n^{pock} = \alpha_n P_n$.

[53] Results did not significantly change when we limited the instrument set to two variables: the population of the MSA and the unemployment rate of the county. Results under this specification were $_3$ = :20 for orthopedics and $_3$ = :11 for cardiology, both significant at the one percent level.

[54] No results changed when we included the vector $COST$ and the vector $QUAL$.

[55] As far as we are aware, only the recent work of Dafny et al (2011) tests the e ects of health insurance competition on benefits in commercial insurance markets.

T ` 3: D ` B fi S

	C ` O `
` (HHI_{ins})	0.141***
	(0.008)
` $(medinc_{pat})$	-0.025***
	(0.004)
` $(educ_{pat})$	-0.484***
	(0.015)
EPO	-0.429***
	(0.007)
HMO	-0.694***
	(0.003)
POS	-0.586***
	(0.003)
PPO	-0.323***
	(0.003)
HDHP	0.111***
	(0.015)
CDHP	-0.077***
	(0.006)
EMPLOYER	-0.016***
	(0.002)
O `	2974302

	O `
` (HHI_{ins})	0.216***
	(0.006)
` $(medinc_{pat})$	-0.024***
	(0.003)
` $(educ_{pat})$	-0.285***
	(0.011)
EPO	-0.332***
	(0.006)
HMO	-0.520***
	(0.003)
POS	-0.424***
	(0.003)
PPO	-0.214***
	(0.002)
HDHP	0.303***
	(0.012)
CDHP	0.083***
	(0.005)
EMPLOYER	0.026***
	(0.001)
O `	3822689

Notes: The dependent variable is the logarithm of the share of expenditures paid by the patient, ln( ). Both regressions include a dummy variable indicating the patient's gender, a polynomial in the patient's age (i.e. AGE, AGE^2, and AGE^3), a polynomial in the number of co-morbidities, state-halfyear and disease-stage-of-illness fixed e ects. The omitted plan types are \basic medical" and \comprehensive," $BMCOMP$. Huber-White robust standard errors are reported. One, two, and three asterisks indicate significance at the 10-percent, 5-percent, or 1-percent significance level, respectively.

5.1 Determinants of Service Utilization

O fi , -

$$(Q_n) = \gamma_1 \widehat{(P_n)} + \gamma_2 \widehat{(P_n^{pock})} + \delta' COST + \kappa' QUAL + \lambda' PAT + \zeta_{at} + \zeta_d + "_n; \quad (9)$$

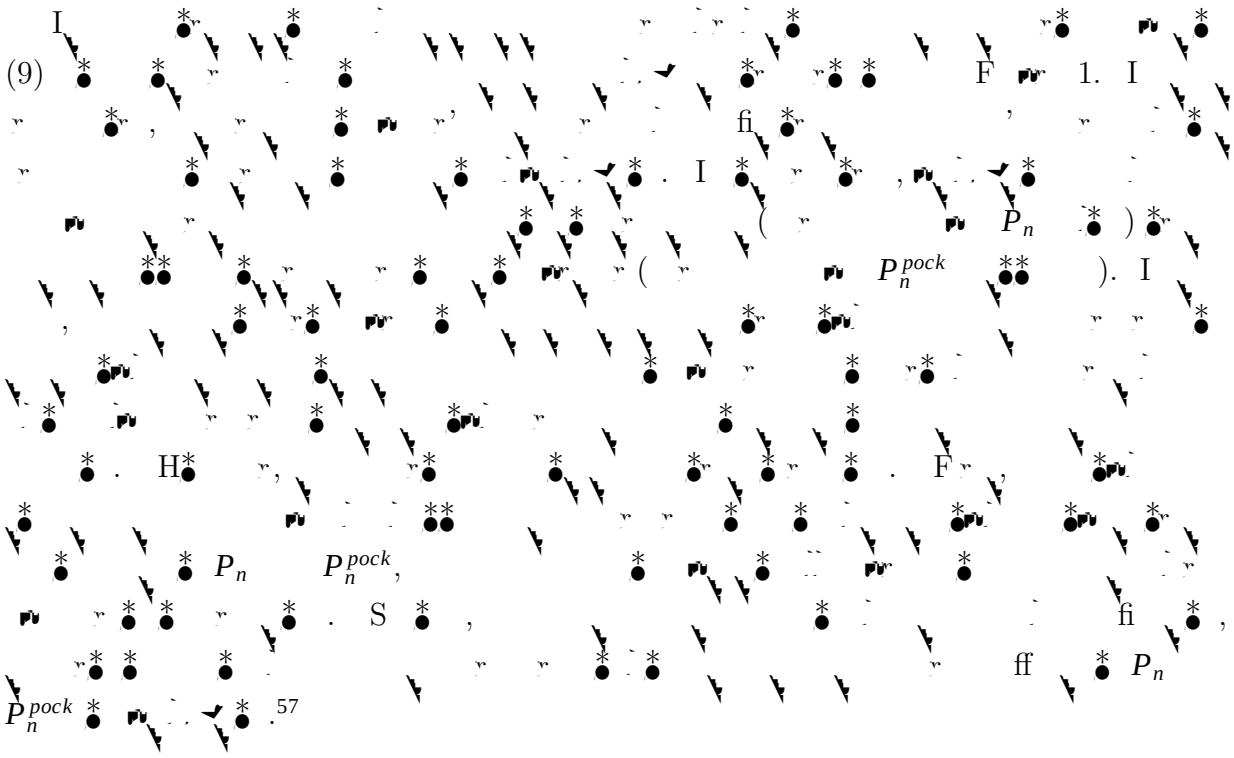
P_n P_n^{pock}. J , . T , P_n, -
P_n^{pock}, .
T ffi γ_1 ff fi -
. T , γ_1 ff , fi , .
. T ffi γ_2
. S fi , γ_2
ff -
, fi .
. T ,
W fi (7), .
COST *QUAL*, .
, *PAT*. A ζ_d - - fi ff ζ_{at}

C85 7.97T 5.47-1.8T [(8)_TJ/F1111.955T 9.811.79T [99

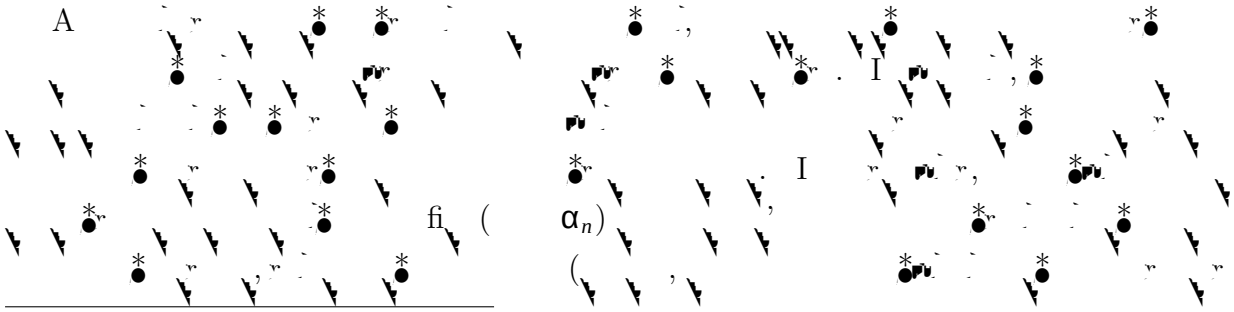
T ` 4: D ` S ` U ` `

	C ` **	O ` *
` $(\widehat{P_n})$	1.127***	0.274***
	(0.153)	(0.068)
` $(\widehat{P_n^{pock}})$	-0.464***	-0.144***
	(0.082)	(0.048)
` $(medinc_{pat})$	0.010	0.029***
	(0.012)	(0.005)
` $(educ_{pat})$	-0.459***	-0.361***
	(0.044)	(0.024)
EPO	-0.092**	-0.063***
	(0.038)	(0.018)
HMO	-0.219***	-0.119***
	(0.058)	(0.025)
POS	-0.220***	-0.067***
	(0.051)	(0.021)
PPO	-0.146***	-0.036***
	(0.028)	(0.011)
HDHP	0.062***	0.073***
	(0.022)	(0.018)
CDHP	-0.030***	0.073***
	(0.011)	(0.007)
EMPLOYER	0.034***	-0.056***
	(0.007)	(0.004)
` $(medval_{phys})$	-0.081***	-0.066***
	(0.011)	(0.008)
` $(rent_{phys})$	0.426***	0.228***
	(0.044)	(0.020)
` $(facwage_{phys})$	-0.033***	-0.017***
	(0.007)	(0.004)
` $(medinc_{flow})$	-0.071***	-0.027**
	(0.021)	(0.011)
UNIV	-0.012	-0.036***
	(0.013)	(0.006)
O ` *	2962919	3798361

Notes: The dependent variable is the logarithm of the utilization of services, ln(Q). All regressions include a dummy variable indicating the patient's gender, a polynomial in the patient's age (i.e. AGE, AGE^2, and AGE^3), a polynomial in the number of co-morbidities, as well as state-halfyear and disease, stage-of-illness fixed e ects. The omitted plan types are \basic medical" and \comprehensive," $BMCOMP$. Standard errors are clustered by disease, provider, and county. One, two, and three asterisks indicate significance at the 10-percent, 5-percent, or 1-percent significance level, respectively.



5.2 Net E ects of a Change in Service Price on Utilization



[57] If a switching model is the correct specification, then the absolute values of the elasticities of individuals and physicians may be greater than the values estimated. In particular, the empirical model averages the elasticities of consumers that are responding to P and those that are constrained by their physician's decision and have a P elasticity of 0.

Although one may be concerned that the empirical model does not precisely conform to the proposed theory, it is worth noting that specification (9) fits closely to a related theory of physician-induced demand where the profit margin of the physician influences the consumer preferences for di erent levels of services. That is, a higher profit margin may cause a physician to induce a patient to seek additional services, as in McGuire and Pauly (1991). However, since the key empirical predictions from either of the two theories are the same (that is, negative e ect on utilization from P and positive e ect from P), empirically distinguishing between these theories may be challenging. More importantly, the policy implications of both theories are very similar, so for many practical purposes it may not matter which of the two theories is the correct one.

T 5: N Eff C S P U

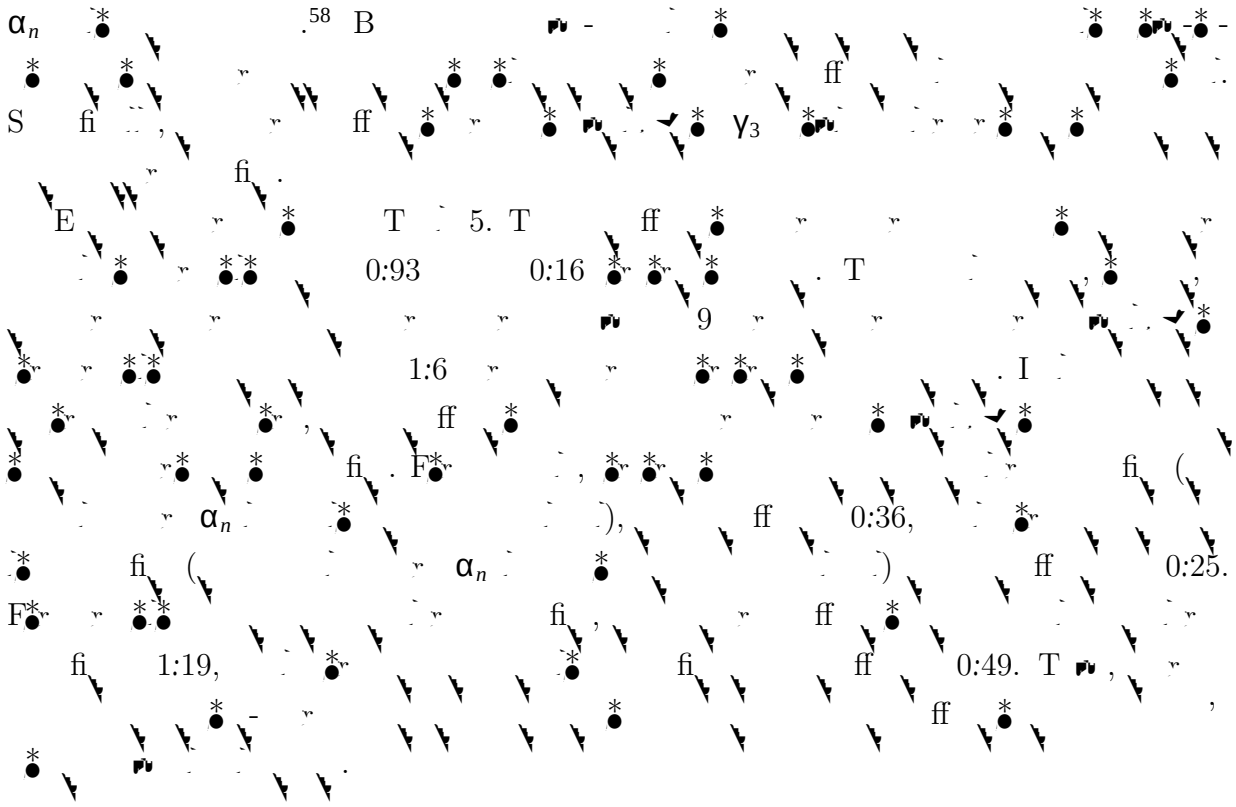
	C			O		
	F S	L α_n S	H α_n S	F S	L α_n S	H α_n S
$\widehat{(P_n)}$	0.925***	1.189***	0.493***	0.157**	0.360***	-0.252***
	(0.153)	(0.172)	(0.173)	(0.066)	(0.079)	(0.069)
O	3669343	1834671	1834671	4133673	2066836	2066836

Notes: The dependent variable is the logarithm of the utilization of services, ln(Q). All regressions include a dummy variable indicating the patient's gender, a polynomial in the patient's age (i.e. AGE, AGE^2, and AGE^3), a polynomial in the number of co-morbidities, state-halfyear and disease/stage-of-illness fixed e ects, as well as variables in the vector PAT, $COST$, and DEM. Standard errors are clustered by disease, provider, and county. One, two, and three asterisks indicate significance at the 10-percent, 5-percent, or 1-percent significance level, respectively.

). I ,
fi (α_n)
(,
). T , ff P_n ff
ff , ff
.
A ff :

$$\widehat{(Q_n)} = \gamma_3 \widehat{(P_n)} + \delta' COST + \kappa' QUAL + \lambda' PAT + \zeta_{at} + \zeta_d + \varepsilon_n; \qquad (10)$$

fi (9), ,
. I γ_3



6 Market Power and Service Provision

. D :

$$(Q_n) = \gamma_1 (P) + \gamma_2 (P^{pock}):$$

P $P^{pock} = \alpha P$, :

$$(Q_n) = \gamma_1 (P) + \gamma_2[(\alpha) + (P)]: \tag{11}$$

N , fi (7) P $FTHHI_{phys}$ HHI_{ins}, fi (8) α HHI_{ins}. T (11) $(FTHHI_{phys})$:

$$\frac{@ (Q)}{@ (FTHHI_{phys})} \quad \beta_1[\gamma_1 + \gamma_2 \tag{12}$$

(11) (HHI_{ins}):

$$\frac{@ (Q)}{@ (HHI_{ins})} \quad \beta_2[\gamma_1 + \gamma_2 + \gamma_2\beta_3: \tag{13}$$

β_1 β_2 $\frac{@\ln(P)}{@\ln(FTHHI_{phys})}$ $\frac{@\ln(P)}{@\ln(HHI_{ins})}$, β_3 $\frac{@\ln( )}{@\ln(HHI_{ins})}$, γ_1 γ_2 $\frac{@\ln(Q)}{@\ln(P)}$ $\frac{@\ln(Q)}{@\ln(P^{pock})}$. N ffi fi (7), (8), (9), . T (12) (13) . A , $\beta_1 > 0$. T *increase* , , ( ) ($\gamma_1 + \gamma_2 > 0$) *decrease* . O , ff fi fi , $\beta_3 > 0$.[59]

T ff - fi , (7):

$$\begin{aligned} (Q_n) &= \phi_1 (\widehat{FTHHI_{phys}}) + \phi_2 (\widehat{HHI_{ins}}) + \delta' COST \\ &\quad + \kappa' QUAL + \lambda' PAT + \zeta_{at} + \zeta_d + "_n: \end{aligned} \tag{14}$$

[59] Plugging in our estimated values of $_1$, $_2$ from (7), $_3$ from (8) and $_1$ and $_2$ (9), we calculate the marginal e ect of physician concentration on service utilization to be 0.07 for cardiology and 0.01 for orthopedics, and for marginal e ect for insurance carriers is -0.27 for cardiology and -0.06 for orthopedics.

T [illegible] 6: M [illegible] S [illegible] S [illegible] U [illegible]*

	C [illegible]**	O [illegible]*
[illegible] $(\widehat{FTHHI_{phys}})$	0.088***	0.017*
	(0.019)	(0.009)
[illegible] $(\widehat{HHI_{ins}})$	-0.395***	-0.114***
	(0.113)	(0.043)
[illegible] $(medval_{phys})$	-0.047***	-0.051***
	(0.012)	(0.008)
[illegible] $(rent_{phys})$	0.370***	0.173***
	(0.037)	(0.019)
[illegible] $(facwage_{phys})$	-0.034***	-0.011***
	(0.009)	(0.003)
[illegible] $(medinc_{flow})$		

[illegible]

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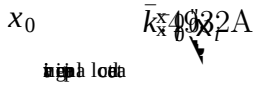


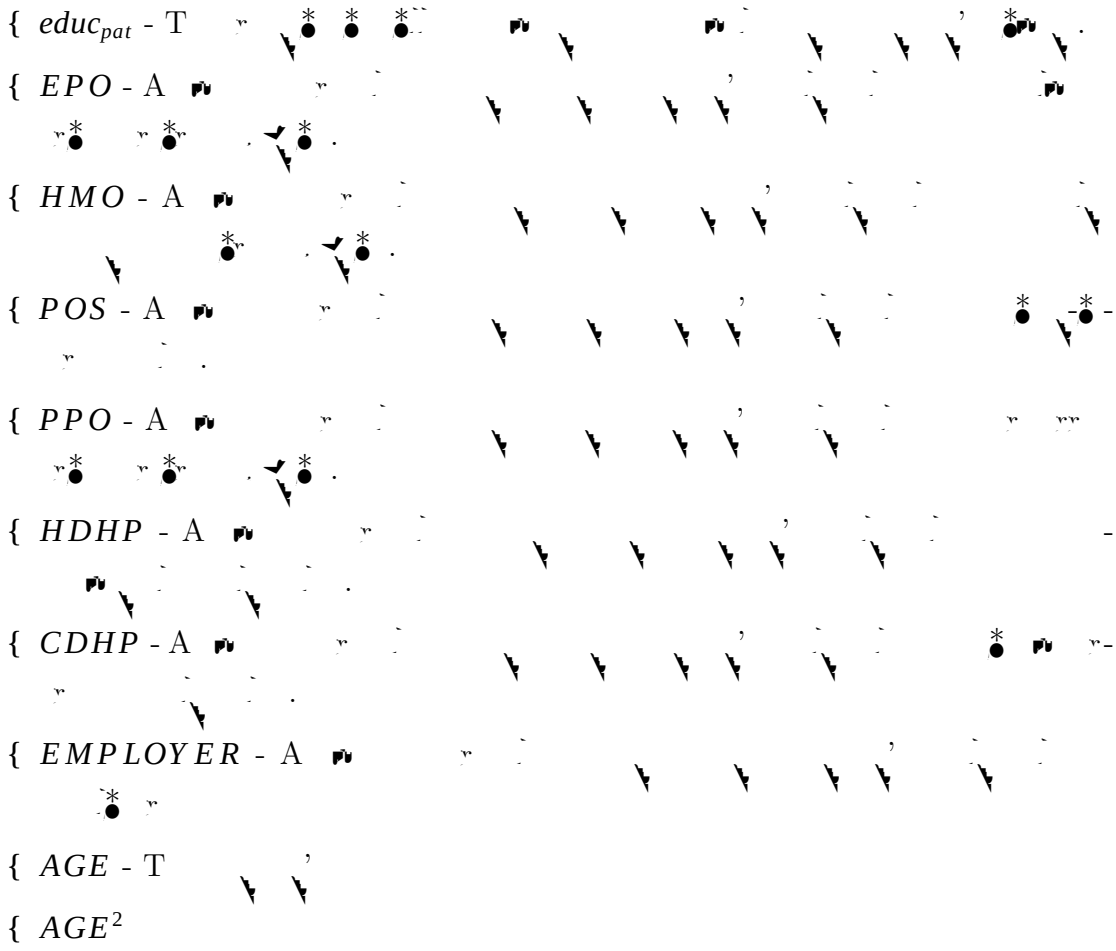
Appendix

A Construction of Fixed-Travel-Time HHI

-325( )2[(, 3[6)-325(-22) -26( )52.91

A SK&A , HHI . T , SK&A . F , h, SK&A , $HHI(x_h) = {}_i S^*_{x_i}(x_h)^2$ $HHI_c = \frac{1}{M_c} {}_{t \in c} HHI(x_h)$ M_c

F , - HHI_c M S ® . S M S ® , - , 3[6 3[6



P C C (*COST*)

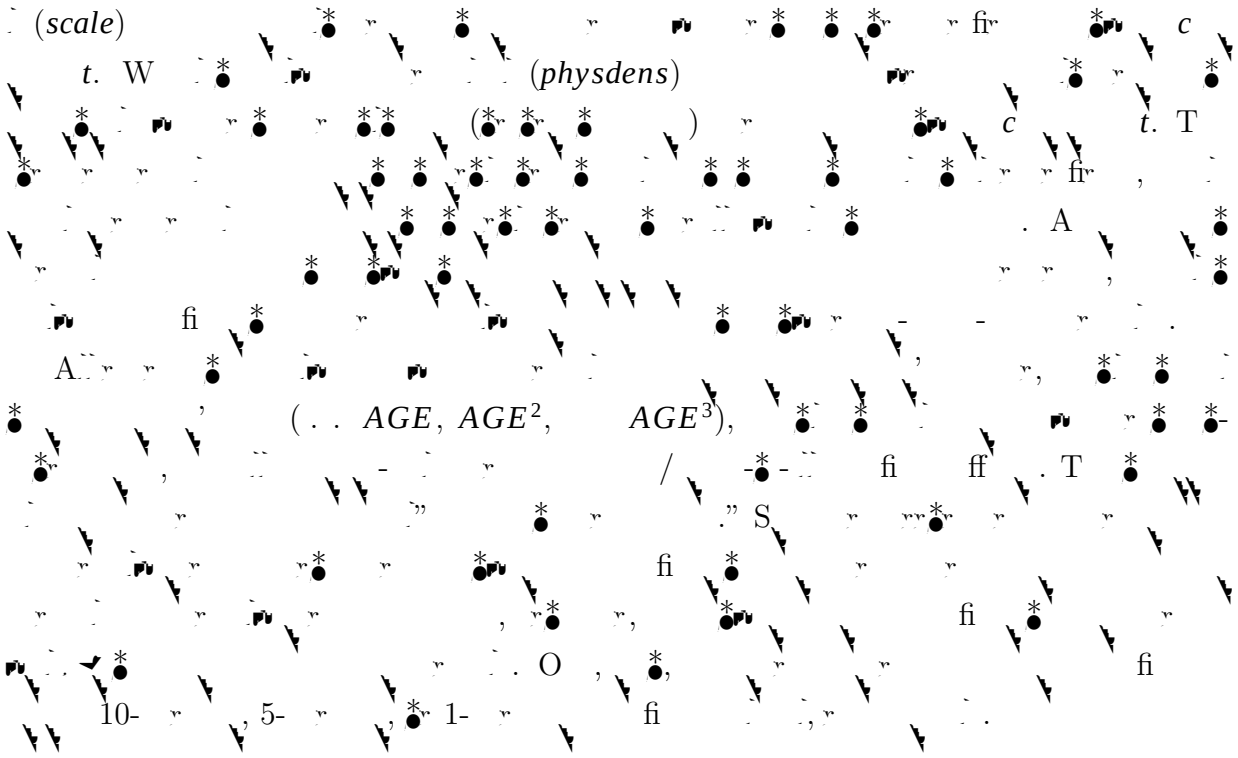
- (*rent*$_{phys}$): T ,
  T A R F .
- (*medval*$_{phys}$): T ,
  . T A R F .
- (*facwage*$_{phys}$): T . T A R F .

I

- (*pop*$_{flow}$) - T - . H ,
  pop$_{flow}$ =

C Estimates of First-Stage Instrumental Variables

	C r		O r	
	$(FTHHI_{phys})$	(HHI_{ins})	$(FTHHI_{phys})$	(HHI_{ins})
(pop_{flow})	-0.016	0.340	1.432**	0.251
	(0.469)	(0.262)	(0.599)	(0.225)
$(pop35_{flow})$	0.671**	-0.172	-1.006***	-0.180
	(0.294)	(0.165)	(0.383)	(0.144)
$(pop45_{flow})$	-1.382***	-0.200**	(T37981111.955T	11588111.9-0.200)



D.1 Robustness: Market Structure on Price

	E [illegible]	C [illegible]	E [illegible]	C [illegible]
	C [illegible]	O [illegible]	C [illegible]	O [illegible]
[illegible] $(FTHHI_{phys})$	0.107***	0.082***	0.114***	0.090***
	(0.015)	(0.016)	(0.015)	(0.019)
[illegible] (HHI_{ins})	-0.304***	-0.161**	-0.288***	-0.233**

D.2 Robustness: Market Structure on Utilization

	E		C	
	C		O	
(*FTHHI*$_{phys}$)	0.099***		0.006	
	(0.021)		(0.009)	
(*HHI*$_{ins}$)	-0.353***		-0.085**	
	(0.113)		(0.042)	
(*scale*)	1T [0**			

	E		C	
	C		O	
	0.145***		0.018*	
	(0.021)		(0.010)	
	-0.181		-0.079	
	(0.126)		(0.053)	

0.145*2Q870T [()**)-21T .398 213.01-45.0

3- 4 398 2**

-0.079