AN ALTERNATIVE APPROACH TO MARKET DEFINITION IN THE ANTITRUST ANALYSIS OF HOSPITAL MERGERS

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Abstract

In this thesis, I first investigate the widespread methods used in antitrust investigations in the hospital markets. Then, pointing out their ineffectiveness in convincing the courts, I offer a metric called "competitive pressure rate" which is based on Google Maps travel time data as an alternative approach to market definition. I test the effects of the new metric on market prices by an OLS estimation applied to the data from California Office of Health Planning and Development. I provide strong evidence for the existence of correlation between geographic clustering of general acute care hospitals and hospital charges. In particular, I show that a one-unit increase in the competitive pressure rate for normal newborn services would have resulted in a price decrease of 0.71% in 2010 and 0.52% in 2012. This corresponds to annual savings of $\$9,448,000$ in 2010 and $\$7,582,000$ in 2012.

HASTANE BİRLEŞMELERİNDE PİYASA TANIMI ANALİZİNE ALTERNATİF BİR YAKLAŞIM

Fatih ÇAKMAK

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Anahtar Kelimeler: hastane; birleşme; antitröst; piyasa tanımı

Özet

Bu tezde önce, hastane piyasalarındaki antitröst soruşturmalarında genel olarak kullanılan yöntemleri incelenmektedir. Daha sonra, bu yöntemlerin mahkemelerin iknasındaki etkinsizliğine dikkat çekerek, piyasa tanımına alternatif bir yaklaşım olarak "rekabet baskısı" oranı sunulmaktadır. Google Haritalar ulaşım süresi verilerine dayanılarak, piyasa dinamiklerine ilişkin basit ve tutarlı bir içgörü sağlanmaktadır. Tezde, bu oranın piyasa fiyatları üzerindeki etkisi California Sağlık Planlama ve Geliştirme Ofisi verileri ile EKK tahmini yöntemi kullanılarak test edilmektedir. Bulgular ile, genel akut hizmet hastanelerinin coğrafi kümelenmesi ile hastane ücretleri arasındaki korelasyonun varlığına ilişkin kuvvetli bir kanıt ortaya konulmaktadır. İnceleme sonuçları, rekabet baskısı oranındaki bir birimlik artışın, yenidoğan hizmetlerine ilişkin olarak yılda, sırasıyla 2010 ve 2012 seneleri için, $9,448,000$ ve $7,582,000$ ABD Doları tasarruf sağlayacağını göstermektedir.

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1 Introduction

Health care industry is a steadily growing, indispensable and capital intensive behemoth and hospitals form the core of this humongous structure. Its idiosyncratic composition and the gravity of the production and protection of health care turn it into a unique field where economic theory and standard policy mechanisms do not apply per se. Under substantial influence of numerous unquantifiable factors such as "morbidity" and "health stock" and intertwined with ethics and political ideology, there simply does not exist a panacea for the issues in health care industry. Therefore general solutions and guidelines require a thorough reconsideration to generate successful outcomes. In that sense, a most debated theme in health care industry is the design of the antitrust enforcement in order to protect current and potential competition aiming a market structure which ensures a sustainable level of consumer welfare.

In this paper I deliver a survey of the chronicles of the antitrust enforcement in the hospital sector and construct a metric depicting the influence of geographical proximity which would build a pathway for a better comprehension of the relevant market in antitrust analysis. In order to maintain a manageable scale I will keep my analysis limited to the hospital markets in the US. As an initial step, it is crucial to define the problem in order to develop a reasonable solution approach. After providing a panorama of the industry, I will introduce the antitrust experiences in the American hospital markets. Following the antitrust chronicles, it will be appropriate to move on to the main body of the paper, evaluating the fundamental aspects of the antitrust enforcement in the hospital industry: market definition consisting of two intertwined elements: geographic and product market definitions, the importance of the non-profit status of hospitals, and the impacts on welfare. In the following chapter, given the details of the antitrust enforcement methods, I will analyze the research on competition in the hospital markets, pointing out the data specific issues and any inconsistencies inherent in the models developed. Given the current issues in antitrust theory, I will present the core chapter of the paper introducing a metric in an attempt to redefine the principles of constructing the geographic market. I will conclude my study mentioning the ongoing research and developments in the relevant antitrust enforcement methodologies providing insight regarding the expectations in the hospital markets.

2 Overview of the Hospital Markets in the US

The institutional status of hospitals in the US is categorized under three headings: (1) publicly owned, (2) non-profit, and (3) for-profit. In a simplistic view, this categorization might be considered as a clear-cut distinction between the agents in the market. However in practice, it turns out to be quite difficult to sustain such a basic classification system. When multi-hospital ownership issues are introduced, it becomes troublesome to position a hospital system consisting of hospitals with different characteristics under distinct headings. In addition to that, we cannot assume permanency of the institutional status of the hospitals. It is observed that every year approximately one percent of the hospitals in the US experience an institutional status change (FTC, 2004).

Another popular type of hospital categorization is performed with respect to the sophistication of the services provided by the institution. Hospitals are mainly divided into four categories: (1) primary, (2) secondary, (3) tertiary, and (4) quaternary. The sophistication of the health care services provided escalate from the most fundamental ones at the primary hospitals, to the state-of-the-art operations and facilities including sub-specialty services such as organ transplantation at the quaternary level. However, this method is also considered problematic as hospitals might invest in services in certain specialties and develop more sophisticated capabilities in those fields while restraining the service level complexity in other fields (FTC, 2004).

Assessing from a financial perspective, currently, 58% of the total community hospitals is categorized as non-profit hospitals and they have approximate 68% of the inpatient[1] beds. Possessing a smaller share, for-profit hospitals make up 21% of the hospital market with 16% of the total number of inpatient beds. The rest (21% with 16% of the inpatient beds) is run by the government at a federal, state or local level (NCHS, 2013). This classification is noteworthy due to its widespread use in policy design.

An alternative approach in categorization of hospitals is to provide an interpretation based on the costs incurred. A major portion of the costs are incurred to the society

[1] According to CMS, inpatient hospital services are defined as follows:
"Inpatient hospital services are defined in Title XVIII of the Social Security Act (the Act) and in the regulations (42 CFR 409.10):
Subject to the conditions, limitations, and exceptions set forth in this subpart, the term "inpatient hospital or inpatient CAH services" means the following services furnished to an inpatient of a participating hospital or of a participating CAH or, in the case of emergency services or services in foreign hospitals, to an inpatient of a qualified hospital:
1. Bed and board, 2. Nursing services and other related services, 3. Use of hospital or CAH facilities, 4. Medical social services, 5. Drugs, biologicals, supplies, appliances, and equipment, 6. Certain other diagnostic or therapeutic services, 7. Medical or surgical services provided by certain interns or residents-in-training, 8. Transportation services, including transport by ambulance." (CMS, 2014b).

itself as a significant share of the health care services is reimbursed by the government transferring public resources. By 2010, the largest single buyer of services in the hospital market is the CMS[2] which administer $378.5 billion corresponding to 46.5% of the total hospital expenditures costs in the US (NCHS, 2013). The private parties, mostly the health insurance companies, providing the costs incurred by the hospital services imitate the government designing similar reimbursement schemes.

CMS data displays a steady growth in the total cost of providing health care in the US. CMS analysis explains that the overall rise in hospital charges is a considerable driver of the increase in the total expenditure in health care services. It is apparent that in the past two decades hospitals managed to enhance their bargaining power against the payors in the industry. CMS estimates that this trend is unlikely to alter in the near future. The projection regarding the spending on hospital care show that in 2022 the bill will reach 19% of GDP with an average annual increase of 6.4%. Given the economic outlook with an expected slowdown in growth, the burden on the society will likely to become even more difficult to carry (CMS, 2014c). It is a dynamic industry and it requires a profound effort to keep up with the shifting powers and constantly altering game plan.

There has been an immense restructuring of the hospital system in the US over the last couple of decades initiated mainly by the radical change in the health care reimbursement policy in 1983. The shift from cost-based reimbursements to the Prospective Payment System (PPS)[3] created a new system where hospitals have to compete for patients. Following that, in the 1990s, numerous US states removed the restrictions on private health insurance companies to engage in selective contracting with health care providers. This has strengthened the incentives for restructuring leading to a second wave of change in the hospital markets as depicted in Figure 1. This reestablishment, leading to a significantly concentrated market, is considered as the fundamental reason behind the surge in the costs of the hospital care (OECD, 2012).

Dranove & White (1994) completed an extensive survey focusing on the studies regarding the role of competition in the hospital market. Although the survey consists of studies using quite different methodologies for defining the geographic and product markets, there was a consensus on the fact that market concentration has a statistically

[2]The Centers for Medicare & Medicaid Services (CMS) defines itself as follows: "CMS, previously known as the Health Care Financing Administration (HCFA), is a federal agency within the United States Department of Health and Human Services (DHHS) that administers the Medicare program and works in partnership with state governments to administer Medicaid, the State Children's Health Insurance Program (SCHIP), and health insurance portability standards" (CMS, 2014b).

[3]CMS defines PPS as follows: "Hospitals contract with Medicare to furnish acute hospital inpatient care and agree to accept predetermined acute IPPS rates as payment in full. The inpatient hospital benefit covers beneficiaries for 90 days of care per episode of illness with an additional 60-day lifetime reserve. [H]ospitals receive Medicare IPPS payment on a per discharge or per case basis for Medicare beneficiaries with inpatient stays" (CMS, 2014a).

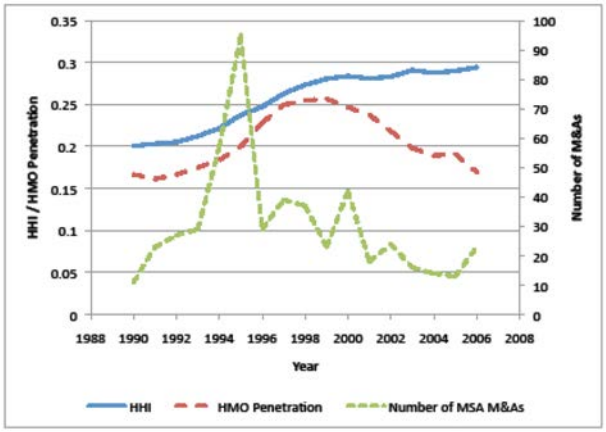

Figure 1: Trends in Hospital Concentration, M&A Activity and HMO Penetration: 1990-2006 (Gaynor & Town, 2011)

significant positive correlation with the price increases in the hospital market. Also, Town et al. (2006) support this theory presenting that the mergers during the 1990s have resulted in on average 3.2% higher HMO premiums.

Historical data on hospital market concentration provides a compatible portrayal of the theory suggested above. Between 1979 and 2001, the percentage of hospitals that operate as part of a system has spiked from 31 to 54.[4] In addition to the rising number of consolidations, the consolidations have become increasingly localized having a further impact on the relevant markets. In other words, it has become more likely to encounter "within market" consolidations which occur between a number of hospitals in the same geographic and product market in comparison with the "across market" consolidations. Cuellar & Gertler (2003) state that thinking of geographic markets equivalent to the metropolitan statistical areas (MSA) nineteen MSAs showed a trend of increasing concentration with seven of them having an HHI level 1700 points higher than the starting level. It is mentioned in Gaynor & Town (2011) that in the US HHI for hospital markets increased on average by over 900 points between 1987 and 2006 as displayed in Figure 2 (OECD, 2012). It is remarkable that the mean HHI value has clearly surpassed the "high concentration" threshold level of 2500 points (DOJ & FTC, 1997). Capps (2010) explains that the general approach of the US Courts in evaluating the hospital markets inadvertently had a major impact on the formation of this rush of M&As in the hospital market. Contradicting the plethora of evidence[5] indicating that the competition in the hospital market is quite local in geographical context, in most cases the US Courts favoured wide market definitions. Letting the watchdogs lose their teeth, between 1993 and 2008, not a single

[4] If the hospitals that are loosely connected with the hospital networks are included, this ratio increases from 54 to 66 percent of the total number of hospitals in the US (FTC, 2004).

[5] See Town et al. (2006) and Varkevisser & Schut (2012).

Year	Mean HHI[b]	Change[c]
1987	2,340	—
1992	2,440	100
1997	2,983	543
2002	3,236	253
2006	3,261	25

[a] Source: American Hospital Association. Data are for U.S. Metropolitan Statistical Areas with population < 3 million.
[b] Herfindahl-Hirschmann Index. Means weighted by MSA population.
[c] Total change from the previous year in the table.

Figure 2: Hospital Market Concentration, US[a], 1987-2006 (Gaynor & Town, 2011)

merger challenge[6] was concluded in favor of Department of Justice (DOJ)/Federal Trade Commission (FTC).

While under constant scrutiny for their potential cost on the society, hospital consolidations are also regarded beneficial mentioning the efficiencies generated (FTC, 2004). It is claimed that consolidations are decent means for eliminating duplications in services and unnecessary administrative costs, relaxing the medical arms race between the agents in the market. The trade-off between the positive and negative impacts of the M&As in the hospital markets will be analyzed thoroughly in the following chapters.

3 Evaluation of Hospital Merger and Acquisitions

Since 1981, the first time a hospital merger is challenged by FTC[7], evaluation of the hospital mergers from an antitrust perspective has been an active policy field. In order to allocate their resources efficiently, the authorities try to run a number of filtering mechanisms by imposing safety zones and identify the suspicious transactions. According to the Health Care Statement, the safety zones applied in hospital markets include the par-

[6] California v. Sutter Health System (2000), FTC v Tenet Healthcare Corp. (1998), United States v. Long Island Jewish Medical Center (1997), FTC v. Butterworth Health Corp. (1996), United States v. Mercy Health Services (1995), FTC v. Freeman Hospital (1995), In re Adventist Health System (2004).

[7] Am. Med. Int'l v. FTC, 104 FTC 1 (1984), as modified by 104 FTC 617 (1984) and 107 FTC 310 (1986)

ties which have a licensed capacity below 100 beds over the three most recent years, and have under normal circumstances an inpatient count less than 40 over the three most years. Also the parties which have been operational for a period less than 5 years are excluded from the safety zones (FTC, 1996). These filters keep the number of probed transactions limited enabling the authorities to provide an involved analysis for each case.

Hospital mergers are analyzed following the Horizontal Merger Guidelines, which define market power as "the ability profitably to maintain prices above competitive levels for a significant period of time." The Horizontal Merger Guidelines provide a recipe for the examination of the antitrust issues which may arise due to merger activity (DOJ & FTC, 1997). In essence, it is suggested that a merger analysis should be initiated with checking the existence of any direct evidence which would simply reveal the presence of a misconduct. Following the initial step, it is considered appropriate to identify the relevant product and geographic markets. There is an abundance of methods for the identification of markets and no consensus over the "right" one. However it is accepted that, in case of the availability of sufficient data, the hypothetical monopolist test, namely SSNIP test (small but significant and non-transitory increase in price), is an appropriate method to acquire a general perception about the case at hand. Analysis is run by testing a larger product group or geographic area which are enlarged with each iteration of the test until the substitution alternatives are exhausted (Sacher & Silvia, 1998). Also in case of any problems with the data availability, which is a common occurrence, there is a general tendency to switch to the indirect analysis methods, namely the Elzinga-Hogarty test and Critical Loss Analysis which are less data-intensive in comparison with the SSNIP test.

The preference of the tests undertaken and the interpretation by courts has received significant criticism. In fact, between 1994 and 2000, only seven of the 900 hospital mergers were litigated. Surprisingly, courts decided in favor of the alleged parties in all seven cases. This extraordinary statistic points out that the legal machinery is not working properly. A closer look on these court decisions show that there are a number of epicenters that cause most of the controversy: methodology for defining geographic and product markets, expectations regarding the effects of the non-profit status of the hospitals and the weight given to the possible positive welfare effects of the hospital consolidations. A detailed analysis of these headlines is required in order to address the problem and propose appropriate cures.

3.1 Geographic Market Definition

Identifying the geographic market is a central part of the merger analysis. Any error, leading to an unnecessarily large geographic market definition, renders the authorities powerless in fulfilling their responsibilities. In current legislation hospital markets do not constitute a special case which requires a unique approach in market identification. This is a crucial loophole in the legislation. In fact, Judge Richard Posner states that "the law concerning hospital [geographic] market definition is in a shambles. Common sense suggests that health care, like politics, is local. People want to be hospitalized near their families and homes, in hospitals in which their own – local – doctors have privileges" (Hammer & Sage, 2003).

As explained above, case law shows that there are two popular tests for determining the geographic market: Elzinga-Hogarty test and Critical Loss Analysis. It is vital to perform a meticulous analysis of these methods in order to figure out the causes of the frequent misinterpretation of the relevant markets.

Elzinga-Hogarty test is one of the most widely used tests in antitrust policy. Its popularity dwells from its practicality and simplicity with a low degree of data requirement. Designed for commodity movements, it is based on two statistics of commodity flow: LIFO ("little in from outside") and LOFI ("little out from inside"). If it is concluded that the candidate geographic market shows a considerable degree of isolation in terms of commodity flows[8]. If the flows in any direction consists of less than 10% of the total commodity flows in the candidate geographic market, it is considered a "strong" market definition and in case of a inter-market flow of between 10-25%, it is considered a "weak" market definition.

In the hospital markets, the patients are considered as the "commodity" and patient flows are interpreted in order to reach a conclusion regarding the relevant geographic market. It is certain that a lump-sum analysis of patient behavior does not provide any consistent information about the market dynamics. As health care services show an enormous degree of differentiation, the buyers of the services, the patients, also consist of significantly different characteristics. The heterogeneity of the hospital market erodes the validity of the application of the Elzinga-Hogarty test as Kenneth Elzinga and Thomas Hogarty themselves argued that their methodology was inherently not suitable for analyzing differentiated goods (FTC, 2004).

[8] By "commodity" hereby, the elements of the relevant product market are addressed.

Another weak spot of the Elzinga-Hogarty test is its naivety in assuming that hospital choice of patients have a univariate characteristic depending solely on price changes. However it is a tremendous leap of faith ignoring the fundamental facts of consumer theory. FTC (2004) claims that research shows travel distance is the fundamental criterion for hospital choice. Also there are a large number of factors such as insurance coverage, service quality, familiarity with the facilities and family connections that affect the hospital choice of the patients. Reducing all these factors to a simple monetary decision ignores a multitude of essential information and thus leads to a biased interpretation of future patient flows in case of a merger.

In addition to that, Elzinga-Hogarty test relies heavily on a flawed assumption that the patient flow data is perfectly representative for the whole population in the candidate market area. A minority of the relevant population group that is visible in the data should not be considered as the basis of a projection of the welfare effects of a hospital consolidation. Capps et al. (2001) coined the term "silent majority fallacy" to explain this misjudgment. They state that the existence of a traveler between candidate markets does not prove that the agents in the candidate market lack market power as the traveler cannot be considered as a perfect representation of the choice of the whole population. This representation problem is exacerbated by the heterogeneity issue detailed above. Capps et al. also emphasize that empirical evidence points out overall reluctance of patients to travel further for receiving similar health care services at a lower price. In practice, the degree of substitutability between hospitals diminish rapidly with increasing travel distances.

It is also noteworthy to mention two intrinsic caveats of the Elzinga-Hogarty test. FTC (2004) explains that constructing the merger analysis upon the LIFO and LOFI criteria is inappropriate for the hospital markets as it might be impossible to meet the criteria in some cases. As new hospitals are included in the analysis with each iteration of the test, it might not be accomplished to reach the required level of patient flow isolation. It results in unnecessarily large market definitions and in some cases failure to define geographic markets. This leaves us with the trade-off between absence of geographic market definition and a "weak" market definition which does not provide sufficient confidence in the analysis. The second caveat of the test dwells from ignoring the fact that population density is not constant over a candidate market area. The variance of population density leads to including regions that should have been excluded and including regions that in fact do not contain a significant amount of patient flows in terms of the ratio to the size of the relevant population group (FTC, 2004).

The second popular approach in merger analysis is to apply the Critical Loss Analysis. It is a decent method providing a straightforward and simple analysis in defining relevant geographic markets. On the other hand, it requires great care in application as it is plagued by various problems due to its susceptibility of being abused, creating confusion over the facts.

The first issue is the misunderstanding regarding the conclusiveness of the analysis. It is a common mistake to jump to a conclusion in a scenario where a hypothetical monopolist incurs losses in case of a 5% price increase. However, empirical studies show that it is of utmost importance to test for alternative scenarios where alternative price increase percentages are posited. It is presented that cases exist where the hypothetical monopolist incurs losses at a 5% price increase scenario, although it becomes profitable when a percentage between 31 and 319 is selected for the posited price increase (FTC, 2004). The market dynamics do not possess a linear relationship with the pricing; hence it is a serious oversimplification to base the analysis over a linearity assumption.

Secondly, the misconception regarding the reasoning behind the pre-merger profit margins creates significant problems. The mechanics of the analysis lead to an inappropriate geographic market definition. Following the critical loss analysis, an extremely broad market definition is achieved where the test subject is a hypothetical monopolist with a high profit margin. High margins are usually translated into low critical loss amounts. Hence it becomes quite probable for the actual losses to exceed the defined critical loss thresholds. However, this train of thought is far-fetched and loosely connected with the economic theory. In an alternative point of view consistent with the economic theory, high profit margin can also be interpreted as low price elasticities of demand (O'Brien & Wickelgren, 2003). In addition to that checking for the "aggregate diversion ratio" I can expect the firm-level elasticities to be quite higher than the market-level elasticities which results in a very low degree of price elasticity of demand for the candidate geographic market (Katz & Shapiro, 2003). This can be spelled out as minuscule sales losses to be faced by the merged entities. Hence the appropriate decision would rather be to delineate a narrow geographic market in contradiction with the common preferences.

A final problematic point is that it is a common oversight to ignore the fact that price changes in the market can show considerable complexities. As explained above, hospital markets consist of heterogeneous characteristics, hence it is not coherent with the economic theory to assume that the whole range of services in the market would show the same price movements. A lump-sum critical loss analysis would not be fruitful in simulating the realities of the candidate market. This misconception is usually accompanied with the inconsistent expectations regarding the pricing behavior of the rival agents in the candidate market. It is insubstantial to expect the rivals of the merging entities to keep their prices constant facing a shift in the market structure (FTC, 2004). Therefore

Figure 3: The Impact of Willingness to Travel (Oxera, 2011)

a ceteris paribus approach in utilizing the critical loss analysis would be inconclusive, at best.

3.2 Product Market Definition

Similar to the geographic market definition, The Horizontal Merger Guidelines are considered as the policy basis for the delineation of the product market without providing any specific policies for the hospital markets. Therefore, defining product markets is also an unresolved field with a vacuum of consensus over the details of the design of the market definition methodologies.

This vacuum bears high costs as the product market definition lies at the core of the merger analysis. Every argument mentioned above regarding the identification of the geographic market is based on the delineation of the product market. The analyses change their courses drastically following any updation in the product market definition. The clusters of services formed result in different degrees of willingness to travel affecting the price elasticities of demand in relevant candidate markets. A most basic example of the role of product market definition is depicted in Figure 3. The approval of a merger between hospitals A and B depends on aggregate willingness to travel of patients in the candidate market. If the product market is defined as a cluster of services which lead to a low degree of willingness to travel, then the hospitals C, D and E would be left outside the reach of the patients and the consolidation would be rendered anticompetitive.

Historically, the product market has been defined as an aggregation of inpatient services, namely "acute general hospital care" (Gaynor & Vogt, 2000). This aggregation eased the merger analyses by alleviating the necessity of testing the anticompetitive effect for each inpatient service category. However as displayed above, such simplification might harm the validity of the whole analysis unless it is applied with precision.

Another aspect of the product market definition is constructed based on complexity of care provided by the hospitals in the candidate market. In the case law, we observe that specialty hospitals were in general excluded from the product market. Varkevisser et al. (2008) offer an alternative approach for delineating the product market by defining five clusters for the acute general hospital care: "1) high-volume complex specialties, 2) low-volume complex specialties, 3) high-volume regular specialties, 4) low-volume regular specialties and 5) specialties that can be provided by general or specialized hospitals and stand-alone ambulatory surgeries." This classification is plausible since hospitals construct their investment strategies based on the available health care services in the locality. Also, evidence gathered from hospital planning documents show that hospitals in the locality are identified as rivals based on their service level sophistication. Another alternative is explained by Zwanziger et al. (1994) as a list of factors to be considered in clustering services: "1) the extent to which treatments for two diseases can be performed by the same personnel and equipment, and 2) the cost for a hospital to convert from providing one treatment to providing another treatment." It is also argued that "physicians (consultants) are the key inputs into hospital care, and cluster diseases based on the least-specialised physician capable of treating them" (FTC, 2004).

3.3 Non-profit Status of Hospitals and Welfare Effects

Case law displays that the institutional status of the hospitals recently gained an increased importance in the court decisions in merger investigations. In the prior landmark cases, the courts seemed to have a tendency towards interpreting the non-profit status irrelevant to the essence of the cases rejecting any efficiency claims based on non-profit status. In 1986, the Seventh Court declared that "different ownership structures might reduce the likelihood of collusion, … this possibility is conjectural," and that "adoption of the non-profit form does not change human nature." Also in 1991, a similar comment was given by the Eleventh Court: "the Supreme Court has rejected the notion that nonprofit corporations act under such a different set of incentives than for-profit corporations that they are entitled to an implicit exemption from the antitrust laws." Similarly in 1990, the Seventh Circuit clarified their legal interpretation regarding the non-profit status of the hospitals: "We are aware of no evidence – and the [appellees] present none, only argument – that

nonprofit suppliers of goods or services are more likely to compete vigorously than profit-making suppliers. ... If the managers of nonprofit enterprises are less likely to strain after that last penny of profit, they may be less prone to engage in profit-maximizing collusion but by the same token less prone to engage in profit-maximizing competition" (FTC, 2004).

However in the late 1990s, there has been a reversal in the legal interpretation and non-profit status has turned into a key to unlock legal barriers against hospital consolidations. In 1997, two cases exemplify the change in the legal trend [9]. In these cases, courts focused on the idea that the question was not whether a non-profit hospital would also acquire profits, but what would be done with the retained profits. The emergent dominant view was that these hospitals were run with a community service mission and any profits would mean further community service. This interpretation resulted in several cases to be concluded in favor of the merging parties.

Considering non-profit status as a mitigating factor for market power has been a dominant legal view until early 2000s. Recently, it was challenged by a number of empirical academic studies supporting that non-profit status can provide no mitigating effect for the market power acquired following a consolidation and it should not be considered as a guarantor of protecting social welfare through securing the realization of claimed efficiencies (FTC, 2004).

As mentioned above, the claimed welfare effects can play a decisive role in the merger investigations. These claimed effects are usually focused on avoided capital expenditures, decreasing costs of management and operational activities and increased productivity by ceasing medical arms race. In numerous cases, the claimed efficiencies were sufficient in convincing the courts in allowing the consolidations. However, retrospective studies show that there is a considerable number of cases where the efficiencies were exacerbated or simply did not happen. For instance in Blodgett/Butterworth case in 1997, it was proposed that the merger would generate $100 million in avoided costs and efficiencies and this was influential in court's decision. Also, the non-profit status of the hospital under consideration was interpreted as a guarantee.

On the other hand, FTC (2004) states that the claimed efficiencies should not be overvalued as it can take a considerably long period of time to realize all the efficiency promises. Indeed in Blodgett/Butterworth case, the merged entity could not achieve the projected operational enhancements and in the following six years not even half of the proposed amount of $100 million in avoided costs and efficiencies was realized. Community commitments were offered as a solution for the failed efficiencies problem, however

[9] FTC v. Butterworth Health Corp., 1997-2 Trade Cas. (CCH) 71,863, 71,867-68 (6th Cir.1997), United States v. Long Island Jewish Med. Ctr., 983 F. Supp. 121, 149, 146 (E.D.N.Y.1997)

it should not be overlooked that these contracts all have an expiration date and there is no certainty for their renewal in the future. Hence, considering uncertain efficiency proposals as a balancing act for possible burdens on the community through increased out-of-pocket expenses and health insurance premiums would result in biased decisions threatening the social welfare.

4 Data Specific Issues in Hospital Merger and Acquisition Analysis

I have provided a detailed list of the much debated points regarding the evaluation of hospital consolidations in the previous chapter. It would be an appropriate step to move on to a brief literature survey pointing out common problems and searching for amendments for the merger evaluation process. It is not surprising that the early academic studies specialized in hospital consolidations conducted in the 1980s and 90s are plagued with a number of misconceptions and technical frailties. The inconsistencies dwelling from these analyses have resulted in biased estimates and equipped merging parties with hollow but convincing arguments which have resulted in a streak of case losses for the FTC. In addition to the problems related to the market definition methodologies, we frequently encounter a number of other data specific issues.

A foremost issue with the prior studies is that the analyses were too often based on hospital chargemaster prices but not the actual ones. Although it might be a fair assumption to proxy actual prices with listed prices, in case of hospital markets, an epitome of monopsony power, this preference significantly weakens the integrity of the study. Hence, it is of utmost importance to count for the relevant data problems, whenever such assumptions are made due to data availability issues. A similar problem occurs when there is an improper implementation of a proxy for actual patient flows. It is cumbersome, and impossible in most cases to acquire actual patient flows, hence the general approach is to construct a proxy value to delineate the geographic markets. For that purpose, usually geopolitical, population based or distance based measures are implemented. The prior literature shows that improper results might be obtained misleading the authorities when these are utilized without controlling for their caveats. A most basic example for such caveats is that when administrative regions are selected as a representative of the geographic markets, it can lead to inconsistencies for the analysis based on hospitals that are located close to borders as cross-border effects are ignored by such measurement strategy.

A second aspect of the problem with the utilization of the price data is related with the product market definition. As explained in the previous chapter, product market definition lies at the core of the merger analysis. Any error by its delineation creates a snowball effect causing even larger inconsistencies in the further steps of the analysis. Therefore, it is better to suffer increased computational costs by assuming a small product market to start with, rather than to risk discrediting the whole study. Product markets chosen at the DRG-level[10] would increase the complexity of the model; however it would greatly diminish the risks of overlooking any market dynamics. The studies conducted by Brooks et al. (1997) , Connor et al. (1998) and Manheim et al. (1994) all use lump-sum price values for hospital admissions. However, this contradicts with the basics of business strategies by overlooking the possibility of cross-product subsidization or exploitation of bargaining power on single services.

Another noteworthy point in the merger analysis is to control for the heterogeneity of the hospital characteristics. Without differentiating for the functional type of the hospital, its location and/or the overall service quality, it is improbable to generate unbiased estimates. For instance teaching hospitals and the hospitals located in urban centers are usually burdened with more severely ill patients and therefore they bear higher costs per patient. Also without including a proxy for the service quality we cannot identify the reasoning behind any price movements clearly. Therefore, any mechanism designed for interpreting effects of the market concentration should consist of sufficient corrective elements to offset these disruptive factors. A decent example of such design is provided by Capps & Dranove (2004). They have opposed the general trend in the relevant literature regarding the utilization of the Herfindahl-Hirschman Index (HHI). In general HHI is computed based on the whole geopolitical region such as the metropolitan area or the predefined HSA (Health Service Area). However, this methodology ignores the effects related with the heterogeneity of the hospital markets. Instead, Capps & Dranove (2004) preferred constructing the HHI using patient-level inpatient hospitalization data, which is consistent with the theory provided above.

One final point is about the choice of econometric model. Most studies are restricted to a cross sectional analysis only. However assuming the researcher is faced with data availability issues at some level, this methodology intensifies the risks of generating biased estimates. Using cross-sectional data, it is difficult to control for heterogeneity among the hospitals and the tested services. On the other hand, introducing a time dimension, panel data format eases the burden of the data requirements for the estimation. Defining a control group for the merging parties, the estimated effects of the transaction under scrutiny can be identified without the need of acquiring a colossal amount of qualitative data.

[10] According to the CMS, discharges are assigned to diagnosis-related groups (DRG), a classification system that groups similar clinical conditions (diagnoses) and the procedures furnished by the hospital during the stay (CMS, 2014a).

5 An Alternative Approach to Market Definition

In the previous chapters, I have put forward the shortcomings of the various techniques in formulating an M&A analysis in the hospital markets. These shortcomings have been exploited by the major players in the market, namely the hospitals, and rendered the FTC ineffective in maintaining a healthy level of competition in the market. The retrospective studies[11] conducted by the FTC show that the common issue with the antitrust cases in the hospital markets is that the evidence and theories stated by the authorities are frequently found inconclusive by the courts. Although the theories under scrutiny bears sound economic foundations, their inherent complexity and fundamental assumptions resulted in lack of confidence in the courts' judgment.

Hence, as an initial step towards bringing the antitrust authorities and the courts on the same page, I attempt to provide a metric that would have a minimal amount of assumptions while delivering a big picture of the relevant market. In order to realize its promises the metric should be interpreted as a tool for providing basic guidance and credibility for rather sophisticated econometric tools. In essence, the purpose of this chapter is to create a metric to display the drawbacks of the current methods and to lay foundations for a better method.

Based on the specifications above, it is natural to infer that a precise definition of the geographic market goes out of the window. In order to avoid violating the dynamic and heterogeneous nature of the markets, the metric should be designed in a modest way delivering only a sense of the boundaries of the market accompanied with the basic symptoms of the market characteristics. Therefore, the metric I develop is based on the level of competitive pressure in the geographic proximity of the hospitals. Given the apparent misguidance created by delineating a precise geographic market based on administrative districts, placing competitive pressure at the core of the metric design points out the heterogeneity and locality of the competition in the hospital markets.

The key aspect of the metric fulfilling its promises is the utilization of travel-time data. A significant level of credibility of the underlying data is achieved following the principles of Wang's methodology[12] in obtaining the travel-time data. Depicting general acute hospitals in California as nodes, the neighbouring nodes for each hospital are determined by applying certain travel-time ranges. The nodes that fall within the specified range formed up the neighbourhood for each hospital. In the next step, for each node in a neighbourhood, the number of intersections with other neighbourhoods is calculated. I

[11] See Farrell et al. (2009), Haas Wilson & Garmon (2011), Tenn (2011) and Thompson (2011)
[12] See Wang & Xu (2011)

propose the statistical average of the number of intersections for each neighbour within the neighbourhood of a hospital as the "competitive pressure rate". In order to test this new metric, I run simple OLS regression to estimate its effects on hospital charges.

5.1 The Data

I use mainly two data resources, namely State of California Office of Statewide Health Planning and Development (OSHPD) and Google Maps. I have acquired the coordinates and physical and financial attributes of hospitals utilizing the databases of OSHPD. The travel-time data is generated using the public data provided by Google Maps.

The gross patient revenue, non-operating revenue, operating expenses and cost-to-charge ratio are acquired from the Complete Set of Hospital Annual Financial data which contains audited data provided by general acute care hospitals in the state of California. The database entails comprehensive information regarding type of ownership, number of beds, balance sheets and income statements, revenues by payer, and expenses. In order to provide consistency and robustness, I use the 2009-2010 and 2011-2012 versions of the financial database. In order to create a consistent proxy for the prices charged for patient services, I have used the patient discharge data aggregated at the hospital level. The data provided by OSHPD contains the total number of discharges, average charge per stay, average charge per day and average length of stay for all available Medicare-Severity Diagnosis Related Groups (MS-DRGs) for each hospital. Similar to the financial attributes data, I use the 2009-2010 and 2011-2012 versions of the database. Finally, the last portion of the OSHPD data contains snapshots of the Healthcare Atlas which is a comprehensive geographic information system application (OSHPD, 2014a).

The second main data source of this study is the geographic information systems data provided by Google Maps. I have created a statewide database including the travel-times between the general acute care hospitals in California. I use Google's Distance Matrix service to compute the travel-times in terms of minutes. In order to obtain a high level of accuracy in the travel-time data I have followed a certain procedure for the data generation process which is detailed in the following chapter.

5.2 Methodology

The main contribution of this study lies in the application of the idiosyncratic competitive pressure metric in the analysis of the hospital markets. The development of this metric is based on a data-intensive highly accurate travel-time calculation. The calculation method diverges from the common crow-fly distance measurement (often encountered in fixed radii catchment analysis) and direct application of administrative areas which only result in a crude adaptation of reality.

The utilization of travel-time data also includes fundamental methodological differences. The most apparent dichotomy is between depending on online geographic information systems services such as Google Maps and MapQuest, and developing an algorithm based on road network data and speed impedances running on GIS software. I prefer constructing the analysis over a travel-time matrix based on real-time Google Maps data.

Wang & Xu provide a comprehensive comparison between these two approaches by testing a sample dataset on the Google Maps API and the ArcGIS Network Analyst. They state that the Google Maps API approach shows overall superiority utilizing an up-to-date road network, real-time traffic congestion data and alleviating the database preparation necessity to a great extent. Despite these advantages it should be kept in mind that depending on Google Maps data brings a number of limitations to the analysis such as restricted calculation duration and amount in a specific time interval accompanied with a limit on the number of variables in a calculation.

I follow the Google Maps API approach using the Distance Matrix service. In order to deal with the limitation mentioned above I develop a basic algorithm which provides automation in database construction and divides the queries in relatively small pieces to overcome the query limitations. In order to implement this algorithm, I use Google Apps Script accompanied by Google Sheets to store the acquired data.

Despite the advantages described above, this data generation methodology entails three major assumptions which could lead to complications. I mitigate the potential effects of the caveats that might arise from these three points by introducing a number of countermeasures, therefore the methodology does not include any significant shortcomings that would discredit the statistical results.

The first point is that the travel-time data is generated based on the up-to-date road network and current traffic congestion levels. As the analysis is based on the 2010 and 2012 snapshot of the hospital markets, this process assumes that there has been no difference in the road network and congestion levels within the time period between 2010 and 2014. In order to mitigate the effects of any problems based on this assumption, I

opt to use the generated data only in an ordinal way creating a ranking within the same dataset. Therefore, any changes in the quality of the road network or congestion levels would affect the metric based on the travel-time data in a similar way for each element of the database.

The second point is related with the dynamic property of the traffic congestion levels. As the congestion level varies over time on different scales at each region, a comparison between travel-times acquired at different moments might be misleading. In order to ameliorate this problem, I execute the data generation process at a certain time interval of the day. Hence, the distance data can be considered comparable to a great extent.

The final point is that the Distance Matrix service has a certain daily query limit, hence it becomes cumbersome to deal with big data (Wang & Xu, 2011). Processing large quantities of data might take a significant amount of time and therefore intensify the effects of the caveat discussed at the previous point. I prefer restricting the data generation process following a filtering mechanism, hence keeping the amount of data at a manageable degree. As an initial step, I calculate the crow-fly distances formulating an origin-destination matrix (OD matrix) for general acute hospitals in California. Next, I rank the neighbours of every hospital based on their crow-fly distance value. Using the rankings I have decided on a cutoff at 60^{th} neighbour for each hospital filtering out 87% of the distance calculations. I calculate the travel-times for the simplified version of the OD matrix and ranked the neighbours based on travel-times. The neighbours surviving the filtering are ranked again with respect to the travel-time values generated by the Distance Matrix Service. I apply a second cutoff at 45^{th} neighbor in order to avoid any nuisance caused by the crow-fly distance ranking in the initial step. In this way, the data processing becomes feasible and more consistent as the disruptive time effect explained in the second point is mitigated.

The resulting OD matrix consists of all 462 general acute care hospital and the travel-time data for the closest 45 neighbouring general acute care hospitals for each one. The distance between any hospital and its farthest neighbor in the OD matrix is at least 30 minutes, hence it is appropriate to run any test with a threshold distance up to 30 minutes.

I create two additional matrices with specific range values (20 and 30 minutes) for both December 2010 and 2012 snapshots of the market. In order to have a sense of the size of the geographical area these ranges correspond to, I execute a basic test comparing the administrative regions which any hospital and its farthest neighbor within the specified range belong to. In the dataset with 20 minutes range, 82% of the hospitals share the same county and with the farthest available neighbor. When the threshold is increased to 30 minutes, the same condition applies for 63% of the hospitals. Hence, it is safe to think that a 20 minute travel-time range results in a geographic area smaller than the county

of any hospital. The extreme locality of the data is crucial in interpreting the pecuniary effects of proximity among hospitals. In the next chapter, the specifications and validity of these effects are discussed.

5.3 The Analysis

My primary aim is to depict the effects of geographic properties of the markets on prices. Hence, I include a minimal number of proxies, namely "total operational expenses" and "cost-to-charge ratio" which speak for numerous variables, in my econometric model. OSHPD (2014b) defines "total operational expenses" as "the total direct expenses incurred by various cost center groups for providing patient care by the hospital which include salaries and wages, employee benefits, professional fees, supplies, purchased services, and other expenses" and the cost-to-charge ratio is defined as "the relationship between the hospital's cost of providing services and the charge assessed by the hospital for the service." In other words, cost-to-charge ratio is the difference between a hospital's total operating expenses and total other operating revenue divided by gross patient revenue. I construct a simplistic econometric model focusing on the effects of the competitive pressure metric on average annual charges per day at the DRG-level. The equation selected for the OLS regression is as follows:

$$\ln drgpday\# = intrt20 + ccr + \ln tot\_op\_exp + \epsilon \tag{1}$$

Here, $\ln drgpday\#$ is the logarithm of the average annual charges by any hospital at the DRG level. In the output tables the symbol "#" is replaced by the relevant DRG code.

$intrt20$ is the competitive pressure rate for the 20 minutes range providing the average number of intersections of the neighbouring hospitals of the selected hospital with the neighbourhoods of the other hospitals in the OD matrix. This measure is a proxy for the level of competition in close quarters depicting the average intensity of the competitive pressure in the neigbourhood of a hospital.

ccr and $\ln tot\_op\_exp$ are financial attributes as explained above providing a large scale proxy for all the factors that might have an effect on the price levels. As the focal point of this study is the effects of geographic properties of the markets on prices, I intend to point out the effect of these factors in a lump sum manner instead of elaborating their singular effects by introducing specific proxy variables.

I apply a set of measures to improve the confidence in the results of the model. As an initial step, I exclude any samples with less than 100 observations for $drgpday\#$, hence reducing the number of the DRGs to be analyzed to 39 for the 2010 data and 43 for the 2012 data. In the next step, interpreting the regression output, I eliminate models that contain any independent variables that are statistically non-significant at the 5% level. Also, the models that fail the F-test at the 5% level are eliminated. As a final measure, I apply a regression specification error test (RESET) for omitted variables using the Stata command "ovtest".

The OLS estimation results are consistent with the theoretical expectations putting forward that there exists a negative correlation between average prices and the competitive pressure rate. Also, testing both for 20 minutes and 30 minutes ranges, the model provides that the pecuniary effect of the competitive pressure rate increases in an exponential manner with decreasing range values as displayed in Table 1 and Table 2.

The analysis provides a simple yet robust relationship between market characteristics. However, it should be noted that there are two caveats which should be kept in mind in any application of the ideas presented. First, I disregard potential effects of existence of any hospital systems on price levels. Assuming that there is no difference between the competition within and between firms, might have a disruptive effect on the relationship presented in the study. However, taking into account the fact that market entities aim profit maximization in a rather myopic manner the disruption is not expected to be considerable (Ziss, 2007). Second, the proxy for prices is constructed as an annual average of hospital charges at the DRG level. However, there is no control inherent in the calculation of the proxy values for patient characteristics. Based on severity of cases, there might be cost disparities which lead to different prices. As the proxy values are annual averages including a large number of patient cases, I expect that casemix of patients would become similar for every hospital in the database. On the other hand, in case of any DRG analysis with a rather low patient volume, the disruptive impact of this caveat would be larger. Also, this might be the reason that the most robust findings belong to normal newborn services, the DRG with the highest patient volume. In further studies I expect to overcome this limitation by working with unaggregated datasets taking the patient characteristics into account for each discharge with charges.

Sum of Discharges with Charges	DRG Description	2010 DRG List	Model No	Ovtest Passed (30 mins)	intrsect30	Ovtest Passed (20 mins)	intrsect20
333,106	Normal Newborn	drgpday795	(33)	Yes	-0.0040**	Yes	-0.0071**
255,168	Vaginal Delivery w/o Complicating Diagnoses	drgpday775	(30)	No	-0.0021*	No	-0.0040*
104,183	Cesarean Section w/o CC/MCC	drgpday766	(28)	No	-0.0044***	No	-0.0077***
71,366	Major Joint Replacement or Reattachment Of Lower Extremity w/o MCC	drgpday470	(22)	No	-0.0023*	No	-0.0044**
64,768	Septicemia or Severe Sepsis w/o Mv 96+ Hours w MCC	drgpday871	(36)	No	-0.0022*	No	-0.0042**
62,713	Esophagitis, Gastroent & Misc Digest Disorders w/o MCC	drgpday392	(19)	-	-	No	-0.0032*
50,949	Chest Pain	drgpday313	(15)	Yes	-0.0029**	Yes	-0.0050**
43,766	Cesarean Section w CC/MCC	drgpday765	(27)	No	-0.0030*	No	-0.0060**
37,640	Cellulitis w/o MCC	drgpday603	(23)	No	-0.0018*	No	-0.0034*
34,167	Kidney & Urinary Tract Infections w/o MCC	drgpday690	(25)	-	-	No	-0.0032*
33,389	Uterine & Adnexa Proc For Non-Malignancy w/o CC/MCC	drgpday743	(26)	No	-0.0055***	No	-0.0094***
19,384	Appendectomy w/o Complicated Principal Diag w/o CC/MCC	drgpday343	(18)	No	-0.0057***	No	-0.0104***
17,874	Bronchitis & Asthma w/o CC/MCC	drgpday203	(8)	-	-	Yes	-0.0047*
15,099	Heart Failure & Shock w CC	drgpday292	(12)	-	-	No	-0.0041*
14,716	Respiratory System Diagnosis w Ventilator Support 96+ Hours	drgpday207	(9)	Yes	-0.0043**	Yes	-0.0069**
13,094	Laparoscopic Cholecystectomy w/o C.D.E. w/o CC/MCC	drgpday419	(20)	No	-0.0045**	No	-0.0074**
12,220	Infectious & Parasitic Diseases w O.R. Procedure w MCC	drgpday853	(34)	Yes	-0.0027**	Yes	-0.0048**
11,090	Septicemia or Severe Sepsis w Mv 96+ Hours	drgpday870	(35)	-	-	No	-0.0031*
10,220	Simple Pneumonia & Pleurisy w MCC	drgpday193	(5)	Yes	-0.0031*	Yes	-0.0063**
8,066	Cardiac Arrhythmia & Conduction Disorders w/o CC/MCC	drgpday310	(13)	No	-0.0030*	No	-0.0051*
7,949	Septicemia or Severe Sepsis w/o Mv 96+ Hours w/o MCC	drgpday872	(37)	No	-0.0062***	No	-0.0108***
5,154	Major Small & Large Bowel Procedures w MCC	drgpday329	(17)	No	-0.0026*	No	-0.0045*
1,053	Wnd Debrid & Skn Grft Exc Hand, For Musculo-Conn Tiss Dis w MCC	drgpday463	(21)	-	-	No	-0.0070*

Table 1: Estimated Effects of Competitive Pressure Rate in 2010

Sum of Discharges with Charges	DRG Description	2012 DRG List	Model No	Ovtest Passed (30 mins)	intrsect30	Ovtest Passed (20 mins)	intrsect20
358,968	Psychoses	drgpday885	(40)	No	-0.0043*	No	-0.0051*
313,781	Normal Newborn	drgpday795	(35)	Yes	-0.0046***	Yes	-0.0052*
237,696	Vaginal Delivery w/o Complicating Diagnoses	drgpday775	(32)	No	-0.0027*	Yes	-0.0044*
97,807	Cesarean Section w/o CC/MCC	drgpday766	(30)	No	-0.0043***	Yes	-0.0082**
72,644	Major Joint Replacement or Reattachment Of Lower Extremity w/o MCC	drgpday470	(23)	No	-0.0030**	Yes	-0.0036*
68,674	Septicemia or Severe Sepsis w/o Mv 96+ Hours W MCC	drgpday871	(38)	-	-	No	-0.0038*
63,005	Esophagitis, Gastroent & Misc Digest Disorders w/o MCC	drgpday392	(20)	No	-0.0020*	No	-0.0091***
46,545	Cesarean Section W CC/MCC	drgpday765	(29)	No	-0.0037**	No	-0.0055**
45,268	Chest Pain	drgpday313	(15)	-	-	No	-0.0043***
41,723	Alcohol/Drug Abuse or Dependence w/o Rehabilitation Therapy w/o M	drgpday897	(41)	Yes	-0.0073*	No	-0.0097***
39,534	Cellulitis w/o MCC	drgpday603	(24)	No	-0.0024**	Yes	-0.0107**
26,917	Simple Pneumonia & Pleurisy W CC	drgpday194	(6)	-	-	No	-0.0054***
24,928	Uterine & Adnexa Proc For Non-Malignancy w/o CC/MCC	drgpday743	(28)	No	-0.0074***	No	-0.0043**
20,657	Septicemia or Severe Sepsis w/o Mv 96+ Hours w/o MCC	drgpday872	(39)	Yes	-0.0047***	No	-0.0124***
19,826	Heart Failure & Shock W MCC	drgpday291	(12)	-	-	No	-0.0072***
18,029	Appendectomy w/o Complicated Principal Diag w/o CC/MCC	drgpday343	(18)	No	-0.0053***	No	-0.0080***
13,314	Respiratory System Diagnosis W Ventilator Support 96+ Hours	drgpday207	(8)	Yes	-0.0051**	No	-0.0055**
13,042	Septicemia or Severe Sepsis W Mv 96+ Hours	drgpday870	(37)	-	-	Yes	-0.0082***
12,533	G.I. Hemorrhage W CC	drgpday378	(19)	No	-0.0026*	No	-0.0036*
12,512	Infectious & Parasitic Diseases W O.R. Procedure W MCC	drgpday853	(36)	-	-	No	-0.0033*
11,689	Laparoscopic Cholecystectomy w/o C.D.E. w/o CC/MCC	drgpday419	(21)	No	-0.0060***	No	-0.0030*
8,427	Chronic Obstructive Pulmonary Disease W MCC	drgpday190	(3)	-	-	Yes	-0.0082***
6,705	Simple Pneumonia & Pleurisy W MCC	drgpday193	(5)	-	-	No	-0.0073*
2,137	Extensive O.R. Procedure Unrelated To Principal Diagnosis W MCC	drgpday981	(43)	Yes	-0.0035*	-	-
779	Wnd Debrid & Skn Grft Exc Hand, For Musculo-Conn Tiss Dis W MCC	drgpday463	(22)	Yes	-0.0056*	-	-

Table 2: Estimated Effects of Competitive Pressure Rate in 2012

OSHPD data shows that in 2010 the total revenue of hospitals in California comprised an amount of $\$54.3$ billion (CHCF, 2010). Hence, it is apparent that even the slightest improvement in the market organization by considering the effects of the competitive pressure rate would result in a humongous saving. Normal newborn services, DRG 795, can be considered as the most reliable analysis as the price data utilized is formed by the largest number of patient discharges, making up approximately 10% of total acute care discharges statewide. In California, general acute care hospitals charged a total of $\$1,330,773,000$ and $\$1,458,098,000$ for normal newborn services in year 2010 and 2012, respectively (OSHPD, 2014b). Based on the estimated effects of the competitive pressure rate, it is interpreted that a one-unit increase in the competitive pressure rate[13] with 20 minutes range would have resulted in an annual saving of $\$9,448,000$ and $\$7,582,000$ in year 2010 and 2012, respectively.

In accordance with the findings in recent research discussed in the third chapter, it is observed that health care services possess different characteristics and react idiosyncratically to the market forces. The results of the analysis point that the competitive pressure rate bears a significance especially in rather homogeneous and time-sensitive DRGs. Therefore at the initiation of any antitrust investigations or M&A evaluations, a basic probe focusing on the competitive pressure rate in the close proximity of an hospital regarding such health care services would provide valuable insight and allow the authorities to use their resources in a more efficient manner.

6 Conclusion

Antitrust policy in hospital markets has been an epicenter of policy debates and there have been a plethora of contradictory outcomes which defy the economic theory. In the contemporary antitrust world, economics carry the burden of shedding light on the path of the law. Cases are getting complicated and the alleged parties are coming up with even more perplexing defences embroiled with computational models. In this environment, case law shows that antitrust policy has failed to keep up with the increasing complexities of the hospital markets.

I have provided an economic backdrop to the lost decade of antitrust policy focusing on hospital consolidations in the US. Going over the insufficiencies of the applied methods and I have attempted to explain the reasoning behind the ineffectiveness of the antitrust policy. Following, a brief list of data specific issues aiming to formulate the

[13] This results in a price decrease of 0.71% in year 2010 and 0.52% in year 2012.

data requirements of a sound hospital merger analysis, I have introduced an alternative approach to market definition. Putting forward a simple metric emphasizing the interplay between geography and prices, I have displayed the capability of this metric in effecting market prices in a business-as-usual case in California. The analysis laid out in Chapter 5 proved that this metric is simple and accurate by construct and successful in providing basic insight regarding the market structure.

In sum, what is necessary to achieve more effective markets and acquiring the capability protect current and potential competition is for the FTC to evaluate the policy proposals in the literature and rebuild its reputation in courts. Hence, utilization of basic metrics that provide basic insight without creating any clouds of suspicion would be essential in reaching these goals.

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