Does the 340B Program Encourage and Reward Non-Profit Hospital Consolidation?

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Introduction

- Hospitals are the largest contributor to rising health care costs in the US.[1] Hospital consolidation is well understood to drive higher prices for commercially insured patients (which comprise about 70% of all hospital revenue)[2] and to increase overall healthcare spending.[3] Policymakers show keen interest in hospital consolidation and potential intersections with the 340B Drug Pricing Program.*
- Prior research has noted that 340B and consolidation might be related, because the opportunity to participate in 340B might add significantly to the opportunity presented by hospital mergers or system affiliation.[4]
- Studies have shown that hospitals that undergo a full change of ownership are more likely to be 340B hospitals[4] and that 340B drug margins are higher in more consolidated markets.[5] Our research defines hospital mergers to include occasions when hospitals join new systems, and seeks to shed new light on the links between the 340B Program and hospital consolidation by examining the relationship between 340B participation and market share, consolidation and subsequent hospital operating profits after controlling for other hospital characteristics, including payer mix, commercial prices, and other key factors.
- If 340B creates additional incentives to consolidate—or if consolidation creates additional opportunities to profit from 340B—then it is likely that 340B is exacerbating the well-known impact of consolidation on hospital prices and consumer welfare. Policymakers should determine whether such effects are aligned with the 340B Program's stated goals.

*The 340B Program requires drug manufacturers to provide steep discounts on outpatient drugs to certain, specified safety net providers (known as covered entities, and specifically enumerated in the statute). Congress established the 340B Program in 1992 with the limited purpose to restore discounts manufacturers had traditionally provided to safety net providers before enactment of the Medicaid Drug Rebate Program, while protecting against duplicate discounts and diversion.[6] The Program has grown exponentially in recent years, becoming the second largest federal prescription drug program after Medicare.[7]

Hypotheses

- We hypothesize that 340B participation and hospital operating margins might be entwined in three ways:
  1. Hospitals may be more likely to *participate in* the 340B Program when they are in a health system with greater market share, considering that consolidation can present opportunities for:
     a) managing where patients receive their care (which might help a hospital maintain hospital eligibility by meeting statutorily defined disproportionate share hospital [DSH] requirements),
     b) maximizing the benefits of participation (through greater patient reach);
  2. 340B hospitals may have higher profit *margins* reflecting these opportunities, especially if they have recently changed systems;
  3. Hospitals with more significant *outpatient revenues* (as a share of total revenues) may have greater opportunity to profit from 340B, because 340B profits are based on outpatient activities.

Data

- For our model, we gathered data on hospital participation in the 340B Program from the HRSA OPAIS database[8] and collected overall hospital data from the RAND hospital database,[9] which is a cleaned version of annual cost reports that hospitals are required to file with the Centers for Medicare & Medicaid Services. This data set comprises 2,226 non-profit hospitals for 2023 where data on health system participation was also available.
- Each hospital was assigned to a health system (if a hospital is not in a multi-hospital system, it is a system of 1). Within each hospital's Metropolitan Statistical Area (MSA), we calculate overall health system market share for the hospital's system. For years 2017–2022, we determined whether a hospital changed systems and created a "merger" indicator variable to capture whether a hospital had at least one merger over the period.
- For the profitability model, we also gathered overall commercial hospital pricing data from Hospital Pricing Specialists and used it to create a hospital price index capturing relative negotiated commercial prices for core hospital and inpatient and outpatient procedures.[10] This narrowed the dataset to 1,336 hospitals for which both pricing data and other data fields were available.

Methods

- We estimated a probit regression for a hospital's 2023 340B participation as a function of its earlier (2017) 340B participation, system market share, merger activity over the prior five years, hospital size, outpatient revenue share, and commercial revenue share (plus interaction terms). We included state-level fixed effects to control for state-specific factors that might influence 340B participation (e.g., Medicaid program characteristics). Coefficients in **Tables 1** and **2** are the marginal estimates calculated from probit results. The coefficients in such a regression indicate the change in probability of 340B participation in 2023 that is associated with each characteristic holding a hospital's prior participation constant.
- We separately estimated 2023 hospital operating margins as a function of recent merger activity, current 340B participation, and standard factors that likely impact profitability such as system market share, outpatient revenue share, commercial revenue share, DSH adjustment percentage, and negotiated commercial prices. We included interaction terms and state-level fixed effects. As is standard, regression results show relationships but do not imply causality.
- We illustrated 340B's potential impact for merged and non-merged hospitals across three illustrative hospital archetypes, and applied the coefficients to the means for all independent variables in each of the archetypes.

Results

A. Consolidation and 340B Participation

Key Results from Table 1. Probability of 340B Participation in 2023: Larger Hospitals (≥228 Beds)

- **Table 1** illustrates the influence of various factors on the probability of 340B participation in 2023. This analysis specifically examines the top quartile of hospitals by bed size, referred to in this subsample as 'larger' hospitals, to contrast these results with those from the full hospital dataset (Table 2).
- Larger hospitals in systems with higher local market share have a higher chance of participation, holding other factors (including prior participation) constant (line 2). Note that 54% of hospitals in our data set participated in 340B in 2023; the coefficients imply that a 20-percentage point increase in system market share (e.g., from 40% to 60% share) is associated with an increase in the chance of participation by 7.6% (20% * 0.37914). Importantly, this effect does not apply for hospitals that previously participated in 2017.
- Separately, larger hospitals with a merger in the prior five years are associated with an 8.6% higher chance of participation, independent of prior 340B participation (line 4).
- Hospitals with greater outpatient revenue share have a higher chance of participation (line 8); a 10-percentage point increase in outpatient revenue share is associated with a 5.7% higher chance of participation.

Table 1. Probability of 340B Participation in 2023: Larger Hospitals (≥228 Beds)

Variable	Coefficient	t-statistic	*P* value
1. 2017 340B Status (participation = 1)	0.93736	15.58	<0.001
2. 2023 Hospital system market share	0.37914	6.90	<0.001
3. 2023 System share × 2017 340B status	−0.39153	−4.91	<0.001
4. Merged 2017–2022 (merged = 1)	0.08595	2.22	0.02684
5. 2017 340B Status × merged	−0.09225	−1.60	0.10989
6. 2023 Beds	0.00032	3.86	<0.001
7. 2017 340B Status × 2023 beds	−0.00027	−2.73	0.00657
8. 2023 Outpatient revenue share	0.56781	4.58	<0.001
9. 2023 Commercial revenue share	−0.27025	−2.41	0.01614

R^2=0.63; n=744; includes state-level fixed effects.

Key Results from Table 2. Probability of 340B Participation in 2023: All Hospitals

- **Table 2** expands the participation analysis to include all hospitals. The impact of market share is still large and significant (line 2), though somewhat smaller than for the larger hospital sample (0.24 vs 0.38 coefficient). The outpatient revenue share impact (line 8) is similarly significant but smaller than for the large hospital sample.
- Note that the likelihood of 340B participation decreases as the share of commercial revenue increases (line 9)—this is because hospitals with a greater share of Medicaid patients have a higher chance of reaching the DSH percentage threshold for participation in 340B.
- The impact of prior merger activity is much smaller for the all-hospital sample, and is not statistically significant (line 4).
- Together, the results suggest a strong connection between hospital system market share, merger activity, and 340B Program participation that is largely concentrated in larger hospitals.

Table 2. Probability of 340B Participation in 2023: All Hospitals

Variable	Coefficient	t-statistic	*P* value
1. 2017 340B Status (participation = 1)	0.84727	27.01	<0.001
2. 2023 Hospital system market share	0.24222	8.92	<0.001
3. 2023 System share × 2017 340B status	−0.24508	−6.02	<0.001
4. Merged 2017–2022 (merged = 1)	0.01142	0.56	0.57454
5. 2017 340B Status × merged	−0.02939	−0.91	0.36116
6. 2023 Beds	0.00049	8.15	<0.001
7. 2017 340B Status × 2023 beds	−0.00031	−4.62	<0.001
8. 2023 Outpatient revenue share	0.27698	4.60	<0.001
9. 2023 Commercial revenue share	−0.40735	−5.98	<0.001

R^2=0.58; n=2,226; includes state-level fixed effects.

B. 340B Participation, Hospital Operating Margins, and Consolidation

Key Results from Table 3. Estimated Fixed-Effect Impacts on Hospital Operating Margins, 2023

- **Table 3** shows the connection between 340B participation and hospital operating margins in 2023, controlling for merger activity and other key factors that impact hospital profits, including payer mix, ownership type, and market share.
- Independent of 340B status, we find expected impacts on operating margin for payer mix (line 11; higher commercial share of revenue increases profits) and commercial prices (line 13; higher commercial prices are associated with higher profit margins); hospitals with higher revenue (line 9) and for-profit hospitals (line 14) are more profitable.
- Our positive and statistically significant estimate for the potential impact of 340B participation must be interpreted along with the statistically significant interaction terms.
- Overall, hospitals that merged in the prior five years were associated with lower operating profits (line 8). However, this appears to be offset by 340B participation, as merged 340B hospitals were associated with 4% higher profit margins than 340B hospitals that did not merge (line 3).
- The observed 340B impact appears to be amplified by the share of outpatient revenue, whereas a 10-percentage point shift in outpatient revenue is associated with a 1.1% increase in profit margin beyond any benefit observed for non-340B hospitals (line 4).
- The observed 340B impact diminishes (but does not disappear) as total patient revenue increases (line 2) and as the commercial share of revenue increases (line 5). Additionally, higher commercial prices appear to have a smaller impact on profit margins for 340B hospitals compared with non-340B hospitals (line 6). This may be attributable to the fact that 340B hospitals exhibit higher commercial prices than non-340B hospitals to begin with, as our previous work has shown.[11]

Table 3. Estimated Fixed-Effect Impacts on Hospital Operating Margins, 2023

Variable	Coefficient	t-statistic	*P* value
1. 340B Status	0.10968	1.85	0.060
2. 340B Status × patient revenue	−0.00005	−2.79	0.010
3. 340B Status × merged	**0.03999**	**2.70**	**0.010**
4. 340B Status × outpatient revenue share	**0.10707**	**2.09**	**0.040**
5. 340B Status × commercial revenue share	−0.17600	−2.77	0.010
6. 340B Status × price index	−0.05040	−2.08	0.040
7. Health system market share	0.01758	1.54	0.120
8. Merged (2017–2022)	−0.05996	−5.87	<0.001
9. Patient revenue (millions)	0.00007	4.37	<0.001
10. Outpatient revenue share	−0.04041	−1.09	0.280
11. Commercial revenue share	0.21458	4.22	<0.001
12. DSH percentage	−0.04431	−1.05	0.290
13. Commercial price index	0.10367	5.58	<0.001
14. For-profit ownership	0.04147	4.01	<0.001

R^2=0.29; n=1,131; includes state-level fixed effects. **DSH**, disproportionate share hospitals.

Illustrating the Connection Between 340B Participation and Higher Operating Margins

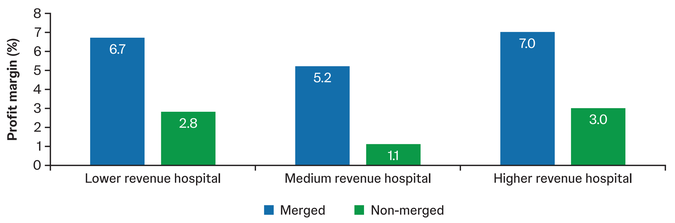
- To better illustrate the potential overall impact of 340B based on the various interaction terms, we created three hospital archetypes and calculated the implied impact of 340B for merged and non-merged hospitals.
- **Table 4** presents the parameters used to calculate potential impacts on three illustrative hospital archetypes drawn from our data. To anchor the archetypes, we used total hospital revenues at the 25th, 50th, and 75th percentiles. Next, we calculated the mean values of the independent variables across the top 50%, middle 50%, and bottom 50% of hospitals in our data to define broader parameters for each archetype. Our coefficients were then applied to the contextual averages of these variables for both merged and non-merged hospitals, and the weighted average impact for each archetype was calculated based on the share of mergers within each category. This approach offers a useful illustration of how the 340B Program can influence profit margins for hospitals with varying revenue sizes.

Table 4. Illustrative Hospital Archetypes by Revenue

Revenue archetype	Lower	Medium	Higher
Revenue (millions)	$54	$137	$623
Number of beds	53	118	284
Commercial share of revenue	66%	70%	72%
Outpatient share of revenue	77%	70%	59%
Commercial price index	0.79	0.84	0.9
Share of hospitals that merged	35%	33%	24%

- **Figure 1** shows the potential impact 340B can have on the illustrative archetypes of hospitals (by revenue size), accounting for their merger activity. Our estimates imply that, for different archetypes, 340B participation is associated with between 1.1% and 3.0% higher profit margins for non-merged hospitals and between 5.2% and 7.0% for merged hospitals overall, after accounting for other factors that impact hospital profits.

Figure 1. Potential Impact of 340B Participation on Hospital Profit Margins, 2023



Our combined results indicate strong statistical associations between hospital consolidation and the 340B Program. Hospitals in health systems with greater local (MSA) market share have a substantially higher probability of joining the 340B Program, and hospitals that have merged in the prior five years may enjoy a significant boost to their operating profit margins compared to those that have not merged, though both categories get an advantage from 340B participation, holding other factors constant. These impacts appear to be amplified in proportion to a hospital's share of revenue from outpatient services, which is where 340B profits are generated.

Conclusions

Policymakers continue to scrutinize not-for-profit hospitals with respect to their community benefits, prices, and market share.[12] This research provides new evidence that the 340B Program should be incorporated into their investigative work and the broader discussion about the future of both 340B and hospital consolidation.

The evidence suggests that hospital consolidation is strongly connected to both hospitals' 340B Program participation and 340B hospital profits. Potential benefits of 340B appear to be especially pronounced for hospitals that joined a larger health system within the prior five years.

Hospitals in systems with greater market share are significantly more likely to participate in 340B, adding to the potential methods by which larger hospitals and systems may earn disproportionately high profits. Conversely, independent of market share, 340B hospitals appear to earn higher profits after controlling for other factors that impact profitability.

Hospitals in the 340B Program can benefit disproportionately from outpatient revenues, consistent with the hypothesis that it is the outpatient-only 340B Program that is the key to their higher profits. This finding should be interpreted with the understanding that hospitals, in general, are a more expensive site of care for outpatient treatment[13] and that the 340B Program provides additional incentives to shift outpatient care into hospital-owned facilities.[14]

Disclosures

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