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Regulatory restrictions on selective contracting: an empirical analysis of "any-willing-provider" regulations

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Abstract

"Any-willing-provider" (AWP) laws compel managed care plans to accept any provider willing to accept the plan's terms and conditions, potentially undermining managed care's ability to constrain spending. However, AWP laws potentially respond to inefficient risk-selection by providers of managed care. With risk selection, observed reductions in expenditures in the managed care sector may be offset by increases in the fee-for-service (FFS) sector, with no net decrease. This paper uses panel data on state expenditures to compare per capita spending levels in states with and without AWP laws. The results indicate that expenditures are higher when AWP laws are enacted. Published by Elsevier Science B.V.

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1. Introduction

Managed care health insurance plans have grown substantially over the past two decades, to the point where most privately insured Americans now subscribe to such plans. [1] Although the term 'managed care' masks substantial heterogeneity in the nature of the contrac tual arrangements among providers, subscribers, and insurers, managed care plans as

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[1] According to the American Association of Health Plans 1999 Fact Sheet, HMO enrollment grew from 34.7 million in 1990 to 78.8 million in 1998. For PPOs, the comparable figures are 38.1 and 89.1 million. This represents about 88% of all privately insured Americans (Census, http://www.census.gov/hhes/hlthins/hlthin98/hi98tl.html).

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conventionally defined almost always provide enrollees with some financial incentive to obtain health care services from a limited panel of providers.

Notwithstanding, the rapid growth of selective contracting, this practice appears to have proven unpopular with at least some subscribers (who would prefer fewer restrictions on provider choice) and some providers (who suffer financially when they are not included in managed care provider networks). This discontent has precipitated the enactment of regulations that would limit the ability of insurers to contract selectively. Enacted in numerous states, and proposed in many more, these laws fall into two related categories: "any-willing-provider" (AWP) laws, which compel managed care plans to accept into their networks any qualified provider who is willing to accept the plan's terms and conditions; and 'freedom of choice' (FOC) laws, which obligate plans to reimburse for care obtained from a qualified provider even if the provider is not a member of the network. [2] By one count, 34 states had enacted some form of FOC or AWP law by 1996. [3]

Holding constant managed cares' market share, it is seemingly self-evident that AWP/FOC laws must increase health expenditures, since they appear to undermine a principal instrument by which managed care entities constrain health care spending, and more generally, because they constrain presumptively beneficial voluntary contracting among providers, subscribers, and insurers. It is possible, however, to rationalize AWP/FOC laws as a welfare-improving response to inefficient risk-selection by managed care insurers, a phenomenon that, if uncorrected, could actually increase expenditures in the fee-for-service (FFS) sector.

There currently is little empirical evidence on the effects of AWP and FOC regulations. [4] In this note, I attempt to assess the impact of AWP/FOC laws on annual state-level health care expenditures data, a task that is complicated by the possible endogeneity of the managed care penetration level. I find some evidence that highly restrictive AWP laws are associated with higher health care expenditure levels. Some caution is warranted in interpreting these results, however, as I also find some evidence indicating that managed care penetration levels and expenditure levels are determined simultaneously.

2. Restrictions on managed care: background

The conventional explanation for the replacement of traditional FFS health insurance plans by managed care institutions is well known, and thus, does not require extensive discussion. [5] The traditional FFS (or indemnity) policy reimbursed providers retrospectively on the basis of incurred expenditures, thereby, inducing moral hazard, i.e. physicians prescribe, and consumers purchase, medical services that would not have been purchased were consumers expected to bear the full cost of the treatment. By integrating the health insurance and health care production functions, and linking physician compensation to the

[2] There are also 'direct access laws', which guarantee that managed care subscribers can seek care directly from specialists without a referral from a primary care provider, without losing benefits. Although 11 states now have such laws, they are all of very recent vintage (i.e. 1994 and 1995).

[3] Ohsfeldt et al. (1998, appendix).

[4] A recent review article found that the only evidence on the impact of AWP laws comes from a handful of studies conducted by consulting firms on behalf of large managed care organizations. See Hellinger (1995).

[5] A more thorough analysis is provided in Cutler and Zeckhauser (2000).

Health Maintenance Organizaton's (HMO) financial performance, this moral hazard can be attenuated, thereby, reducing the plan's per capita expenditures. [6]

If HMOs, PPOs, and other managed care organizations successfully address the moral hazard problems inherent in traditional FFS plans, they not only will induce efficient choices by their own providers and subscribers, but potentially in FFS plans as well. This is because of the simple logic of market competition: the loss of market share and profits to managed care entities may compel traditional FFS plans to offer subscribers (or their employers) comparable premium reductions. This will be especially true in market settings where competition among incumbent FFS plans was sufficiently imperfect to allow them to earn rents. Thus, an increase in managed care market share might be expected to lead to (per capita) expenditure (and, therefore, premium) reductions in both the managed care and FFS sectors. Baker and Corts (1996, 1999) call this the 'market discipline' effect.

Although most analyses of managed care have focused on its ability to (efficiently) constrain expenditures through mitigation of moral hazard, several recent contributions have focused on a less desirable consequence, which Baker and Corts term the 'market segmentation' effect. This effect derives from the susceptibility of insurance markets to adverse selection—consumers who expect to be in relatively poor health will tend to prefer health care plans offering generous benefits, while the relatively healthy will have less demand for broad coverage. Since insurers cannot easily identify the riskiness of prospective enrollees ex ante and charge them different premiums to reflect this risk, they might attempt to charge a premium reflecting average risk. But this premium structure would tend to disproportionately attract unhealthy consumers into the generous plan, necessitating further premium increases. [7]

The existence of unobservable heterogeneous risks gives insurers an incentive to identify high risk enrollees, and to price the policy to reflect this risk (when such pricing is possible), and to discourage enrollment when it is not. [8] Some observers (Newhouse, 1996) have suggested that selectively contracting only with those providers who choose to treat a relatively healthy patient mix is one means by which insurers accomplish the latter. It is this behavior that provides an efficiency rationale for AWP laws. If selective contracting is primarily a mechanism by which insurers undertake privately profitable, but socially inefficient risk selection, policies that restrict their ability to contract selectively might reduce this efficiency loss.

If this selection phenomenon is empirically important, the efficiency gains frequently attributed to managed care are overstated. Premium and expenditure reductions in the managed care sector would be offset, at least partially, by increases in the FFS sector. A number of studies have examined the impact of managed care on conventional FFS expenditures and premiums. The evidence does not clearly favor either of the two competing

[6] In addition to the cost and expenditure reductions obtained through attenuation of subscriber and provider moral hazard, the selective contracting aspect of managed care creates efficiencies because the lower administrative and monitoring costs associated with a smaller provider network. Administrative expenses account for approximately 15% of insurance premiums (Cutler and Zeckhauser, 2000, p. 590). The ability to reduce these expenses substantially, therefore, may also constitute a non-trivial source of economic efficiency from limited provider panels.

[7] This can create what Cutler and Zeckhauser (2000, p. 616) term an adverse selection 'death spiral'. This phenomenon arises when there is no equilibrium in which the most generous plan survives.

[8] See Feldman and Dowd (2000) for a general discussion.

hypotheses. Some studies (e.g. Cutler and Sheiner, 1998; Gaskin and Hadley, 1997; Baker, 1997; Zwanziger and Melnick, 1988) found that increases in managed care market shares led to reductions in FFS expenditure levels and/or rates of growth, a result consistent with the 'market discipline' effect. Other studies, however (e.g. Baker and Corts, 1996, 1999; Feldman et al., 1993; McLaughlin, 1987), found that managed care market share growth can lead to higher FFS premiums, a finding consistent with the 'market segmentation' hypothesis.

3. Empirically testing the impact of AWP and FOC regulations

3.1. Model specification

In this section, I assess the effects of AWP and FOC laws on various measures of health expenditures. [9] The basic test of the impact of AWP laws proposed here exploits state-level information on per capita health care expenditures provided by the Health Care Financing Administration (HCFA). HCFA has constructed annual estimates (for 1980–1998) of total health care spending in each state. [10] These expenditure estimates are disaggregated further by expenditure category (e.g. hospital care, physician care). The empirical specification used here is an adaptation of the framework used in Cutler and Sheiner (1998) and Baker (1997). In those papers, various measures of per capita expenditures are regressed on a measure of managed care market share and a set of control variables. I employ a similar specification, modifying it to include variables indicating the presence of AWP/FOC regulations:

$$e_{it} = \alpha_0 + \beta_1 \times \text{HMOSHARE} + \beta_2 \times \text{AWP} + \sum_{i=1}^{N} \gamma_i \times \text{STATE}_i + \delta \times \text{TREND} + \varphi' X_{it} + \varepsilon_{it} \quad (1)$$

where e_{it} equals real per capita health care expenditures (or some individual component of total expenditures, such as hospital expenditures) in state i and year t; HMOSHARE is the HMO market share (estimates of PPO enrollment are not available); [11] AWP is a dummy

[9] There is a paucity of empirical information on the effects of these regulations. These studies are Lewin-VHI (1995); Wyatt (1991); Atkinson (1994). The Atkinson study is an update of the Wyatt study. The Atkinson and Wyatt studies are simulation studies based on proprietary models of managed care providers. The Lewin-VHI study is a regression analysis which estimates the impact of AWP laws on HMO market share, and the impact of HMO market share on per capita health care expenditures.

[10] The expenditure data are described in Levit et al. (1995). A possible drawback associated with the HCFA state expenditure data is that they are based on revenue received by providers, rather than benefits received by residents (Basu et al., 1995). To the extent there is substantial border crossing by consumers of health care, per capita expenditures calculated on 'revenues received' and 'benefits received' bases could differ. HCFA carried out border crossing adjustments for 1991, which appear to have a relatively minor impact on estimated per capita expenditures on physician services and inpatient hospital services (about 1.80 and 0.98%, respectively). For the purposes of this paper, I assume that the 1991 adjustment factors apply to other years as well, and I adjust the data accordingly.

[11] This variable was obtained from InterStudy, which estimates (as of July of each year) HMO enrollment. These estimates have been used in most other studies of managed care, such as Cutler and Sheiner (1998) and Gaskin and Hadley (1997).

variable indicating the presence or absence of an AWP law; $STATE_i$ are state dummy variables; [12] TREND is a linear time trend; and X_{it} is a vector of other control variables related to health care expenditures (e.g. age, race, income, education).

In the basic specification presented above, the effect of AWP laws is captured by the coefficient on a single dummy variable. This representation is too simplistic, as it fails to capture the heterogeneity observed in actual AWP laws. Marsteller et al. (1997, p. 1135) note that none of the existing quantitative studies differentiates among existing AWP or FOC laws in terms of the strength of the restriction. As they note, this is a potentially a serious drawback, since an AWP/FOC law 'can either greatly interfere with regular plan operations or have little effect in practice' (Marsteller et al., 1997, p. 1140). Restrictions on selective contracting can vary across a number of dimensions. First, some laws apply to some classes of health plans (e.g. PPOs) but not others (e.g. HMOs). [13] Second, some laws make it extremely difficult to terminate providers, while in others termination is easy. Third, some laws affect virtually all providers, while others apply to only certain specific categories of providers. [14]

To reflect this heterogeneity in the strength of AWP restrictions, I adopt a classification scheme derived from the descriptive information contained in Marsteller et al. (1997). Marsteller et al. (1997) rank existing AWP/FOC laws ('weak'; 'weak-to-medium'; 'medium-to-strong'; 'strong'), according to three criterias: (1) entities regulated (e.g. all health plans, or just some small subset); (2) range of providers covered and (3) stringency (e.g. do deselected providers have a grievance procedure?). [15] From this classification scheme, I create two measures of AWP strength: 'weak/moderate', equal to 1 if the regulation falls into the 'weak', 'weak-to-medium', or 'medium-to-strong' categories; and 'strong', equal to 1 if the regulation is classified as 'strong'.

A second issue involves the endogeneity of the managed care share and AWP variables. Basic reasoning suggests that managed care penetration is unlikely to be exogenous with respect to expenditure levels; the greatest opportunities for managed care growth are likely to arise when utilization levels are relatively high, a conjecture that has found empirical support in several earlier studies. [16] Similarly, AWP laws might be more likely to be enacted where

[12] Including the state dummies may help control for some of the simultaneity between managed care share and expenditures, as it has been hypothesized (Cutler and Sheiner, 1998) that HMO growth during the 1980s and 1990s was greatest in states with the highest initial levels of per capita spending. The effects of any such cross-sectional differences will be captured in the coefficients on the state dummy variables.

[13] It is important to note that no AWP or FOC law applies to self-insured employee benefit plan because the Employment Retirement Security Act of 1974 (ERISA) prevents states from regulating any employee health plan. Additionally, the Health Maintenance Organizaton Act of 1973 (HMO Act) also preempts certain categories of laws that would restrict the growth of HMOs (Marsteller et al., 1997, p. 1145).

[14] Arkansas's AWP law, for example, applies to a very large class of providers (including physicians, hospitals, osteopaths, podiatrists, pharmacists, long-term care facilities, among many others) and all types of insurance networks (except of course those that are exempted by ERISA), and provides grievance procedures for deselected providers (Marsteller et al., 1997, p. 1140). A much weaker plan is Utah's, which appears to allow plans to impose limitations based on 'reasonable' selection criteria, which include 'substantial objective and economic grounds, or expected use of particular services based upon prior provider–patient profiles' (Marsteller et al., 1997, p. 1141).

[15] For a more detailed discussion, see Marsteller et al. (1997), Table 2.

[16] See, e.g. Welch (1994) and Porell and Wallack (1990).

growth in HMO share has had a substantial impact on provider welfare. This suggests that expenditures, HMO share, and presence of AWP laws might be determined simultaneously. If so, ordinary least squares estimates of Eq. (1) will yield biased and inconsistent parameter estimates. The standard approach to addressing this would be to employ instrumental variables; however, it is highly questionable whether suitable instruments are available here. [17] Rather than attempting to justify the use of invalid instruments, I attempt instead to assess through indirect means whether endogeneity of these variables is likely to be a problem here.

The empirical implementation of Eq. (1) also includes a number of other exogenous determinants of health care expenditures found in previous studies (e.g. McLaughlin, 1987; Baker, 1997; Baker and Corts, 1999) to vary systematically with health care expenditures. These include: percentage of the population aged 65 and up; population growth rate; percentage of the population black; percentage of the population with bachelor's degrees or better; the unemployment rate; real per capita income; the HCFA wage index; and the percentages of total employment in the following categories: government, agriculture, construction, manufacturing, transportation and public utilities, retail trade, and wholesale trade.

3.2. Parameter estimates

The parameters of Eq. (1) are estimated using state-level annual data for the 1983–1997 period using a generalized least squares procedure that corrects for first order autocorrelation. [18] Table 2 presents a series of regression results, corresponding to three different dependent variables, all calculated on a per capita basis: real total health care expenditures; real total physician services expenditures; and real total hospital care expenditures. [19] I estimate first a model (see Table 2, panel (A), columns (1)–(3)) in which expenditures are a simple additive function of the controls (see Table 1 for a complete list), HMO share, the two AWP regulatory dummy variables, state fixed effects, and a single linear time trend. [20] The coefficients from this model specification suggest that while one cannot reject the null hypothesis that 'weak' or 'moderate' (WEAK) AWP laws have no effect on health care expenditure levels, 'strong' (STRONG) laws are associated with substantially higher total spending levels (see column (1)), a result that is significant at the $p = 0.05$ level. Both the hospital (column (2)) and the physician (column (3)) components of total spending are also substantially higher in the presence of 'strong' AWP laws, although only the former result is significant ($p = 0.10$) at conventional levels of significance.

[17] A few recent studies (Baker, 1997; Baker and Corts, 1999) of the relationship between managed care penetration and expenditures have attempted to develop instruments for managed care penetration, but the plausibility of these instruments is dubious. And as Bound et al. (1995) have shown, estimates derived using poor instruments may perform worse than OLS.

[18] The estimation procedure assumes a common autocorrelation coefficient across states.

[19] As Cutler and Sheiner (1998, p. 79) found, managed care might shift expenditures from one category to another (e.g. procedures might be shifted from hospitals to physicians' offices).

[20] For brevity, I show only the coefficients on the AWP and HMO variables. The full set of coefficient estimates is available upon request.

Table 1
Descriptive statistics

	Description	Mean	Minimum	Maximum
WEAK	State has weak AWP/FOC law	0.06	0	1
STRONG	State has strong AWP/FOC law	0.048	0	1
HMOSHARE	HMO penetration rate	10.68	0	49.33
Pchealth	Per capita total health expenditure	2917.03	1528.06	4616.94
Pchosp	Per capita hospital expenditure	1211.81	660.15	1814.14
Pcmd	Per capita MD expenditure	809.03	337.75	1310.46
Pcrx	Per capita Rx expenditure	115.74	49.48	239.17
Black (%)	Proportion population black	9.6	0.24	36.38
65%+	Proportion population 65+	12.29	2.91	18.56
BA_degree (%)	Proportion population BA degree	20.84	11.1	33.5
Govt_employee (%)	Proportion workforce government	17.58	0	31.31
Agric_employee (%)	Proportion workforce agriculture	1.03	0	6.60
Const_employee (%)	Proportion workforce construction	4.75	0	9.71
Manu_employee (%)	Proportion workforce manufacturing	16.99	3.1	32.91
Trans_employee (%)	Proportion workforce transportation/ public utility	5.23	2.37	9.4
Ret_employee (%)	Proportion workforce retail trade	18.61	3.6	22.9
Ws_employee (%)	Proportion workforce wholesale trade	5.43	3.2	11.52
Unemploy_rate	Unemployment rate	6.21	2.2	18
Income	Real per capita income	22032.53	13629.16	36827.5
Wage_index	HCFA wage index	8608.92	6577	14878
Growth	Population growth rate	0.009	−0.39	0.09
Density	Population density	165.87	0.86	1085.62

Columns (4)–(6) of Table 2, panel (A), relax the assumption of a single linear time trend, and instead allow for state-specific time trends. [21] The resulting coefficient estimates continue to indicate that 'strong' AWP laws are associated with increased levels of total health spending, although the magnitude of this effect (US$ 38 versus 52), and its significance level ($p = 0.10$), are smaller compared to the results obtained with a common trend. The bigger changes occur in the hospital and physician expenditure equations (columns (5) and (6)). Here, the coefficient on STRONG in the hospital equation falls substantially (from US$ 25–14), as does its significance level (from $p = 0.09$–0.31). By contrast, the coefficient on STRONG in the physician services equation increases considerably (from US$ 17–23), and is now statistically significant ($p = 0.08$). This result is consistent with anecdotal evidence that the principal constituency for AWP laws are physicians, not hospital owners. [22] When AWP laws are enacted, the results in column (6) suggests the primary beneficiaries may be high cost physicians who are admitted into what otherwise would be lower cost physician networks.

The estimates in Table 2, panel (A) also suggest, consistent with earlier research (Cutler and Sheiner, 1998; Baker, 1997), that HMO share growth is associated with

[21] We reject the null hypothesis of a common trend at the $p < 0.001$ significance level.

[22] See, e.g. 'Florida Effort Would Let More Doctors Into Managed Care', Business Insurance, 23 September 1996, p. 30.

Table 2
Per capita expenditure equations and annual data, 1983–1997 (t-statistics in parentheses)[a]

	Total health expenditures[b] (1)	Hospital expenditures[b] (2)	Physician expenditures[b] (3)	Total health expenditures[c] (4)	Hospital expenditures[c] (5)	Physician expenditures[c] (6)
(A) Includes HMO share						
WEAK	2.68 (0.19)	5.98 (0.74)	−7.77 (−1.06)	−14.19 (1.22)	−7.13 (−0.96)	−9.82 (−1.42)
STRONG	52.39* (2.07)	24.80^{+} (1.70)	16.93 (1.29)	38.62^{+} (1.79)	14.18 (1.02)	22.81^{+} (1.77)
HMOSHARE	−3.80** (−4.23)	−3.18** (−6.14)	−0.83 (−1.78)	−4.51** (−5.91)	−3.31** (−6.84)	−1.35** (−2.97)
(B) Excludes HMO share						
WEAK	5.12 (−0.36)	7.74 (0.94)	−7.11 (−0.97)	−10.79 (−0.94)	−4.43 (−0.60)	−9.09 (−1.31)
STRONG	49.73* (1.96)	22.14 (1.49)	16.59 (1.26)	32.57 (1.54)	9.88 (−0.72)	21.11^{+} (1.64)

[a] Parameters estimated with GLS procedure assuming common autocorrelation coefficient across panels. Sample size: $N = 50$, $T = 15$. Other control variables: black (%); 65+ (%); BA_degree (%); government_employee (%); agric_employee (%); const_employee (%); manu_employee (%); trans_employee (%); ret_employee (%); ws_employee (%); unemploy_rate; income; wage_index; growth; density.

[b] Includes state fixed effects and common time trend.

[c] Includes state fixed effects and state-level time trends.

$^{+}$ Significant at $p < 0.10$.

* Significant at $p < 0.05$.

** Significant at $p < 0.01$.

economically and statistically significant reductions in total health care expenditures.[23] These estimates are generated under the maintained hypothesis that managed care share is exogenous, notwithstanding the possible invalidity of this assumption. For example, as Cutler and Sheiner (1998) argue, it is plausible that managed care growth rates were highest in those states where initial expenditure levels were highest. Indeed, similar arguments could be made about AWP regulations—for example, it is plausible that the presence of these laws might be determined in part by a state's recent experiences with health care expenditures.

The natural approach to addressing possible endogeneity problems would be to use instrumental variables, provided suitable instruments could be found.[24] It is difficult, however, to conceive of variables that plausibly are determinants of HMO membership or AWP laws, but not health care spending behavior.[25] Because of this difficulty in obtaining defensible instruments, it is important to attempt to assess the severity of any simultaneity bias through some alternative means.

As a first pass at this, I simply re-estimate Eq. (1) using the original additive specification (i.e. the specification used in Table 2, panel (A)), but omitting the managed care share variable. These estimates are presented in Table 2, panel (B). As in panel (A), these regressions are estimated with both a common trend and with state-specific trends. Comparing the results contained in panel (B) with those in panel (A), one sees that although the omission of the managed care variable reduces slightly both the economic and statistical significance of the estimated coefficients on STRONG, the basic effect is fairly robust to this change in specification. In particular, the coefficient on STRONG is positive in both physician expenditure regressions; it is statistically significant ($p = 0.10$) in the regression with state-level time trends.

An alternative approach is provided by Gruber and Hanratty (1995) and Friedberg (1998). Here, I create dummy variables set equal to 1 in the year preceding enactment of a 'weak' or 'strong' AWP law. If the direction of causation in the AWP-expenditure relationship is from the former to the latter, then the coefficient on the lead variable should equal zero. If high levels of expenditures prompt the enactment of AWP laws, then the lead term coefficient should be positive. I also include in this equation a lead term for HMOSHARE. If, as seems possible, high expenditure current levels lead to high (future) managed care penetration, we

[23] Although previous research appears to have established that managed care is associated with lower health care expenditures, not all of these studies are clear about the mechanism by which these reductions are achieved. As noted by Cutler and Sheiner (1998, pp. 82–83), managed care programs can curtail expenditures either through 'one-time' reductions—for example, reductions in the fees paid to physicians, or reductions in hospital lengths-of-stay — or through 'ongoing' reductions—related, for example, to the rate at which new medical care technologies are adopted (see Baker and Phibbs, 2000; Baker, 2000). Conceivably, the success of managed care in states such as California reflects 'one-time' reductions that cannot be sustained. If so, presumably this would imply that any attenuation of managed cares' ability to reduce expenditures brought about by AWP policies is also of a one-time nature. To differentiate between these possibilities, I estimate a version of Eq. (1) in which the dependent variables are defined as the annual growth rate of real per capita expenditures (i.e. $\log(e_{it}/e_{i(t-1)})$). The resulting parameter estimates (available upon request) suggest that the expenditure-increasing effects of strong AWP laws may be of a one-time nature, although it must be noted that most of these 'strong' laws are of a fairly recent vintage, and there may be insufficient data points to accurately estimate any effects the laws might have on expenditure trends.

[24] See, e.g. Baker and Corts (1999) for such an attempt.

[25] As Bound et al. (1995) show, using poor instruments can be a worse estimation strategy than using no instruments.

Table 3
Per capita expenditure equations and annual data, 1983–1996 with lead terms for AWP laws and HMO share (t-statistics in parentheses)[a]

	Total health expenditures[b] (1)	Hospital expenditures[b] (2)	Physician expenditures[b] (3)	Total health expenditures[c] (4)	Hospital expenditures[c] (5)	Physician expenditures[c] (6)
WEAK	15.33 (0.81)	14.55 (1.36)	−10.20 (−1.01)	−11.10 (−0.68)	−1.09 (−0.11)	−12.62 (−1.27)
WEAK(+1)	14.72 (1.05)	9.62 (1.21)	−0.96 (−0.13)	2.45 (−0.20)	3.05 (0.42)	−3.33 (−0.45)
STRONG	51.45 (1.57)	33.32^{+} (1.80)	4.94 (0.28)	36.04 (1.20)	13.19 (0.73)	20.25 (1.11)
STRONG(+1)	2.01 (0.08)	9.33 (0.67)	−10.40 (−0.78)	−8.38 (−0.38)	−0.68 (−0.05)	−6.40 (−0.48)
HMOSHARE	−3.64** (−3.49)	−2.96** (−4.99)	−0.82 (−1.45)	−4.79** (−5.33)	−2.92** (−5.40)	−1.84** (−3.37)
HMOSHARE(+1)	−3.18** (−3.49)	−2.54** (−4.90)	−1.08* (−2.18)	−4.41** (−5.57)	−2.97** (−6.24)	−1.81** (−3.77)

[a] Parameters estimated with GLS procedure assuming common autocorrelation coefficient across panels. Sample size: $N = 50$, $T = 14$. Other control variables: black (%); 65+ (%); BA_degree (%); government_employee (%); agric_employee (%); const_employee (%); manu_employee (%); trans_employee (%); ret_employee (%); ws_employee (%); unemploy_rate; income; wage_index; growth; density.

[b] Includes state fixed effects and common time trend.

[c] Includes state fixed effects and state-level time trends.

$^{+}$ Significant at $p < 0.10$.

* Significant at $p < 0.05$.

** Significant at $p < 0.01$.

would expect to find that future HMO shares would be positively correlated with current expenditures.

The results from this specification are shown in Table 3. They provide little evidence of AWP law endogeneity—in none of the equations are the coefficients on the lead term of an AWP variable statistically different from zero. The same is not true of the lead value of HMOSHARE, however; its coefficient tends to be large (in absolute value) and significantly different from zero, a finding consistent with the possibility that HMOSHARE is endogenous. The signs of these coefficients are inconsistent, however, with the theory that high current expenditures lead to high future managed care shares—in three of the four equations we find a negative (and statistically significant) coefficient on the future HMO share variable.

4. Conclusion

Previous research on the relationship between managed care penetration and expenditure levels has yielded mixed evidence on the extent to which this growth will result in market segmentation or market discipline. None of this research has taken into account the impact of regulations that attenuate the ability of managed care entities to contract selectively with providers. In this paper, I have done so explicitly, controlling not only for the presence or absence of such regulations, but also the 'strength' of such constraints. This paper's basic finding—that HMO growth reduces health care expenditures, and that AWP laws attenuate this effect—is broadly consistent with earlier research on managed care. The economic magnitude of the AWP effect is robust across the various empirical specifications, and is statistically significant in most. Perhaps most interesting is the indication that AWP laws may have had a larger impact on physician expenditures than on hospital expenditures. Previous research into the relationship between managed care and the individual components of health expenditures found that managed care reduced hospital expenditures, but may have actually increased physician expenditures. By contrast, my results suggest that managed care has reduced both the hospital and physician components of health care spending, and that a principal effect of AWP laws is to mitigate this latter effect. This is an interesting possibility that invites further research.

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