



CRA Competition Memo

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A look at hospital mergers and antitrust enforcement through the lens of willingness-to-pay

New tools to predict likely competitive outcomes

Between 1993 and 1999, federal antitrust agencies and state attorneys general filed and lost seven consecutive challenges to hospital mergers. Perhaps as a result of these decisions, there were no antitrust challenges to hospital mergers from 2000 to 2003. In the decisions the agencies and states lost during the 1990s, the courts defined geographic markets using variants of tests based on patient flow data. The federal antitrust agencies, however, believe that the use of tests based on patient flow data resulted in geographic markets for hospital services that were implausibly large. More importantly, the antitrust agencies and many academic economists argued that the conceptual bases of these tests were seriously flawed.

Rather than define markets on the basis of patient flow tests that had previously been used by the courts, the agencies have recently advocated a structurally based approach to analyzing competition between hospitals. The foundation of this structural approach is referred to as the model of two-stage competition, and the analytic approach to assessing hospital competition based on that model is referred to as the willingness-to-pay (WTP) approach.¹ The WTP approach directly estimates the impact of mergers by modeling the competitive interactions between hospitals and managed care companies based on the perceived value of the hospitals to patients. The approach reflects the differentiated nature of hospital competition by accounting for the impact of specific attributes of the merging hospitals, and it is flexible enough to account for distinctive features of competition between hospitals, such as the concept of “anchor hospitals” that was articulated in the Department of Justice’s 1997 challenge of the merger of two hospitals on Long Island, New York.

As a predictor of post-merger price competition, WTP is a potentially powerful tool that agencies are increasingly relying on when assessing proposed hospital mergers. The agencies’ increasing reliance on the technique means that a thorough understanding of it is essential for attorneys involved in hospital merger transactions.

¹ The two-stage model of competition was initially advocated and described in Gregory Vistnes, “Hospitals, Mergers, and Two-Stage Competition,” *The Antitrust Law Journal*, January 2000. Although Dr. Vistnes was with the agencies at the time, he is currently a vice president at Charles River Associates. The WTP approach to assessing hospital competition was first described in Robert Town and Gregory Vistnes, “Hospital Competition in HMO Networks: An Empirical Analysis of Hospital Pricing Behavior,” *The Journal of Health Economics*, September 2001.

What is willingness-to-pay?

Willingness-to-pay measures the value that a managed care company places on including a particular hospital in its provider network. That valuation, in turn, depends on how important the individual hospital is to the managed care company's members. If members feel a particular hospital is important and they are less able or willing to receive care at alternative hospitals (perhaps due to hospital or patient location, hospital characteristics, or a patient's medical condition), the WTP is greater and a managed care company will be willing to pay the hospital more. Hospital merger analysis then focuses on whether a proposed merger is likely to significantly increase the WTP for one or both of the merging parties.

The central idea is that WTP for a hospital is the difference between (1) the "value" of a managed care network that includes the hospital and (2) the "value" of a managed care network that excludes the hospital. WTP is particularly helpful when analyzing hospital mergers because it:

- Correctly reflects the two-stage nature of hospital competition,
- Takes into account the differentiated nature of hospital competition, and
- Provides an estimate of the direct effect of hospital mergers without the need to explicitly define geographic markets.²

The WTP approach also captures a hospital's bargaining power in negotiations with managed care companies. For example, a renowned teaching hospital may be perceived by a managed care company's members as a "must-have" hospital, and this puts that hospital in a better bargaining position than other hospitals in the area with regard to pricing. WTP measures the value that members put on a particular hospital based both on that hospital's characteristics and the characteristics of health plan members who may use the hospital. That value, in turn, says something about the negotiated price that managed care companies and the hospital are likely to agree to.

Estimating willingness-to-pay and the price effects of hospital mergers

There are two principal steps in applying the WTP approach to hospital mergers. First, the demand for hospitals is estimated based on the hospitals that patients choose. Based on this estimated demand, it is possible to calculate members' change in valuation if they have access to a managed care network that includes a particular hospital compared to another network that does not. Second, the relationship between the valuation of a particular hospital and the prices for care at that hospital can be estimated if data on hospitals' actual prices are available. If the merger increases WTP for a hospital, this relationship can be used to estimate the increase in price that corresponds to that increase in WTP.

The first of these steps involves estimating an econometric model in which the probability that a patient chooses to be hospitalized at a particular hospital is determined by the patient's characteristics (e.g., age, gender, and diagnoses), the hospital's characteristics (e.g., quality, amenities, number of beds, and services offered), and the patient's distance from the hospital. This is similar, in principle, to estimating demand in a differentiated products merger; however, the price paid by the patient typically remains the same (as long as the hospital is included in the patients' managed care network), so a patient's hospital choice is not affected by price.

This econometric model provides estimates of the probability that any given patient will choose to receive care at any given hospital. If the estimated probability that patients will choose a particular hospital is greater, the WTP for that hospital will be greater. If patients of one merging hospital view the other merging

² WTP fits into a growing line of tools that predict the price effect of mergers directly (e.g., upward pricing pressure and merger simulation in differentiated consumer products mergers) without precisely defining relevant markets. Its use is consistent with a view held by some economists (and reflected to some degree in the proposed changes to the *Horizontal Merger Guidelines*) that market definition may not always be a requirement for assessing competitive effects. Yet while applying WTP to assess competitive effects does not require definition of markets, it does provide a tool that can be used to define markets if desired.

hospital as a close substitute (i.e., the two merging hospitals are patients' first and second choices), then the WTP for the merged hospital system will be high. On the contrary, if patients of one merging hospital are unlikely to choose the other merging hospital, the merger will have little effect on the WTP for the merged hospital system.³

The second step is to estimate the relationship between WTP and the price that is negotiated between hospitals and managed care companies. This requires data on the negotiated price at each hospital, which can, in practice, be difficult to obtain. In most cases, these data will not be available to the merging hospitals, although the antitrust agencies may be able to obtain them.⁴ However, if the necessary data are available, one can estimate the extent to which prices paid by managed care companies are related to the hospitals' WTP.

The relationship between prices and WTP can then be used in combination with the merger-related change in WTP to estimate the likely competitive effect of the merger. Even in the absence of claims data, the change in WTP and the econometric model used to calculate it are of value for two key reasons:

- A significant merger-related increase in the WTP for a hospital may suggest that the hospital merger will receive significant scrutiny from the antitrust agencies, and
- The econometric model used to calculate WTP can also be used to calculate diversion ratios for the merging hospitals and, more generally, to provide information about closeness of substitution between different hospitals.

Based, in part, on how a merger will affect patients' valuation of hospital networks and how those changes will impact the prices that the hospital can negotiate with managed care companies, regulatory agencies will then make a determination of whether the proposed merger is potentially anticompetitive.

Issues to consider in the use of willingness-to-pay

There are significant issues to keep in mind when WTP is used. First, the WTP model is estimated using choices made by patients and it assumes that there are no differences in out-of-pocket costs across the hospitals from which the patient can choose. But if the data used to estimate the first model do not permit the econometrician to distinguish the in-network hospitals for each patient, patient preferences over hospital characteristics cannot be determined independently of other effects such as large out-of-pocket costs for using non-network hospitals. Alternatively, the hospital choices made by Medicaid or Medicare beneficiaries (who can generally choose to receive services at any hospital) may be used to estimate the preferences of members of private health plans, but this requires an assumption that the preferences of these patients are similar to the preferences of patients enrolled in commercial managed care plans.

Second, the calculation of WTP is based on a particular econometric model (multinomial logit) of patient choice. Like all empirical exercises, the results may be sensitive to the particular approach and specification adopted by the economist.

³ Willingness-to-pay will be different for each patient (depending on the patient's characteristics and distance from the hospitals), so overall WTP is an aggregate reflection of the preferences of individual patients. One of the implications of this is that different groups of patients may have differing preferences for hospitals, and the econometric models allow for estimation of how overall WTP might differ for different patient populations.

⁴ Even with access to these data, hospital contracts with managed care companies are often complicated and depend on a broad range of factors, including type of service provided, length of stay, patient severity, and co-morbidities. In this case, prices cannot be determined simply from a review of contracts between hospitals and managed care companies and a statistical model based on managed care claims data may be needed to estimate the price of an inpatient hospital admission. This model calculates the adjusted "price" paid by a managed care plan at a particular hospital holding constant all the factors that may affect the actual payment amounts.

Third, the econometric specification used to estimate WTP is important. In estimating the model, the economist has to make decisions about which hospital and patient characteristics are most likely to affect patients' choices of hospital (and thereby which characteristics will determine WTP). Importantly, some factors may be known to affect patients' choices of hospitals (e.g., patients' relationships with their physicians) but may be impossible to capture in an econometric model. If the factors excluded in the model are important determinants of hospital choice, the model may incorrectly predict patients' valuation.

Beyond the econometric results, it may also be important to consider other factors in evaluating evidence from a WTP model:

- What are the appropriate thresholds for merger-related price effects derived from a WTP model?
- In the absence of contracts or claims data from managed care companies, what are the appropriate thresholds for merger-related changes in WTP?
- What role do merger-specific efficiencies play in evaluating WTP?
- How might the competitive effects predicted by the WTP model be muted if a competing hospital repositioned itself (e.g., improved quality or amenities or added clinical services)?
- Consideration should also be given to non-econometric evidence on the merging hospitals' closest competitors, the bargaining positions of hospitals and private health plans, evidence on diversion ratios and switching costs for patients (e.g., where physicians have privileges), and the price elasticity of demand for hospital services.

How CRA can help clients when regulators utilize willingness-to-pay

CRA economists have the specialized knowledge and experience to help clients anticipate likely outcomes when WTP is used to evaluate hospital mergers. In addition to Gregory Vistnes, the former agency antitrust economist who helped develop the two-stage model of competition and the WTP concept, the staff at Charles River Associates includes numerous economists and econometricians who are skilled in evaluating the competitive effects of hospital mergers on behalf of both merging parties and antitrust enforcement agencies.

WTP increases the complexity of transactions that already consider of a significant number of complex economic analyses. Our experience with econometric analysis is an important advantage in merger reviews that involve, at the very least, estimation of an econometric model of hospital choice using publicly available inpatient discharge data.

Drawing on our knowledge of WTP and our experience in healthcare antitrust and econometrics, CRA can assist clients by:

- Implementing a WTP analysis using hospital inpatient discharge data,
- Critically assessing the WTP analyses adopted by antitrust enforcement agencies,
- Assessing merger-related efficiencies relative to the estimated price impact of the merger,
- Considering non-cost-based efficiencies (e.g., an improvement in hospital quality),
- Developing arguments for the repositioning of the competing hospital that can be used to reassess the likelihood of merger-related increases in prices, and
- Evaluating non-econometric evidence concerning the likelihood of adverse competitive effects.

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